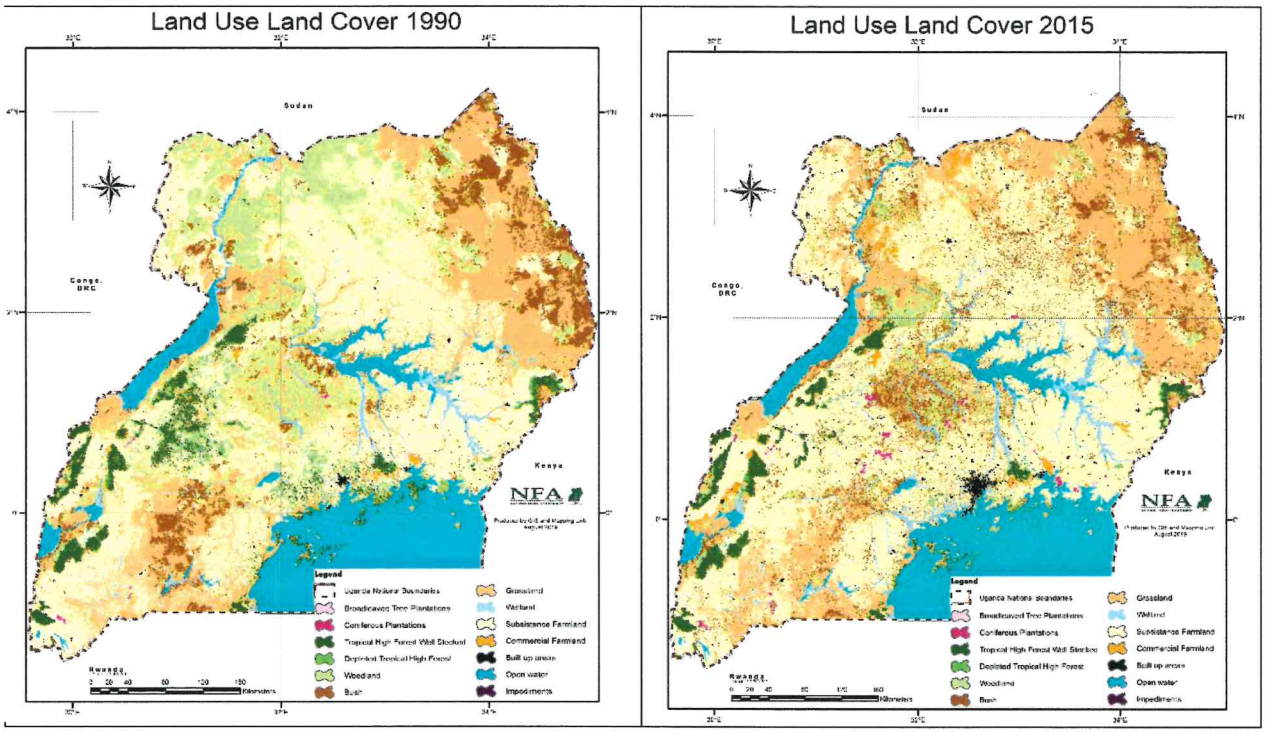
UGANDA BUREAU OF STATISTICS

THE REPUBLIC OF UGANDA

NATIONAL LAND PHYSICAL ASSET ACCOUNT FOR UGANDA: TECHNICAL REPORT



Uganda Natural Capital Accounting Program

WAVES

WORLD BANK GROUP

October 2019

FOREWORD

The Uganda Physical Asset Accounts for Land are an important initial milestone towards the attainment of a comprehensive set of System of Environmental Economic Accounts (SEEA) for the country. Natural Capital Accounting (NCA) has long been espoused in Uganda, with the need to ensure sustainable economic development that recognizes the value of country's natural capital being enshrined in the National Constitution (1995). The Uganda Green Growth Development Strategy (UGGDS) 2017/18 – 2030/31 included the natural capital approach as one of the ways to attaining sustainable development in the country and achieving the Sustainable Development Goals (SDGs).

Natural capital includes everything that we get from nature: clean air and water, fish, forests, other biodiversity, and minerals, and more. For too long, society has taken natural resources for granted. By failing to appreciate their value, we have undermined the very resources on which we depend. Natural capital accounting (NCA) refers to the inclusive and sustainable way of promoting economic growth: by measuring natural capital, recognizing their value, and incorporating that information directly into national economic accounts and statistics.

Since 2016, a series of NCA activities supported by the United Nations Statistical Division (UNSD), United Nations Environment Programme (UNEP) and the UNEP World Conservation Monitoring Centre (UNEP WCMC) have taken place and led to the production of draft national water accounts, biodiversity accounts, preliminary forest account, and a draft National Plan for Advancing Environmental Economic Accounting in Uganda. With the support of the World Bank Wealth Accounting and the Valuation of Ecosystem Services (WAVES) Program, the Government of Uganda is implementing the NCA activities, including developing accounts for land, forests, and wetlands. Land Accounts are the basic building blocks of the accounting frameworks. Their main role is to show the changes in land use and land cover associated with human activity and natural processes.. Uganda's physical asset accounts for land shows the land cover/land use changes over a 25 year timeline, from 1990 and 2015. The accounts presented are for the national level land cover, by the four regions (central, east, north and west), by 11 sub-regions of Acholi, Central North, Central South, East Central, Elgon, Karamoja, Lango, Southwest, Teso, West Nile and Western, and by the 112 Districts based on the Districts number on July 1, 2010.

The results of the Land Physical Accounts accounts point to an increase in small scale farmlands and commercial farmlands, forest plantations, built up areas and bushlands. In contrast, natural forests, comprising woodlands and tropical high forests, and grasslands declined between 1990 and 2015. The results of the physical asset accounts for land were able to show which regions, sub-regions and districts experienced the most land cover change and the pecific land cover classes that changed.

On behalf of the Government of Uganda, the Uganda Bureau of Statistics would like to thank the World Bank WAVES program for the technical and financial support provided in developing Uganda's National Land Accounts. The Land Accounts provide a sound basis for land use planning and foundation for continued development of natural capital accounts in the country.

Chris N. Mukiza (PhD)
Executive Director
Uganda Bureau of Statistics

ACKNOWLEDGEMENT

Uganda's Land Physical Accounts 1990 to 2015 were developed through a stakeholder driven process led by a Technical Working Group for the Uganda Natural Capital Accounting (NCA) Program constituted from Ministries, Departments and Agencies (MDAs) of Government. The work has received technical and financial support from the World Bank's Wealth Accounting and the Valuation of Ecosystem Services (WAVES) Partnership Program. The Land Physical Asset Accounts for Uganda are part of Uganda's NCA Program that is also expected to produce forest and wetland accounts for Uganda. The Uganda Bureau of Statistics (UBOS) provides technical leadership in satellite accounts including the Land Physical Asset Accounts.

Gratitude is extended to the following for their contributions to the completion of the Land Physical Accounts for Uganda. The institutions are:

The Uganda Bureau of Statistics (UBOS)

The Ministry of Finance, Planning and Economic Development (MoFPED)

The Ministry of Water and Environment (MWE)

The Ministry of Lands, Housing and Urban Development (MLHUD)

The Forestry Sector Support Department

The National Planning Authority (NPA)

The National Forestry Authority (NFA)

The National Environment Management Authority (NEMA)

The Uganda Wildlife Authority (UWA)

The World Bank/ Wealth Accounting and Valuation of Ecosystem Services (WAVES)

The World Bank Uganda Country Office

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ACRONYMS

CD ROMs	Compact Disc Read Only Memory
CFR	Central Forest Reserve
DJM	Dual Joint Management
FAO	Food and Agriculture Organisation of the United Nations
FLR	Forest Landscape Restoration
FSSD	Forestry Sector Support Department
FY	Financial Year
GIS	Geographical Information System
GoU	Government of Uganda
IUCN	International Union for the Conservation of Nature
LCCS	Land Cover Classification System
LCCS	Land Cover Classification System
LFR	Local Forest Reserves
LGs	Local Governments
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MES	Macro-Economic Statistics
MFNP	Murchison Falls National Park
MLHUD	Ministry of Lands, Housing and Urban Development
MoFPED	Ministry of Finance, Planning and Economic Development
MoLG	Ministry of Local Government
MWE	Ministry of Water and Environment
MWLE	Ministry of Water, Lands and Environment
NCA	Natural Capital Accounting
NDP II	National Development Plan, Two
NDP III	National Development Plan, Three
NFA	National Forestry Authority
NORAD	Norwegian Agency for Development Cooperation
NPA	National Planning Authority
PA	Protected Area
REDD+	Reduced Emissions from Deforestation and forest Degradation (plus)
ROAM	Restoration Opportunities Assessment Methodology
SEEA	System of Environmental Economic Accounting
SEEA-CF	System of Environmental Economic Accounting – Central Framework
SEEA-EEA	System of Environmental Economic Accounting – Experimental Ecosystem Accounts
SNA	System of National Accounts
SPD	Statistical Production Division
THF	Tropical High Forests
UBOS	Uganda Bureau of Statistics
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNSD	United Nations Statistics Division
UWA	Uganda Wildlife Authority
WAVES	Wealth Accounting and Valuation of Ecosystem Services
WMZ	Water Management Zone

EXECUTIVE SUMMARY

The Government of Uganda (GoU) is in the process of establishing a System of Environmental Economic Accounts (SEEA) to augment the current System of National Accounts (SNA). Whereas the SNA provides an overview of economic processes, recording how production is distributed among consumers, businesses, government and foreign nations, the SEEA Central Framework (SEEA CF) is a multipurpose conceptual framework for understanding the interactions between the economy and the environment, and for describing stocks and changes in stocks of environmental assets. Introducing SEEA into Uganda's SNA aims to address the omission and underrepresentation of the contribution of the environmental resources, herein referred to as natural capital, to the national economy. Initiatives on SEEA are implemented under the framework national plan, "the National Plan on Advancing Environmental Economic Accounting". The national plan ensures alignment and coordination of Uganda's current and future Environmental-Economic Accounting initiatives and optimisation of potential applications of SEEA in the country.

Since October 2018, GoU with the support of the World Bank-led Wealth Accounting and the Valuation of Ecosystem Services (WAVES) Global Partnership Program has been implementing the Environmental-Economic Accounting under the World Bank-WAVES Natural Capital Accounting (NCA) program. The NCA program aims to mainstream natural capital into development policy dialogue and planning by integrating a set of accounts that will inform the Third National Development Plan (NDPIII) and other national and sectoral policies. The NCA program will increase understanding on the real contribution of natural assets and the ecosystem services to the economy and how the economy and its sectors affect the natural asset base.

The World Bank-WAVES NCA programme whose programming period is October 2018 to August 2020 is organized in three components. The three components are: (i) Accounts development, with the objective to strengthen UBOS in the production and dissemination of NCA by developing land accounts, forest resource accounts, forest and wetland ecosystem accounts, and supporting the production and dissemination of the National SEEA Compendium; (ii) Studies and activities to enhance accounts development, with the objective to address gaps that need special attention for future NCA implementation by developing an assessment of ecosystem services in the Albertine Rift and linkages between NCA and NDPIII; and (iii) Institutional engagement, capacity building and policy dialogue, with the objective to raise awareness and increase understanding on the possible policy applications of NCA through a strong communication strategy, implementing a series of training events and knowledge sharing activities and fostering inter-institutional dialogue on NCA.

The Initial land physical asset accounts (Land Accounts) for Uganda are the first SEEA accounts developed under the World Bank-WAVES NCA program. The program sought to start with the land accounts because they are the basic building block of natural capital accounts and underpin the creation of ecosystem accounts. The main role of the land accounts is to describe the area of land over an accounting period by land use and land cover and to show the various additions and reductions in land stocks associated with human activity and natural processes. Land in Uganda is a critical factor for production and an essential pillar of human existence and national development The Initial Uganda Land Accounts seek to contribute to the goal of Uganda's National Land Policy to ensure an efficient, effective and optimal utilisation and management of Uganda's land resources for poverty reduction, wealth creation and overall socioeconomic development.

Uganda's land accounts were developed based on the standard structure of physical asset accounts of the SEEA Central Framework. Asset accounts record both the opening and the closing stock of assets and the changes over the accounting period. The opening and closing stocks of an asset are compiled with information pertaining to the reference dates of the accounting period. The data for the national land cover were collected by the National Forest Authority (NFA) based on the cycle of the National Biomass Surveys (NFA 2002, 2009, 2015) and national forest inventories. The dates for the opening and closing for Uganda's land accounts start in 1990 up to 2015. The data appears in 5-year cycles; 1995 was skipped. Therefore, the time series covered is for 1990, 2000, 2005, 2010 and 2015. The entries concerning the changes between opening and closing stocks of each asset are divided into: (a) additions to the stock and (b) reductions in the stock. An additional row on net reductions was also introduced into Uganda's initial land accounts.

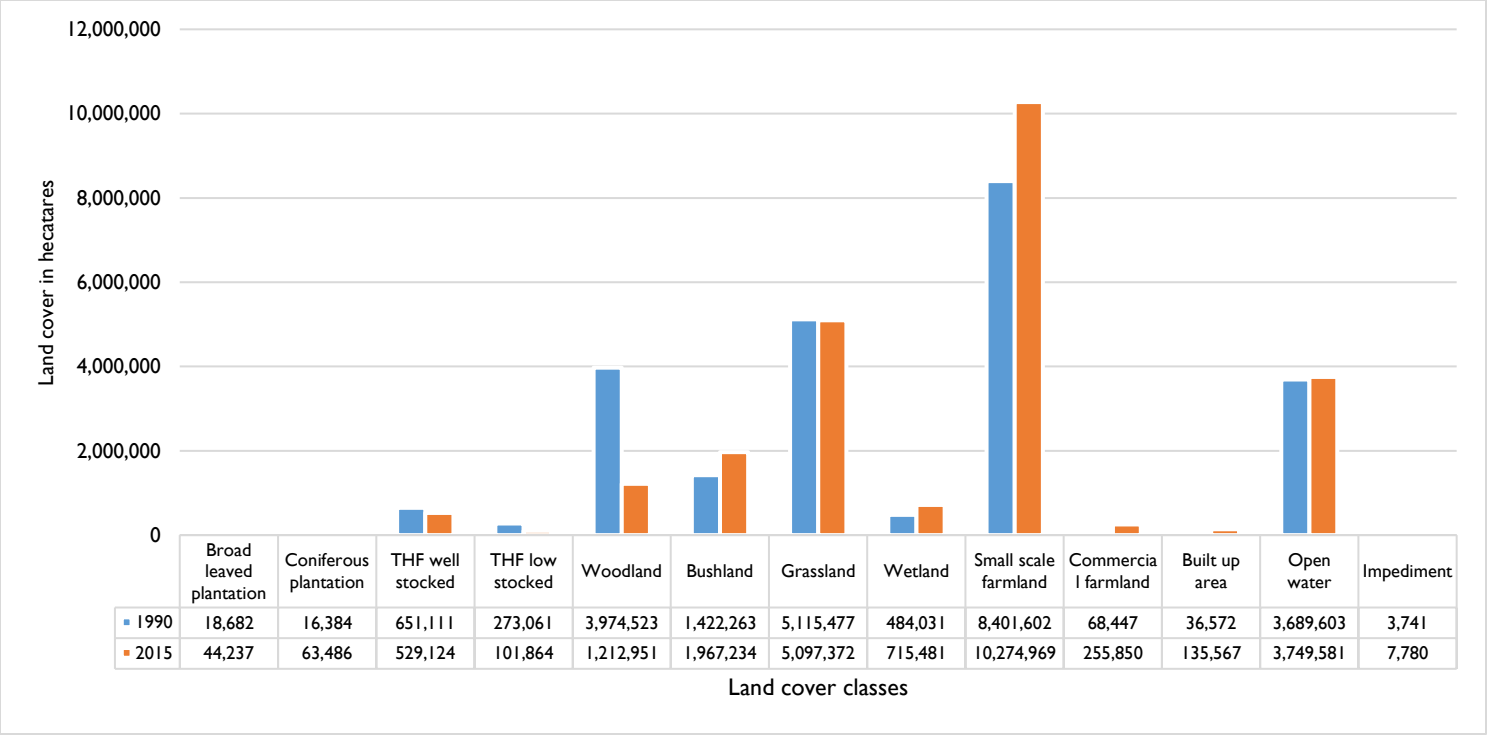
The report is organised into five sections. The introductory section explores the rationale, objectives and methods and tools used. The second chapter describes the national land accounts statistics (with presentation by forest landscape, by Water Management Zone, by agro-ecological zone, and by climate zone). The third chapter focuses on the land accounts for the four regions of Uganda; Central, Eastern, Northern and Western. The fourth chapter explores land accounts based on 11 sub-regions (Acholi, Central North, Central South, East Central, Elgon, Karamoja, Lango, South western, Teso, West Nile and Western). The fifth chapter describes the land accounts by the District, with boundaries as at July 1, 2010.

Results of Initial Physical Accounts for Land

National aggregate accounts

The results of the national land accounts show that Uganda had an overall land cover of 24.155 million hectares (ha) comprising forest plantations (broad leaved and coniferous plantations), Tropical High Forest (THF) (well stocked and low stocked), woodlands, bushlands, grasslands, wetlands, farmlands (small scale and commercial farmlands), built up areas, open water and impediments (See Annex 1). The major changes in land cover between 1990 and 2015 comprise an increase in small scale farmlands and an increase in the combined grassland and bushlands. The forest area declined from 20.4% to 8.1% over the same timeline.

The land cover transition between 1990 and 2015 was characterised by dominance of small scale farmlands largely at the expense of forest covers, especially woodlands. Grasslands were stable as a land cover while bushlands increased. Built up areas and commercial increased by nearly three and nearly four times, respectively.



