Drivers of deforestation and forest degradation in Zimbabwe

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Acknowledgements

Executive Summary

Zimbabwe is Party to the United Nations Framework Convention on Climate Change (UNFCCC) since 1992 which aim to stabilize greenhouse gas (GHG) concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. The Kyoto Protocol of 2007 gave birth to the Reduced emissions from deforestation and forest degradation (REDD) which was transformed to REDD plus in December 2008. The Paris agreement of 2015 led to a new international climate agreement applicable to all countries and aim to keep global warming below 2° C in accordance with recommendations of the Inter-governmental panel on climate change (IPCC). The Government of Zimbabwe in its attempt to implement its nationally determined contribution (NDC) under the Paris agreement on climate change has identified several gaps in the forest sector which make it difficult for the country to compile the GHG inventory data and establish a forest reference emission level. One of the gaps that have been identified is lack of scientifically based quantitative information on the drivers of

deforestation and forest degradation in all the ecological regions of Zimbabwe. Between 1990 and 2000 Zimbabwe lost an average of 312,900 hectares of forest per year. This amounts to an average annual deforestation rate of 1.41 %. Between 2000 and 2005, the rate of forest change increased by 16.4% to 1.64% per annum. This loss of biodiversity can compromise the contributions of the indigenous forests to climate change mitigation through carbon sequestration affecting carbon and nitrogen cycles and livelihoods sustainability. Quantitative national-level information on drivers and activities causing deforestation and forest degradation in Zimbabwe are generally unknown. Moreover, UNFCCC 2009; 2010 have encouraged developing countries to identify land use, land use change and forestry activities, that are linked to the drivers of deforestation and forest degradation, and to assess their potential contribution to the mitigation of climate change. The identification and assessment of drivers of deforestation and land degradation at national level is also complementary to REDD+ related estimation and reporting using the IPCC Good Practice Guidance (IPCC, 2000). Understanding these drivers is essential in the development of policies and measures that aim to change current trends in forest activities toward a more climate and biodiversity friendly outcome for the nation.

The specific objectives of this study were to: i) determine deforestation and forest degradation hotspots in Zimbabwe, ii) determine the direct drivers and iii) indirect drivers of deforestation and forest degradation in deforestation hotspots. Deforestation and forest degradation hotspots were found to be common in all the provinces, mainly the rural, resettlement and peri-urban areas. The direct drivers of deforestation include Firewood, settlements, agriculture, wildfire, tobacco curing, charcoal, brick making, logging, overstocking, construction, mining and brushwood. The indirect drivers included socioeconomic factors, legal factors, tenure, climate change/environmental factors and politics. Settlement expansion, agriculture, mining and tobacco curing were the most common drivers of deforestation and forest degradation and the most difficult to address. Mining and agriculture are likely to remain important in the future because both are economic pillars of the country.

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List of Acronyms

UNFCC United Nations Framework Convention on Climate Change

FAO Food and Agriculture Organisation of the United Nations

STZ-NDC Support towards implementation of Zimbabwe's Nationally Determined

    Contributions to the Paris Agreement Project

NDC Nationally Determined Contributions

IPCC Intergovernmental Panel on Climate Change

REDD Reducing emissions from deforestation and forest degradation

REDD+ Reducing emissions from deforestation and forest degradation, conservation of

    forests, sustainable management of forests and enhancement of carbon stocks

FC Forestry Commission

EMA Environmental Management Agency

UNDP United Nations Development Programme

1 Introduction

1.1 Background

Zimbabwe is Party to the UNFCCC since 1992. UNFCCC emanated from deliberations at the Earth Summit in Rio de Janeiro, Brazil. The objective of the UNFCCC is to stabilise greenhouse gas (GHG) concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Parties (Countries) have met annually since 1995 in meetings known as Conference of the Parties (COPs) to assess progress in dealing with Climate Change. Some COPs have managed to produce significant outputs that alter the status quo. COP 11held in Montreal in 2005 brought the proposal of Reducing emissions from deforestation and forest degradation (REDD) under Land Use, Land Use Change and Forestry (LULUCF) as a mitigation measure, which was then expanded at COP 13 held in Bali 2007 to Reducing emission from deforestation and forest degradation plus (REDD+) incorporating measures for forest conservation, sustainable management of forests and enhancement of carbon stocks (REDD Research and Development Centre, 2012). The Paris agreement of 2015 led to a new international climate agreement applicable to all countries and aiming to keep global warming below 2^0 C in accordance of recommendations of the IPCC.

The Constitution of Zimbabwe (2013) gives every person environmental rights that include the right:

a) to an environment that is not harmful to their health or well-being; and

b) to have the environment protected for the benefit of present and future generations, through reasonable legislative and other measures that:

   i. prevent pollution and ecological degradation;

   ii. promote conservation; and

   iii. Secure ecologically sustainable development and use of natural resources while promoting economic and social development.

However, the country continues to face multiple environmental management challenges that include pollution, poor waste management, deforestation and land degradation, veldt fires and is susceptible to perennial floods and droughts caused by climatic changes emanating from global warming. Table 1.1 shows the position of Zimbabwe in the ranking of countries for forest loss.

Table 1.1 Top ten countries reporting the greatest annual net loss of forest area, 2010 -2015 (Source: FRA 2015).

Country	Annual forest area net loss	
	Area (thousand ha)	**Rate (%)**
Brazil	984	0.2
Democratic Republic of Congo	311	0.2
Bolivia (Plurinational State of.)	289	0.5
Indonesia	684	0.7
United Republic of Tanzania	372	0.8
Argentina	297	1.1
Myanmar	546	1.8
Paraguay	325	2.0
Zimbabwe	312	2.1
Nigeria	410	5.0

The Government of Zimbabwe in its attempt to implement its nationally determined contributions (NDC) under the Paris agreement on climate change has identified several gaps in the forest sector which make it difficult for the country to compile the GHG inventory data and establish a forest reference emission level. One of the gaps that have been identified is lack of scientifically based quantitative information on the drivers of deforestation and forest degradation in all the ecological regions of Zimbabwe.

The dry miombo woodlands are the most dominant vegetation type in Zimbabwe. The other vegetation types in this Southern African country are, *Baikiaea plurijug*a in the west, *Colophospermum mopane* woodlands in the lower altitudes, *Acacia* woodlands in eutrophic zones and *Combretum - Terminalia* woodlands scattered all over the country. These woodlands have contributed immensely to the maintenance and wellbeing and directly supported the livelihoods of most rural communities. The woodlands store approximately 23 Mg C ha^{-1} making them an important global carbon sink and key to climate change mitigation (Shirima et al., 2011).

