Land Degradation Neutrality
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ZAMBIA

Land Degradation Neutrality

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THE CHANGWON INITIATIVE

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Executive Summary

Zambia is vulnerable to climate change, which to a large extent is also one of the causes of land degradation. Degraded land often has an impact on the livelihoods of many people, especially communities that depend on natural resources.

To contribute to addressing land degradation, Zambia has committed to voluntarily set land degradation neutrality (LDN) targets. The objective of LDN is "to maintain or enhance land-based natural capital and associated ecosystems functions and services aims at achieving no loss to maintain the status quo or make gains through land restoration activities. As the country aims to implement SDG target 15.3, states that "By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world". In Zambia, LDN is well linked to achieving the SDGs and other country objectives. As a member of the international community, Zambia has implemented international protocols at national level, while at the same time developing its own programs such as the NASAP, NAPA, national policy on climate change, ILUA 1&2, ZIFL, and nationally determined contributions (NDCs). These plans or programs are not framed in isolation. All national programs are anchored in the national development plans and Zambia Vision 2030.

To understand the trends in land degradation, three indicators (forest cover, land productivity and soil s=organic carbon) were observed over a 15-year period, using three epochs 2000, 2010 and 2015, with 2000 being the base year. During the period under review, it was noted that substantial forest cover changed, and the country lost 11,008 km2 (2.3%) of forest cover due to various activities. Grassland also decreased minimally, by 361.54 km2 (0.22%), while an increase was recorded in cropland by 7,163.41 km2 (11.08%) from 64,665.55 to 71,828.96 km2; wetland also increased from 36,665.24 km2 to 36,805.78 km2 (0.38%); artificial surfaces had the highest proportional increase from 1,372.45 km2 to 5,016.58 km2 (265.52%), representing a 265% increase; water bodies also increased by (1.61%), and other land cover types by (22.17%). under the tree covered area, about 1,864.2 km^2 deteriorated, representing a 0.4% declined in productivity. Only 1.6% of tree cover (8302.98km^2) was considered as having moderately declined while 2.5% (11,624.55km^2) was described as stressed. But 43% (195,667.62 km^2) was deemed stable and 53% of forest cover increased in its productivity (see table 5).

Land productivity under cropland decreased by an average of 4% (3057.23 km^2), an attribute of poor agricultural practices. However, 68% of cropland remained stable although 4% was described as stressed. The areas under grasslands and wetlands experienced a 20% general increase in productivity. As expected, areas under artificial surfaces reduced in productivity by 5%.

During the assessment period, as table 6 shows, the conversion of tree cover and grassland to cropland resulted in about 12% losses in soil organic carbon (SOC). When tree cover and grasslands were converted to wetlands, there was a gain of 74% from 4,064 tonnes to 12,104 tonnes of soil organic carbon. The greatest loss in SOC was incurred during the change in land use from tree cover and grassland to cropland between the year 2000 and 2015. The challenges of land degradation encompass various spheres such as land tenure, direct and indirect drivers, institutional and legal frameworks. Targets were set and measures to meet the targets were put place by the LDN working group (TWG) and validated in a stakeholder meeting. The measures were of policy and agronomical nature. The Minister of Water Development, Sanitation and Environmental Protection, Hon. Dr Dennis Mukuyu Wanchinga MP, endorsed the targets and communicated the same to the UNCCD Secretariat on 17th January 2019.

Zambia has in the past implemented several programs that address land degradation. Currently there are some programs that are in the process, such as the Integrated Forest Landscape Program in Easter province the regeneration project in Muchinga and Eastern province and community forest management programs initiated by the Forestry Department, in line with the Forest Act of 2015.

Zambia's LDN Targets

LDN is achieved by 2030 (no net loss)

By 2030, the deforestation rate in Zambia is reduced by at least 50%

By 2030, 40% of households adopt appropriate alternative energy sources from fuel wood

By 2030 maintain and/or improve the SOC content (no net loss)

By 2030 good agricultural practices that mitigate loss of forest cover and SOC are increased from 6000 Km^2 in 2015 to 10,000 Km^2 in 2030.

By 2030, Zambia shall seek to halt land use change of wetlands and ecologically sensitive areas and normal functions of these areas shall be achieved (no net loss).

By 2030 integrated land-use planning adopted and practiced across the nation.

By 2030 Land Degradation Neutrality Values have been integrated in the Eight National Development plan, Programmes and other planning processes.

By 2030, 50% of agricultural land is under sustainable agricultural practices compared to 2015.

All degraded land in mining and quarrying areas rehabilitated by 2030 compared to 2015.

By 2030 increase forest cover by 5% compared to 2015.

By 2030 the production of timber wood fuel (charcoal & firewood) Strengthened and regulated compared to 2015

By 2030 the mining industry contributes to management of surrounding indigenous forests and establishment of forest plantations for local communities' timber needs compared to 2015.

By 2030 Catchment Management Plans for the six (6) catchments of Zambia incorporate measures to mitigate against or prevent land degradation developed.

By 2030 increase national water storage by at least 10 % (i.e. from 188 km^3 to 207 km^3).

1.0 Background

Zambia is increasingly vulnerable to climate change and variability as evidenced by increased frequencies of extreme events such as drought, seasonal floods and flush floods, extreme temperatures and dry spells and the country's inadequate preparation and response mechanism to the ensuing disasters. The disasters have, to varying extents, adversely affected sectors such as agriculture, wildlife, forestry, water and energy, and human health, thereby significantly affecting livelihoods and national socio-economic development.

Coupled to this is the fact that the country's economy is predominantly based on the exploitation of the country's natural resources (such as land, water, forests and wildlife) which experience the adverse effects of the climatic hazards stated above. Each year, disasters originating from prolonged drought not only affect most of the people in the country, but also contribute to famine and starvation among a majority of rural people in Zambia. Land degradation manifests itself through deforestation, biodiversity loss, soil erosion, soil infertility, siltation, sedimentation and flooding among others. The effects of land degradation are multiple, and they include loss of environmental benefits such as shelter, shade, visual amenities and productivity of the land to support natural veld, livestock and crop production. The low productivity of the land caused by land degradation causes low crop yields, poor animal productivity and animal diseases. Noting that the human population in Zambia is dependent on agriculture, these factors undermine social economic and environmental development and continue to deepen the poverty crisis.

In Zambia, land degradation has had negative implications on the hydrological cycle, in particular on flood occurrence, drying-up of streams, poor ground water recharge systems due to high run-off rates and siltation and sedimentation of rivers. Deforestation reduces the carbon sink, and this contributes to climate change.

2.0 Leveraging LDN

Zambia's aim of setting voluntary national Land Degradation Neutrality (LDN) targets is to secure both local and international resources to prevent, halt and restore degraded land caused by various agents.

2.1 Link between LDN, achieving SDGs and other country commitments

As a signatory to various international and multilateral agreements, Zambia implements several of these protocols in the area of land management. For instance, the COP 12 requested UNCCD bodies to provide guidance for formulating national LDN targets, which are anchored in sustainable development goal (SDG) 15, which states that countries should "protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss". In line with this, Zambia endorsed the LDN Target Setting Process in 2015 as a vehicle for addressing land degradation issues.

For a long time now, Zambia has faced challenges in addressing the direct and indirect causes of land degradation. For instance, the deforestation rate, which was once between 250,000ha and 300,000ha per annum, has in the recent past reduced to about 176,000ha per year (FAO, GRZ 2016). The main

causes of deforestation were identified as agriculture expansion, infrastructure development, charcoal production and mining.

Even before this endorsement and after that, the country has been implementing various initiatives to combat land degradation. Some of the projects that the country has implemented are;

1. Strengthening Management Effectiveness and Generating Multiple Environmental Benefits within and around the Greater Kafue National Park in Zambia;
2. Promoting Climate Resilient Community-based Regeneration of Indigenous Forests in Zambia's Central Province;
3. Zambia Lake Tanganyika Basin Sustainable Development Project;
4. The PPCR;
5. Zambia Integrated Forest landscape Project.

Zambia realizes that the LDN process cannot work in isolation, but that such a concept should be anchored in existing sustainable land management (SLM) efforts being implemented by various stakeholders. In implementing LDN, it will be critical to reflect on both the Seventh National Development Plan (7NDP) as a national planning framework and the provisions of the Sustainable Development Goals (SDGs) 15.3, which states that "by 2030 combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and try to achieve a land-degradation neutrality world".

Like in the past, Zambia is committed to implementing the LDN concept to enable her tackle land degradation, whose overall objective is to achieve the set targets and take the necessary identified measures. The country has found a strong link between the LDN, SDGs and Zambia's program in addressing land degradation as shown in Table 2 below.

Table 1: Linkages between LDN, SDG and Local Programs

SDG Objective	LDN Approach	Zambia's response to Land degradation
SDG 15 "to protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss"	LDN aims to maintain or enhance the land based natural capital and associated ecosystem functions and services.	Zambia has domesticated various international treaties and protocols and has also developed local programs aimed at achieving loss of land degradation. These programs are nationwide and being implemented by different stakeholders in Sustainable Land Management and coordinated by institutions mandated to do this, in collaboration with other institutions. In additional to the Parliamentary Caucus on Land, the government has formed an inter-ministerial committee on natural resources and land management in the country. There are laws that have been enacted and policies developed on which a successful LDN implementation will be anchored.
15.3 "By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world".	The desire is to achieve neutrality in land degradation, that is "no net loss" of (at least) or gain in healthy and productive land through various strategies with restoration of degraded land (gain).	The country has set targets to achieve this in accordance with the UNCCDs guidance in LDN TSP. measures have also been developed to help mitigate land degradation.
15.3.1 "Proportion of land that is degraded over total land area".	Assessing trends and drivers of land degradation have been identified and assessed for impact, including hotspots.	Baseline report has been produced which formed a baseline for national target setting.