	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediment
1990	18,682	16,384	651,111	273,061	3,974,523	1,422,263	5,115,477	484,031	8,401,602	68,447	36,572	3,689,603	3,741
2015	44,237	63,486	529,124	101,864	1,212,951	1,967,234	5,097,372	715,481	10,274,969	255,850	135,567	3,749,581	7,780

ES Figure 1: Overall change in distribution of land covers between 1990 and 2015

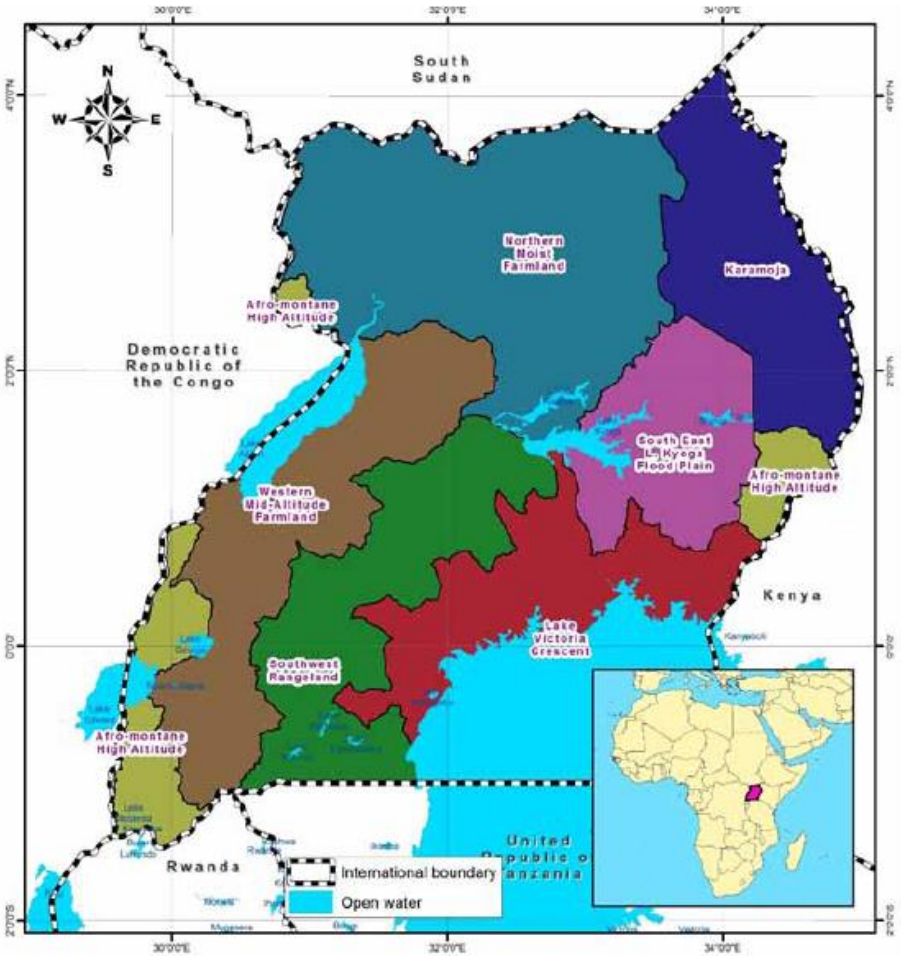
Forest Landscapes

The country is stratified into seven Forest Landscapes, namely: (i) Afro-montane; (ii) Karamoja; (iii) Lake Victoria Crescent; (iv) Northern moist; (v) South-East L. Kyoga floodplains; (vi) Southwest rangelands; and (vii) Western mid-altitude. By percentage cover, the Northern moist is the largest landscape at 24% of the national cover followed by the Lake Victoria crescent at 22%, the Western mid-altitude at 15%, the Southwest rangelands at 13%, the Karamoja landscape at 11%, the South East L. Kyoga floodplains at 9% and the Afro-montane as the smallest landscape at 6% of national land cover.

The Afromontane landscape had a total area of 1.466 million ha. The largest changes in land cover for Afromontane landscape occurred between 1990 and 2000 when there was a net gain of 101,641 ha for bushlands and a net reduction of 94,215 ha for woodlands. Over the same period, THF well stocked increase by 58,587 ha and small scale farmlands increased by 31,278 ha while grasslands declined by 72,093 ha. Between 2000 and 2005, the net changes in land cover were all relatively small, under15,000 ha. Overall, between 1990 and 2015, small scale farmlands and grasslands experienced marginal changes with a reduction of 0.12% and an increase of 0.9%, respectively. Woodlands reduced by 57%, tropical high forests increased by 9%, forest plantations increased by 25%, wetlands increased by 12.8% while bushlands increased by 49%. The stability of the Afromontane landscape in terms of land cover classes makes it well suited for biodiversity conservation and production of long term perennial crops. The emergence of oil gas particularly in the Albertine Graben may bring about long term pressures that could reduce the stability of the landscape. The landscape's protected areas contribute to the stability of the system, and the uniqueness of the farming system also supports consistency for small scale farmlands.

For the Karamoja landscape, the main land covers are grasslands followed by bushlands, woodlands and small scale farmlands at 1.45 million ha (52.6%), 731,523 ha (26.5%), 346,362 ha (12.6%) and 227,073 ha (8.2%) respectively. The largest land cover changes occurred between 1990 and 2005, especially

reductions for grasslands and woodlands as well as net gains for bushlands and small scale farmlands. The Karamoja landscape had the smallest proportion of its land cover under small scale farmlands. The small scale farmlands increased from 8% to 12% from 1990 to 2015.



ES Figure 2: Forest Landscapes of Uganda

Source: MWE and IUCN (2016)

The Lake Victoria Crescent is dominated by the open water system and small scale farmlands. The open water covers 2.8 million ha followed by the 1.39 million ha cover for the small scale farmlands. The trends of land cover change in the Lake Victoria Crescent show the dominance of small scale farmlands. Small scale farmlands increased between 1990 to 2000, 2005 to 2010, and 2010 to 2015 with a reduction occurring between 2000 and 2005.

The standout transition in the land accounts for the Northern Moist landscape was the reduction in woodland cover from 1.88 million ha to 336,737 ha. On the other hand, grasslands and small scale farmlands increased from 821,700 to 1.30 million ha and 2.62 to 3.15 million ha, respectively. In 1990, the 1.88 million ha woodlands in Northern Uganda represented 47% of the total woodland cover (3.97 million ha) of the country. The reduction in woodland cover that occurred between 1990 and 2015 was equivalent to a reduction of 37% of the woodland cover of the country. Expansion of small scale farmlands in the Northern Moist landscape mirrored a consistent shift observed across the country. For 1990 and 2015 respectively, small scale farm lands in Northern Moist increased steadily and were equivalent to 31% of the national small scale farmlands.

The South East Lake Kyoga Flood Plain Landscapes is located on the eastern side of the Lake Kyoga. The landscape is dominated by small scale farmlands (1.28 million ha), followed by grasslands (463,530 ha) and woodlands (81,392 ha). The small scale farmlands increased from 1.28 million ha to 1.49 million ha between 1990 and 2015 while grasslands and woodlands reduced. Whereas the North-South-East Lake Kyoga Flood Plains occupy only 9% of the national land cover, it had Uganda's largest wetland area, by landscape, in 1990 of 147,000 ha (30%). In 2015, the wetland cover increased to 233,839 ha (33%) in 2015.

In the Southwest Rangeland Landscape, grasslands were the dominant land use of livestock production in 1990. However, like in most of the country, crop production largely based on small scale farmlands became increasingly dominant from 28% to 43% of landscape cover. The increase in small scale farmlands was at the expense of grasslands, which reduced from 33% to 28% between 1990 and 2015.

The Western Mid Altitude Farmlands Landscape is located in the Albertine Rift, the country's most important biodiversity conservation zone. It is also host to the Albertine Graben, home to the country's oil and gas resources currently under development. The landscape is dominated by small scale farmlands (34%), followed by grasslands (21%) and woodlands (20%). The landscape. The landscape accounted for 52% of all the THF well stocked in the country in 1990 and 50% in 2015. Between 1990 and 2015, the grasslands declined by 16% while bushlands increased by 329%. The largest reduction in land cover was for woodlands which decreased from 691,513 to 307,034 ha while the largest increase was for small scale farmlands which increased from 1.25 million to 1.62 million ha.

Land Cover by Region

The regions of Uganda are known as Central, Western, Eastern, and Northern. These four regions are in turn divided into districts (*Annex 2*) The largest territory lies in Northern Uganda with 35% of the country's land cover, followed by Central region with 26%, Western region with 23%, and Eastern region, the smallest, with only 16% of the country's total area (MoLG 2018).

Central Region. Nearly 90% of the central region land cover in 1990 was concentrated in open water (35%), small scale farmlands (27%), grasslands (15%) and woodlands (12%). By 2015, the land cover had transitions. Whereas the open water was the dominant land cover, the 553,625 ha increase in small scale farmlands was the largest increase, followed by the 114,500 ha increase in bushlands. Conversely, woodlands reduced by 436,977 ha from 715,456 to 278,479 ha while grasslands reduced by 265,097 ha from 935,060 to 669,963 ha between 1990 and 2015.

Eastern Region. The Eastern region of Uganda is dominated by small scale farmlands. Open water was the second largest cover while the grasslands were also a relatively large land cover with an area of 572,573 ha in 1990. The trends of land cover for the eastern region show that small scale farmlands are the dominant land cover. The Eastern region had only 3.9 million ha as cover, of which 1.9 million ha in 1990 and 2.2 million ha in 2015 were covered by small scale farmlands. The increase in small scale farmlands is largely largely attributed to the rural population who are mostly small scale farmers.

Northern Region. The Northern region showed dominance of the small scale farmlands, grasslands and the woodlands in 1990. In 2015, small scale farmlands and grasslands maintained their dominance while the woodlands had been reduced by76.2% of the cover in 1990. Grasslands surged from 2.28 million to 3.05 million ha. The trend lines show that the small scale farmlands have steadily increased as the largest land cover. For Northern Uganda some of the transformation observed especially for the woodland cover was related to the transitions in security status of the landscape.

Western Region. The small scale farmlands increased from 1.94 million to 2.47 million ha between 1990 and 2015 largely due to thriving smallholder farming systems for the East African highland bananas

(matooke) and perennial tea estates and food crops production (UBOS 2018). Indeed, given the commercial success of the small scale farmlands, they are expected to continue expanding at the expense of grasslands, bushlands and natural forests. Woodlands reduced by 55% between 1990 and 2015, bushlands edged up by 109,376 ha, and commercial farmlands increased threefold from 26,297 ha to 75,948 ha. Forest plantations doubled over the 25 years, while the tropical high forests declined by 123,536 ha, about one-fifth of the THF cover in 1990. The lower than expected growth of the built up area might be an indication of the relative stability of existing land use options.

Land Cover by Sub-Region

In order to facilitate analysis of sub-national activity, the Uganda Bureau of Statistics initially grouped the country into 11 sub-regions (UBOS/UNHS 2012). The 11 sub-regions used are 1. Acholi, 2. Central North, 3. Central South, 4. East Central, 5. Elgon, 6. Karamoja, 7. Lango, 8. South-western, 9. Lango, 10. West Nile and 11. Western.

Acholi sub-region. The Land Physical Accounts of the Acholi sub-region show two major trends. First is the excess pressure put on woodlands in the landscape and the expansion of grasslands and small scale farmlands. In 1990, the landscape was dominated by woodlands (42%), small scale farmlands (40%) and grasslands (14%). Woodlands decreased by 85.5% between 1990 and 2015 while small scale farmlands and grasslands increased by 25% and 229%. Eighty-five percent

Central North sub-region. The trends in the sub-region show that small scale farmlands increased by 30% from 772,265 to 1.0 million ha between 1990 and 2015. Wetlands decreased by 65% from 628,271 to 222,214 ha, THF reduced by 81% from 42,037 to 7,879 ha while grasslands decreased from 21% from 419,127 to 330,020 ha. All the other land covers increased.

Central South sub-region. More than half (52%) of the sub-region's territory is covered by open water of the Lake Victoria and the River Nile basin in Uganda. The trends for the Central South sub-region show the dominance of the open water and the steady gradual increase of small scale farmlands. The sub-region had limited opportunities to provide additional land for the increasing small scale farmland as built up areas and commercial farmlands increased concurrently with the small scale farmlands. The sub-region likely experiences conflict and competition over land uses, particularly with the very large small scale farmlands, and the growing urban populations in the Lake Victoria basin areas including Kampala City and the other metropolitan areas. By 2015, the tropical high forests reduced by 56.5% from the levels of 1990 while the forest plant cover had increased by 7,417 ha. Wetlands increased 1.6 times from 54,249 ha to 141,479 ha and the built up areas increased from 14,405 to 61,879 ha between 1990 and 2015.

East Central sub-region. The standout land covers for the East Central sub-region in 1990 are the open water and the small scale farmlands with a cover of 838,779 ha and 749,221 ha, respectively. By 2015, the small scale farmlands had increased to 855,918 ha at the expense of woodlands and grasslands which dwindled to 2,583 ha and 9,982 ha, respectively in 2015. The trajectories for the land physical accounts for the East Central clearly show that the sub-region is getting to the point where there is no additional land for expansion of small scale farmlands. Already, the increasing small scale farmlands are likely to completely convert tropical high forests, woodlands and grasslands within the next five to 10 years if the change trends remain the same.

Elgon sub-region. The Elgon sub-region is the smallest in the country with an area of only 604,776 ha about 2.5% of the country's land cover. The trend lines show dominant small scale farmlands which increased further, from 57% in 1990 to 62% in 2015 of the regions land area. By 2015, the woodlands had reduced to one-fifth of their land cover for 1990. Like the East Central, the Elgon had limited land for

additional expansion of the farmlands. Similarly, land cover is needed to be able to allow for optimal land use. In addition, external and internal interventions of regulatory reforms and enforcement may be needed to optimally and sustainably utilise the land in the sub-region.

Karamoja sub-region. The Karamoja sub-region is the third largest behind the Western and Acholi sub-regions. It had an area of 2.76 million ha, i.e. about 11.4% of the national land cover. In 1990, the sub-region was dominated by grasslands (1.45 million ha), bushlands were second with 731,523 ha, woodlands covered 346,362 ha while small scale farmlands cover only 227,073 ha. Unlike all the other sub-regions, small scale farmlands were not the major livelihood/ land use in Karamoja in 1990. Nonetheless, small scale farmlands had the largest percentage increase in area of 46% between 1990 and 2015 suggesting an increasing importance within sub-region. Grasslands continued to be dominant and gained an additional land cover of 19.4% between 1990 and 2015 while woodlands and bushlands reduced by 45% and 31%, respectively. The sub-region still had additional land cover to expand smallholder farmlands and commercial farmlands. Nonetheless, the area of open water is quite small at just 292 ha in 2015.

Lango sub-region. The Lango sub-region, also in northern Uganda, is dominated by small scale farmlands which cover 894,390 ha equivalent to 65% of the 1.37 million ha of land cover for the sub-region. In 1990, the small scale farmlands were nearly five times larger than the second largest land cover of grasslands and seven-times larger than the third largest land cover of woodlands. The open water area occupied about 8.3% of the entire sub-region; therefore, it would be possible to introduce irrigation using surface water for the farmlands. The sub-region had little natural forest cover outside of woodlands in 1990. But by 2015, most of the woodlands had been converted into other land cover and only 28,223 ha, one-fifth of the woodland land cover in 1990, was left.

South Western sub-region. The South-western sub-region covers an important agriculture and tourism zone for the country. According to the 2008 Agriculture Crop Census (UBOS 2009), the south west produced over 60% of all the East African highland cooking bananas (Matooke) in the country. The trends show an increase in small scale farmlands from 946,607 ha to 1.014 million ha and a decrease for grasslands from 717,515 to 704,346 ha. Woodlands decreased from 60,202 to 54,207 ha while bushlands which decreased by 69,806 ha from 192,687 to 122,881 ha ha. The relative stability of the sub-region indicates stable land cover/ land use patterns. The crop and livestock enterprises are fairly stable and fairly homogenous across the sub-region; therefore, land cover and land use are stable and predictable. The long-term nature of the small scale farmland enterprises also means that the communities have learned to integrate the need for wood fuel, timber, pastures and sustainable water resources into their land use plans. The challenge for the sub-region is that a considerable area lies within the protected areas. Therefore, future population increases are likely to result into migration from the sub-region to other sub-region. The sub-region may be close to full saturation between land use and current inhabitants.

Teso sub-region. The Teso sub-region lies in eastern Uganda. The sub-region occupies 1.49 million ha, of which 54% was under small scale farmlands in 1990 which increased to 65% by 2015. The trend lines show that the small scale farmlands are the major influence within the sub-region. The rapid 30,160 ha reduction in woodlands from 50,727 to 20,567 ha between 1990 and 2005 was also a major feature and this continued throughout the 25-year assessment period. The other land cover systems were fairly stable with minimal changes with the exception of wetlands and bushlands that experience large increases. Whereas a large area of the sub-region is used for small scale farmlands, and alternative land covers are small, the increase in bushlands from 15,664 ha to 90,258 suggests that, in addition to future limitations of land, that there may be challenges with both land productivity and utilisation in the short to medium term. However, allocation of 65% of the land in 2015 to small scale farmlands means that there is limited land

for other land uses and both efficiency in land use and a growing population that relies on small scale farmlands for livelihoods will increase conflict over land and result into migration to other areas in search of land for production.