Between 1990 and 2000 Zimbabwe lost an average of 312,900 hectares of forest per year. This amounts to an average annual deforestation rate of 1.41 %. Between 2000 and 2005, the rate of forest change increased by 16.4% to 1.64% per annum. This loss of biodiversity can compromise the contributions of the indigenous forests to climate change mitigation through carbon sequestration affecting carbon and nitrogen cycles and livelihoods sustainability (FAO, 2014).

Zimbabwe ratified several international environmental agreements including the Convention of Biological Diversity (1992), United Nations Convention to Combat Desertification (1994) and UNFCCC (1992) which among other things address deforestation and forest degradation. The

Paris Agreement under UNFCCC requires all Parties to put forward their best efforts through nationally determined contributions (NDCs) and to strengthen these efforts to lower GHG emissions in a way that does not threaten food security (United Nations 2015). Furthermore, the African Union initiative on forest landscape restoration is a key ingredient of the global movement to adapt to and mitigate climate change.

Quantitative national-level information in Zimbabwe on drivers and activities causing deforestation and forest degradation are generally unknown. For example, the question of what fraction of deforestation (emissions) in Zimbabwe is caused by a specific driver (i.e. expansion of agriculture versus infrastructure) cannot be answered. Moreover, UNFCCC 2009; 2010 have encouraged developing countries to identify land use, land use change and forestry activities, that are linked to the drivers of deforestation and forest degradation, and to assess their potential contribution to the mitigation of climate change. The identification and assessment of drivers of deforestation and land degradation at national level is also complementary to REDD+ related estimation and reporting using the IPCC Good Practice Guidance (IPCC, 2000). The need to identify and quantify the drivers of deforestation and forest degradation before any intervention is implemented cannot be overemphasised (Mujuru and Chidumayo, 2014). Understanding these drivers is essential in the development of policies and measures that aim to change current trends in forest activities toward a more climate and biodiversity friendly outcome for the nation.

Currently, Zimbabwe has prepared its NDC document, Climate Policy, and Climate Change Response Strategy. The Forest Policy, 4th National Communication and 1st Biennial Update Report to the UNFCCC are all under construction. The LEDS and MRV framework development process and, NAP have also been initiated. All these programmes require the existence of a

national forest definition and identification of drivers of deforestation and forest degradation, which Zimbabwe did not have. As of February, 2013, after the 1st REDD+ National workshop to draft the strategy for implementation of REDD+ activities in the country and the REDD+ country needs assessment of 2015, not much has been done. All this necessitated the simultaneous launch of a study on drivers of deforestation and forest degradation and the definition of a forest. The goal of this report is to outline the main drivers of deforestation and forest degradation.

The specific objectives of this study were to:

i.   Determine deforestation and degradation hotspots in Zimbabwe

ii.   Determine the direct drivers of deforestation and forest degradation in deforestation hotspots.

iii.   Determine the indirect drivers of deforestation and forest degradation in deforestation hotspots.

Studies on the drives of deforestation and forest degradation have emphasised on the importance of separating proximate or direct causes from underlying or indirect causes (Kissinger et al. 2012). Proximate causes include anthropogenic activities that directly influence forest cover and carbon loss such as activities in infrastructure development, agriculture expansion, and wood harvesting. Underlying or indirect causes are complex interactions social, economic, political, cultural factors that are often distant from their area of impact (Kissinger et al. 2012). The indirect causes often influence the direct causes and are related to international (i.e. markets, commodity prices), national (i.e. population growth, domestic markets, national policies,

governance) and local circumstances (i.e. change in household behaviour) (Geist and Lambin 2002; Lambin and Meyfroidt 2010).

This study on drivers of deforestation and forest degradation will inform activities, policies and measures for a Green Climate Fund (GCF), forest related project proposal for Zimbabwe. Concerns have been raised that there is lack of data to confirm deforestation and its causes both at national and subnational level. Zimbabwe is persuaded to priorities the development of a REDD+ strategy in the near future. In this regard, results of the study will inform the scope of the REDD+ strategy as well as the policies and measures to be enforced. Results of the study will serve as a critical baseline for transformative activities, policies and measures to ensure emissions reductions and enhancement of carbon sinks in the forest sector.

Carbon dioxide concentration in the atmosphere has increased from around 200 ppm in the ice age to around 280 ppm in the warmer glacial periods (Lüthi et al. 2008), surpassed 400 ppm in 2013 and is currently at 408 ppm (National Oceanic Atmospheric Administration (NOAA), 2018). Under the business as usual scenario it is expected that by 2100 the concentration of this greenhouse gases (GHGs) will rise to 800 ppm resulting in atmospheric temperature rise by 4.5 ºC (NOAA, 2018). An increase of 1.5 ºC will reduce the availability of freshwater, massive latitudinal and elevated shift of biomes, increase the rate of shrub encroachment and increases food insecurities in most developing nations (Schleussner et al. 2016). Efforts to adapt and mitigate against the effects of elevated atmospheric carbon around the world have focused on the potential of forest ecosystems to sequester the carbon.

At local scales, forest ecosystems regulate water cycles and provide vegetative cover that protects the soil from erosion (Müller and Mburu, 2009). Although they are of high economic,

ecological and social importance, woodlands are under threat from massive deforestation and forest degradation due to anthropogenic activities (FAO, 2015). Between 1990 and 2000, African countries were among the top ten highly deforested countries with Nigeria having the highest followed by Zimbabwe (Table 1.1).

A study by Hosonuma et al. (2012) reported that agriculture accounted for 73 %, mining 7 %, infrastructure 10 % and urban expansion 10 % of the total deforestation extent in the world. However, in Africa deforestation and 3.forest degradation are largely driven by small scale subsistence activities such as firewood collection, charcoal production, livestock grazing, subsistence farming (Fisher 2010; Hosonuma et al. 2012) and brick moulding. Furthermore, DeFries et al. (2010) concluded that the traditional practices of clearing forests for subsistence needs or local markets had seized to be a dominant driver of deforestation in many places. Their results suggested that higher rates of forest loss were strongly linked to demands for agricultural products in distant urban and international locations.