Source: Zambia LDN Baseline, 2019.

2.2 Leverage opportunities identified

As Zambia desires to voluntarily implement the LDN Target Setting Process (TSP), it has identified current challenges and existing and potential opportunities on which it can leverage the program.

3.0 Land management initiatives in Zambia and Leveraging Opportunities

Despite Zambia experiencing increased land degradation and biodiversity loss, the country has put in place various measures aimed at reducing, halting and or reversing land degradation. The 7-NDP builds on the country's long-standing recognition of the importance of reducing or reversing land degradation, reducing biodiversity loss and protecting its population and productive resources from the adverse impacts of climate change. To this end, Zambia continues to reaffirm its commitments to the implementation of multilateral environmental agreements (MEAs) and protocols, to which it is Party. These include, among others, the United Nations Convention to Combat Desertification (UNCCD), the United Nations Convention on Biological Diversity (CBD) and the United Nations Framework Convention on Climate Change (UNFCCC), as well as the Cancun Protocol and the Paris Agreement on climate change. The country has taken steps to domesticate the various MEAs and protocols through the development of various policies and strategies including the National Policy on Climate Change, the National Action Plan on Combating Desertification, the Investment Framework for Sustainable Land Management, the National Adaptation Programme of Action (NAPA), and the National Biodiversity Strategy and Action Plan (NBSAP), among others. However, the extent to which these national policies and plans have leveraged and are mainstreamed in existing national and subnational programmes and processes has been limited at best and largely untested. Regional and country integrated land use planning, particularly at district and sub-district level, represent some of the best opportunities for accelerating implementation of land degradation neutrality, climate change, and biodiversity management.

3.1 National Development Plans

The seventh National Development Plan (7NDP) is a document that shows the Zambian government's aspiration about what plans to achieve between 2017 and 2021. The plan encompasses all sectors of the economy, among them forest management, land management, animal husbandry, environmental protection, agriculture, energy, tourism and water resources management. These plans are overarching in the development of the nation as they provide a planning framework in which other plans may be attached. The seventh National Development Plan (2017-2021) is an integrated (multisectoral)

development approach under the theme **"Accelerating development efforts towards Vision 2030 without leaving anyone behind".** In natural resources, it recognizes the impact of urbanization and its impact on land degradation. It seeks to promote sustainable forestry management.

3.2 Zambia Integrated Forest Landscape

The project objective is "to improve landscape management and increase environmental and economic benefits for targeted rural communities in the Eastern Province and to improve the recipient's capacity to respond promptly and effectively to an Eligible Crisis or Emergency". The benefits the project intends to generate are economic and would result from improved capacity to manage natural resources and climate resilience. The project has three phases; 2015-2017 preparation phase; 2017-2021 implementation and 2021-30 emissions reduction phase. The project activities include community forestry management, regularization of land and resource rights, support for the national protected area system and community management of wildlife.

3.3 The Integrated Land Use Assessment (ILUA 1&2)

The overall objective of ILUA II was to **"strengthen forest resources management and enhance its contribution to sustainable development, land use and livelihoods"** in the country. Phase 1 (2005-2008) provided baseline data, while ILUA II (2011-2018) was for the purpose of designing to enhance the use and development of that data to be used in sustainable forest management (SFM), the Reduction of Emissions from Deforestation and Degradation (REDD+) and provide additional information on trends in forest cover change through enhanced and refined methodologies.

3.4 Nationally Determined Contribution (NDC)

In December 2015, Zambia declared to the UNFCCC that it plans to achieve a 25 percent emissions reduction (20,000 tCO2e) with limited international financial support by 2030, but, with substantial international financial support (roughly defined as US$35 billion) this could be a 47 percent emissions reduction (38,000 tCO2e). In either scenario, the government of Zambia plans to achieve most of its emissions reductions from sustainable land use and forestry management. This will be achieved by implementing three programs. Zambia intends to reduce through the country's Climate Response Strategy, which is supported by national development policies including energy, forestry, agriculture, water, town and country planning, sanitation, and transport. The three programs are (a) Sustainable

Forest Management, (b) Sustainable Agriculture, and (c) Renewable Energy and Energy Efficiency. These projects will be piloted so that the country can meet its NDCs. Emissions that are not credited through the REDD+ mechanism will be considered a contribution toward Zambia's NDCs. Based on Zambian plans, the NDC programs will be fully supported by various climate-related activities such as REDD+, Nationally Appropriate Mitigation Actions (NAMAs), and Technology Needs Assessments. The NDC will run from 2017 to 2019.

3.5 The ISFL of the Bio Carbon Fund (BioCF)

This Fund seeks to reduce emissions from the land sector using smarter land use planning, policies, and practices. These efforts are expected to reduce millions and also improve livelihoods, reduce poverty, and contribute to the sustainability of national economies. The objective of the ISFL is to promote reduced GHG emissions from the land sector, from deforestation and forest degradation (REDD+), and from sustainable agriculture, and to promote smarter land use planning, policies, and practices. One of the key design features is to operate at the sub-national level.

3.6 Zambia's second National Biodiversity Strategy and Action Plan 2015-2025

This follows the first National Biodiversity strategy which was developed in 1999, and it aimed at domesticating international protocols and agreements, which includes Convention on Biological diversity (UNCCBD) UNCCD, Ramar Convention on wetlands and other regional protocols such as the Southern Africa Development Committee (SADC). It also responds to current challenges. The main objectives of the National Biodiversity Strategy and Action (2015-2025) are to:

(a) Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society;
(b) Reduce the direct pressure on biodiversity and promote sustainable use;
(c) Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity;
(d) Enhance the benefits of all biodiversity and ecosystems services;
(e) Enhance implementation of NBSAP2 through participatory planning, knowledge management and capacity building.

4.0 LDN working group – issues discussed and agreed upon

During the several consultative meetings that the LDN working group (TWG) held, it was agreed that;

1. The TWG should include representation from public service, private sector, academia, research institutions, and Non-Governmental Organizations (NGOs);
2. Reduce the number of people on the TWG from 35 to 15 for effectiveness;
3. Follow the revised work plan;
4. Recommend use of national data and supplemented by default data;
5. Sources of data to be cited in all works must be from government approved sources/institutions;
6. Learn from institutions that have or are implementing land management programs;
7. Set targets at national level, and cascade implementation to sub-national level;
8. Implementation of set targets will be institutional-wide, and not restricted to Ministry of Water Development, Sanitation and Environmental Protection;
9. Anchor target setting and other programs on national plans (i.e. 7th National Development Plan and Vision 2030).

5.0 Assessing LDN: Baseline, Trends and Drivers

5.1 Baseline

Land degradation not only affects ecosystems, but also the socio economics of a country and the livelihoods of a people. It is caused by, among others, unsustainable agricultural practices, mining, deforestation and climate change. To reverse this requires immediate action plans.

Data collected for determining land degradation trends and drivers were obtained using two sources; national data and default data from the UNCCD. These complemented each other. As guided by the UNCCD, land cover trends were determined using three epochs; 2000, 2010 and 2015. Figures 1,2,3 show the trends in land cover during the review period.

5.1.1 Land Cover

According to the Integrated Land Use Assessment from 2000, Zambia has a total land area of 752,614 km^2, of which 470,541.48 km^2 is forest; grasslands cover 164,263.37 km^2; 64,665.55 km^2 is under cropland; wetlands cover 36,665.24 km^2 and artificial areas cover 1,372.45 km^2. Water bodies cover 13,749.48 km^2 while 1,356.43 km^2 is covered by other land cover types.