West Nile sub-region. The West Nile sub-region occupies an area of 1.58 million ha, equivalent to 6.5% of the national land cover. The sub-region had two dominant land covers in 1990, together covering 77% of the sub-region - small scale farmlands covering 653,013 ha (41.4% of the sub-region) and woodlands with 559,990 ha (35.5% of the sub-region). Grasslands occupied 15% of the sub-region and only 7% of the sub-region was occupied by the other 10 land covers. The trends for land cover change reinforce the dominance of the small scale farmlands and the decline of woodlands within the sub-region. The West Nile region has over the last 25 years been a refugee hosting areas area, and recent results show that population increase may have resulted into an increase in degradation of woodlands, bushlands and crop lands within a 5 to 15 km from refugee settlements. The sub-region is small in area despite the high demand on land based resources. The West Nile region may not be at risk of saturation of land cover and land use but there are indications that the land use patterns do not provide efficiency. The rapid loss of natural forest cover of 419,695 ha of natural forest cover in 25 years or 16,788 ha/year) means a deficit of wood fuel would be expected in future and the expansion of bushlands suggests that some of the land is underutilised. The area for forest plantations is quite low and unlikely to meet the needs for timber for the sub-region therefore, timber would have to be imported into the sub-region.

Western sub-region. The Western sub-region is the largest in the country with an area of 3.36 million ha, or about 14% of the national land cover. The Western sub-region lies along Uganda's border with the Democratic Republic of the Congo (DRC). The sub-region is also the central component of Uganda's Albertine Graben where most of Uganda's current oil discoveries under development are located. The region hosts key protected areas including Murchison Falls National Park, Budongo and Bugoma Central Forest Reserves, Toro Semliki Wildlife Reserve, and Semuliki National Park, among others. The trend line for the sub-region's land cover shows the steady increase of small scale farmlands while the grasslands, tropical high forests, and woodlands are reducing. Wetland cover, forest plantations, commercial farmlands and built up areas increased. The Western sub-region is traditionally important in the production of maize and sugarcane, and several food crops (UBOS 2009, 2018). From the perspective of the land accounts, the optimal use planning is critical to the success of the land uses within the sub-region. The rapid expansion of agriculture may be related to the industrial need of sugarcane for the sugar industry and cogeneration of electricity while the expansion of food crop may be for both subsistence needs and commercial maize, cassava and beans production, among others.

Conclusions

1. Based on national aggregates, the land cover class for small scale farmlands showed consistent increase while forest cover, particularly woodlands and tropical high forests, generally declined. Grasslands stabilized after fluctuations, while bushlands increased. Wetlands increased from 1990 but reduced from 2000. Built up areas and tree plantations increased.

2. The Afromontane forest landscape, western region, and the south western sub-region experienced more stability and had only marginal changes in land cover compared to the other land cover types, regions and sub-regions respectively. This may be attributed to the higher concentration of protected area or conservation activities with long-term perennial crop systems fairly stable. Long-term land use plans such as those used for protected areas and stable land use in the case of perennial crop production minimize regular land use/ land cover change.

3. The land cover change trends point small scale farmlands croplands as the most common land cover and there by land use followed by tropical high forests. The gains in small scale farmlands were largely achieved through conversion of grasslands and woodlands which seem to be the less preferred land covers.

4. Some of the conversion that occurred in woodlands and grasslands was likely related to over harvesting of existing resources such as harvesting of woodlands for wood fuel production, and over grazing of grasslands, among others.

5. Small scale farmlands tend to be largely subsistence in nature which is associated with low productivity and land fragmentation. The low productivity of small scale farmland was likely to perpetuate expansion of farmland at the expense of the other existing land cover/land uses in order to achieve increased production.

Emerging Issues

1. This report comprises the first iteration of land accounts for Uganda. While the data are indicative the accounts are not fully comprehensive. For example, the report includes only physical accounts for land. The opportunity for developing monetary accounts for land will be considered at a later stage. At the sub-regional level, the number of sub-regions were increased to 15 (2016/17) from 11 (2011/12)[1]. When this report was produced, data pertaining to these 15 sub-regions was not yet available. Expanding to cover the 15 regions will also be considered in a later stage.

2. The land physical accounts are presented at several scales. Sub-national users of these accounts may seek to revise existing spatial distribution of land use to boost livelihoods, economic performance and social equity. At the national and international level, these accounts will support review and/or evaluation of the targets of the National Development Plans and the long-term development strategic frameworks such as Vision 2040 and Uganda's attainment of the Sustainable Development Goals, among others.

3. There are different land cover and other classifications in use in Uganda. For example, the agricultural sector uses 10 agro-ecological zones while the land cover classes of the National Biomass Surveys, on which the land accounts were based, have only four agro-ecological zones. Additionally, the classification of the climate zones is not readily available in literature on climate in Uganda. These differences mean that a stronger emphasis is needed on standardization of areas used for the production and use of the accounts. It also recognised that different types of classifications will be useful for different purposes and selecting the most appropriate classifications will need to be a considered process.

[1] Uganda National Household Survey 2009/10; and UNHS 2016/17

GLOSSARY

Broad-leaved plantations (Class 1)	Broad leaved plantations are planted trees or forests of hardwood including *Eucalyptus* spp., *Maesopsis eminii*, *Acacia mearnsii* (Black Wattle) and some *Markhamia lut*ea.
Built up area (Class 11)	These are artificial surfaces including built up urban areas, airports, village trading centres, internally displaced people's camps, schools, and recreational grounds.
Bushlands (Class 6)	Bushlands refers to vegetation dominated by bush, scrub and thicket growing together as an entity, but not exceeding an average height of 4 meters. Bush; called shrubs in LCCS is also graded as closed, open or very open. Shrubs can occur naturally as a climax on its own but in many cases occur as a result of forest or woodland degradation.
Commercial farmlands (Class 10)	These are large fields of farmland usually under one crop type. In Uganda these are traditionally Sugar and tea estates, but in Masindi, Kabarole and Kasese districts, maize and cotton were found grown on large scale.
Coniferous Plantations (Class 2)	These are planted trees or forests of softwood including the Conifers; Pine spp. and Cypress spp.
GeoVis	Software for photographic interpretation and geographical data management
Grasslands (Class 7)	Grasslands are rangelands, grazing grounds, improved pastures or natural savannah grassland. Various trees - bush/woody vegetation frequently occur on this land, but grass dominates the landscape.
Impediments (Class 13)	These include bare rocks, bare soil, quarries and usually have little or no biomass.
Natural Capital	includes everything that we get from nature: clean air and water, fish, forests, unique biodiversity, diamonds and other minerals, and more
Natural Capital Accounting (NCA)	An inclusive and systematic way of measuring natural capitalresources, recognizing their value, and incorporating that information directly into national economic accounts and statistics. It puts statistics on the environment and its relationship to the economy at the core of official statistics.
Open Water (Class 12)	Open water includes lakes and rivers. The expanse of open water in Uganda cover about 18% of the national territory.
SEEA Central Framework	The SEEA Central Framework is a multipurpose conceptual framework for understanding the interactions between the economy and the environment, and for describing stocks and changes in stocks of environmental assets.
Small scale farmland Area (Class 9)	- Farmland areas including small holder subsistence farm units cover 50-90% of the land cover of Uganda. Scattered trees are frequently found in the vicinity of the homesteads. Examples include fruit trees and various multipurpose trees integrated in the farming system (agro forestry), The cropping systems include mono-and mixed cropping.
System of National Accounts (SNA)	The SNA is the internationally agreed standard set of recommendations on how to compile measures of economic activity. The SNA describes a coherent, consistent and integrated set of macroeconomic accounts in the context of a set of internationally agreed concepts, definitions, classifications and accounting rules. The

	SNA provides an overview of economic processes, recording how production is distributed among consumers, businesses, government and foreign nations
The Bonn Challenge	The Bonn Challenge is a global effort to bring 150 million hectares of deforested and degraded land into restoration by 2020 and 350 million hectares by 2030
Tropical High Forest (THF) Well Stocked or normal (Class 3)	These are natural forests rich in species biodiversity i.e. flora and fauna i.e. normally stocked forest, for example Mabira Forest along Kampala-Jinja highway
Tropical High Forest Low Stocked, depleted or encroached (Class 4)	THF low stocked are natural forests rich in species biodiversity but with reduced species richness and composition dominated by secondary growth of bush and shrubs, in particular *Solanum gigantea*.
Wetlands (Class 8)	Wetlands comprises of permanent wetland (usually with papyrus and reeds) or seasonally flooded areas. Both types can be identified by presence or absence of certain species
Woodlands (Class 5)	Woodlands are wooded areas where trees and shrubs are predominant. There are wet and dry types. The wet type occurs as a zone along wetlands (riverine forest) and the dry type is found on grass-covered upland areas.

CHAPTER ONE
INTRODUCTION

1.1 Background

1.1.1 The Uganda Natural Capital Accounting Project

Natural capital includes everything that we get from nature: clean air and water, fish, forests, other biodiversity, and minerals, and more. For too long, society has taken natural resources for granted. By failing to appreciate their value, we have undermined the very resources on which we depend. Natural capital accounting (NCA) refers to the inclusive and sustainable way of promoting economic growth: by measuring natural capital, recognizing their value, and incorporating that information directly into national economic accounts and statistics (World Bank 2017). The internationally agreed methodology for natural capital accounting is the System of Environmental-Economic Accounting (SEEA). The SEEA is a framework that contains the standard concepts, definitions, classifications, accounting rules and tables for producing internationally comparable statistics on the environment and its relationship with the economy. It guides the compilation of consistent and comparable statistics and indicators for policy making, analysis and research (United Nations et al. 2014).

The Uganda Natural Capital Accounting (NCA) program aims to mainstream natural capital into development policy dialogue and planning by integrating a set of accounts that will inform the Third National Development Plan (NDPIII) and other national and sectoral policies. The aim of the program is to increase understanding, among other things, on what is the real contribution of natural assets and the ecosystem services to the economy and how does the economy and its sectors affect this natural asset base. NCA can address different questions about the relationship between natural capital and the economy. Some initial policy questions include: what is the real contribution of natural assets and the ecosystem services they provide to the national economy? How does the economy and its sectors affect the natural asset base?

The World Bank-led Wealth Accounting and the Valuation of Ecosystem Services Partnership (WAVES) is providing technical and institutional knowledge for producing natural capital accounts, analysing results, and using the findings to inform policy and planning. The WAVES Partnership grant is supporting a range of valuation studies (e.g. on ecosystem services, wood fuel), capacity-building, knowledge exchange and support for preparing and publishing natural capital accounts. The Ministry of Finance, Planning and Economic Development (MoFPED), and the Uganda Bureau of Statistics (UBOS), the National Planning Authority (NPA), the Ministry of Water and Environment (MWE) and the National Environmental Management Authority (NEMA) lead implementation of the project.

1.1.2 Land in the context of Uganda's economic development

Land is a unique environmental asset that delineates the space in which economic activities and environmental processes take place and within which environmental assets and economic assets are located (United Nations 2014). Land is a most basic resource that provides space, contains and supports environmental resources, and it represents and generates capital. Land in Uganda is a critical factor of production and an essential pillar of human existence and national development (MHLUD 2013). The Initial Uganda Land Accounts seek to contribute to the goal of Uganda's National Land Policy (2013) to

ensure an efficient, effective and optimal utilisation and management of Uganda's land resources for poverty reduction, wealth creation and overall socioeconomic development.

This report of Uganda's land accounts captures the spirit of four of the seven guiding principles of the National Land Policy. The principles captured are:

- Effective regulation of land use and development;
- Optimal land use and sustainable management for economic productivity and commercial competitiveness;
- Transparency and accountability in democratic land governance; and
- Land as the central factor in leveraging other productive sectors.

The importance of land in Uganda is reflected by the coverage it is given in the National Constitution (1995). Under the National Objectives and Directive Principles of State Policy XIII (Protection of natural resources) it states; "the State shall protect important natural resources, including land, water, wetlands, minerals, oil, fauna and flora on behalf of the people of Uganda." On the one hand, land is a resource that is an input for production at the same time it is an environmental resource that receives special protection. Under section XVII (The environment) it is stated that the State shall promote sustainable development and public awareness of the need to manage land, air and water resources in a balanced and sustainable manner for the present and future generations. In addition, the utilisation of the natural resources of Uganda shall be managed in such a way as to meet the development and environmental needs of present and future generations of Ugandans; and, in particular, the State shall take all possible measures to prevent or minimise damage and destruction to land, air and water resources resulting from pollution or other causes.

According to the National Constitution, land in Uganda belongs to the citizens of Uganda and is vested to them in accordance with four land tenure systems (GoU 1995). The Constitution provided for four systems of land tenure, they are: (a) customary; (b) freehold; (c) mailo; and (d) leasehold. In addition, the Constitution states that the Government may, under laws made by Parliament and Policies made from time to time, regulate the use of land.

1.1.3 SEEA Central Framework (accounting structure and compilation process) and Alignment to the Sustainable Development Goals

Natural Capital Accounting is a tool that can be used to measure the state of ecosystems, flows of ecosystem services as well as changes in stocks and flows of natural resources in relation to economic changes (Ruijs et al. 2018). The SEEA allows for compiling physical and monetary accounts for a range of natural resources and linking these to the System of National Accounts. It distinguishes between physical flow accounts, functional accounts and asset accounts. The physical flow accounts record the flows of natural inputs, products and residuals within the economy and those between the environment and the economy (United Nations et al. 2014).

Natural Capital Accounting can play various roles in national SDG policy processes. In the context of Uganda, NCA may provide a broad range of SDG indicators, including those that go beyond the natural resource base (Table 1.1). Starting with SDG 1 (No Poverty) the distinguishing features for poverty assessment are the rural and urban divide on poverty. The land accounts can provide a scope for delineating rural cover from urban cover. Fisheries accounts can provide information for the conservation

and sustainable use of freshwater fisheries resources (SDG 14) by assessing the value of stocks over time, alternative management practices and employment opportunities. Forest accounts can also provide information for a number of the SDGs – in particular SDG 15.2, which says that, by 2020, a country should promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase reforestation. Another goal is SDG 15.9, which calls for ecosystem and biodiversity values to be integrated into national and local planning, development processes, poverty reduction strategies and accounts, for which ecosystem and biodiversity accounts provide essential information (Ruijs A. et al. 2018).

Table 1.1: Examples of how land accounts support SDG Implementation

Use land accounts to	SDG addressed	Indicators
Distinguish urban/rural	Goal 1: No poverty	1.1.1 poverty (by urban, rural)
	Goal 4: Quality education	
Distinguish freshwater areas	Goal 6: Clean water and sanitation	
	Goal 9: industry, innovation and infrastructure	9.1.1 Rural population with access to all season road
Provide detail within urban	Goal 11: Sustainable cities and communities	11.1.1 Urban population living in slums
		11.3.1 Land consumption rate
		11.7.1 Urban open space for public use
Distinguish catchment areas	Goal 14: Life below water	14.1.1 Eutrophication and floating plastic
		14.2.1 Ecosystem-based management of exclusive economic zones
Distinguish forest area	Goal 15: Life on land	15.1.1 Forest area share of total land area
		15.2.1 Sustainable forest management
		15.2.2 Net permanent forest loss
Distinguish degraded land	Goal 15: Life on land	15.3.1 Proportion of land that is degraded
Distinguish mountain areas	Goal 15: Life on land	15.4.1 Sites for mountain biodiversity

Source: UN ESCAP (2017)

1.1.4 Purpose and application of the land accounts

Land is central to economic and environmental accounting. In the broad assessment, land accounts show how the changing shares of different land use and land cover within a country may provide useful indicators of change; however, increasingly the power of land accounts is reflected in the use of mapping technologies that can pinpoint areas of change (UN et al. 2014).

Land accounts are the basic building block of natural capital accounts, and underpin the creating of ecosystem accounts. Their main role is to map the physical location of economic activities and environmental processes (World Bank 2019). They provide the key information needed for resource management, for example, how much forest and farmland exists? They show how the land cover is changing through time and what the impact is of this change on the economy and ecosystems. Through land accounts it is also possible to explore issues such as ownership and wealth, urbanization, and intensity of crop and animal production.

The land accounts in the context of Uganda will be used to address the challenges of natural resources whose land use is based on the 13 national land cover/land use systems. The 13 national land cover/land use systems are; 1. broad leaved forest plantations, 2. coniferous forest plantations, 3. tropical high forests

well stocked, 4. tropical high forests low stocked, 5. woodlands, 6. bushlands, 7. grasslands, 8. wetlands, 9. small scale farmlands, 10. commercial farmlands, 11. built up areas, 12. open water and 13. impediments. Whereas, the land cover refers to spatial cover of land, the land system in Uganda is defined based on land use. The first five land covers are for forest land followed by bushlands and grasslands that are part of Uganda's rangelands, wetlands, farmlands; where most of the population in the country derives its livelihood, built up areas, associated with urban areas in the country, open water, which captures fisheries, water transport and water for production and energy generation and impediments, which are often bare soils with limited use value. Therefore, the land accounts for Uganda will not only lay a foundation for the development of other natural capital accounts, they will also provide an improved understanding of the transitions in land use in the country, and provide an entry point for assessment for how to improve land use planning and land use in the country.

1.1.5 Theoretical description of the Land Physical Accounts

The theory of the Land Physical Accounts builds from the 2008 System of National Accounts (SNA) for Uganda and the contributions of the SEEA CF to support the measuring of the environment and its relationship with the economy. The objective of land accounts in physical terms is to describe the area of land and changes in the area of land over an accounting period. Uganda's land accounts were developed based on the standard structure of physical asset accounts based on the SEEA Central Framework (UN et al. 2014). Asset accounts record both the opening and the closing stock of assets and the changes over the accounting period.

According to the SEEA CF, the opening and closing stocks of an asset are compiled with information pertaining to the reference dates of the accounting period. In the case of Uganda's land accounts, the data for the national land cover are typical collected every five years, based on the cycle of the National Biomass Surveys (NFA 2002, 2009). The dates for the opening and closing stocks for Uganda's land accounts are from 1990 up to 2015. The data appears in 5 year cycles - 1995 was skipped. Therefore, the time series covered is for 1990, 2000, 2005, 2010 and 2015. The entries concerning the changes between opening and closing stocks of each asset are divided into: (a) additions to the stock and (b) reductions in the stock. In the case of land assets, unlike other asset accounts, the aggregate for national land would typically be fixed, as no additional acquisition of land beyond the country's borders is expected. Therefore, the additions and reductions in stock are often within the specific land cover/land use systems assessed. For instance, land that was considered coniferous plantation in one year, say 1990, may, have changed to small scale farmland, by 2000. Such a change represents a reduction for the coniferous plantation cover, and an addition for the small scale farmland cover, even though the aggregate national land cover is unchanged.