1.2 Relevant Legislative framework for deforestation and forest degradation

The legal instruments used to control deforestation and forest degradation are the Forest Act (Chapter 19:05) and the Communal Land Forest Produce Act (Chapter 19:04), administered by the Forestry Commission. It is an "*offence to cut, injure, remove, and collect any forest produce without authority and to move firewood from one place to another without a timber movement permit issued by the Forestry Commission*." Section 4 of the Communal Land Forest Produce Act allows inhabitants of communal land (and by implication, those in A1 and similar model resettlement areas), to exploit forest produce for own use and not for commercial purposes. Section 55 of the Forest Act requires that any removal of indigenous trees must be

preceded by a notification to the Forestry Commission before removal, subjecting such forest resource to State control.

Forestry Commission also makes use of Statutory Instrument 116 of 2012 (Control of Firewood, Timber and Forest Produce) referred to as Forest Regulations 2012. This Statutory Instrument controls both wood and timber movement and trade in Zimbabwe and has special emphasis on encouraging the production of flue-cured tobacco on a sustainable basis. Flue-cured tobacco production consumes substantial amounts of wood, up to 15 000 kg wood/1400 kg tobacco (TRB, 2011). The destruction of forests starts from land clearing for tobacco farming purposes where virgin land is cleared, harvesting of poles for barn construction right up to the curing process itself (about up to 37 m^3 wood/1kg tobacco) (Sacchetto, 2012).

Statutory instrument 112 of 2001 which is the Forest Regulation 2001 for Control of Timber and Export of Unprocessed and Primarily Processed Indigenous Hardwood that controls movement of hardwood timber. These sets of regulations ensure control in utilization, trade and movement of firewood and timber and other forest produce in Zimbabwe. This is expected to assist in controlling deforestation and forest degradation in Zimbabwe and to ensure sustainability of forest resource supplies.

Apart from the above principal legislation, there are complementary legal instruments which are: Environmental Management Act, Traditional Leaders Act, Rural District Councils Act, Plant and Pest and Diseases Act and the Parks and Wildlife Act.

2 Methodology

2.1 Data collection

The study followed a multi-disciplinary approach where a desk review of previous deforestation and forest degradation studies was done to draw from other views on deforestation and forest degradation in Zimbabwe. This was followed by the identification of deforestation and forest degradation hotspots in Zimbabwe. These were identified through a snow balling technique in which Provincial and District level extension officers gave guidance towards the hotspot areas. In the hotspot areas further investigation to understand drivers of deforestation and forest degradation was done through face to face interviews of key stakeholders including a questionnaire administered to a sample of forest users in the identified hotspot areas. Field officers made observations and notes during the assessment procedures. Key stakeholders mostly forestry related extension workers, policy makers were interviewed from the provincial level to district and the specific hotspot areas. Questionnaires were administered to randomly selected users of forest resources in the hot spot areas

3 Results and Discussion

3.1 Deforestation and forest degradation hotspots in Zimbabwe

 A total of 582 forest users were randomly selected across 23 districts (Figure 3.1). Several

hotspot areas were identified in wards across the 23 districts (Annex 1).
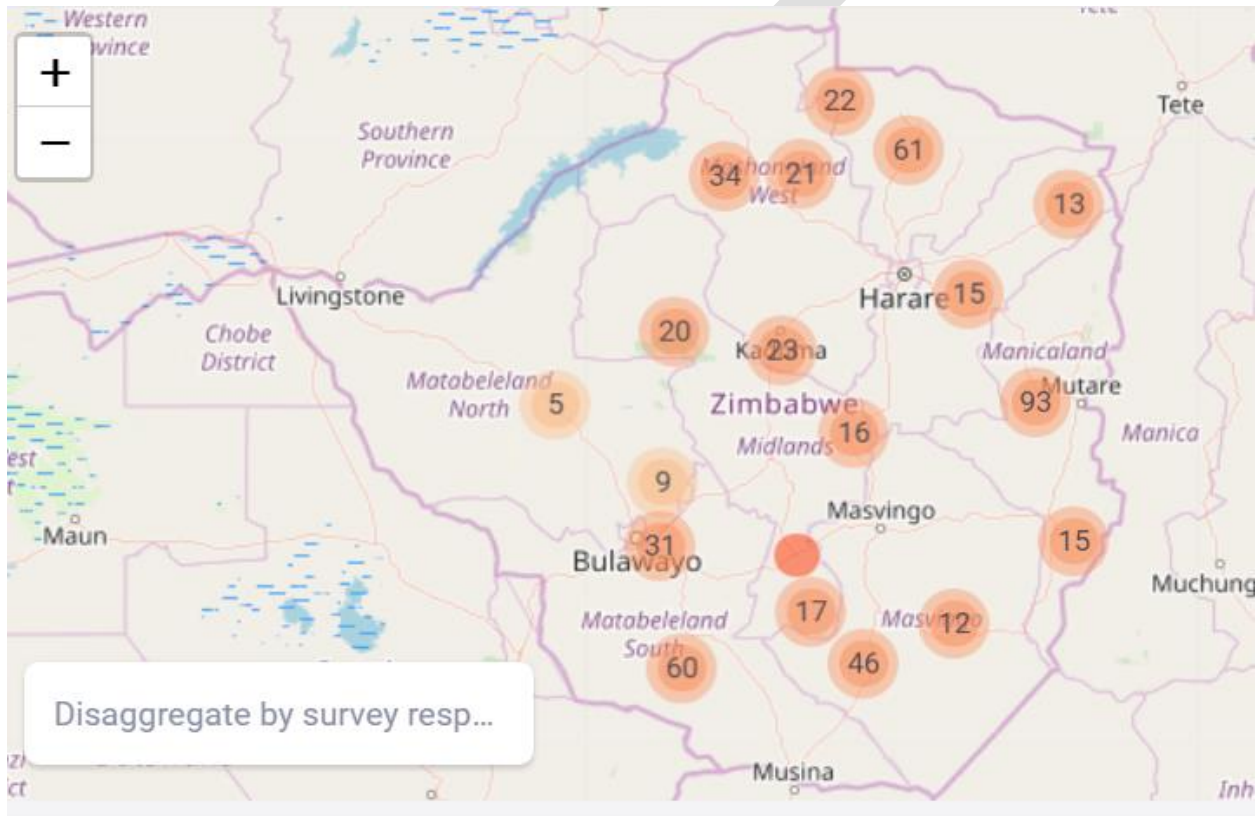