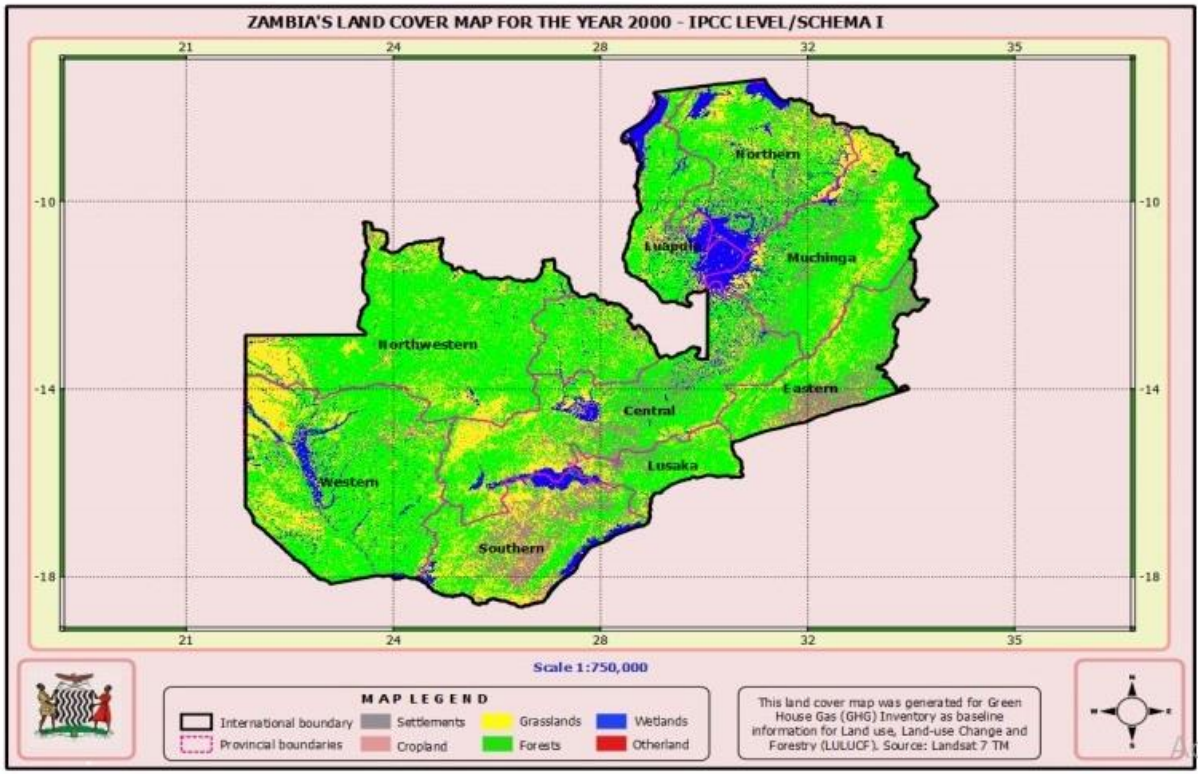

Figure 1: Zambia Land Cover Map in 2000. Source: ILUA II

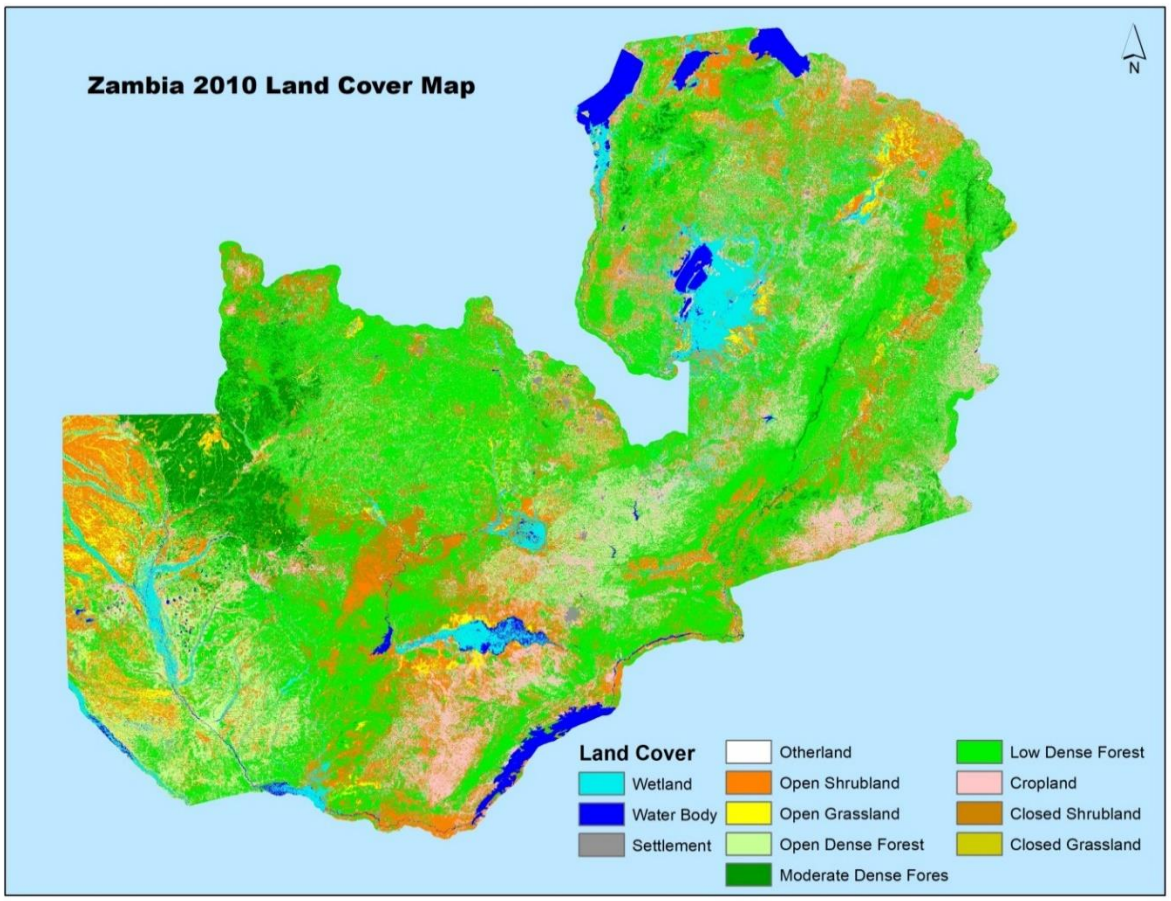

Figure 2: Zambia Land Cover Map in 2010. Source: Forest Cover Map 2014, Integrated Land Use Assessment II – Report for Zambia Final Report prepared by the Forestry Department, the Ministry of Lands and Natural Resources and the Food and Agriculture.

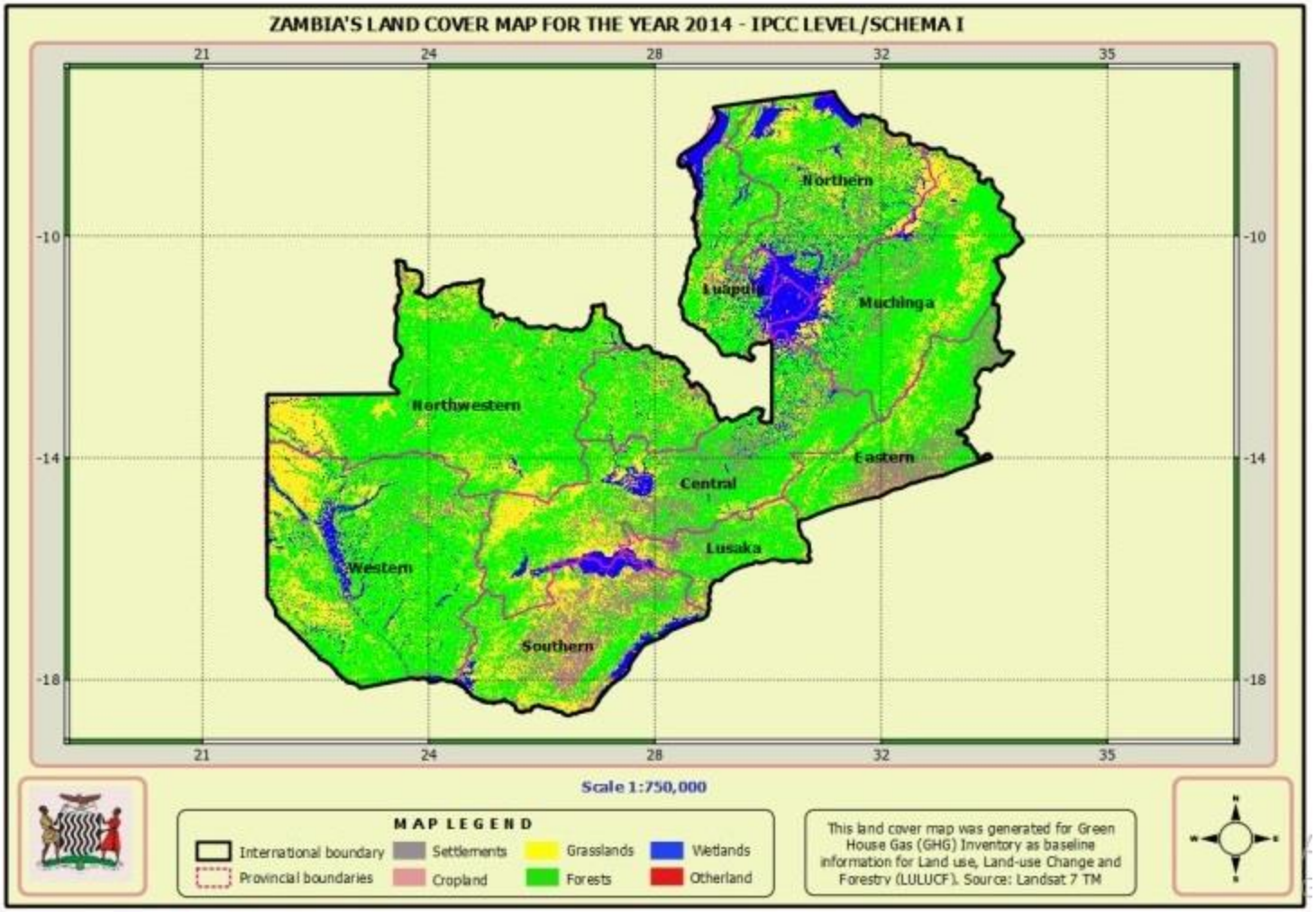

Figure 3: Forest Cover Map 2014. Source: Integrated Land Use Assessment II – Report for Zambia Final Report prepared by the Forestry Department, the Ministry of Lands and Natural Resources and the Food and Agriculture Organization of the United Nations.