Table 1.12 shows the format for Uganda land physical accounts. The columns represent the 13 land covers in Uganda's land cover classification system. The opening stock represents the land cover for the set opening year, the additions and/or reductions are the increased and/or reductions in land cover over the stated period i.e. 1990 to 2000. Often, increases and reductions occur concurrently. Land may change from one land cover to another over the years of assessment, therefore the figures that appear as additions and reductions are netted over the period assessed. The net reductions are calculated as the difference between the reductions and the additions, over the assessment period. The net reductions are added to the opening stock to provide the closing stock. The closing stock, provided as part of the National Biomass Survey series on land cover, tallies with the calculation and provides a basis for balancing the opening stock and the closing stock, as well as the additions and reductions.

Table 1.2: Format of Uganda's Land Physical Accounts

Entries/transactions	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock 1st Jan. 1990 (1st Jan 1990)													
Additions (1990 – 2000)													
Reductions (1990 – 2000)													
Net gains/reduction/Additions													
Closing stock 31st Dec. 1999 (December 31st 1999)													

1.2 Meta data with subsections

1.2.1 Data sources documentation

Uganda has a remote sensing and GIS historical background that includes, among others, the production of the National Land Cover / Land Use maps since 1990. The first map, considered as a reference in Uganda was developed under the frame of the National Biomass Study Project, which started in 1989 in the Forest Department and was funded by The Norwegian Agency for Development Co-operation, (NORAD). The project had several Phases; Phase I (1989-1992), Phase II (1992-1996) and Phase III (1986-2000). The first map of 1990 was followed by 2000, 2005, 2010 and 2015 upated versions. Information related to the land cover changes throughout the last 25 years has been widely used in publications including the Biomass Technical Reports/National Biomass Study, Reductions of Emissions from Deforestation and Forest Degradation or REDD+ Forest Reference Level 2018, and Statiscal Abstract Reports for Uganda as published by UBOS, among others.

In Uganda, the underlying information related to the land cover assests is provided by the National Forestry Authority (NFA) Geographic Information System (GIS) and Remote Sensing Unit which produced the first Land Use/Land Change (LULC) national map in 1990. Using the 1990 map as a reference, maps were created for the following years; 2000, 2005, 2010 and 2015. The basis of all maps was a combination of processed satellite imagery using remote sensing and GIS techniques with field groundtruthing.

1.2.2 Technical notes on each of the national biomass surveys

The land cover data for both the 1990 and 2002 National Biomass Survey data were generated based on mapping for Uganda's land cover/use and were for 13 main strata (Box 1).

Box 1: Classes ofLand cover and Land use

1. Plantations and woodlots – deciduous trees/broadleaves ("hardwood")
2. Plantations and woodlots – coniferous trees
3. Tropical High Forest (THF) – normally Stocked
4. Tropical High Forest (THF) – depleted/encroached
5. Woodland – trees and shrubs (average height > 4m)
6. Bushland – bush, thickets, scrub (average height < 4m)
7. Grassland – rangelands, pastureland, open savannah; may include scattered trees shrubs, scrubs and thickets.
8. Wetlands – wetland vegetation; swamp areas, papyrus and other sedges
9. Subsistence farmland – mixed farmland, small holdings in use or recently used, with or without trees
10. Uniform commercial farmland – mono-cropped, non-seasonal farmland usually without any trees for example tea and sugar estates
11. Built-up area – Urban or rural built up areas
12. Open water – Lakes, rivers and ponds.
13. Impediments (bare rocks and soils)

Source: MWLE/Forest Department 2002

Remote sensing data from SPOT satellite imageries (of early 1990s) were used to interpret the above strata and use of GIS to capture and process the data to produce an up to date land cover/use map of Uganda. The main output of this activity was to produce quantitative data on land cover areas at national, district, county and other lower administrative units, although this report covers up to district level (MWLE/ Forest Department 2002).

For the 2005 and 2010 national land cover data, the major data source used for the mapping was digital Landsat TM imagery, received on CD ROMs. Mapping started with Landsat scene (path)172/(row)059 which covers the areas of Masindi, Nakasongola and Kiboga. It was followed by scene 171/059 which covers the L. Kyoga region. This was followed by scenes that fall south and west of the above and stretch from Mayuge to Bundibugyo and down to Kisoro districts, basically covering central south and western Uganda. In mid-2007, the areas worked on stretched from Busia to Kaabong. Image interpretation and ground truthing for these areas was completed. The last and remaining part was Northern Uganda and West Nile. Interpretation for these areas was completed and ground truthing was completed in December of 2007. In the first quarter of 2008, final interpretation was completed for this area. Edge-matching was also completed so as to join it to the rest of the country. Landsat imagery was used for land cover mapping and stratification. Image interpretation was completed using an application called GeoVIS and a classification system called Land Cover Classification System (LCCS), which is being used by FAO AFRICOVER.

1.2.3 Description of the data set used for developing National Land Accounts

Since 2015, the National Forestry Authority (NFA) with the support of the United Nations Reduced Emissions from Deforestation and forest Degradation (UNREDD+) has been working on updating the national land cover/land use data and the national biomass survey data. The data used for the national land accounts is based on the consolidated update of data from 1990 to 2015. The updated data benefited

from the 1990, 2002 and 2009 National Biomass Survey Reports. The Uganda Bureau of Statistics under the Natural Capital Accounting (NCA) project was able to access the consolidated updated database. The data assessed for the physical national land accounts consisted of:

1. National Land Cover from 1990 to 2015
2. National Land Cover in protected areas from 1990 to 2015
3. Land cover by 4 regions,
4. Land cover by 112 districts
5. Wetlands cover by 4 regions and 112 districts
6. Land cover by land administration including protected areas, water management zone (WMZ), Climate Zones and Agro-ecological zones
7. Water coverage by region and district
8. Land changes by forest landscape based on Restoration Opportunities Assessment Methodology (ROAM)

CHAPTER 2
NATIONAL LAND ACCOUNTS

2.1 Overall land cover trends from 1990 to 2015

Uganda had a total area of 24.155 million hectares (ha) comprising forest plantations (broad leaved and coniferous plantations), tropical high forest (THF) (well stocked and low stocked), woodlands, bushlands, grasslands, wetlands, farmlands (small scale and commercial farmlands), built areas, open water and impediments (Table 2.1). The most dominant land cover by area was small scale farmlands between 1990 and 2015. In 1990, small scale farmlands occupied 34.8% (8.40 million ha) of total area and that increased to 42.5% (10.27 million ha) in 2015.

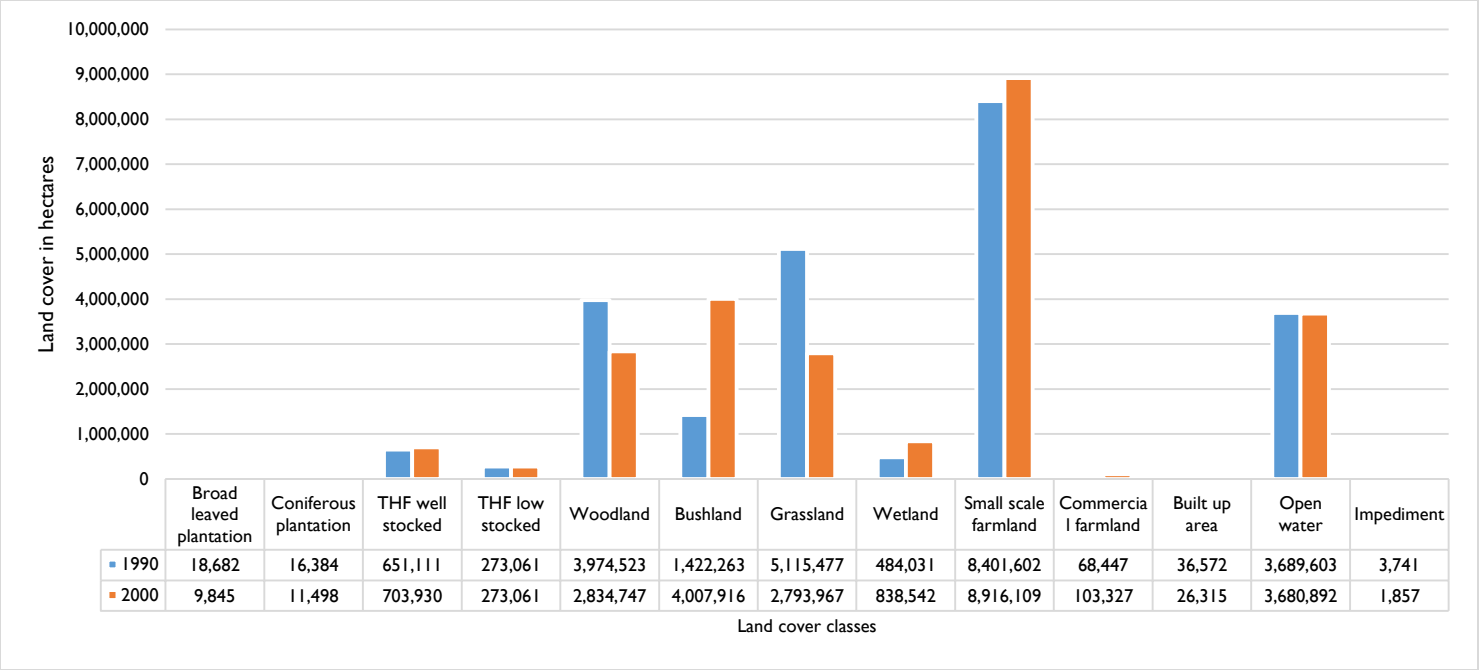
The second largest land cover in the country was grasslands with a total land cover of 5.1million ha in both 1990 and 2015. This land cover experienced large fluctuations in area in 2000 and 2005, but by 2015 it had been restored to the 1990 levels. In 1990, woodland was the third largest land cover, however, unlike the grasslands, woodland reduced by over 2.76 million ha between 1990 and 2015, and did not recover at any point along the assessment period.

The land covers that increased over the assessment period were plantations (both broad leaved and coniferous), bushlands, which increased by over 500,000 ha, and wetlands, which, in 2015, had increased by 231,450 ha from the base land cover in 1990. However, the wetlands had reduced by 123,061 ha from the peak cover of 838,542 ha in 2000. In addition, small scale and commercial farmlands, built up areas and impediments increased.

Table 2.1: Land cover trends, 1990 to 2015 (in hectares)

No.	Classes	Land Area (in hectares)				
		1990	2000	2005	2010	2015
1.	Broad leaved plantation	18,682	9,845	14,786	20,995	44,237
2.	Coniferous plantation	16,384	11,498	18,741	43,743	63,486
3.	Tropical high forest well stocked	651,111	703,930	600,959	564,951	529,124
4.	Tropical high forest low stocked	273,061	226,551	191,694	120,756	101,864
5.	Woodland	3,974,523	2,834,747	2,778,062	1,448,878	1,212,951
6.	Bushland	1,422,263	4,007,916	2,968,704	2,371,791	1,967,234
7.	Grassland	5,115,477	2,793,967	4,063,619	5,068,300	5,097,372
8.	Wetland	484,031	838,542	753,042	810,450	715,481
9.	Small scale farmland	8,401,602	8,916,109	8,847,695	9,772,284	10,274,969
10.	Commercial farmland	68,447	103,327	106,630	134,916	255,850
11.	Built up area	36,572	26,315	97,271	98,450	135,567
12.	Open water	3,689,603	3,680,892	3,706,490	3,689,369	3,749,581
13.	Impediments	3,741	1,857	7,804	10,614	7,780
	Grand Total	**24,155,496**	**24,155,496**	**24,155,496**	**24,155,496**	**24,155,496**

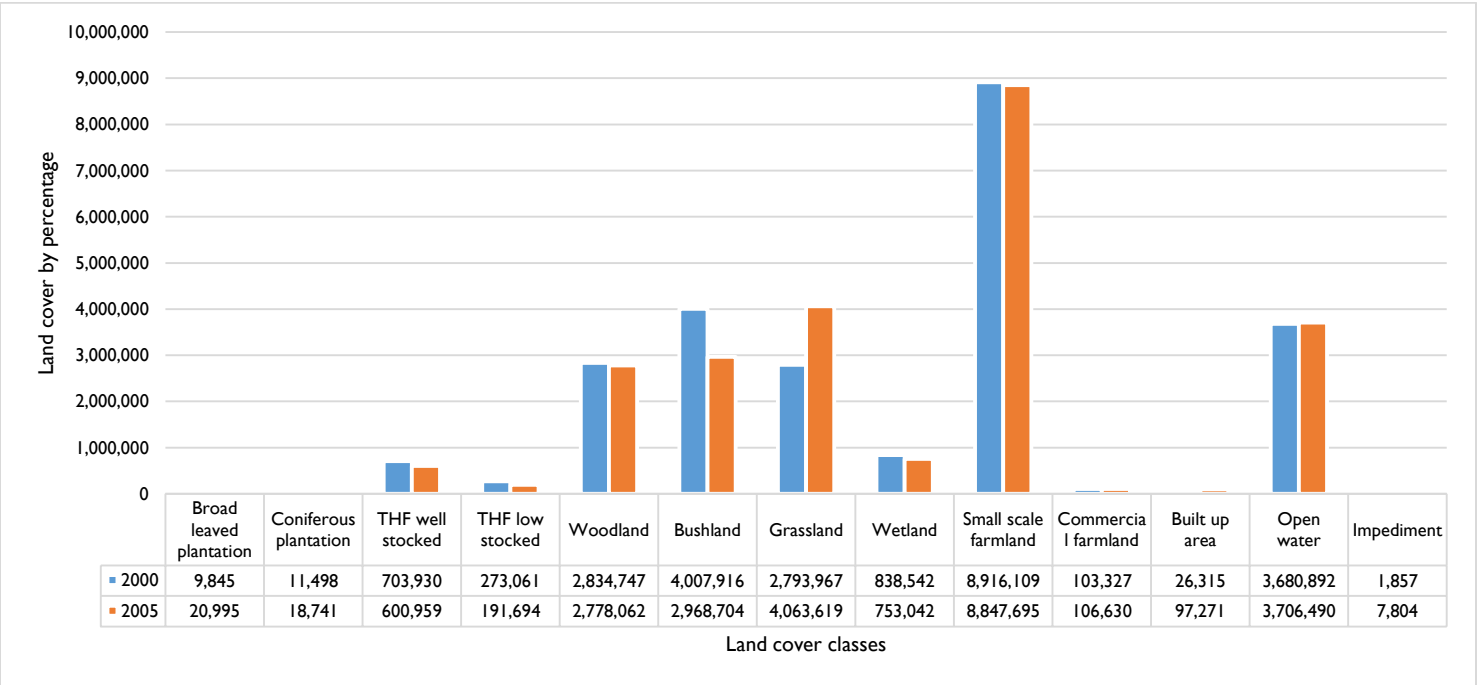
Between 1990 and 2000, the area of small scale farmlands edged up by 6% from 8.4 to 8.9 million ha (Figure 2.1). Similarly, bushlands, THF well stocked and commercial farmlands increased. In contrast, grasslands, THF low stocked, built up areas and forest plantations decreased. The largest transition in land cover was the threefold increase in bushlands and the halving in the area of grasslands, the transition between bushlands and grasslands was a measurement error that was rectified by the year 2000 as was the change in wetland cover which was also rectified by the year 2000. The 1990s were characterised by modest decline in land cover. Nonetheless, the woodlands decreased by more than 1.0 million ha from 3.97 to 2.83 million ha.