Figure 3.1 Survey sites in Zimbabwe and the number of interviewees contacted

The highest number of respondents were in the above 60 years category (Figure 3.2). More men

participated in the survey than the female counterparts throughout all the age groups. The pattern

exhibited would be as expected where the young population might have migrated to large cities

for employment.
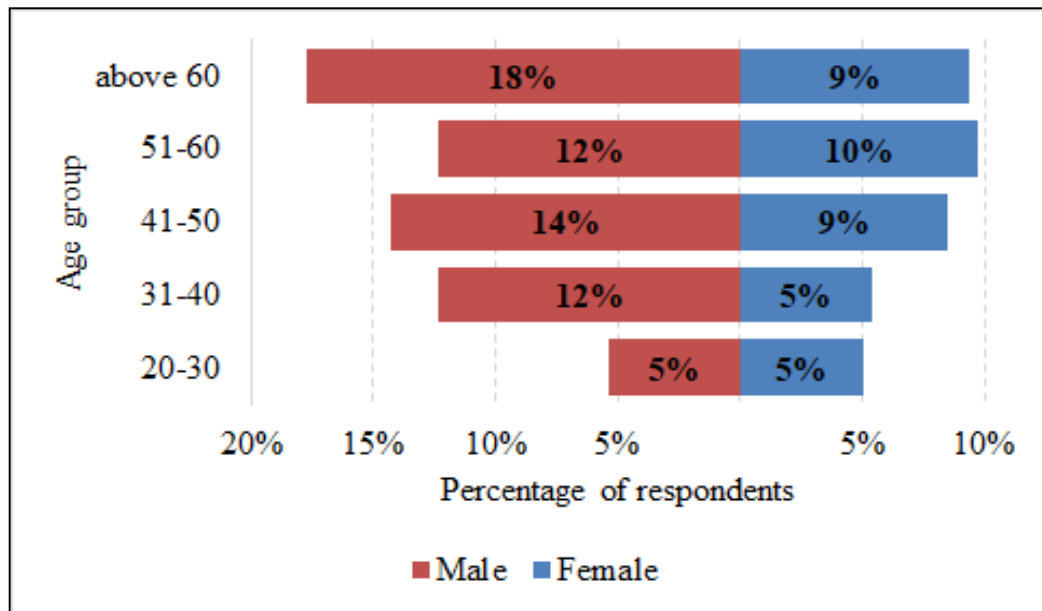
Figure 3.2: Respondent distribution by age and gender

Of the 586 people interviewed, 62 % were males and 38% were females. Of the respondents 18 % were males above 60 years old and for females the largest group was the 51-60 age group (10 %). The 20-30 age group was the smallest (5 % for males and 5 % for females). The predominant age group was the 41-50 years constituting 23% of the respondents. A Stakeholders consultative meeting was held on 15 July 2019, in Harare where they analysed, prioritised and profiled possible solutions to address identified drivers of deforestation.

3.2 Landcover and land use categories

Over 40% of the land is used for agriculture production throughout the country, with most of the country's population dependent on agriculture. This ties in well with about 100% of the respondents confirming agriculture as a main land use category (Figure 3.3). The majority

(>50%) of the respondents confirmed that crop and livestock production were dominant in all districts except for Chipinge, Gwanda, Mwenezi and Umzingwane districts (Annex 2). Other common land uses were forest, tourism and mining (Figure 3.3), with the forest land being common in Gokwe (75%), Chipinge (45%) and Lupane (40%) (Annex 2). Tourism was identified in Chipinge, Chirumanzu, Gwanda and Mutare while mining was common in Zvishavane, Umzingwane, Sanyati, Mhondoro-Ngezi, Mudzi, Chirumanzu and Bubi (Annex 2). In areas where tourism and mining were mentioned the land uses would overlap with other land uses such as agriculture and forest land. Other land uses which were not mentioned include urban developments and wetlands.
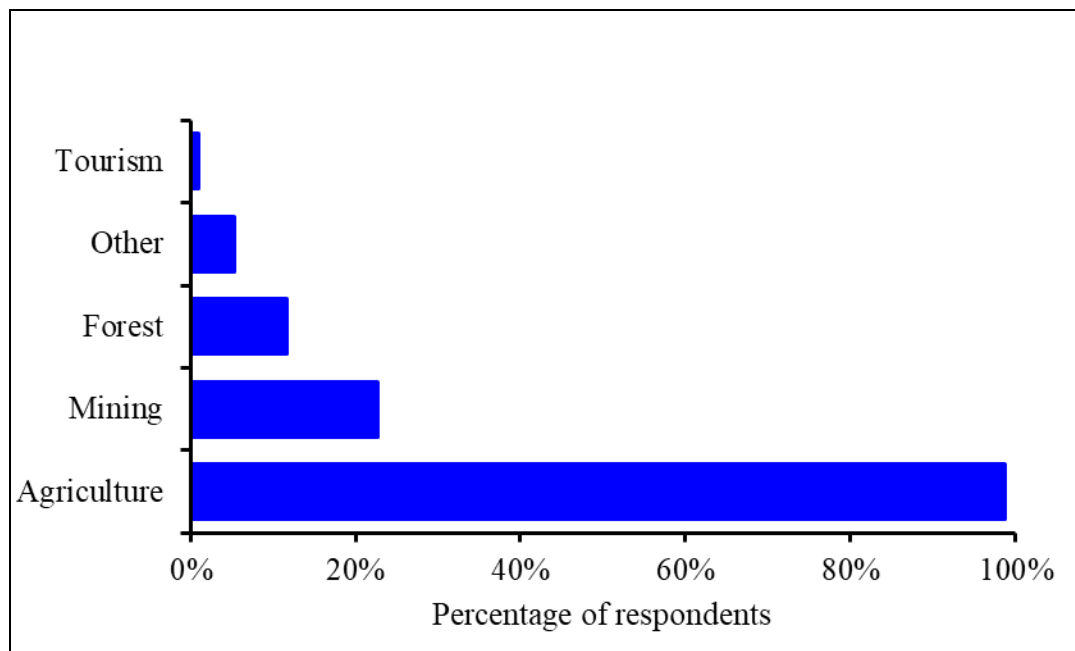