Remote sensing-based estimates of forest cover in Zambia for 2014 were projected to be 42,096,087.5 hectares. Table 3 shows the distribution of land cover at provincial level. In terms of total countrywide forest cover, North-Western Province occupied 20.6%, Western Province 18.5%, Muchinga Province 12.9%, Central Province 13.8%, Northern Province 8.2%, Southern Province 5.3%, Eastern Province 6.9%, Luapula Province 5.4%, Lusaka Province 3.7%, while forests in the Copperbelt Province covered 4.7% of the total forest cover (ILUA, 2016). Table 3 shows the percentage composition of forest cover by province.

Table 2 Forest Cover in Zambia Based on Estimates from Satellite Data (2014)

Province	**Forest cover estimates (ha) Land Cover Maps**	**Proportion of forest cover %**	
		of country forest cover	**of province land surface area[#]**
Central	5,794,024.14	13.8	52.4
Copperbelt	1,993,645.89	4.7	63.8
Eastern	2,921,719.32	6.9	56.8
Luapula	2,281,074.66	5.4	45.9
Lusaka	1,553,034.24	3.7	60.1
Muchinga	5,415,457.41	12.9	62.4
Northern	3,443,308.83	8.2	68.9
North-Western	8,671,258.53	20.6	44.6
Southern	2,247,381.00	5.3	32.5
Western	7,775,174.52	18.5	59.9
Zambia	42,096,078.54	**100.0**	**-**

Source: ILUA, 2016

5.1.2 Land Productivity

In the context of the LDN baseline report, L=land productivity refers to the biological productive capacity of the land, the source of all food, fiber, and fuel that sustains humans (provisional of ecosystem services). Out of total land area of 738643.5 Km^2, 297,250.8 Km^2 (40.28%) is land with improved productivity. Land with stable productivity is 384,968.3 Km^2 or 52.17%, while land with degraded productivity is 52,453.8Km^2 (7.11%). About 3,285.7Km^2 (0.45%) represented land without data.[1]

5.1.3 Soil Organic Carbon

According to Table 6, the baseline soil organic carbon was 59.3t/ha covering 459,259.41 Km^2 for forest areas; 60.08t/ha for grassland covering 171,927.79Km^2, and 52.17t/ha for croplands with an area of 78,022 Km^2. Others are wetlands at 104.59 t/ha on an area of 28,159 Km^2, artificial areas at 57.00t/ha on 423.61 Km^2 of land and other lands at 58.94 t/ha covering 36.76 Km^2.The SOC was obtained at a depth of 30cm^2.

5.2 Changes in land cover, land productivity and soil organic carbon

5.2.1 Land Cover

The land cover changes refer to the three epochs 2000, 2010 and 2015, when substantial forest cover changed, and the country lost 11,000 km2 (2.3%) of forest cover due to various activities. Grasslands also decreased minimally by 361.54 km2 (0.22%), while an increase was recorded in cropland by 7,163.41 km2 (11.08%) from 64,665.55 to 71,828.96 km2; wetland also increased from 36,665.24 km2 to 36,805.78 km2 (0.38%); artificial surfaces had the highest proportional increase from 1,342.45 km2 to 5,016.58 km2 (265.52%), representing a 265% increase; water bodies also increased by (1.61%), and other lands by (22.17%). However, when considering the total land change, the change in land use resulted in forest cover to reduce by 221 km2 from 738,864.52ha to 738,643.52 km2 (refer to Table 4 below).

[1] UNCCD. 2018. Report from Zambia: Performance Review and Assessment of Implementation System Seventh Reporting Process.
[2] Ibid, UNCCD 2018 Report.

Table 3: Land Cover Change (2000 - 2015)

Land cover classes	*Baseline area (sq. km)*	Target area (sq. km)	Change in area (sq. km)	Change in area (percent)
Forest	470,541.48	459,433.16	-11,108.32	-2.36%
Grasslands	164,263.37	163,901.83	-361.54	-0.22%
Croplands	64,665.55	71,828.96	7,163.41	11.08%
Wetlands	36,665.24	36,805.78	140.54	0.38%
Artificial areas	1,372.45	5,016.58	3,644.13	265.52%
Other lands	1,356.43	1,657.21	300.78	22.17%
Water bodies	13,749.48	13,970.48	221.00	1.61%
Total:	***752,614.00***	***752,614.00***	**-**	**-**

Source: Zambia LDN Baseline report, 2018

The main drivers identified for change in land cover are deforestation, agriculture extensification, charcoal production, infrastructure development, high poverty levels, soil and water pollution due of chemicals used on land, erosion and siltation, gaps in the legal framework and enforcement, challenges in policy and legislative enforcement, and lack of monitoring activities that cause land degradation.

5.2.2 Land Productivity

Land productivity dynamics were measured based on parameters including; declining, moderate decline, stressed, stable and increase of production status. Under the tree covered area, about 1,864.2 km^2 deteriorated representing a 0.4% declined in productivity. Only 1.81% of tree covered areas (8302.98km^2) was considered moderately declined while 2.5% (11,624.55km^2) was described as stressed. But 42.6% (195,667.62 km^2) was deemed stable and 52.6% of forest cover increased in its productivity (see table 5).

The land productivity under cropland decreased by an average of 4% (3057.23 km^2), an attribute of poor agricultural practices. However, 68% of the crop land remained stable although 4% was described as stressed. The areas under grasslands and wetlands experienced a 20% general increase in productivity.

Table 4: Net land productivity dynamics 2000-2015

Land Cover Class	Declining	Moderate Decline	Stressed	Stable	Increasing	No Data	Total
Tree Covered Areas	1,864.29	8302.98	11624.55	195,667.62	241,559.66	414.06	459,433.16
Grasslands	981.26	4997.64	4432.5	114425.49	38,630.02	434.92	163,901.83
Cropland	3057.23	7307.92	2532.27	44121.84	7504.98	141.31	64,665.55
Wetland	659.47	1705.35	2507.67	18882.75	9737.08	2788.81	36,281.13
Artificial Surfaces	133.99	10.15	115.29	913.09	81.15	5.36	1,259.03
Other Land	215.95	138	7.68	770.47	10.16	214.16	1,356.42
Total	**6,912.19**	**22,462.04**	**21,219.96**	**374,781.26**	**297,523.05**	**3,998.62**	**726,897.12**

Source: UNCCD. 2018. National Report from Zambia to the UNCCD, PRAIS. Performance Review and Assessment of Implementation System Seventh reporting process.

5.2.3 Soil Organic Stock

Soil organic carbon is a measurable component of soil organic matter. It is one of the essential constituents of the soil that determine fertility, consequently affecting plant growth, hence land productivity. During the assessment period (2000-2015), the conversion of tree covered areas to cropland resulted in about 50,343.02 tons of carbon loss in soil organic carbon. When tree covered areas were converted to wetlands, there was a gain of 16,267 tons of soil organic carbon. The greatest loss in SOC was incurred during the change in land use from tree cover and grassland to cropland between the year 2000 and 2015.

Table 5: Changes of SOC stock due to land conversion to new land cover types

Land conversion		**Net area change km²**	**Soil organic carbon stock change**				**2000-2015**
From	To		Initial SOC stock (t/ha)	Final stock t/ha	Initial SOC stock total	Final stock total	SOC stock change (t)
Tree cover	Crop land	7,143.63	59.23	52.17	423,117.2	372,683.18	-50,343.02
Tree cover	Artificial land	3,664.13	59.23	57	215,841.82	207,715.41	-8126.41
Tree cover	Other land	230.95	59.23	58.98	13,679.17	13,621.43	-57.74
Tree cover	Wetlands	89.61	59.23	104.59	5,307.6	9,372.31	4064.71
Grassland	Croplands	19.78	60.08	52.17	1,188.38	1,031.92	-156.46
Grassland	Other land	69.83	60.08	58.98	4,195.39	4,118.57	-76.82
Grassland	Wetlands	271.93	60.08	104.59	16,337.55	28,441.16	12,103.61

Source: UNCCD. 2018. National Report from Zambia to the UNCCD, PRAIS. Performance Review and Assessment of Implementation System Seventh reporting process.

5.2.4 Drivers of Land Degradation in Zambia

The challenges that Zambia faces in land degradation emanate from various sources. Some are institutional, legal and technical. The following list indicates the immediate challenges and how the country can leverage on the existing programs and other solutions.

Zambia has a dual land tenure system whereby the traditional leadership controls about 60% of the land and the rest is state land and central government. Traditional land is under the control of traditional leadership which comes with user rights for the 'owner'. Land tenure and ownership under traditional land is given by traditional leadership, and so is it succession. Under traditional/customary systems the Commissioner of Lands does not have any control, and converting customary land to state is possible, with the permission of the local chief.

State land includes urban areas, industries, administrative, institutions, agriculture land and shops in the Central Business District (CBD). Through the local district council, the state administers this land. The land under the state has three kinds of leasehold; 14 years lease, 99-year lease and occupancy licenses for temporary access up to 30 years, generally used for unplanned settlements.

Irrespective of the type of land ownership, land degradation occurs. Some of the causes of land degradation cited are:

Legal and policy issues:

- Weak enforcement of land management related legislation;
- Conflicting application of legislation;
- Delay in finalisation of pieces of legislation to operationalize the principal acts of parliament;
- Inadequate enforcement.

Institutional: disjointed approvals by different institutions for different activities (differing interests among institutions). For instance, the Ministry of Mines and Minerals Development may issue a mining license in ecologically sensitive places. The other practice is when 'job creation' outweighs conservation.