	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediment
1990	18,682	16,384	651,111	273,061	3,974,523	1,422,263	5,115,477	484,031	8,401,602	68,447	36,572	3,689,603	3,741
2000	9,845	11,498	703,930	273,061	2,834,747	4,007,916	2,793,967	838,542	8,916,109	103,327	26,315	3,680,892	1,857

Figure 2.1: Transition in distribution of land covers between 1990 and 2000

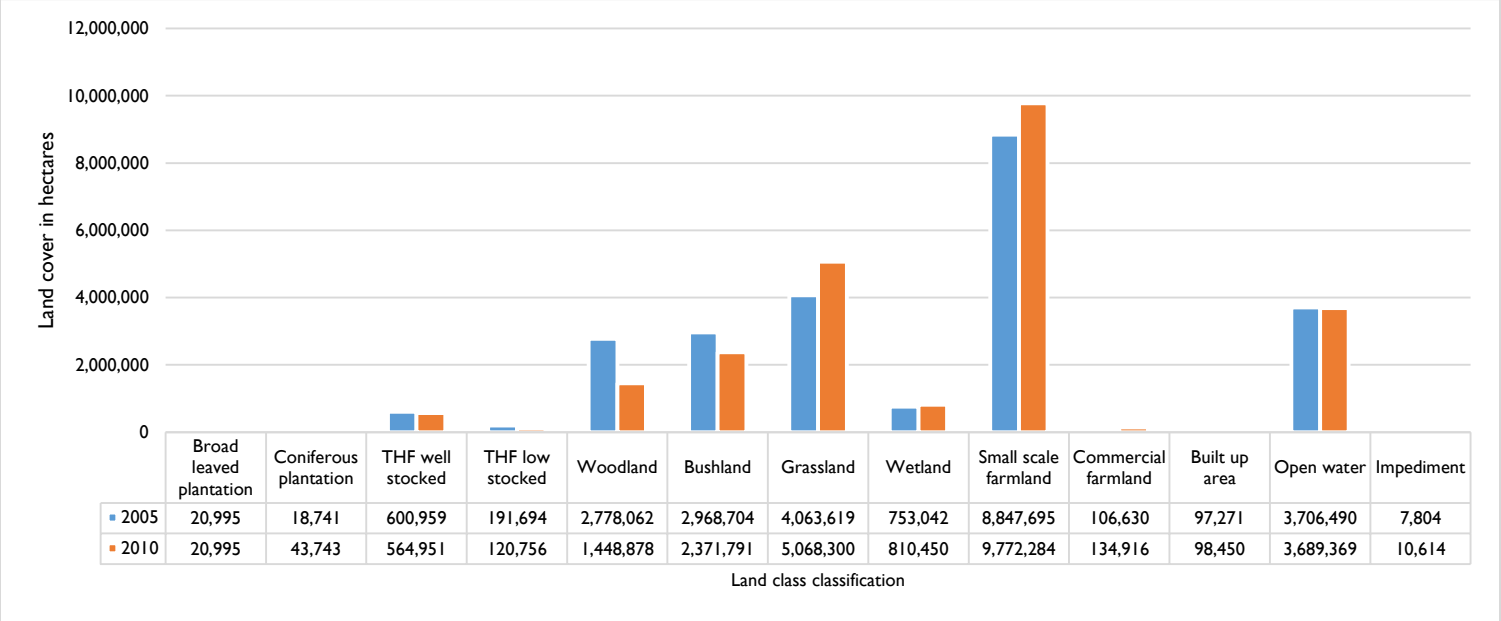
In 2005, the small scale farmland area was marginally less than that for 2000, by 68,414 ha, by 0.7% (Figure 2.2). Wetlands, THF well stocked, THF low stocked and woodlands declined. between 2000 and 2005, woodlands lost another 1.0 million ha, while the decrease for wetlands was 84,000ha, i.e. 10% of the wetland land cover. Forest plantations started to edge upwards with a 20,000 ha and 7,399 ha increase equivalent to 213% and 163% for broadleaved plantations and conifers, respectively.



	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediment
2000	9,845	11,498	703,930	273,061	2,834,747	4,007,916	2,793,967	838,542	8,916,109	103,327	26,315	3,680,892	1,857
2005	20,995	18,741	600,959	191,694	2,778,062	2,968,704	4,063,619	753,042	8,847,695	106,630	97,271	3,706,490	7,804

Figure 2.2: Transition in distribution of land covers between 2000 and 2005

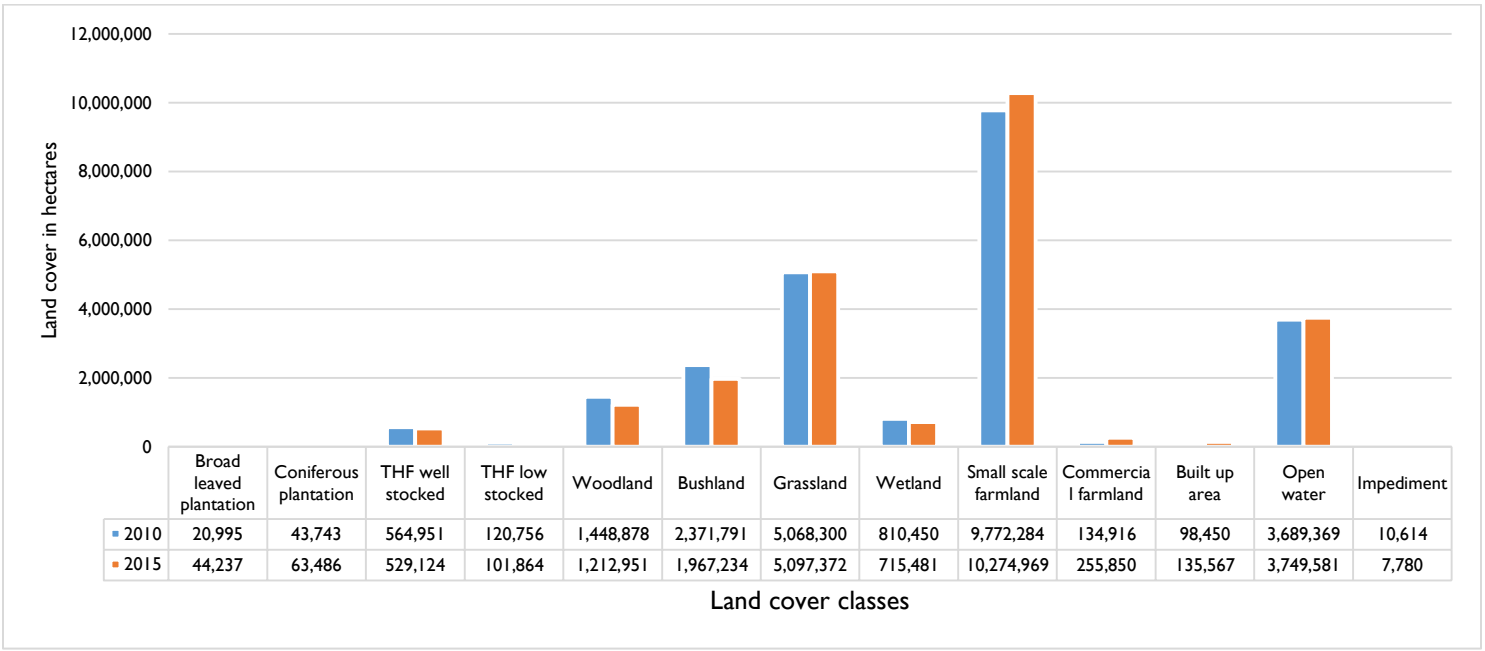
Between 2005 and 2010, the decline in woodland accelerated from 1.0 million to 1.3 million ha every 5 years. Along with the small scale farmlands that increased by 924,589 ha, broadleaved plantations, conifers, built up areas and commercial farmlands also increased (Figure 2.3). The bushlands decreased by 596,913 ha while grasslands increased by 1.0 million ha.



	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediment
2005	20,995	18,741	600,959	191,694	2,778,062	2,968,704	4,063,619	753,042	8,847,695	106,630	97,271	3,706,490	7,804
2010	20,995	43,743	564,951	120,756	1,448,878	2,371,791	5,068,300	810,450	9,772,284	134,916	98,450	3,689,369	10,614

Figure 2.3: Transition in distribution of land covers between 2005 and 2010

Between 2010 and 2015, small scale farmlands continued to increase, by 5% (Figure 2.4). The grasslands consolidated at just over 5.0 million ha of land cover. Tropical high forests well stocked were fairly stable with an 8% decline while THF low stocked decreased by a wider 16%. Bushlands also continued to decline but commercial farmlands and built up areas increased by 90% and 38%, respectively.



	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediment
2010	20,995	43,743	564,951	120,756	1,448,878	2,371,791	5,068,300	810,450	9,772,284	134,916	98,450	3,689,369	10,614
2015	44,237	63,486	529,124	101,864	1,212,951	1,967,234	5,097,372	715,481	10,274,969	255,850	135,567	3,749,581	7,780

Figure 2.4: Transition in distribution of land covers between 2010 and 2015

2.2 Overall national land accounts

The physical assets accounts for land for periods 1990 – 2000, 2000 – 2005, 2005 – 2010 and 2010 – 2015 show that between 1990 and 2000, the largest change in land cover occurred when the bushland area increased 2.5 times from 1.4 million to 4.0 million hectares; concurrently, the grasslands nearly halved from 5.1 million to 2.8 million hectares. With the exception of Tropical High Forests (THF) well stocked, which increased by 52,820 ha, all other forest covers reduced, with the largest reduction occurring for woodlands, which decreased from 3.97 million to 2.83 million hectares. Wetlands increased from 484,031 to 838,542 hectares, while small scale farm lands increased by half a million hectares. Built up areas and impediments also declined (Table 2.2).

Between 2000 and 2005, the major change in land cover was the reversal between bushlands and grasslands. The bushlands decreased to 2.97 million hectares from 4.0 million hectares while the grasslands increased from 2.79 million to 4.1 million hectares. Small scale farmlands decreased by 68,414 hectares and commercial farmlands increased marginally by 3,303 hectares. All three natural forest land covers declined - woodlands by 56,685 hectares, THF low stocked by 34,847 hectares, and THF well stocked by 102,971 hectares. Plantation forest land cover increased 50% and 63% for broad leaved and coniferous plantations, respectively.

The largest land cover change between 2005 and 2010 occurred for woodlands - 2.0 million hectares were lost with only 678,877 hectares gained, compared to bushlands, where a larger land cover of 2.19 million hectares was lost but a larger addition of 1.59 million hectares occurred. Grasslands (2.64 million hectares) and small scale farmland (2.33 million hectares) also experienced large additions in land cover, while the reductions were also considerable at 1.64 and 1.4 million hectares, respectively. The net land cover change for natural forests was negative while that for plantations was positive.

Between 2010 and 2015, the small scale farmlands had the largest additions to land cover of 1.78 million hectares, followed by grasslands and bushlands at 1.57 and 1.1 million hectares, respectively. Natural forest land cover of woodlands and tropical high forests continued to have a negative net land cover change.

Table 2.2: National Physical Asset Accounts for Land, 1990 – 2015 (in hectares)

National land cover stocks	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock (1st Jan. 1990)	18,682	16,384	651,111	273,062	3,974,523	1,422,263	5,115,477	484,031	8,401,602	68,447	36,572	3,689,603	3,741
Additions	8,059	3,787	186,030	158,163	1,111,145	3,324,510	1,170,999	493,471	1,953,081	59,297	13,213	57,882	1,799
Reductions	16,896	8,673	133,210	204,673	2,250,920	738,857	3,492,509	138,960	1,438,574	24,417	23,469	66,593	3,683
Net gain/reduction	(8,838)	(4,886)	52,820	(46,511)	(1,139,775)	2,585,652	(2,321,510)	354,512	514,506	34,881	(10,256)	(8,710)	(1,884)
Closing stock (3st Dec. 1999)	9,845	11,498	703,930	226,551	2,834,747	4,007,916	2,793,967	838,542	8,916,109	103,327	26,315	3,680,892	1,857
Opening stock (1st Jan. 2000)	9,845	11,498	703,930	226,551	2,834,747	4,007,916	2,793,967	838,542	8,916,109	103,327	26,315	3,680,892	1,857
Additions	13,107	11,489	68,654	124,979	1,319,547	1,534,777	2,538,925	217,502	1,525,134	45,672	78,141	62,147	7,541
Reductions	8,166	4,246	171,626	159,835	1,376,233	2,573,989	1,269,274	303,002	1,593,548	42,369	7,186	36,550	1,594
Net gain/reduction	4,941	7,243	(102,972)	(34,857)	(56,686)	(1,039,212)	1,269,652	(85,500)	(68,414)	3,303	70,956	25,598	5,947
Closing stock (31st Dec. 2004)	14,786	18,741	600,959	191,694	2,778,062	2,968,704	4,063,619	753,042	8,847,695	106,630	97,271	3,706,490	7,804
Opening stock (1st Jan 2005)	14,786	18,741	600,959	191,694	2,778,062	2,968,704	4,063,619	753,042	8,847,695	106,630	97,271	3,706,490	7,804
Additions	18,460	33,710	87,904	90,494	678,877	1,593,059	2,644,084	296,031	2,328,810	65,861	48,049	35,251	9,001
Reductions	12,251	8,708	123,911	161,432	2,008,061	2,189,972	1,639,403	238,623	1,404,221	37,576	46,870	52,373	6,191
Net gains/reduction	6,209	25,002	(36,008)	(70,938)	(1,329,184)	(596,913)	1,004,681	57,408	924,589	28,286	1,179	(17,121)	2,809
Closing stock (31st Dec. 2009)	20,995	43,743	564,951	120,756	1,448,878	2,371,791	5,068,300	810,450	9,772,284	134,916	98,450	3,689,369	10,614
Opening stock (1st Jan 2010)	20,995	43,743	564,951	120,756	1,448,878	2,371,791	5,068,300	810,450	9,772,284	134,916	98,450	3,689,369	10,614
Additions	34,128	27,538	37,951	59,186	441,480	1,094,221	1,566,083	161,431	1,782,267	153,258	70,790	72,621	4,962
Reductions	10,886	7,795	73,778	78,078	677,407	1,498,778	1,537,011	256,400	1,279,582	32,324	33,673	12,408	7,795
Net gain/reductions	23,242	19,743	(35,827)	(18,892)	(235,927)	(404,557)	29,072	(94,970)	502,685	120,935	37,117	60,213	(2,834)
Closing stock (31st Dec. 2014)	44,237	63,486	529,124	101,864	1,212,951	1,967,234	5,097,372	715,481	10,274,969	255,850	135,567	3,749,581	7,780
Opening stock (1st Jan. 2015)	44,237	63,486	529,124	101,864	1,212,951	1,967,234	5,097,372	715,481	10,274,969	255,850	135,567	3,749,581	7,780

Overall trends for 1990 to 2015 show that forest land cover consistently declined while small scale farmlands, commercial farmland and built up area increased (Figure 2.5). Much as, the land cover for combined bushlands and grasslands increased between 1990 and 2010, it also dipped between 2010 and 2015.

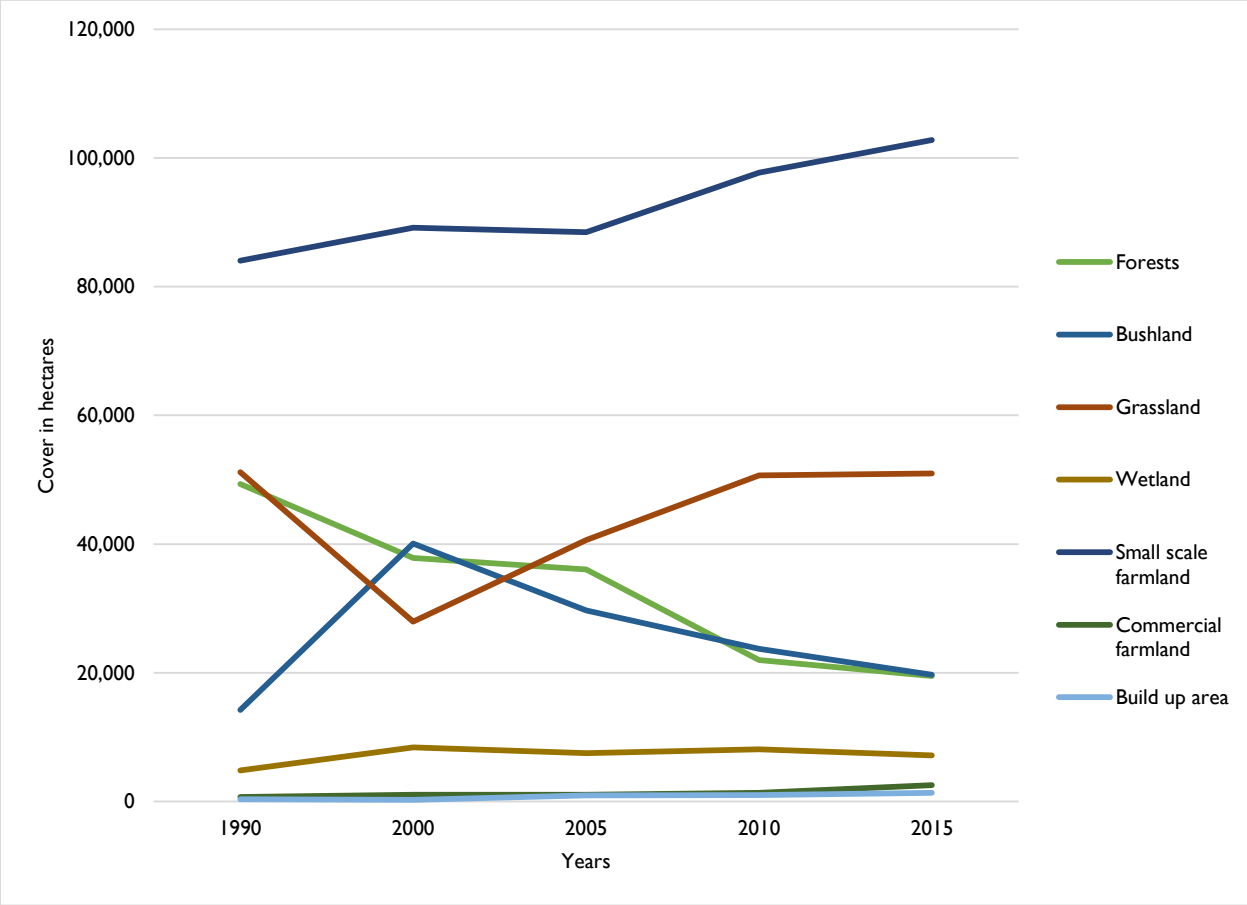


Figure 2.5: Overall change in land cover trends (1990-2015)

The combined land cover of grasslands and bushlands may have increased between 1990 and 2010 but as Figure 2.6 shows, the grass generally increased while the bushlands generally declined. While the small scale farmlands consistently increased as the forest land cover decreased.