Figure 3.3: Major land use types for the areas sampled

3.3 Direct drivers of deforestation and forest degradation

Deforestation and forest degradation is attributed to a number of issues as demonstrated by the perceptions of forest users (Figure 3.4). The main drivers of deforestation and forest degradation as perceived by forest users included settlement and agriculture expansion, fire wood extraction, tobacco curing, veld fires, brickmaking and overstocking as well as logging, mining and charcoal production). These drivers can be taken as rough assessments but they provide insight on the most important factors affecting sustainability of the nation's woodland resources. Most of the respondents identified settlement and agriculture expansion as major drivers of deforestation and forest degradation. Rural settlements include the area cleared for homestead construction and the surrounding cropland. However, the drivers of deforestation were different per region/district, for instance most respondents in Umzingwane district attributed most of the deforestation to mining
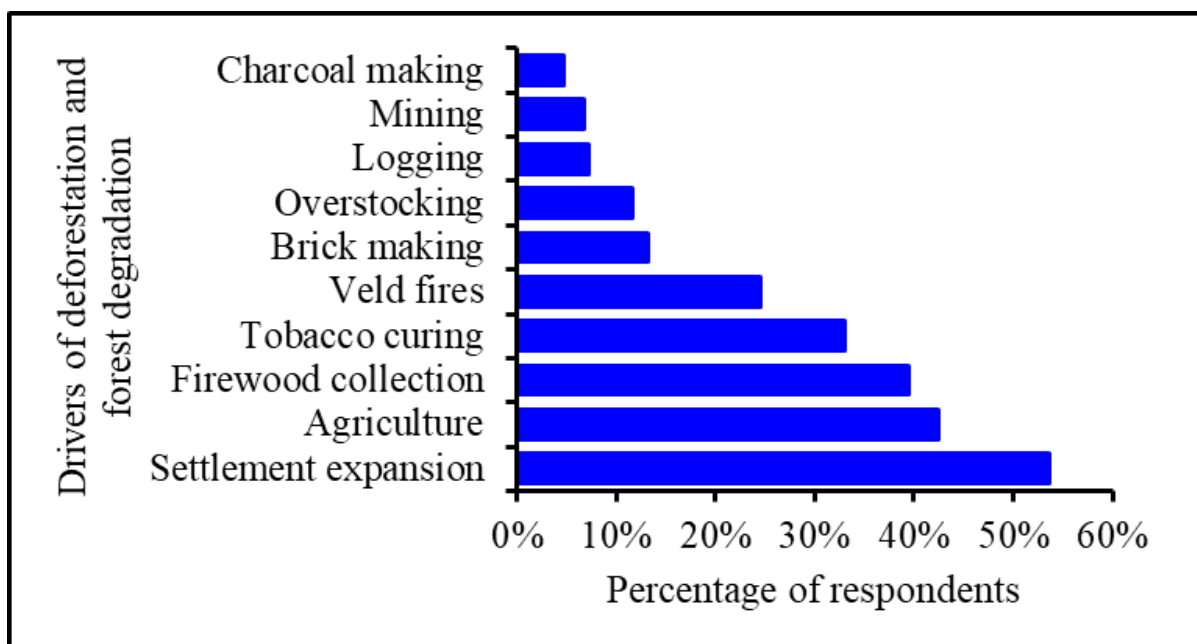

Figure 3.4: Forest users' perceptions on the causes of deforestation and forest degradation activities (Annex 3).

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Settlement expansion, Agriculture, firewood collection and tobacco curing were identified as the major drivers of deforestation in the country. Similarly, Fisher *et al* (2011) showed that the conversion of miombo woodlands into agricultural lands drives the fragmentation and isolation of forested landscapes. It even becomes worse if the clearing for agriculture is done for tobacco growing as the forest destruction is at all levels of the production chain i.e. land clearing for tobacco planting, barn construction and the curing processes itself consumes large quantities of wood for curing (Figure 3.5a), making it a major cause of forest deforestation and forest degradation (Geist, 1999; Sacchetto, 2012). Tobacco curing contributes about 5% of the world total deforestation, 15% of Southern Africa's deforestation and around 15% of Zimbabwe's deforestation (Sacchetto, 2012). The figures for Zimbabwe could actually be higher when considering the increase in the number of tobacco farmers. Despite these negative impacts on forests, in Zimbabwe, tobacco production is propelled by perceived farmer prosperity and improved livelihoods due to the high incomes realized from tobacco sales (Masvongo *et al*, 2013; Manyanhaire and Kurangwa, 2014).

The majority of smallholder farmers and the urban poor use firewood. The contribution of fuel wood consumption to deforestation however, varies from one province to the other, with highest firewood related deforestation in tobacco growing areas. Furthermore, 94% of rural households use wood energy for all their cooking energy requirements, mainly firewood, whilst 20% of urban households use wood as the main source of fuel energy for cooking (ZIMSTS, 2010). Firewood stalls are common in most urban areas (Figure 3.5b). This is emanating from increased fuel wood in urban areas in response to massive power cuts by Zimbabwe Electricity Supply Authority. In Tanzania, wood fuel accounted for about 91% of total energy and about 95% of

total wood consumed in the country (Lusambo 2009) whilst in Zambia, wood energy accounts for 80% of the total household energy balance (Kalinda *et al.*, 2008).

Charcoal making and mining although less than 10 %, were prevalent at a large scale in only a few districts with some of the charcoal mainly prepared and sold in urban areas (Figure 3.5c).

(a)	(b)	(c)

Figure 3.5: A stack of firewood for (a) curing flue-cured tobacco in Odzi and (b) Firewood sales in Warren park, Harare and (c) a pile of charcoal ready to be transported to Harare

Fires were also identified as a driver (Figure 3.6), globally, wildfires destroyed between 150 and 250 million ha of tropical forests annually (Appiah, 2007) and this represents a massive loss in ecosystem services that can sustain livelihoods. In the African continent, the extent, pattern and frequency of burning increases due to human activities. Fires occur regularly and frequently in the miombo woodlands and have always revolved around socio-economic activities of the rural people (Kusimi *et. al,* 2012). Wildland fires create negative effects such as GHG emissions, soil destruction along with habitat destruction and desertification.

Logging activities have been a threat to most of the woodlands where timber concessions have been operated especially under Rural District Councils which own woodlands of commercial indigenous timber species. Mopane woodlands have been under threat from unsustainable

exploitation of mopane worms (*Gonimbrasia belina*) and illegal logging activities living the areas with no signs of under growth (Figure 3.6b). Studies elsewhere, showed that illegal logging and extensive extraction of fuel wood and bush fires were a challenge for the sustainability of miombo woodlands (Campbell, et al 2007; Lupalala et al., 2014). Other drivers include the fencing of fields with brushwood, construction and brick molding (Figure 3.7).