Infrastructure development: while it is good to develop infrastructure, it contributes to land degradation.

Economic challenges: high poverty levels in the country drives people to engage in practices such as charcoal production for livelihood and shifting cultivation, which leaves the land in poor conditions. In

addition, due to limited incomes, most farmers aim to increase land productivity by applying inorganic fertilizers, which, in the long run, damage the soil condition.

Mining activities: for some time now there has been an increase in developing new mines in the country. Most the current mines use open pit mining methods, which leaves lands degraded.

Industrial effluence: poor monitoring of industries that produce effluence by ZEMA, the regulatory authority. Some of this ends up contaminating the soil, resulting in vegetation not growing on the soil.

Agricultural activities: population growth has resulted in demand for agricultural land for growing crops, either for subsistence or commercial use.

Unplanned settlements: unplanned settlements are some of the causes of land degradation as well.

6.0 LDN institutional and legal environment

6.1 Institutional Environment

For the success of achieving land degradation neutrality, there is a need to have participation from a cross section of stakeholders. This list is divided into public and private sectors, research institutions and academia, and civil society organizations in natural resources management. The public sector category also includes those institutions that are grant-aided or quasi-governmental. The private sector is mainly commercial entities that benefit from good land management. In addition, the media will be required to sensitize the public about the dangers of not meeting land degradation neutrality or informing the public about what UNCCD and the government of Zambia plan to do about this voluntary agreement.

In addition, there are ad-hoc institutional arrangements that provide linkages in natural resources and land management. At legislative level there is a Zambian Parliament Conservation Caucus and the Parliamentary Session Committee on Land, Environment and Tourism (who scrutinize the functions or activities of various government ministries or departments). Their functions are stipulated in the Standing Orders of the National Assembly.

A Standing Committee is composed of Members of Parliament (MPs). According to the National Assembly of Zambia Standing Orders, portfolio committees mirror, as much as possible, the structure of the Government. The functions of a Committee are:

(i) Study, report and make the appropriate recommendations to the Government through the House on the mandate, management and operations of the government ministries, departments and agencies under their portfolio;

(ii) Carry out detailed scrutiny of certain activities undertaken by the government ministries, departments and agencies under their portfolio and make appropriate recommendations to the House for ultimate consideration by the Government;

(iii) Make, if considered necessary, recommendations to the Government on the need to review certain policies and existing legislations;

(iv) Examine annual reports of government ministries and departments under their portfolios in the context of the autonomy and efficiency of government ministries and departments and determine whether the affairs of the said bodies are being managed according to relevant Acts of Parliament, established regulations, rules and general orders;

(v) Consider any Bills that may be referred to them by the House;

(vi) Consider International Agreements and Treaties in accordance with Article 63 of the Constitution;

(vii) Consider special audit reports referred to them by the Speaker or an order of the House;

(viii) Where appropriate, hold public hearings on a matter under their consideration; and

(ix) Consider any matter referred to them by the Speaker or an order of the House.

Under the Executive wing of government, there are two inter-ministerial coordinating mechanisms that would influence LDN. They are listed below with their membership. Stakeholders are larger institutions with independent governance structures (mainly public, private, civil society academia and research institutions), while committees fall under any of the larger umbrella organizations.

1. Membership of the Inter Agency Environment and natural resources Committee;
2. Committee on Climate Change Meeting;
3. Public Sector;
4. Research and Academia Institutions;
5. Civil Society Organizations (CSOs);
6. Development Agencies.

6.2 Legal Environment

The following list depicts the legal framework that governs LDN in Zambia;

1. Forest Act of 2015. Promotes conservation and management of forests and trees. Rationalization of exploitation of forest resources and promotion of sustainable forest management.
2. The Environmental Management Act, 2011. Promotes best practices in environment and natural resources management.
3. Tourism and Hospitality Act, 2015. The Act provides for sustainable development of tourism and environmental management and protection.
4. Water Resources and Management Act, 2011. Provides for management and regulation of water resources.
5. Urban and Regional Planning Act, 2015. Regulates energy use, which also includes charcoal and forest products and promotes renewable energy.
6. Zambia Wildlife Act, 2015. Provides for implementation of CITES and other global and regional conservation protocols.
7. Energy regulation Act, 1995. Regulates energy use, which also includes charcoal and forest products and promotes renewable energy.
8. Lands Act Cap 184. The Act is responsible for the management and administration of land in Zambia.
9. Agriculture Act. Makes provision on practices, development, investment and management of cropland.
10. Local Government Act Cap 281. Article 65 provides for the Council to acquire land by agreement whether by purchase, exchange of gift, or lease.
11. National Heritage Conservation, Act 173. Provides for protection, conservation and management of fauna and flora.
12. National Heritage Conservation Act, 173. Provides for protection, conservation and management of fauna and flora.
13. Mines and Mineral Development Act, 2008. Safe and environmentally-friendly mining.

To understand the operating environment for LDN in Zambia a legal and institutional SWOT analysis was conducted. The results are presented in Table 7.

Table 6: SWOT analysis of current situation legal and institutional framework for LDN

STRENGTHS	WEAKNESSES
Legal • Legislation to support environmental or natural resource ecosystems integrity. • Existing provisions to support existing community natural resource management and participation. • Signatory to multilateral and bilateral environmental conventions. • Legal instruments like EMA No. 12 of 2011– Strategic environmental assessment and Management of derelict land. • Existence of policy and legal frameworks (EMA, Land Act, Agriculture Act, WARMA Act etc. **Institutional** • Established and functional institutions. • Reasonably skilled staff. • Mainstreamed environmental and climate change aspirations into our national development frameworks. • Capacity to conduct periodic assessments of environmental and natural resources. • Legally established institutions mostly by acts of parliament. • Well defined institutional structure for LDN: National Development Plans, Ministry of Water Development, Sanitation and Environmental Protection, Technical Services Branch of Ministry of Agriculture, Land and survey department.	**Legal** • Weak enforcement of land management-related legislation. • Conflicting application of legislation. • Delay in finalisation of pieces of legislation to operationalize the principal acts of parliament. • Inadequate enforcement. **Institutional** • Poor stakeholder management • Dilapidated and inadequate infrastructure of institutions. • Insufficient funds. • Low staffing levels. • Systems not automated (manual). • Weak interpersonal working skills and leadership. • Weak linkage with regional conservation initiatives. • Lack of training institutions that are specialized in providing relevant training. • Inadequate manpower and other resources to enforce the law. • Sustainability of most interventions- most are project based. • Poor funding to research initiatives.

OPPORTUNITIES	THREATS
Legal • Enabling conditions for PPPs. • Recognition of environment and climate change as an economic concern. • Linkages with trans - frontier conservation initiatives. • Presence of draft lands policy. • Second nation agriculture policy under development. • Available major Acts and policies are current (Environmental Management Act, Water Resource Management Authority Act, Agriculture Act, Forest Act. **Institutional** • Availability of skilled personnel in the labour market. • Growing interest of partners supporting environmental and climate resilient green growth. • Presence of a repository for all key geospatial data layers. • Presence of climate-smart agriculture alliance. • Presence of department of agriculture at all levels from national to sub-district level. • Decentralisation policy. • Seventh National Development Plan (7NDP). • Skilled human resource. • Environmental & fiduciary systems in place.	**Legal** • Weak legislative enforcements. • Changing institutional arrangements. • Weak or poor publicity for land management. • Delay in finalisation of pieces of legislation to operationalize the principal acts of parliament. • Disbursement of financial resources. **Institutional** • Seemingly unclear natural resource delineation stewardship between the policy holders and traditional systems, including judicial interpretation. • Encroachment of ecologically sensitive areas. • Strong and competitive private sector actors in land use. • Partner reluctance to finance green development infrastructure interventions. • Inconsistence government policies.

7.0 Setting LDN targets and measures

7.1 LDN targets

After careful consideration of the land use changes and the country's capacity to implement projects, the following targets were set.

- LDN is achieved by 2030 (no net loss).
- By 2030, the deforestation rate in Zambia is reduced by at least 50%.
- By 2030, 40% of households adopt appropriate alternative energy sources from fuel wood
- By 2030 maintain and/or improve the SOC content (no net loss).
- By 2030 good agricultural practices that mitigate loss of forest cover and SOC are increased from 6000 Km^2 in 2015 to 10,000 Km^2 in 2030.
- By 2030, Zambia shall seek to halt land use change of wetlands and ecologically sensitive areas and normal functions of these areas shall be achieved (no net loss).
- By 2030 integrated land-use planning adopted and practiced across the nation.
- By 2030 Land Degradation Neutrality values have been integrated in the Eight National Development plan, Programmes and other planning processes.
- By 2030, 50% of agricultural land is under sustainable agricultural practices compared to 2015.
- All land degraded in mining and quarrying areas rehabilitated by 2030 compared to 2015.
- By 2030 increase forest cover by 5% compared to 2015.
- By 2030 the production of timber wood fuel (charcoal & firewood) strengthened and regulated compared to 2015.
- By 2030 the mining industry contributes to management of surrounding indigenous forests and establishment of forest plantations for local communities' timber needs compared to 2015.
- By 2030 Catchment Management Plans for the six (6) catchments of Zambia incorporate measures to mitigate or prevent land degradation are developed.
- Increasing national water storage by at least 10% by 2030 (i.e. from 188 km^3 to 207 km^3).