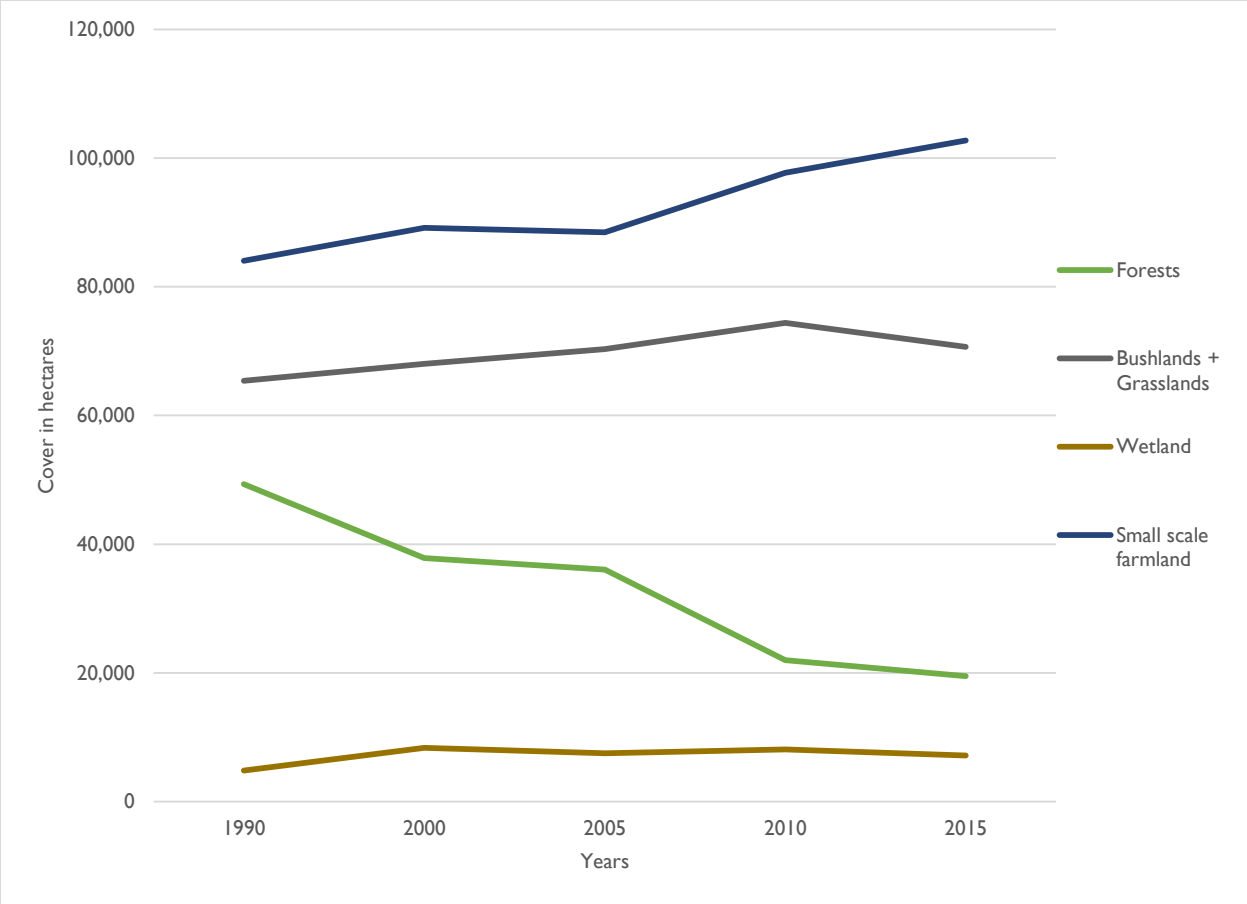


Figure 2.6: Trends of land cover for forests, bushlands, grasslands and small scale fam lands (1990-2015)

The largest decrease in forest land cover occurred in woodlands with a decrease of over 2.7 million hectares from 3.97 million to 1.2 million hectares between 1990 and 2015 (Figure 2.7). Tropical High Forests, both well stocked and low stocked, also declined while plantations increased. Plantations because of their small coverage, combined land cover for forest plantations of 107,723 hectares in 2015 compared to 1.2 million hectares for woodlands alone, had a small impact on the forest land cover compared to the impact of woodlands.

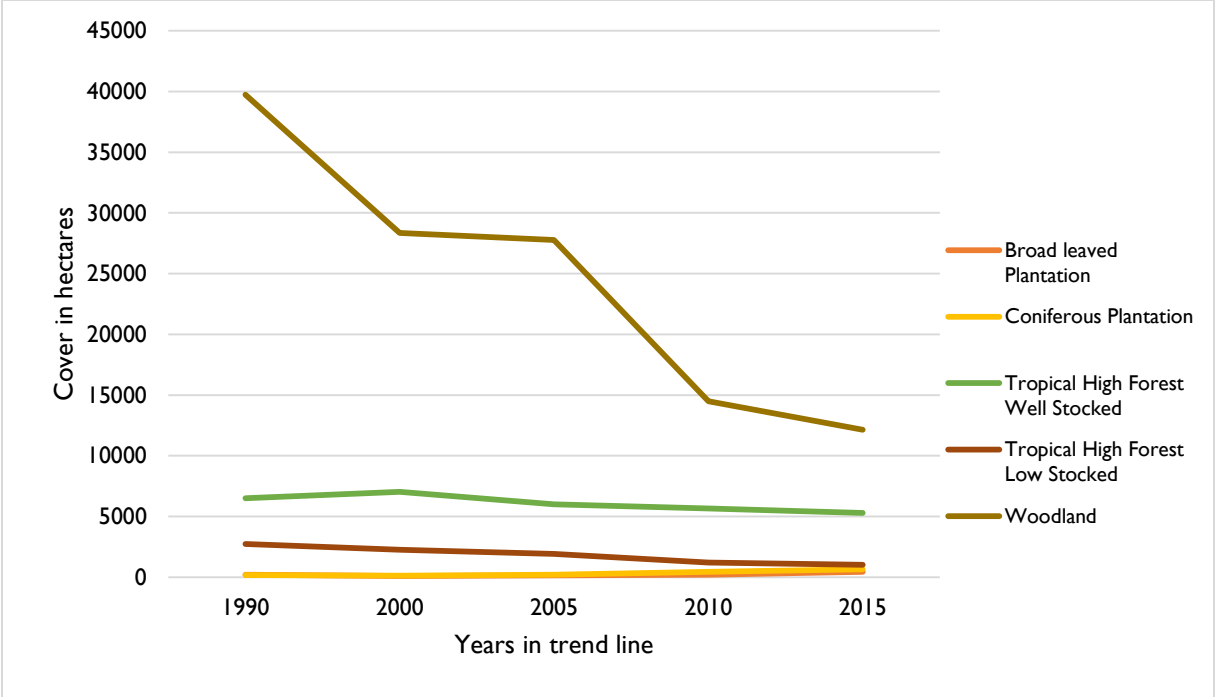


Figure 2.7: Trends of land cover for forests by type; plantations, tropical high forests and woodlands (1990-2015)

2.2.1 Net Land Cover Change

The change that occurred across the land covers was due to shift from one land cover to another within the five-time series of 1990 to 2000, 2000 to 2005, 2005 to 2010 and 2010 to 2015. Between 1990 and 2000, there were aggregate reductions for broad leaved plantations, coniferous plantations, low stocked tropical high forests, woodlands, grasslands, built up areas, open water and even impediments. Conversely, the land cover for tropical high forests well stocked, bushlands, wetlands, small scale farmlands and commercial farm lands increased. The largest reduction in land cover was for grasslands, with a land cover area loss of 2.3 million ha, followed by woodlands, at 1.1 million ha, over the 10-year timeline. The largest gain in land cover was bushlands, with a net gain of over 2.58 million ha, most of which (1.5 million ha) was gained from grasslands. The second highest gain was 514,506 ha for small scale farmlands, with 504,885 ha gained from grasslands as well (Table 2.3).

Whereas the gain from grasslands to small scale farmlands was due to land use change in grasslands, the change from grasslands to bushlands was likely influenced by change from remote sensing data from SPOT satellite imageries (of early 1990s), that were used to interpret the established strata and to produce quantitative data on land cover areas. Between 1990 and 2000, the close appearance of bushlands and grasslands means that the two land covers were not easily distinguishable. In 2005, the National Forestry switched from SPOT Satellite imagery to Landsat imagery, which improved precision and consistency of the data.

Table 2.3: Net land cover change 1990 to 2000 (in hectares)

Land classes	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Build up area	Open water	Impedi-ments	Total reductions
Broad leaved plantation		714	(233)	(382)	(671)	(26)	563	(90)	(7,580)	(1,051)	(105)	24	0	(8,838)
Coniferous plantation	(714)		(896)	(952)	366	(542)	858	18	(3,772)	22	13	(8)	(0)	(5,607)
Tropical high forest well stocked	233	896		14,643	46,220	1,486	10,749	(1,493)	(18,533)	(218)	3	(1,170)	5	52,820
Tropical high forest low stocked	382	803	(14,643)		24,014	(4,771)	7,446	(1,907)	(56,124)	(321)	(174)	(1,286)	71	(46,511)
Woodland	671	(552)	(46,220)	(24,014)		(778,117)	(16,224)	(52,535)	(217,070)	(4,701)	(449)	454	(1,018)	(1,139,775)
Bushland	26	142	(1,486)	4,771	778,117		1,505,269	16,203	283,492	(2,640)	(82)	1,342	497	2,585,652
Grassland	(563)	(858)	1,493	(7,446)	16,224	(1,505,269)		(299,233)	(504,885)	(4,832)	37	(4,446)	509	(2,309,268)
Wetland	90	(18)	18,533	1,907	52,535	(16,203)	299,233		24,870	(939)	12	(8,528)	59	371,551
Small scale farmland	7,580	3,772	18,533	56,124	217,070	(283,492)	504,885	(24,870)		(19,991)	10,860	22,585	1,451	514,506
Commercial farmland	1,051	(22)	218	321	4,701	2,640	4,832	939	19,991		165	331	1	35,169
Built up area	105	1	(3)	174	449	82	(37)	(12)	(10,860)	(165)		(99)	108	(10,256)
Open water	(24)	8	1,170	1,286	(454)	(1,342)	4,446	8,528	(22,585)	(43)	99		201	(8,710)
Impediments	(0)	-	(5)	(71)	1,018	(497)	(509)	(59)	(1,451)	(1)	(108)	201		(1,483)
Total additions	*8,838*	*4,886*	*(23,538)*	*46,361*	*1,139,589*	*(2,586,052)*	*2,321,510*	*(354,512)*	*(514,506)*	*(34,881)*	*10,271*	*9,400*	*1,884*	

Between 2000 and 2005, the largest loss in land cover occurred for bushlands, with about 1.0 million ha lost, mostly to grasslands (Table 2.4). The change in land cover largely corrected the area of grasslands and bushlands that occurred with the year 2000 land cover data, when compared with the land cover of 1990. Other than bushlands, the THF well stocked lost over 100,000 ha over the five years. Topical High Forest well stocked degraded to 36,056 ha of THF low stocked, 28,406 ha of woodlands and 15,344 ha bushlands, and 20,432 ha of small scale farmlands. Between 2000 and 2005, small scale farmlands decreased by 68,414 ha. Similarly, wetlands decreased in cover by 65,894 ha. The loss in wetland area was significant as it represented a decline of 8% of total wetland cover in 1990. Even though the wetlands gained 20,432 ha of THF well stocked, 69,579 ha of wetland was to grasslands.

There was a large increase of 70,956 ha of built up area, equivalent to a 270% increase. The increase was largely from conversion of small scale farmlands (65,192 ha) into built up areas. Over 1,000 ha of woodlands, bushlands, grasslands, and 873 ha of commercial farmlands, were also converted into built-up areas. The increase in built up area was in contrast to the 10,256 ha decline that occurred between 1990 and 2000. The decline in the built up areas in the 1990s may have been associated with insurgency in many parts of Northern Uganda, where many areas were not habitable and the population generally moved to urban areas and internally displaced people's camps. The changes between 2000 and 2005 might therefore have been due to a large population of people returning to open up lands for settlement, as well as the increasing real estate industry in urban areas near Kampala Capital City (NFA 2009).

Table 2.4: Net land cover change 2000 to 2005 (in hectares)

Land classes	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments	Total reductions
Broad leaved plantation		(372)	33	592	708	(54)	(915)	42	4,859	84	(38)	6	(4)	4,941
Coniferous plantation	372		648	320	980	916	(289)	(59)	4,698	83	27	-	(4)	7,692
Tropical high forest well stocked	(33)	(648)		(36,056)	(28,406)	(15,344)	(1,177)	(826)	(20,432)	(1,313)	(100)	1,389	(26)	(102,972)
Tropical high forest low stocked	(592)	(395)	36,056		(21,297)	(6,960)	(1,629)	(1,314)	(39,326)	(2)	(106)	832	(123)	(34,857)
Woodland	(708)	(554)	28,406	21,297		(57,207)	(119,039)	(2,138)	76,529	1,532	(1,497)	(1,289)	(2,018)	(56,686)
Bushland	54	(840)	15,344	6,960	57,207		(1,004,701)	15,685	(123,602)	(4,547)	(1,566)	194	600	(1,039,212)
Grassland	915	289	826	1,629	119,039	1,004,701		69,579	80,878	(7,036)	(1,161)	461	(821)	1,269,300
Wetland	(42)	59	20,432	1,314	2,138	(15,685)	(69,579)		2,524	(1,234)	(278)	(5,458)	(85)	(65,894)
Small scale farmland	(4,859)	(4,698)	20,432	39,326	(76,529)	123,602	(80,878)	(2,524)		8,285	(65,192)	(22,611)	(2,767)	(68,414)
Commercial farmland	(84)	(83)	1,313	2	(1,532)	4,547	7,036	1,234	(8,285)		(873)	78	-	3,353
Built up area	38	0	100	106	1,497	1,566	1,161	278	65,192	873		191	(46)	70,956
Open water	(6)	-	(1,389)	(832)	1,289	(194)	(461)	5,458	22,611	(28)	(191)		(658)	25,598
Impediments	4	-	26	123	2,018	(600)	821	85	2,767	-	46	(658)		4,632
Total additions	*(4,941)*	*(7,243)*	*122,226*	*34,781*	*57,112*	*1,039,287*	*(1,269,652)*	*85,500*	*68,414*	*(3,303)*	*(70,929)*	*(26,863)*	*(5,951)*	

During the period of 2005 and 2010, there was a high loss of woodlands (1.33 million ha) followed by 596,913 ha of bushlands well above the losses in any other land covers. The important land cover losses were the 70,938 ha lost from THF well stocked and 36,008 ha for THF low stocked (Table 2.5). Tropical High Forests and woodlands constitute Uganda's natural forest cover. Most of the area under woodlands was loss to grasslands (510,112 ha), small scale farmlands (489,812 ha), and bushlands (304,365). Therefore, whereas conversion for agricultural farmlands was significant, the loss to the lower biomass land covers suggests that the woodlands were largely targeted for their biomass and the opportunity of agricultural production.

Grasslands gained over 1.0 million ha, while small scale farmlands, and commercial farmlands gained 924,589 and 28,286 ha respectively. Therefore, land use for agricultural production was one of the major causes of the change in land cover observed between 2005 and 2010. There was also significant increase in the plantation forest area of coniferous and broadleaved plantations.

Table 2.5: Net land cover change 2005 to 2010 (in hectares)

Land classes	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments	Total reductions
Broad leaved plantation		(526)	(282)	67	1,867	791	1,326	48	2,952	30	(60)	(0)	(3)	6,209
Coniferous plantation	526		340	(50)	5,666	5,718	2,659	48	10,727	514	77	15	(9)	26,231
Tropical high forest well stocked	282	(340)		307	(2,578)	487	(4,163)	32	(27,647)	(1,318)	(52)	(723)	(295)	-36,008
Tropical high forest low stocked	(67)	126	(307)		3,430	(5,841)	(459)	(1,298)	(64,326)	(1,393)	(106)	(303)	(392)	-70,938
Woodland	(1,867)	(5,196)	2,578	(3,430)		(304,365)	(510,112)	(7,907)	(489,812)	(8,292)	(2,364)	1,774	(191)	-1,329,184
Bushland	(791)	(5,092)	(487)	5,841	304,365		(600,178)	(17,922)	(269,539)	(10,881)	(750)	230	(1,709)	-596,913
Grassland	(1,326)	(2,659)	(32)	459	510,112	600,178		(50,721)	(52,410)	(3,795)	(134)	424	389	1,000,487
Wetland	(48)	(48)	27,647	1,298	7,907	17,922	50,721		(33,273)	82	(429)	13,620	(311)	85,087
Small scale farmland	(2,952)	(10,727)	27,647	64,326	489,812	269,539	52,410	33,273		(3,051)	2,798	2,332	(818)	924,589
Commercial farmland	(30)	(514)	1,318	1,393	8,292	10,881	3,795	(82)	3,051		138	862	7	29,111
Built up area	60	(14)	52	106	2,364	750	134	429	(2,798)	(138)		133	99	1,179
Open water	0	(15)	723	303	(1,774)	(230)	(424)	(13,620)	(2,332)	(36)	(133)		418	-17,121
Impediments	3	5	295	392	191	1,709	(389)	311	818	(7)	(99)	418		3,645
Total additions	*(6,209)*	*(25,002)*	*59,492*	*71,014*	*1,329,653*	*597,538*	*(1,004,681)*	*(57,408)*	*(924,589)*	*(28,286)*	*(1,116)*	*18,783*	*(2,814)*	

During the period of 2010 and 2015 was lower than that observed between 1990 and 2000, 2000 and 2005 or 2005 and 2010. Nonetheless, there was a continued increase in land converted to small scale farmlands. The 502,685 ha increase in small scale farmlands was largely gained from grasslands (233,671 ha), bushlands (181,190 ha) and woodlands (144,090 ha) (Table 2.6).

Whereas the built up areas increased by just over 1,000 ha between 2005 and 2010, between 2010 and 2015 the built up area increased by 37,117 ha (34%). Bushlands (404,557 ha) and woodlands (235,927 ha) continued to decline while a reversal for grasslands occurred as they increased by 29,072 ha. Tropical high forest continued to decline by 35,827 ha and 18,892 ha for well stocked and low stocked THF, respectively.

Whereas the change in land cover experienced a narrower range between 2010 and 2015, the trends show continued increase of small scale farmlands. There was continued decline for natural forest cover while the plantation forest area increased.