(a)

(b)
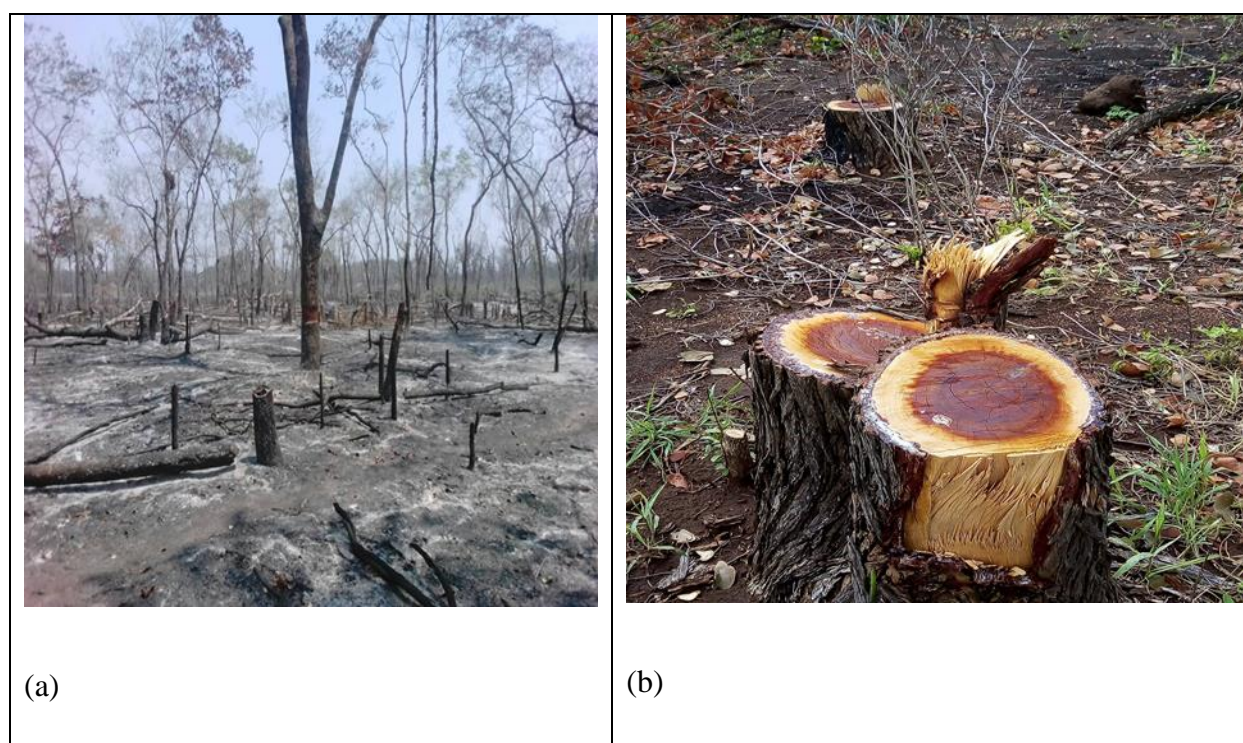
Figure 3.6: (a) A miombo woodland in Nyazura after a fire (b) Logging in mopane woodland in Chiredzi district. Note the use of chainsaws in the operation

Mining activities were also identified as major contributors to deforestation and degradation caused by both domestic and foreign mineral investment. Elsewhere, mining activities were also identified as potential sources of deforestation and forest degradation (Putzel et al., 2011). In

most instances, mining gains precedence over conservation and other environmental issues even when environmental impact assessments (EIAs) have been done.

Figure 3.7: Mining, road Construction and brick molding

3.4 Indirect drivers of deforestation and forest degradation

3.4.1 Socio-economic drivers

Poverty and hunger characterises most of the rural and peri-urban communities. The low incomes, economic hardships and lack of alternative energy sources exert great pressure on woodland resource base:

'An increase in demand for firewood for domestic purposes, especially in urban areas is due to increase in fuel and gas prices and shortage of electricity'
Bindura, Key Informant, 06 February 2019.

The reliance of communities on natural resources depends on their income status and support they get from other sources of livelihoods. In this study the majority (>80%) of respondents

indicated that agriculture was their main source of livelihood (Figure 3.8). This was followed by other source of livelihood options which included, engagement in casual jobs (Figure 3.8). Diaspora remittances and reliance on monthly salary accounted for small proportions of sources of livelihoods. However, it was observed that in the quest to increase production from agriculture, some farmers clear more land for cropping.
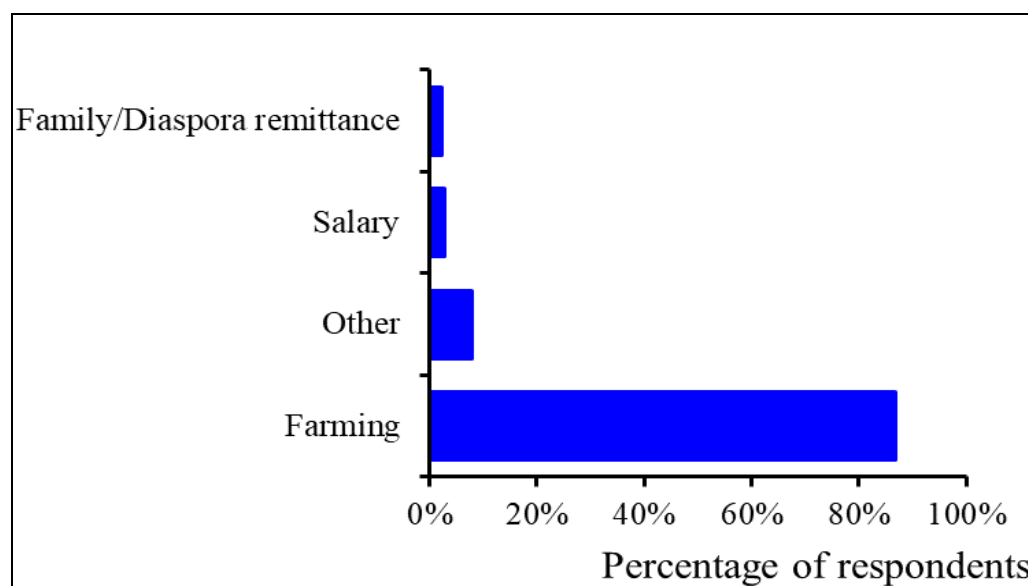
Figure 3.8: Ranking of major sources of livelihoods by farmers

Several products are obtained from the forest for subsistence and for sale depending on productivity and season to supplement livelihoods requirements. Fruits were the main product obtained from the forest (Figure 3.9). Of these products, extraction of construction materials and medicines threaten biodiversity depending on forms and rates of harvesting. The availability of wild food plants impacts on household dietary intake and cash income (Gillet et al., 2016).