7.2 Associated measures to achieve LDN

7.2.1 Policy Measures

- Support traditional leadership and communities to develop local level rules and regulation to facilitate effective management of forestry resources.
- Strengthen and regulate the harvesting of trees for charcoal production.
- Promote energy-efficient wood fuel production and utilization technologies.
- Enhance capacity building among stakeholders.
- Identify and legislate threatened and sensitive protected areas.
- Substitute fuels (such as diesel and HFO to biodiesel) and promote use of bio-fuel and substitute fossil fuels, where possible and promote renewable energy.
- On-grid expansion program to support economic growth and grid extension through inter-basin water transfer.
- Grid extension to non-electrified rural areas.
- Promotion of smart incentives for alternative energy sources adoption.
- Promote CPPPs in renewable energy technology development and utilization.
- Develop models for sustainable and regulated wood fuel production and promote energy-efficient wood fuel utilization technologies.
- Support certification of feedstock supply, improved production systems and capacity along wood fuel value chains.
- Promote rural biogas plants.
- Promote farm-based natural regeneration practices to increase forest cover.
- Promote minimum/zero tillage, composting, mulching and less use of inorganic fertilizers.
- Map ecologically-sensitive areas.
- Promote education and public awareness on wetlands.
- Support traditional leadership and communities to develop local level rules and regulations to facilitate effective management of wetlands.
- Promote dialogue and collaboration between government, private sector and communities on planning processes.
- Promote education and public awareness on integrated planning and institutionalize integrated land use planning compatible with management of natural resources and infrastructure development.

- Mainstream LDN into the national planning and budgeting processes.
- Conduct awareness and mainstreaming of LDN in educational programs.
- Strengthen an inter-departmental and sectoral coordination mechanism.
- Incentivize climate-smart agricultural practices that mitigate carbon emissions through market linkages.
- Promote investment into reducing post-harvest losses.
- Support land use planning to enable optimal location of agro-business concessions (farm blocks) and community climate smart agriculture.
- Promote livestock Conservation Smart Agriculture (CSA) practices through: improved feed management, animal health, rangeland management and use of drought-tolerant breeds.
- Promote sustainable and or CSA aquaculture practices.
- Support the operationalization of the environmental fund under the Environmental Management Act.
- Promote Integrated water resources planning.
- Promote implementation of flood and drought management plans.
- Strengthen protection and management of aquifers.
- Promote the protection of upstream catchment areas.
- Promote efficiency in water use and allocation.

7.2.2 Technical/Agronomical Measures

- Promote and enhance sustainable forest management.
- Forest enhancement including natural regeneration and afforestation/reforestation.
- Introduce sustainable charcoal production to include improved kilns and build capacity of charcoal producers and communities.
- Improve cooking devices to include improved biomass stoves, use of ethanol and LPG stoves, and switch to electric stoves.
- Enforce participatory forest management (Community Forest Management, Joint Forest Management) in accordance with the Forest Act of 2015.
- Enforce effective forest fire management
- Promote establishment of community forests
- Promote natural and assisted regenerations
- Promote implementation of the coupe systems.

- Promote establishment of woodlots by mining companies
- Develop and implement conservation plans program and guidelines for sustainable management of wetlands
- Define wetlands management areas and develop a wetlands classification system
- Establish, implement and maintain wetlands ecosystems restoration mechanisms
- Promote Conservation/ Climate Smart agriculture
- Promote climate-smart agricultural (CSA) practices related to production including uptake of agroforestry.
- Identify and restore/rehabilitate degraded land areas across the focal landscapes.
- Develop small water storage facilities to support irrigation, aquaculture, and livestock development to improve rural livelihoods and mitigate against poverty related land degradation
- Promote rain water harvesting.

8.0 Achieving LDN

8.1 Leverage already achieved

Some of the items under this section are discussed under section 3 above.

8.2 LDN transformative projects and programmes opportunities identified

Current and planned projects that have been identified to contribute to LDN are listed in the LDN transformation report. On-going projects include:

8.2.1 The regeneration project in Central province.

The Forestry Department is working with local traditional leadership. The objectives of the project are "to increase the rate of forest regeneration and promote climate-resilience adaptation practices among forest-dependent communities in Zambia's Central Province". The activities include:

(a) Piloting of Community-Based, Climate Adaptive Agro-forestry and Assisted Natural Regeneration Techniques.

(b) Integrated Climate-Resilient Fire Management (includes data collection for effective fir management as fire has been identified as a major inhibitor of regeneration).

(c) Increased Knowledge about, and uptake of, appropriate supply-side biomass energy production technologies.

8.2.2 Zambia Integrated Forest Landscape Project in Eastern province.

8.2.3 The Community-Based Forest Management Program in Eastern and Muchinga provinces.

8.2.4 Project on **"**Strengthening management effectiveness and generating multiple environmental benefits within and around greater Kafue National Park and West Lunga National Parks in Zambia"**.**

9.0 Conclusions

The Process

Zambia endorsed the LDN TSP in 2015, but the process to establish targets and get government's commitment did not start until July 2018. The LDN target setting process started with constituting the TWG from various government institutions in the land management value chain, academia, research institutions, GOs and development agencies. After constituting the TWG, the latter identified stakeholders, which culminated in a stakeholder meeting in October 2018. The major outputs of that stakeholder meeting were:

- Re-aligning the roadmap to complete the process by December 2018.
- The leverage plan.
- The legal and institutional framework for LDN in Zambia.

The TWG held meetings to provide inputs to and refine the baseline report and presented the same to stakeholders during the validation workshop held on 3rd January 2019. On 17th January 2019, the Zambian government endorsed the LDN targets and the associated measures.

Lessons learnt

- Establishment of the TWG was critical to the success of the process, as members brought in expertise from their various fields;
- It was important to have buy-in from the various stakeholders;
- Although stakeholders were present in the meetings, they mainly came from within Lusaka, hence would not be considered "nationally representative";
- Lack of funds limited the TWG from inviting stakeholders from outside Lusaka;
- The LDN targets that were set were at national level, with a hope to cascade implementation at sub-national level;
- Time for validating hotspots was not adequate, as teams that visited hotspots only interacted with government officials in the visited districts and did not meet the whole spectrum of local

stakeholders. In future, there should be more time and resources provided for data and information collection from/for sub-national level stakeholders.

10.0 Annexes

Annex 1: Dates and short description of working group meetings and workshops

Date	Activity	Objective	Output
28-29 Oct. 2018	Inception meeting at Ibis Garden lodge, Chisamba	To introduce the LDN process to stakeholders	Buy-in and support from stakeholders
	Submission of Leverage Plan, Institutional and legal framework	To understand opportunities and constraints of implementing LDN in Zambia.	Government's understanding of opportunities and constraints of implementing LDN
21st Nov. 2019	Technical Working Group Meeting at Purview, Kafue	For TWG to provide inputs to the baseline report.	Technically sound draft baseline report
3-8 Dec 2018	Field Visits to selected hotspots	To identify causes and verify extent of land degradation in the country.	Verified actual drivers of land degradation in the country.
18-19 Dec 2018	Technical Working Group Meeting at Purview, Kafue	To fine tune the baseline report prior to presentation to stakeholders for validation	Final baseline report
03.01.19	Validation workshop	Validate contents of the baseline report	Nationally accepted baseline report
31 Jan. 2019	Submission of baseline report	Meet the UNCCD requirements for possible resource mobilization	Summary of all reports and the LDN process.
	Submission of high-level note to UNCCD	To have government commitment to the LDN TSP process	High level note signed and sent.
11 Jan 2019	Submission of transformative programs report	To identify national and international land management-based programs for leveraging LDN	Snapshot and summary of nationally implemented projects.
12 Jan 2019	Submission of final national report	To complete the process and send the report to UNCCD	Zambia's national report.

Annex 2: Proposed composition of the LDN national technical working group and ToRs

LDN FOCAL AREA	COMPOSITION
LAND COVER	1. Ministry of Lands and Natural Resources • Forestry Department • Survey Department • Climate Change and Natural Resources Department • Lands Department) 2. Ministry of Agriculture • Technical Services Branch 3. National Remote Sensing Centre 4. Ministry of Local Government • Department of Physical planning 5. Ministry of Tourism and Arts • Department of National Parks and Wildlife 6. Ministry of Chiefs and Traditional Affairs 7. WWF 8. TNC 9. CIFOR 10. Savannah Research Institute (Professor Emmanuel Chidumayo) 11. ZEMA
LAND PRODUCTIVITY	1. Ministry of Agriculture • Department of Agriculture 2. Ministry of Livestock and Fisheries 3. Ministry of Mines and Minerals Development 4. Zambia Land Alliance 5. Total Land Care 6. One Acre Fund 7. International Union for Conservation of Nature 8. National Meteorological Department 9. ICRAF 10. Zambia Climate Change Network 11. CERED 12. WARMA
CARBON STOCKS ABOVE/BELOW GROUND	1. Zambia Agriculture Research Institute 2. The university of Zambia • Soils Department • Department of Geography and Environment Studies 3. The Copperbelt University • School of Natural Resources 4. FAO 5. UNDP

TERMS OF REFERENCE FOR THE LAND DEGRADATION NEUTRALITY TARGET SETTING PROGRAMME NATIONAL TECHNICAL WORKING GROUP

1.0 BACKGROUND

In September 2015, the United Nations General Assembly adopted "The 2030 Agenda for Sustainable Development", including 17 Sustainable Development Goals (SDG) and 169 targets. SDG 15 urges countries to protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss. Target 15.3 aims to "combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world" by 2030. The indicator adopted to measure the achievement of SDG target 15.3 is "Proportion of land that is degraded over total land area".