Table 2.6: Net land cover change 2010 to 2015 (in hectares)

Land classes	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments	Total reductions
Broad leaved plantation		625	803	4,471	1,870	1,517	1,516	413	11,757	297	8	(37)	1	23,242
Coniferous plantation	(625)		92	80	4,288	2,572	3,746	131	10,489	(28)	160	7	(22)	20,888
Tropical high forest well stocked	(803)	(92)		(14,840)	(1,625)	(3,053)	(2,208)	(776)	(10,480)	(734)	12	(1,212)	(17)	(35,827)
Tropical high forest low stocked	(4,471)	(73)	14,840		3,627	(3,786)	(88)	(312)	(28,340)	(474)	(44)	(157)	385	(18,892)
Woodland	(1,870)	(3,601)	1,625	(3,627)		(17,515)	(53,265)	1,702	(144,090)	(11,252)	(813)	(3,122)	(99)	(235,927)
Bushland	(1,517)	(2,236)	3,053	3,786	17,515		(259,972)	38,683	(181,190)	(19,427)	(1,035)	(2,734)	518	(404,557)
Grassland	(1,516)	(3,746)	776	88	53,265	259,972		14,721	(233,671)	(58,078)	(933)	(4,042)	804	27,639
Wetland	(413)	(131)	10,480	312	(1,702)	(38,683)	(14,721)		2,518	(1,881)	(172)	(40,997)	124	(85,266)
Small scale farmland	(11,757)	(10,489)	10,480	28,340	144,090	181,190	233,671	(2,518)		(29,243)	(34,578)	(7,085)	585	502,685
Commercial farmland	(297)	28	734	474	11,252	19,427	58,078	1,881	29,243		140	508	88	121,556
Built up area	(8)	(13)	(12)	44	813	1,035	933	172	34,578	(140)		(382)	97	37,117
Open water	37	(7)	1,212	157	3,122	2,734	4,042	40,997	7,085	114	382		338	60,213
Impediments	(1)	(10)	17	(385)	99	(518)	(804)	(124)	(585)	(88)	(97)	338		(2,158)
Total additions	*(23,242)*	*(19,743)*	*44,098*	*18,899*	*236,614*	*404,892*	*(29,072)*	*94,970*	*(502,685)*	*(120,935)*	*(36,970)*	*(58,916)*	*2,802*	

The net land cover change between 1990 and 2015 points to a 69% (2.76 million ha) loss of woodlands of over 3.97 million ha in 1990, as well as 1.87 million ha increase in small scale farmlands, as the largest changes in land cover across the time line. Overall, there was an increase in bushlands of 544,971 ha while tropical high forests also reduced (Table 2.7). Forest plantations, commercial farmlands and built up areas generally increased. Wetlands also generally increased over the time horizon. The trends suggest an increase in use for industrial activities of commercial and small scale farmlands, forest plantations and built up areas.

Table 2.7: Net land cover change 1990 to 2015 (in hectares)

	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments	Total reductions
Broad leaved plantation		(807)	2,299	2,275	8,945	387	3,671	377	9,234	(511)	(313)	20	(23)	25,555
Coniferous plantation	807		143	2,659	20,742	1,001	9,319	146	11,645	333	125	43	(24)	46,939
Tropical high forest well stocked	(2,299)	(143)		10,327	27,817	(16,075)	(517)	(3,679)	(127,088)	(7,462)	(373)	(2,335)	(159)	(121,986)
Tropical high forest low stocked	(2,275)	(3,199)	(10,327)		2,636	(18,450)	1,243	(4,768)	(129,769)	(2,056)	(2,838)	(1,363)	(30)	(171,197)
Woodland	(8,945)	(21,021)	(27,817)	(2,636)		(503,483)	(885,862)	(38,306)	(1,167,265)	(96,631)	(4,376)	(2,645)	(2,585)	(2,761,572)
Bushland	(387)	(421)	16,075	18,450	503,483		(68,850)	8,372	79,784	(7,762)	(2,834)	(843)	(97)	544,971
Grassland	(3,671)	(9,319)	3,679	(1,243)	885,862	68,850		(226,006)	(692,671)	(23,500)	(4,888)	(11,598)	(439)	(14,943)
Wetland	(377)	(146)	127,088	4,768	38,306	(8,372)	226,006		9,512	(4,145)	(681)	(37,058)	(41)	354,859
Small scale farmland	(9,234)	(11,645)	127,088	129,769	1,167,265	(79,784)	692,671	(9,512)		(45,839)	(82,416)	(4,100)	(897)	1,873,367
Commercial farmland	511	(333)	7,462	2,056	96,631	7,762	23,500	4,145	45,839		(233)	531	1	187,872
Built up area	313	(28)	373	2,838	4,376	2,834	4,888	681	82,416	233		(41)	112	98,995
Open water	(20)	(43)	2,335	1,363	2,645	843	11,598	37,058	4,100	(63)	41		123	59,979
Impediments	23	3	159	30	2,585	97	439	41	897	(1)	(112)	123		4,284
Total additions	*(25,555)*	*(47,102)*	*248,557*	*170,658*	*2,761,292*	*(544,391)*	*18,105*	*(231,450)*	*(1,873,367)*	*(187,404)*	*(98,898)*	*(59,265)*	*(4,061)*	

2.3 Land cover series by Forest Landscape

2.3.1 Importance of land accounts for Uganda's forest landscapes

Uganda prioritized forest restoration among the core targets of Uganda's Vision 2040, National Development Plans (I and II), and the National Forestry Plan (2011/12- 2021/22). The main objective is to restore forest cover from the current level of less than the 10% to the 1990 level of 24% of the land area (GoU 2013). In 2014, the Government of Uganda made a pledge to contribute to the Bonn Challenge to restore 2.5 million hectares of land to forests using the Forest Landscape Restoration (FLR) approach (MWE and IUCN 2016).

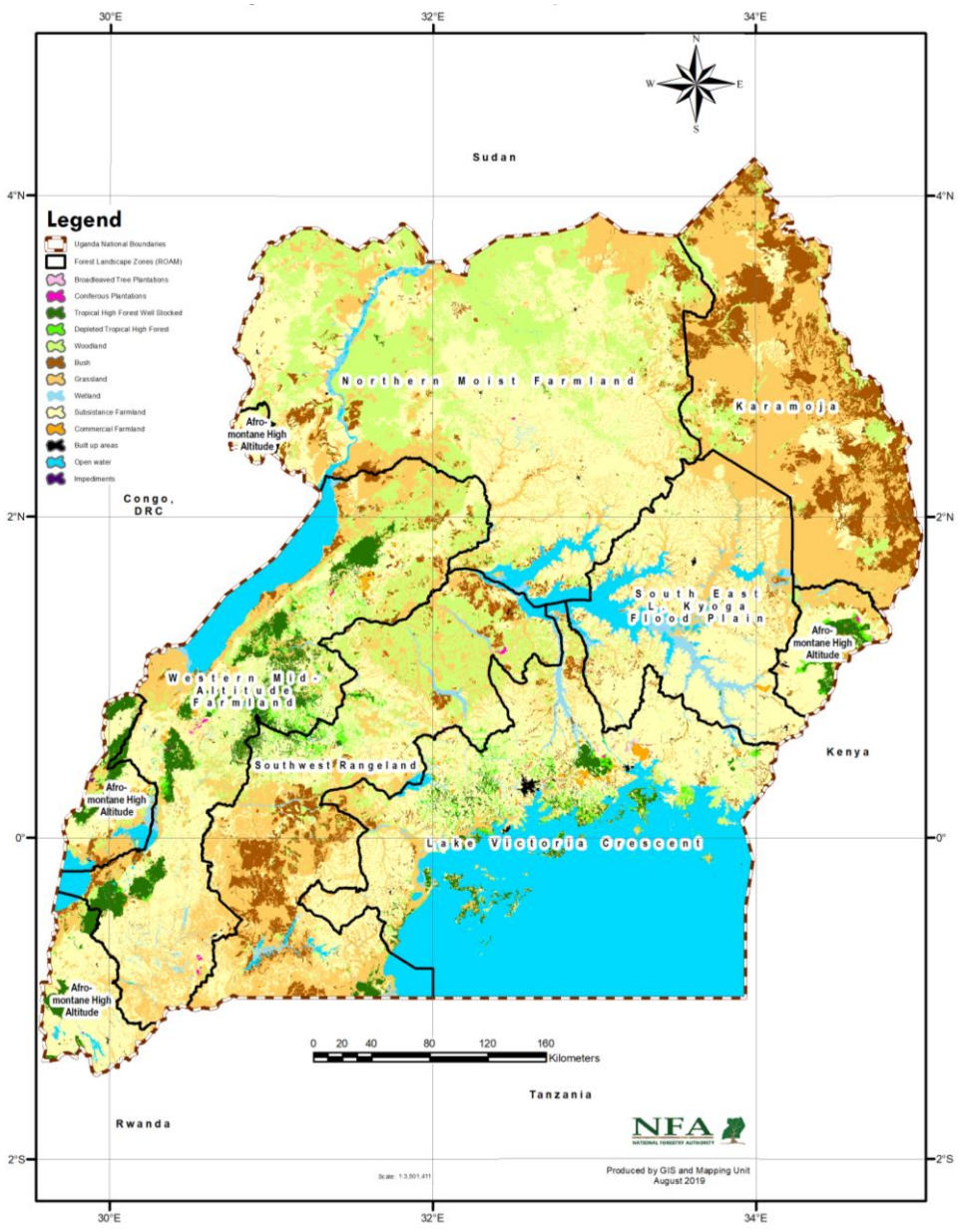


Figure 2.8: National and cover/land use map 1990 by forest landscape

Source: NFA (2019)

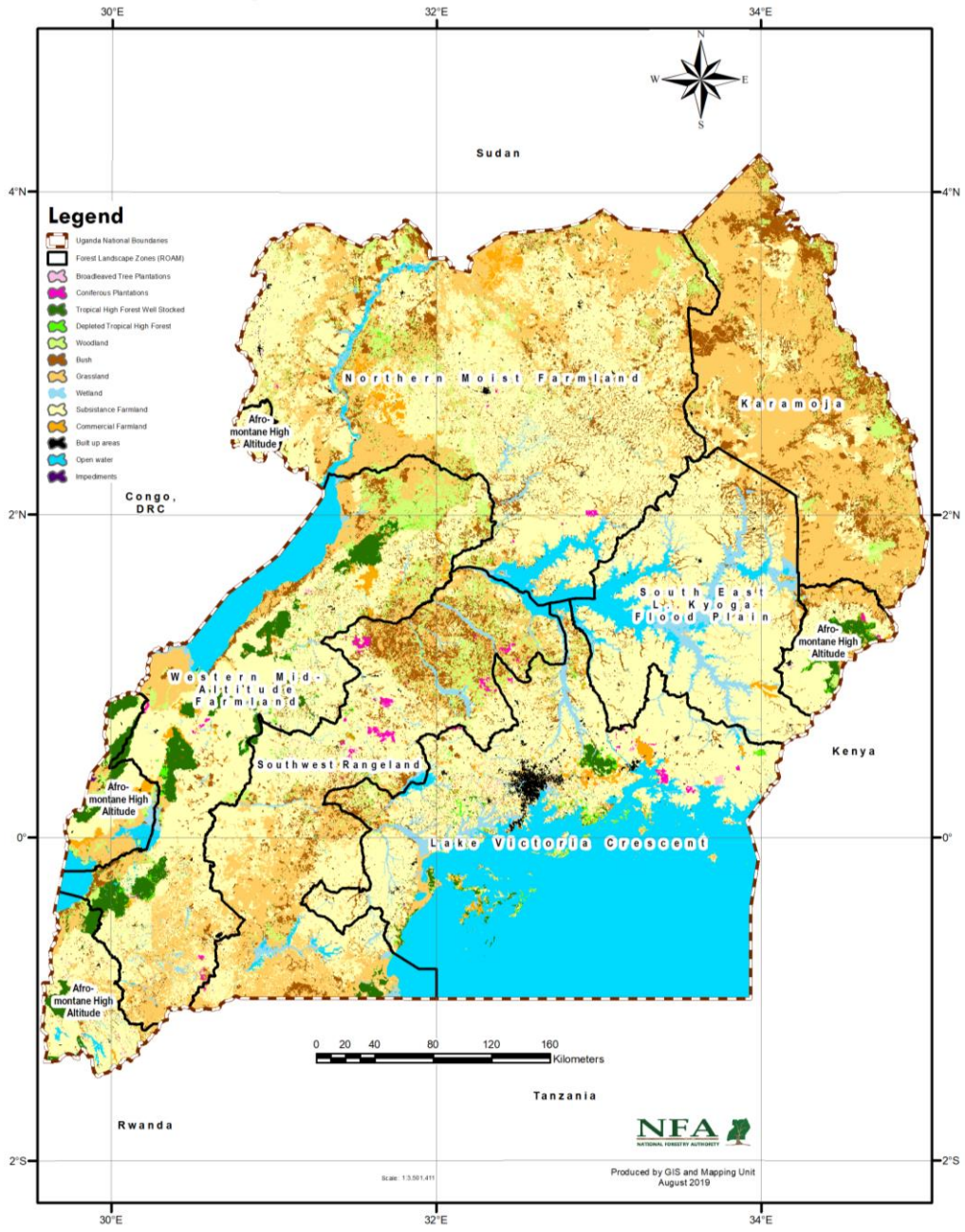


Figure 2.9: National and cover/land use map 2015 by forest landscape

Source: NFA (2019)

The government through the Ministry of Water and Environment (MWE) in partnership with the International Union for the Conservation of Nature (IUCN) and other government agencies conducted a study to comprehensively assess the potential for FLR in Uganda (Figure 2.8 and 2.9). As the outcome of the studies, the Government identified available area for FLR, hot spots for FLR interventions, and site specific restoration options for various ecological landscapes among other parameters. The country was stratified into seven ecological zones, namely: (i) Afro-montane; (ii) Karamoja; (iii) Lake Victoria Crescent; (iv) Northern moist; (v) Southeast L. Kyoga floodplains; (vi) Southwest rangelands; and (vii) Western mid-altitude. The classification created relatively homogeneous landscapes to enable restoration interventions to be implemented (MWE 2016).

2.3.2 National Land Accounts for Afromontane High Altitude Landscapes

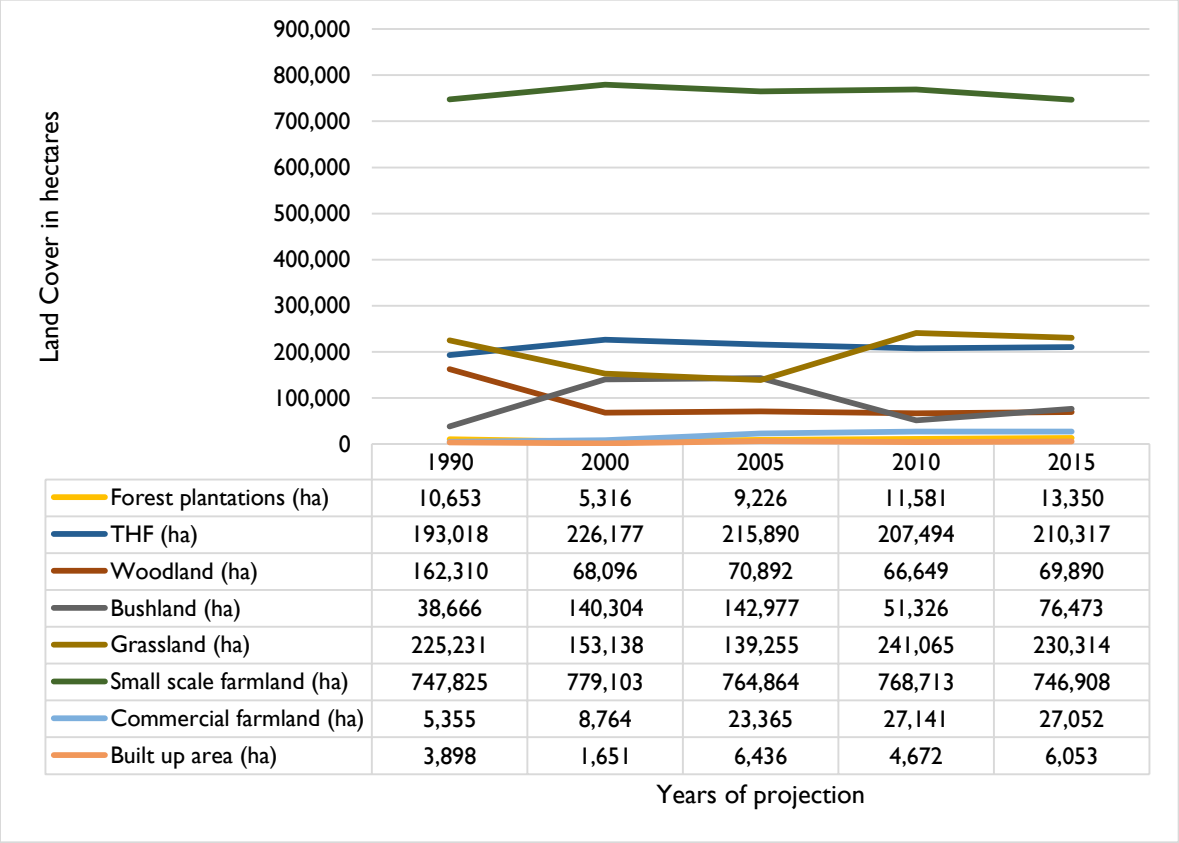
The largest changes in area for the land cover for Afromontane landscape occurred between 1990 and 2000 where there was a net gain of 101,641 ha for bushlands and a net reduction of 94,215 ha for woodlands. Additionally, THF well stocked had a net increase of 58,587 ha and small scale farmlands increased by 31,278 ha while grasslands declined by 72,093 ha (Table 2.8). Between 2000 and 2005, the net changes in land cover were all under 15,000 ha. The highest loss in land cover was for subsistence farmlands (14,242 ha) followed by THF low stocked (10,311 ha). Conversely, the commercial farmland, wetland, built up area and coniferous plantation, all had net of land cover by 14,600 ha, 12,957 ha, 4,787 ha and 4,588 ha, respectively. Woodlands and THF well stocked experienced the largest net reduction in land cover between 2005 and 2010 of 32,924 ha and 31,127 ha respectively. The grasslands gained 25,952 ha followed by small scale farmlands (20,586 ha) and bushlands (10,157 ha). The change in land cover across the 13 land cover classes were all under 12,000 ha between 2010 and 2015. The largest change was a net reduction for wood lands of 17,459 ha, and a net increase of 11,910 ha for small scale farmlands.