Figure 3.9: Ranking of forest products obtained from the forests throughout the country by farmers

3.4.2 Policy and legal frameworks

Other indirect drivers are related to the policy and legal frameworks related to forests and environmental management. These are either formal or traditional frameworks. The traditional
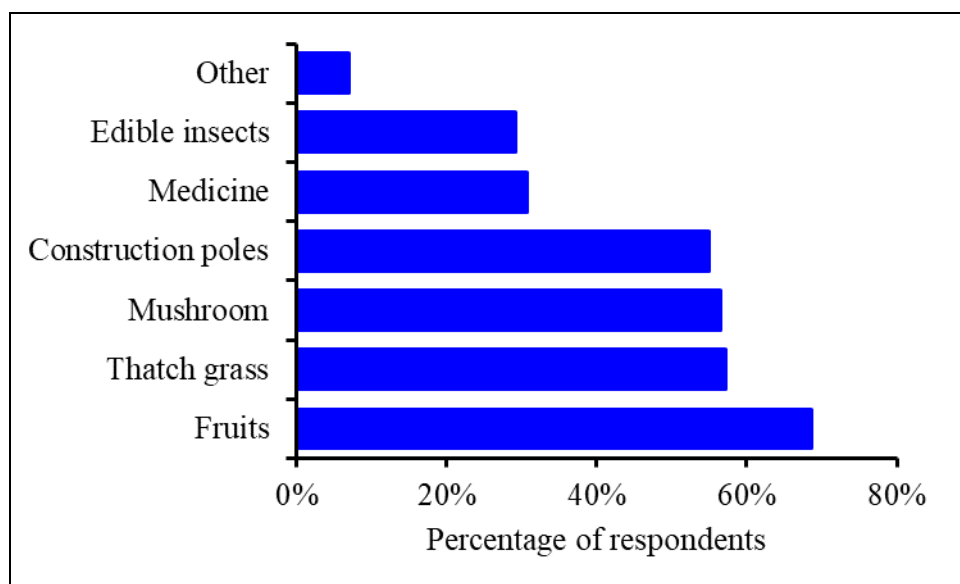
> 'Those who breach the set rules [for conservation of natural resources] are referred to village heads for punishment. In the event of an appeal being made, depending on how severe the case is, an appeal can be made through the Chief'.
> **Hurungwe, Key Informant, 14 February 2019**

frameworks are operational at local level.

Legal frameworks, however, have challenges of variations in penalties for environmental offences such as causing a fire or cutting down sacred trees, can be a cork or a goat in some instances. Where monetary values are imposed, fines as low as $5.00 can be imposed. The fines are not deterrent enough to prevent further damage to the forest. The offenders often call the

fines "*the cost of doing business*" and this is a sorry state. Although Zimbabwe has several good formal policies that support sustainable natural resource management, there is usually enforcement and implementation failures. The existing legislation is also supported by inadequate institutional capacity, coordination across sectors and staffing in departments that deal with natural resources management and this has greatly contributed to deforestation and forest degradation.

The challenge is that the police and law enforcement agents do not regard forest issues with the seriousness they deserve **(Gokwe South, Key Informant)**

I have been a land use inspection technician for more than 20 years now. We used to conduct thorough inspections but now because of resource challenges it has been a while since we did that **(Chirumahnzu, Key Informant)**

Resource constraints to execute operations; some weaknesses in the SI, SI 116, say that farmers should plant 0.3 ha of trees for every 1ha of tobacco planted but there is no punishment for not complying **(Bindura, Key Informant, 06 February 2019)**

There is no cohesion among different actors in terms of implementation of laws. **Lupane Key Informant,**

Zimbabwe has a legal/policy framework comprising of laws (Acts of Parliament). The Forest Act (Chapter 19:05) is the principal Act for forest resources management supported by other legislative instruments such as the Communal Lands Forest Produce Act (Chapter 20:04), Environmental Management Act (Chapter 20:27), Parks and Wildlife Act (Chapter 20:14), Rural District Councils Act (Chapter 29:13), Statutory Instrument (SI) 116 which discourages the use of indigenous trees as an energy source for tobacco curing. The SI requires tobacco farmers in all

tobacco growing regions to establish woodlots of exotic, fast growing species such as Eucalyptus. Local authorities also administer environmental by-laws, however, interviews with some key informants indicated that some local authorities are still in the formative stages of establishing environmental by-laws while others local authorities do not have by-laws at all.

> 'The council doesn't have any by-laws for environment and forest management, [and this] affects the operations of the environmental monitor.'
> **Interview with Makonde Key Informant [13 February, 2019].**

3.4.3 Land tenure and property rights

The land tenure and property rights has had its share on the deforestation and forest degradation in Zimbabwe. Most of the land in communal and resettlement areas is open access without clearly defined property rights. Security of tenure has a bearing on the way a forest or woodland is managed. The initiation of the land reform programme was characterised by an initial period of widespread uncontrolled destruction and overexploitation of woodland resources.

> 'In this area we were issued with A1 Schemes and we are still clearing land. As for me I have not finished clearing land. I was given 10 ha and I have only cleared 3. Personally, I think it's not appropriate to talk about deforestation here because there are lots of indigenous trees here that we are clearing to open up our farms' **(Key informant in Mberengwa)**

The open-access regimes in communal and resettlement areas cases rapid depletion and degradation of the forest resource base.

3.4.4 Climate change and other environmental factors

Climate change is one of the environmental factors that influences the drivers of deforestation (Campbell *et al.*, 2011). The unreliable rainfall patterns, increasing temperatures, frequent extreme weather conditions and onset of forest pests (e.g. red gum lerp psyllid*, Glycaspis brimblecombei* and the blue gum chalcid, *Leptocybe invasa*) and diseases (e.g. *Teratosphaeria gauchensis*) (Jimu et. al., 2015). Climate also exerts negative impacts on rainfall dependent agriculture through increased drought frequency and rainfall variability. The droughts have an impact on both forestry and agriculture and rural communities often engage in off-farming activities such as selling firewood after climate related crop failure. Furthermore, the threats of wild fire severity and extent increases depending on fire management strategies in place. Some farmers clear more land for cropping after existing lands become depleted of soil nutrients.