The twelfth session of the Conference of Parties (COP) of the United Nations Convention to Combat Desertification (UNCCD), held in Ankara, Turkey in October 2015, endorsed SDG target 15.3 and the concept of land degradation neutrality (LDN) as a strong vehicle for driving the implementation of the Convention. It invited all UNCCD country Parties to formulate voluntary targets to achieve LDN and requested UNCCD bodies to provide "guidance for formulating national LDN targets and initiatives" and to facilitate "the use of the UNCCD indicator framework as a contribution to the monitoring, evaluation and communication of progress towards the national LDN targets".

As a party to the convention (UNCCD), Zambia is obliged to voluntarily set its national land degradation neutrality targets and implement the program. The country, through the focal institution (Ministry of Water Development, Sanitation and Environmental Protection), has since embarked on the national target setting process and because LDN target setting is not a stand-alone process but should be embedded in overarching national development policy processes, strong county ownership and the active involvement of all stakeholder groups and sectors impacting the land based natural capital are essential, hence the formulation of this working group.

2.0 TERMS OF REFERENCE FOR THE WORKING GROUP (TWG) MEMBERS

The primary role for the TWG is to support the National Focal Institution for the United Nations Convention to Combat Desertification (UNCCD) to develop a National Land Degradation Neutrality (LDN) Target Setting Process (TSP). In doing so, the TWG will:

1. Provide technical advice and information on strategies, policies and plans in effect to Desertification Land Degradation and Drought (DLDD), Sustainable Land Management (SLM) and Land Degradation Neutrality (LDN) in Zambia.
2. Review and highlight appropriate literature on the trends and status of Desertification and Land Degradation in Zambia.
3. Review the national reports on Land Degradation.
4. Outline Land Degradation challenges and opportunities for land neutrality.
5. Determine the underlying drivers of Land Degradation in Zambia.
6. Determine the Theory of Change.
7. Determine the scope of interventions which respond to the drivers in line with the UNCCD Convention guidelines and other Environmental Conventions.
8. Contribute to the drafting and review of the National Land Degradation Neutrality (LDN) targets.
9. Participate in all the agreed meetings.
10. The tenure of TWG will run until the National Land Degradation Neutrality (LDN) Target Setting plan is submitted to the UNCCD Secretariat.

Annex 3: High Level Note

1.0 Introduction

Zambia is a and locked/linked country with an estimated are of 752,614Km2 and lies between latitudes 8°–18° S and longitudes 22°–34° E and covers a total surface area of approximately 75.3 million hectares. According to CSO (2010)[3] the population was estimated at 10.5 million and has since grown to about 16 million (CSO, 2018)[4] at an annual growth rate of 5.9%. The population grown comes with it demand for more land for settlement and agricultural and infrastructural development, among others, which eventually contributes to land degradation.

It has been documented that deforestation, while once between 250,000ha and 300,000ha per annum, has now been reduced to about 176,000ha per annum (GRZ, FAO 2016). Deforestation caused by agriculture, infrastructure development, charcoal production, not only have reduced forest cover, but have contributed to land degradation and loss of soil fertility. Both small scale farmers who shift from land to land in search of fertile land, and commercial farmers who expand vast areas of land and extensively use inorganic fertilizers contribute greatly to land degradation.

In spite of all the challenges that the country faces in land degradation, Zambia has over the years sought solutions to reverse the trend. Apart from participating in global initiatives such as the UNCCD and implementing multilateral agreements and other protocols like the UNFCCC, the Cancun Protocol and the Paris Agreement on climate change, the country has put in place several measures and programs meant to address these challenges. The Nationally Determined Contributions (NDC), the National bio-diversity Strategy, the Zambia Integrated Forest Landscape and the Integrated Land use Assessment (ILUA I and II) and the Conservation Strategy and the National Adaptation Program of Action (NAPA), are some of the national programs that the country has developed.

In addressing LDN Zambia notes that this concept cannot work in isolation but must be anchored in existing sustainable land management efforts implemented by various agencies and organizations and the national development agenda. LDN will also be aligned with Vision 2030, which coincides with the LDN implementation framework, the Seventh National Development Plan (7NDP) and the Sustainable Development Goal (SDG) 15.3, which states that “By 2030, combat desertification, restore degraded land

[3] CSO. 2010. Census of Population.
[4] CSO. 2018. Zambia in Figures.

and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world".

2.0 Achieving the LDN as a national priority

Zambia accepts the support rendered by the GM and UNCCD secretariat aimed at arresting the causes of land degradation in the country, to reduce, reverse and restore degraded land at national and sub-national levels. At policy level there are several frameworks that have been formulated and these include among others the forest policy, energy policy, agricultural policy, water policy and wetland policy. On the legal framework, key laws that support SLM include the Forest Act (2015), Environmental Management Act (2011), Energy regulation Act (1995), Urban Planning Act (2015), Land Act 1995, Wildlife Act 2015 and the Water Resource Management Act (2011).

As part of Zambia's efforts to find solutions for avoiding, minimizing and reversing land degradation, the country has accepted to adopt the Land Degradation Neutrality (LDN) Target Setting Process. The overall objective of LDN in Zambia is to achieve targets as set below.
Prior to developing the baseline using the globally accepted indicators (land cover, land productivity and soil organic carbon) and set targets, the country developed an LDN Leverage Plan, carried out an institutional assessment using the Strength, Weakness, Opportunity and Threats (SWOT) and carried out a legal and policy assessment as they relate to LDN in Zambia.

Following the baseline, Zambia identified and adopted key measures of a policy and technical nature aimed at achieving land degradation neutrality. These measures are nestled in national development policies and sectoral strategies, as well as integrating LDN in the country's national and sectoral policies, whose implementation is expected to be at provincial and district levels. As the country participates in LDN TSP, it is expected to benefit from the global uniform application of the process, which will result in improved ecosystems and socio-economic benefits.

3. Zambia's LDN Baseline

The national LDN baselines were set using the three globally adopted indicators which are land cover, land productivity and soil organic carbon. Guided by the UNCCD, three epochs (2000, 2010 and 2015) were used to establish the trends in the three indicators that were provided.

3.1 Land cover

According to GRZ (2016)[5] forest cover in Zambia were projected to be 42,096,087.5 hectares. In terms of total countrywide forest cover, North-Western Province occupied 20.6%, Western Province 18.5%, Muchinga Province 12.9%, Central Province 13.8%, Northern Province 8.2%, Southern Province 5.3%, Eastern Province 6.9%, Luapula Province 5.4%, Lusaka Province 3.7%, while forests in the Copperbelt Province covered 4.7% of the total forest cover (GRZ, 2016)[6].

The land cover change under review refers to the period between the year 2000 and 2015. Between this period there was some substantial land cover change. During the 15-year time lapse between 2000 and 2015 Zambia lost 11,000 km2 (2.3%) of forest cover due to various activities. During this period, grassland also decreased minimally by 361.54 km2 (0.22%), while there were increases recorded in cropland by 7,163.41 km2 (11.08%) from 64,665.55 to 71,828.96 km2; wetland also increased from 36,665.24 km2 to 36,805.78 km2 (0.38%); artificial surfaces had the highest proportional increase from 1,342.45 km2 to 5,016.58 km2 (265.52%), representing a 265% increase; water bodies also increased by (1.61%), and other lands by (22.17%). However, when considering the total land change, the change in land use resulted in a reduction of forest cover by 221 km2, from 738,864.52ha to 738,643.52 km2.

The main reasons for changes in land cover are deforestation, agricultural extensification, charcoal production, infrastructure development, high poverty levels, soil and water pollution due to chemicals used on land, erosion and siltation, gaps in the legal framework and enforcement, challenges in policy and legislative enforcement, and lack of monitoring activities that cause land degradation.

[5] FAO, GRZ. 2016. Integrated Land Use Assessment II (ILUA) Report
[6] ILUA II Report

3.2 Land Productivity

Out of total land area of 737,958.6 Km2, 297,250.8 Km2 (40.28%) was land with improved productivity. Land with stable productivity was 384,968.3 Km2 or 52.17%, while land with degraded productivity was 52,453.8Km2 (7.11%). About 3,285.7Km2 (0.45%) represented land without data.

Land productivity dynamics were measured based on parameters including; declining, moderate decline, stressed, stable and increase of production status. Under the tree covered areas, some 1,864.2 km2 deteriorated, representing a 0.4% declined in productivity. Only 1.6% of tree cover (8,302.98km2) was considered moderately declined while 2.5% (11,624.55km2) was described as stressed. But 43% (195,667.62 km2) was deemed stable and 53% of forest cover increased in its productivity.

The land productivity under cropland decreased by an average of 4% (3057.23 km2), an attribute of poor agricultural practices. However, 68% of the crop land remained stable although 4% was described as being stressed. The areas under grasslands and wetlands experienced a 20% general increase in productivity. As expected, areas under artificial surfaces reduced in its productivity by 5%.

3.3 Soil organic carbon

The baseline soil organic carbon was 59.3t/ha covering 459,259.41 Km^2 for forest areas; 60.08t/ha for grassland covering 171,927.79Km^2, and 52.17t/ha for croplands with an estimated area of 77,650.34 Km^2. Others are wetlands at 104.59 t/ha for 28,159 Km^2, artificial areas at 57.00t/ha on 423.61 Km^2 of land and other lands at 58.94 t/ha covering 36.76 Km^2. SOC was obtained at a depth of 30cm. Figure 4 shows the distribution of SOC in the country.