3.5 Drivers of deforestation and forest degradation and implications on sustainable forest management and REDD +

There were several challenges to sustainable forest management across the country, and they include lack of resources, political interference and issues of governance. The existing pieces of forest legislation (Forest Act and communal Lands Forest Produce Act) have no reference to community participation and forest value generation. Some areas are characterised by unplanned developments that cause rampart destruction of forest areas. The Forestry commission has one poorly resourced officer per district making it difficult to monitor the national forest resource base. All these challenges indirectly cause deforestation and forest degradation and negatively impact all efforts for sustainable forest management. Beyond identification of the drivers of

deforestation and forest degradation, stakeholders at a consultative meeting in Harare identified possible solutions to address some of the drivers of deforestation. The outcomes of group discussions showed that settlement expansion, agriculture, mining and tobacco curing were the most common drivers of deforestation and forest degradation and also the most difficult to address (Table 3.1). Mining and agriculture were likely remain important in the future because both are economic pillars of the country. If these drivers are not correctly addressed, the country will continue to suffer from loss of forest cover hence climate change effects such as global warming increases.

Table 3.1 Priority drivers of deforestation and forest degradation and their possible solutions

Rank	Driver	Possible solutions
1	Settlement expansion	Birth control and family planning, Reduce area of allocated land per person, land use planning revision and enforcement proper land use planning, use of high rise building models
2	Agriculture	land use planning, intensive agriculture
3	Firewood collection	incentives for non-wood fuel product i.e. solar, gas, hydropower, wind power
4	Mining	Addressing corruption, enforcement of forest conservation and Environmental Impact Assessment regulations, address governance issues.
5	Tobacco curing	law enforcement, providing incentives for sustainable tobacco wood energy program
6	Charcoal production	Capacity building of regulatory institutions for law enforcement (EMA & FC)

4.0 Conclusion and recommendations

Woodland resources are potential carbon sinks for climate change mitigation and have capacity to support biodiversity while at the same time ensuring livelihoods for local communities. Deforestation and degradation on the other hand, erode the potential benefits from forests. In Zimbabwe, deforestation and forest degradation hotspots are common in all the provinces, mainly the rural, resettlement and peri-urban areas. The direct drivers of deforestation include firewood, settlements, agriculture, wildfire, tobacco curing, charcoal, brick making, logging, overstocking, construction, mining and brushwood. The indirect drivers included socioeconomic factors, legal factors, tenure, climate change/environmental factors and politics. There is need to identify potential areas for forest land restoration activities in each province and join the other

African countries in the drive to achieve the AFR100 target of 100 million hectares. There may be need to develop tools for effective stakeholders engagement and build capacity for monitoring deforestation and forest degradation.

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Annexes

Annex 1: Deforestation and forest degradation hotspots

District	Wards / Areas
Muzarabani	Ward 12; Ward 1
	Wards 29,9, 23,24, 2
Umzingwane	Wards 15, 19, 20,9,10,11, 13,6,12,3
Bindura	Shashi; Matepatepa; Burasi; Simona; Wise acre; Pimmato
	Wards 1,2,3 ;4,5,19,7,8
Bubi	Wards 18,17, 3 , 20
Chirumhanzu	wards 15, 12, 19, 20, 22;16
Gokwe	District wide; Gwehava
Gwanda	Peri Urban Wards
Kwekwe	Wards 1;33;25;17;24
Hurungwe	2;3;9;8;7;11;22

Lupane	Wards 9,13;14;25;24, 22, 21;15;20;28;6
Makonde	3;8;6; Doma
Mberengwa	Wards 1, 2, 35, 36
Mbire	Wards 12;17;16;1;4;10;15
Mhondoro	Wards 12;9; 8
Sanyati	Wards 1;3;18; 12;5;2; 4;6,13,14, 16, 17
Shamva	Wards 1,2,3; 4,5,19,7,8; 20 ;21;14, 15;17;12;25
Zvishavane	Wards 13,14,19,12,7
Chipinge	5;15;16
Chiredzi	Wards 1,2,5,3;17; 16;26;29;32
Marondera	ward 3, 23, 6, 8, 2, 4
Mudzi	wards 1;12;16;17;12;8;14
Mutare	Chikubvu ;Burma Valley; Marange; Odzi; Vhumba
Mwenezi	Wards;7 ;16;14;15;13;15

Annex 2: Percentage of respondents on major land uses by district

DISTRICT	Agriculture	Mining	Forest
Bindura	100	17	0
Bubi	100	40	0
Chipinge	95	5	45
Chiredzi	100	6	19
Chirumanzu	100	44	38
Gokwe	100	0	75
Gwanda	99	6	32
Hurungwe	100	0	0
Lupane	100	0	40
Makonde	100	0	0
Marondera	100	0	0
Mberengwa	100	12	6
Mbire	100	0	0

Mhondoro-Ngezi	100	50	0
Mudzi	100	46	0
Murehwa	100	0	0
Mutare	100	37	6
Muzarabani	100	0	0
Mwenezi	98	0	2
Sanyati	100	80	0
Umzingwane	87	94	0
Wedza	100	0	0
Zvishavane	100	100	0

Annex 3: Perceptions of respondents on drivers of deforestation and forest degradation

District	Farming	Mining	Settlement expansion	Charcoal	Brick Making	Tobacco curing	Firewood Collection	Veld Fire	Logging	Overstocking

							s		
Bindura	71	8	79	0	17	75	29	8	4	0
Bubi	0	14	86	0	14	0	43	43	0	29
Chipinge	44	0	89	33	28	0	61	33	22	17
Chiredzi	67	0	44	33	0	0	33	22	0	0
Chiruman zu	86	7	64	0	43	14	86	71	7	43
Gokwe	100	0	100	0	35	0	88	65	29	35
Gwanda	75	0	70	0	30	2	59	5	15	41
Hurungwe	3	0	22	0	3	88	38	31	0	3
Lupane	100	0	100	0	0	0	50	25	0	0

Makonde	27	0	47	0	0	80	7	33	7	0
Marondera	36	0	45	0	0	91	45	36	9	0
Mberengwa	100	0	75	0	19	0	88	0	0	31
Mbire	67	0	100	0	22	0	11	56	0	0
Mhondoro-Ngezi	39	0	67	89	0	0	0	50	0	6
Mudzi	31	38	54	0	23	0	85	8	31	0
Murehwa	0	0	100	0	0	0	0	0	0	100
Mutare	52	3	68	0	16	90	56	38	9	7
Muzarabani	32	0	39	0	4	89	18	46	0	0
Mwenezi	26	0	48	0	10	0	39	0	6	13
Sanyati	35	35	95	0	0	0	20	2	10	0

								5		
Umzingwane	57	74	61	0	9	0	65	57	0	26
Wedza	100	0	100	100	100	100	0	0	0	0
Zvishavane	100	100	0	100	100	0	100	0	0	100