Soil organic carbon is a measurable component of soil organic matter. It is one of the essential constituents of the soil that determine fertility, consequently affecting plant growth, hence land productivity.

The greatest loss in SOC was incurred during the change in land use from tree cover and grassland to cropland between the year 2000 and 2015. During this period, the conversion of tree cover and grassland to cropland resulted in over 12% SOC loss. However, when tree cover and grasslands were converted to wetlands, there was a net gain of 4,064 and 12,104 tons of SOC respectively, representing over 74% increment.

BRIEF SUMMARY OF THE LDN TARGETS SET AND ASSOCIATED MEASURES IDENTIFIED, WITH PROPOSED TIMELINES

LDN NATIONAL WIDE TARGETS

	Target	Proposed Measures
1.	LDN is achieved by 2030 (no net loss)	All measures applicable
2.	By 2030, the deforestation rate in Zambia is reduced by at least 50%	• Promote and enhance sustainable forest management • Forest enhancement including natural regeneration and afforestation/reforestation • Sustainable charcoal production to include improved kilns • Improved cooking devices to include improved biomass stoves, use of ethanol and LPG stoves, and switch to electric stoves • Participatory forest management (CFM, JFM, PFM) • Forest fire management • Promote registration of community forests
3.	By 2030, 40% of households adopt appropriate alternative energy sources from fuel wood	• Fuel switch (diesel/HFO to biodiesel) • Fuel switch (coal to biomass) • Switch from existing isolated diesel to mini-hydro • Introduce and increase blending of bio-fuels with fossil fuels and where possible substitution with bio-fuels • Off-grid RE to non-electrified rural P.V and wind • On-grid expansion program to support economic growth and grid extension through inter-basin water transfer • Grid extension to non-electrified rural areas • Promote alternative renewable energy sources (e.g., mini hydro, solar, biogas, geothermal, wind, etc.) • Promotion of smart incentives for alternative energy sources adoption • Promote CPPPs in renewable energy technology development and utilization • Develop models for sustainable and regulated wood fuel production • Promote energy-efficient wood fuel utilization technologies.

		• Support certification of feedstock supply, improved production systems and capacity along wood fuel value chains. • Develop incentive mechanisms for sustainable wood fuel production and utilization • Build capacity of charcoal producers and communities
4.	• By 2030 Maintain and/or improve the SOC content (no net loss) • By 2030 good agricultural practices that mitigate loss of forest cover and SOC are increased from 6000 Km^2 in 2015 to 10,000 Km^2 in 2030.	• Promote farm-based natural regeneration practices to increase forest cover • Promote minimum/zero tillage, composting, mulching and less use of inorganic fertilizers
5.	By 2030, Zambia shall seek to halt land use change of wetlands and ecologically sensitive areas and normal functions of these areas shall be achieved (no net loss).	• Mapping of ecologically sensitive areas and landscape-level planning • Develop and implement conservation plans, programs and guidelines for sustainable management of wetlands • Define wetlands management areas and develop a wetlands classification system • Establish, implement and maintain wetlands ecosystems restoration mechanisms • Promote education and public awareness on wetlands • Support traditional leadership and communities to develop local level rules and regulations to facilitate effective management of wetlands.

6.	By 2030 integrated land-use planning adopted and practiced across the nation	• Promote integrated land use planning systems • Promote dialogue and collaboration between government private sector and communities on planning processes • Promote education and public awareness on integrated planning • Promote local area planning systems • Institutionalize integrated land use planning compatible with management of natural resources and infrastructure development
7.	By 2030 Land Degradation Neutrality Values have been integrated in the Eight National Development plan, Programmes and other planning processes	• Promote mainstreaming of LDN into the national planning and budgeting processes • Conduct awareness and mainstreaming of LDN in educational programs • strengthen an inter-departmental and sectoral coordination mechanism
8.	By 2030, 50% of agricultural land is under sustainable agricultural practices compared to 2015.	• Promote Conservation/ Climate Smart agriculture • Promote Rural biogas plants • Promote Rural biomass electricity generating facilities • Promote climate-smart agricultural (CSA) practices related to production including uptake of agroforestry. • Incentivise climate-smart agricultural practices that mitigate carbon emissions through market linkages • Promote investment into reducing post-harvest losses • Support land use planning to enable optimal location of agro-business concessions (farm blocks) and community climate smart agriculture. • Promote livestock CSA practices through: improved feed management, animal health, rangeland management and use of drought-tolerant breeds. • Promote sustainable and or CSA, aquaculture practices
9.	All land Degraded rehabilitated in mining and quarrying areas by 2030 compared to 2015.	• Identify and restore/rehabilitate degraded land areas across the focal landscapes. • Enhance natural regeneration and re-vegetation of degraded areas through assisted natural regeneration (ANR)17 and tree planting

10.	By 2030 Increase forest cover by 5% compared to 2015	• Promote afforestation and reforestation • Promote natural and assisted regenerations • Promote establishment of community forests • Support traditional leadership and communities to develop local level rules and regulation to facilitate effective management of forestry resources. • Expand the forest -protected area systems to include Joint forest management areas, community and private forests
11.	By 2030 the production of timber wood fuel (charcoal & firewood) Strengthened and regulated compared to 2015	• Promote implementation of the Coupe systems • Strengthen and regulate the harvesting of trees for charcoal production • Promote energy-efficient wood fuel production and utilization technologies. • Enhance capacity building among stakeholders
12.	By 2030 the mining industry contribute to management of surrounding indigenous Forests and establishment of forest plantations for local community's timber needs compared to 2015	• Threatened and sensitive protected areas identified and legislated • Promote establishment of woodlots by mining companies. • Support the operationalization of the environmental fund under the Environmental Management Act
13.	By 2030 Catchment Management Plans for the six (6) catchments of Zambia that incorporate measures to mitigate against or prevent land degradation developed	• Promote Integrated water resources planning • Promote implementation of flood and drought management plans • Strengthen protection and management of aquifers • Promote the protection of upstream catchment areas • Promote efficiency in water use and allocation
14.	Increasing national water storage by at least 10 % by 2030 (i.e. from 188 km^3 to 207 km^3)	• Develop small water storage facilities to support irrigation, aquaculture, and livestock development to improve rural livelihoods and mitigate against poverty related land degradation • Promote rain water harvesting

National Reference Documents:

1. Strategic Plan 2014 to 2016, Ministry of Lands, Natural Resources and Environmental Protection in conjunction with the management Development Division, Cabinet Office
2. Zambia's Second National Biodiversity Strategy and Action Plan (Nbsap-2) (2015), Ministry of Lands, Natural Resources and Environmental Protection
3. National Strategy to Reduce Deforestation and Forest Degradation, Ministry of Lands, Natural Resources and Environmental Protection Forestry Department
4. The Seventh National Development Plan 2017-2021 (Volume 2), Ministry of National Development Planning
5. National REDD+ strategy
6. National Environmental policy (2007)
7. National agriculture policy.

Annex 4: Participant List

MINISTRY OF WATER DEVELOPMENT SANITATION AND ENVIRONMENTAL PROTECTION

PARTICIPANTS LIST FOR THE LAND DEGRADATION NEUTRALITY TARGET SETTING PROGRAM INCEPTION MEETING SCHEDULED FOR 28TH TO 30TH OCTOBER, 2018

	Name of participant	Position	Name of institution
	Dr. Bishop Ed Chomba	Permanent Secretary	MWDSEP
1.	Michael C. Melele	Protocol	MWDSEP
2.	Aaron Mwape	Transport Officer	MWDSEP
3.	Pasco Mumba	Statistician	Central Statistics Office
4.	Lungu Mfumu Richard	Assistant Director	MWDSEP – EMD
5.	Rodwell Chandipo	PI – PR	ZEMA
6.	Philippa Hamakasu	ERO	MWDSEP – EMD
7.	Abraham Makano	Consultant	UNCCD
8.	Mwiya Mooka	Principal Land Surveyor	Ministry of Lands and Natural Resources
9.	Jones Yengwe	Lecturer	University of Zambia – School of Agriculture/Social Sciences
10.	Noah Zimba	Facilitator	GBN/C_2A
11.	Dorothy Muleya	Forestry Technologist	Ministry of Lands and Natural Resources
12.	Cecilia Mwengwe	Principal Planner	Ministry of Local Government
13.	Stalin Sichinga	Principal Agricultural Research Officer	Zambia Agricultural Research Institute
14.	Innocent Mulauzi	Principal Agricultural Specialist	Ministry of Agriculture, Department of Agriculture
15.	Bwalya Sashi	Principal Planner	MWDSEP
16.	Loreta Mwansa	Senior Lands Officer	Ministry of Lands and Natural Resources
17.	Gambwe K. Sikantongwe	Natural Resources Management Officer	Climate Change and Natural Resources Department
18.	Godwin F. Gondwe	Director - EMD	MWDSEP
19.	Mirriam Mbewe	EMO – EMD	MWDSEP
20.	Esther G.M. Mulekwa	PERO – EMD	MWDSEP
21.	Michael K. Phiri	Technical Expert	NRSC
22.	Steward Tembo	Driver	MWDSEP
23.	Bernard Mwanza	Driver	MWDSEP
24.	Mukuka Ellias	R/C	MWDSEP