Table 2.8: Land Physical Accounts for Afro-montane High Altitude Landscapes (in hectares)

Afro-Montane High Altitude	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock (1st Jan. 1990)	3,746	6,907	157,274	35,744	162,310	38,666	225,231	15,675	747,825	5,355	3,898	62,744	504
Additions	2,205	431	68,597	3,153	26,006	126,704	75,464	13,065	97,677	7,721	742	3,745	1,483
Reductions	3,536	4,439	10,010	28,580	120,221	25,063	147,557	12,028	66,399	4,314	2,988	1,411	447
Net gains/reductions	(1,331)	(4,008)	58,587	(25,427)	(94,215)	101,641	(72,093)	1,037	31,278	3,407	(2,246)	2,334	1,036
Closing stock (3st Dec. 1999)	2,416	2,900	215,861	10,316	68,096	140,304	153,138	16,711	779,103	8,764	1,651	65,077	1,540
Opening stock (1st Jan. 2000)	2,416	2,900	215,861	10,316	68,096	140,304	153,138	16,711	779,103	8,764	1,651	65,077	1,540
Additions	1,307	5,100	22,399	2	39,037	66,645	58,597	18,058	60,324	18,244	5,046	800	519
Reductions	1,988	512	22,374	10,313	36,240	63,971	72,480	5,101	74,566	3,644	259	3,309	1,321
Net gains/reductions	(681)	4,588	25	(10,311)	2,797	2,674	(13,883)	12,957	(14,242)	14,600	4,787	(2,509)	(802)
Closing stock (31st Dec. 2004)	1,736	7,490	215,885	5	70,892	142,977	139,255	29,667	764,864	23,365	6,436	62,569	737
Opening stock (1st Jan 2005)	1,736	7,490	215,885	5	70,892	142,977	139,255	29,667	764,864	23,365	6,436	62,569	737
Additions	90	129	5,937	9,331	17,451	10,157	25,952	1,193	20,586	1,027	51	183	6
Reductions	1,251	3,828	37,064	5	49,945	-	-	-	-	-	-	-	-
Net gains/reductions	(1,161)	(3,699)	(31,127)	9,326	(32,494)	10,157	25,952	1,193	20,586	1,027	51	183	6
Closing stock (31st Dec. 2009)	5,744	5,837	193,480	14,014	66,649	51,326	241,065	22,492	768,713	27,141	4,672	63,052	1,693
Opening stock (1st Jan 2010)	5,744	5,837	193,480	14,014	66,649	51,326	241,065	22,492	768,713	27,141	4,672	63,052	1,693
Additions	295	121	6,315	7,143	4,290	6,226	7,949	593	11,910	254	27	496	347
Reductions	4,135	984	13,164	5,934	21,749	-	-	-	-	-	-	-	-
Net gains/reductions	(3,840)	(863)	(6,849)	1,209	(17,459)	6,226	7,949	593	11,910	254	27	496	347
Closing stock (31st Dec. 2014)	5,898	7,452	191,086	19,231	69,890	76,473	230,314	17,674	746,908	27,052	6,053	65,035	2,813
Opening stock (1st Jan. 2015)	5,898	7,452	191,086	19,231	69,890	76,473	230,314	17,674	746,908	27,052	6,053	65,035	2,813

In the Afromontane landscapes of South western, eastern and the West Nile areas of Uganda, the small scale farmlands were the most important land cover/ land use system. The Afro-montane landscape was able to maintain and increase the land cover for tropical high forests and grasslands (Figure 2.10). The landscape is an important biodiversity habitat and host to the Rwenzori Mountain National Park, the Mt. Elgon National Park, and Bwindi Impenetrable and Mgahinga Gorilla National Parks, and several forest reserves. Whereas the small scale farm lands were dominant, the land cover for the farm lands is fairly uniform and may represent a stable land distribution. The Afromontane areas are suited for crops that require cooler weather and fertilise soils such as Arabica coffee, cocoa, tea and fresh fruits and vegetable and flowers, among others.

The stability of the Afromontane landscape makes it well suited for biodiversity conservation and production of long term perennial crops. The emergence of oil gas particularly in the Albertine Graben may represent a long term pressure that may reduce the stability of the landscape. The landscape's protected areas contribute to the stability of the system, and the uniqueness of the farming system also supports consistency for small scale farmlands. Although the population growth rate is quite high, over 3.2%/ year (UBOS 2014, 2018) and small holder subsistence are dominant, the limited land available for conversion means that land use change and land cover change were not available in the land cover trends reviewed.



	1990	2000	2005	2010	2015
Forest plantations (ha)	10,653	5,316	9,226	11,581	13,350
THF (ha)	193,018	226,177	215,890	207,494	210,317
Woodland (ha)	162,310	68,096	70,892	66,649	69,890
Bushland (ha)	38,666	140,304	142,977	51,326	76,473
Grassland (ha)	225,231	153,138	139,255	241,065	230,314
Small scale farmland (ha)	747,825	779,103	764,864	768,713	746,908
Commercial farmland (ha)	5,355	8,764	23,365	27,141	27,052
Built up area (ha)	3,898	1,651	6,436	4,672	6,053

Figure 2.10: Trends of land cover for Afromontane Landscape for 1990 to 2015

2.3.3 National Land Accounts for the Karamoja Landscapes

For the Karamoja landscape the main land covers are grasslands followed by bushlands, small scale farmlands and woodlands (at 1.73 million ha, 498,666 ha, 331, 236 ha and 191,357 ha respectively). The

grasslands increased from 1.45 million to 1.73 million ha, small scale farmlands increased from 227,073 to 331,236 ha while bushlands and woodlands reduced from 731,523 to 498,666 ha and 346,362 to 191,357 ha respectively between 1990 and 2015. The largest land cover changes occurred between 1990 and 2005 especially reductions for grasslands and woodlands as well as net gains for bushlands and small scale farmlands. Indeed, across the time series (1990 and 2015) bushlands continued to gain land cover while woodlands consistently reduction in land cover.

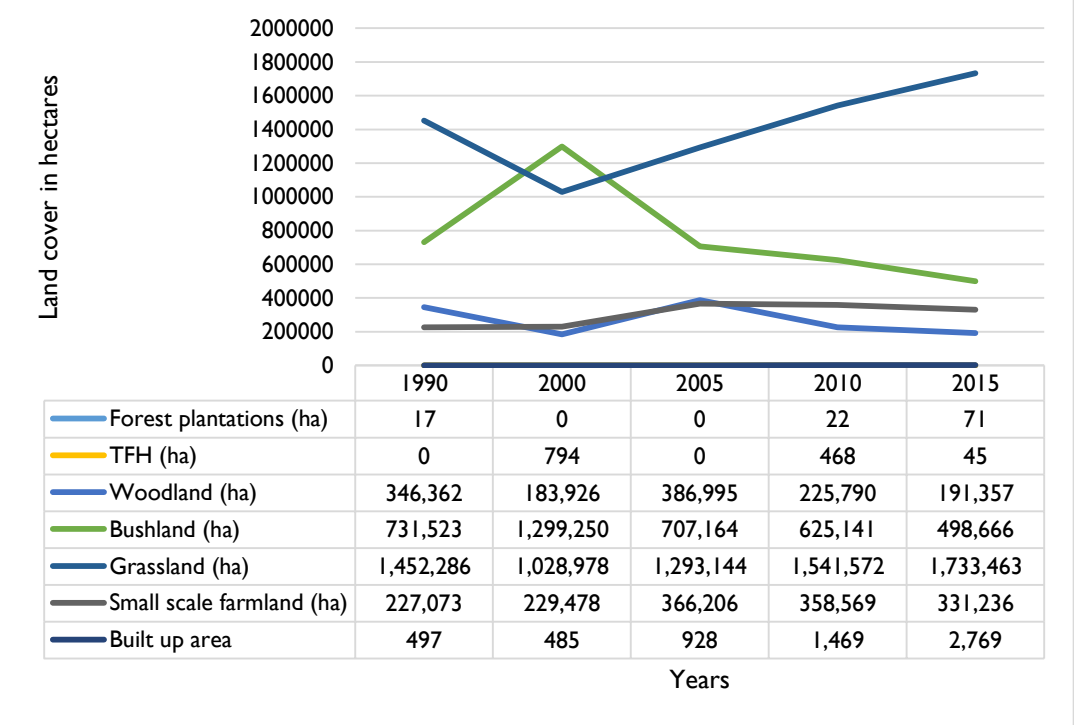
Karamoja landscape has no coniferous plantation forest cover while the broad leaved plantations increased from 17 ha in 1990 to 71 ha by 2015. The THF well stocked is a small area that peaked at 459 ha in 2010 and reduced back to 45 ha in 2015 from 1990 ha in 1990 (Table 2.9). The THF low stocked was completely deforested by 2015 from 749 ha in 1990.

Table 2.9: Land Physical Accounts for Karamoja Landscapes (in hectares)

Karamoja	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi ments
Opening stock (1st Jan. 1990)	17				346,362	731,523	1,452,286	1,443	227,073	83	497	16	506
Additions	-	-	44	749	85,510	882,000	381,444	16,150	144,294	-	485	-	19
Reductions	17	-	-	-	247,964	314,273	804,753	716	141,889	83	498	16	505
Net gains/reductions	(17)	-	44	749	(162,454)	567,727	(423,309)	15,434	2,405	(83)	(13)	(16)	(486)
Closing stock (3st Dec. 1999)			45	749	183,926	1,299,250	1,028,978	16,876	229,478		485		19
Opening stock (1st Jan. 2000)			45	749	183,926	1,299,250	1,028,978	16,876	229,478		485		19
Additions	-	-	-	-	279,959	276,315	741,138	2,875	240,902	34	803	33	1,718
Reductions	-	-	45	748	76,890	868,402	476,972	16,177	104,174	-	**360**	-	9
Net gains/reductions	-	-	(45)	(748)	203,069	(592,087)	264,166	(13,302)	136,728	34	443	33	1,709
Closing stock (31st Dec. 2004)					386,995	707,164	1,293,144	3,575	366,206	34	928	32	1,728
Opening stock (1st Jan 2005)					386,995	707,164	1,293,144	3,575	366,206	34	928	32	1,728
Additions	2	4	107	9	-	101,521	165,893	1,198	14,362	-	116	61	61
Reductions	-	-	-	-	283,334	-	-	-	-	-	-	-	-
Net gains/reductions	2	4	107	9	(283,334)	101,521	165,893	1,198	14,362	-	116	61	61
Closing stock (31st Dec. 2009)	18	4	459	9	225,790	625,141	1,541,572	5,821	358,569		1,469	97	856
Opening stock (1st Jan 2010)	18	4	459	9	225,790	625,141	1,541,572	5,821	358,569		1,469	97	856
Additions	17	-	-	-	209	35,125	40,375	-	8,418	7	41	8	8
Reductions	2	3	415	9	83,779	-	-	-	-	-	-	-	-
Net gains/reductions	15	(3)	(415)	(9)	(83,570)	35,125	40,375	-	8,418	7	41	8	8
Closing stock (31st Dec. 2014)	71		45		191,357	498,666	1,733,463	1,484	331,236	74	2,769	292	351
Opening stock (1st Jan. 2015)	71		45		191,357	498,666	1,733,463	1,484	331,236	74	2,769	292	351

The Karamoja landscape had the smallest proportion of its land cover under small scale farmlands. The small scale farmlands increased from 8% to 12% from 1990 to 2015. Bushlands and later grasslands were the dominant land uses (Figure 2.11). The growth of grasslands was due to the considerable apportioning of land to livestock production, and protected areas, particularly, the Kidepo Valley National Park and the North Eastern tip of Uganda.

The Karamoja plains are dominated by sandy clay loams of low agricultural production and in parts degraded by soil erosion with low water holding capacity, while the base of Napak and Kadam Mountains are characterized by volcanic soils of medium productivity (Nakalembe et al. 2016). While crop production is not the main form of land use, the occurrence of volcanic soils indicates good potential for agricultural production. Moreover, the expansion of agricultural land was not accompanied by an improvement in crop productivity. However, factors such as low access to water for irrigation may be more limiting for agriculture production than availability of land for farming. The open water area was only 292 ha (0.01%) against a landscape land cover of 2.8 million ha.



	1990	2000	2005	2010	2015
Forest plantations (ha)	17	0	0	22	71
TFH (ha)	0	794	0	468	45
Woodland (ha)	346,362	183,926	386,995	225,790	191,357
Bushland (ha)	731,523	1,299,250	707,164	625,141	498,666
Grassland (ha)	1,452,286	1,028,978	1,293,144	1,541,572	1,733,463
Small scale farmland (ha)	227,073	229,478	366,206	358,569	331,236
Built up area	497	485	928	1,469	2,769

Figure 2.11: Trends for land cover for Karamoja Landscape for 1990 to 2015

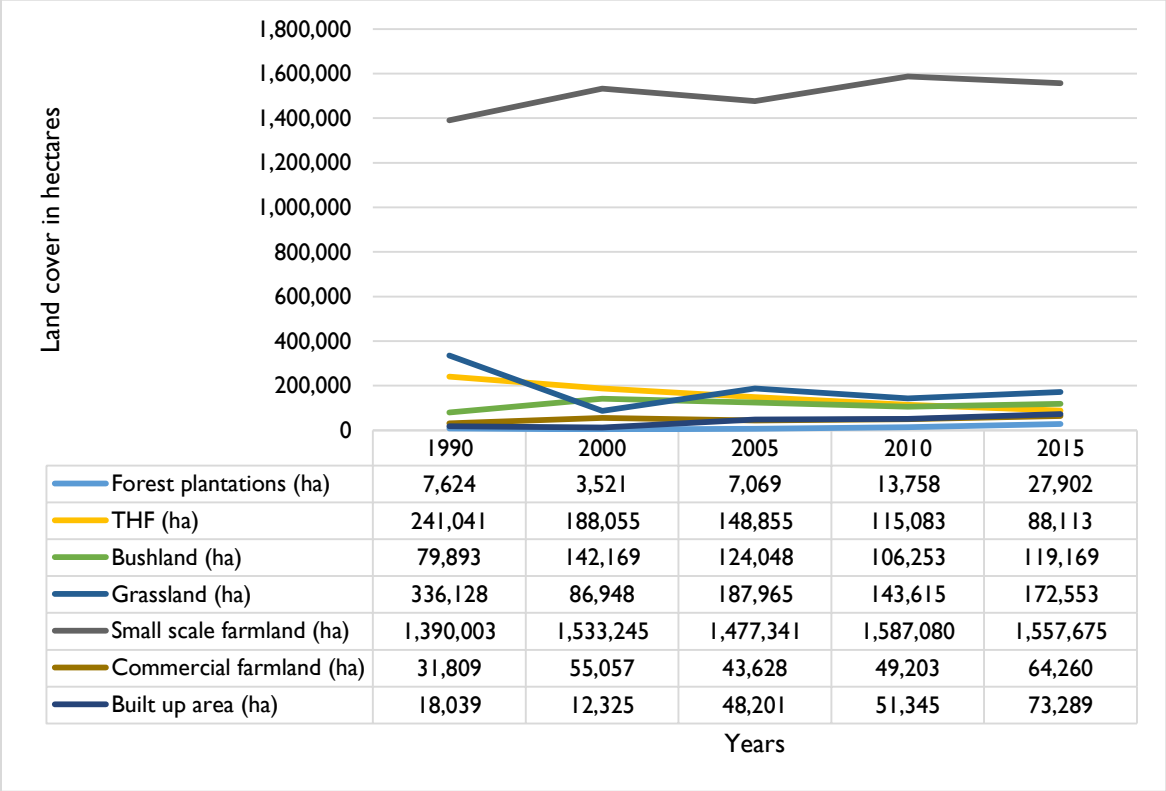
2.3.4 National Land Accounts for the Lake Victoria Crescent Landscapes

The Lake Victoria Crescent is dominated by the open water system and small scale farmlands. The open water covers 2.8 million ha followed by the 1.39 million ha cover for the small scale farmlands. The small scale farmlands increased to 1.56 million ha while grasslands and woodlands halved from 336,128 to 172,553 ha and 173,810 to 80,047 ha, respectively. Commercial farmlands doubled from 31,809 ha to 64,260 ha while built up areas increased four-fold from 18,039 ha to 73,289ha (Table 2.10). The natural forest area declined with the largest decline observed for THF low stocked which reduced from 123,634 ha to 35,398 ha. Similarly, woodlands and THF well stocked land cover halved between 1990 and 2015. The plantation forest cover was also quite small and it increased by just over 100% for broadleaved plantations and by 16-times for coniferous plantations.

Table 2.10: Land Physical Accounts for Lake Victoria Crescent Landscapes (in hectares)

Lake Victoria Crescent	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock (1st Jan. 1990)	6,793	831	117,407	123,634	173,810	79,893	336,128	98,441	1,390,003	31,809	18,039	2,821,221	319
Additions	1,880	528	56,702	23,790	93,684	132,378	26,191	115,712	269,222	30,578	4,893	13,867	10
Reductions	5,693	818	30,479	103,004	111,378	70,102	275,370	20,468	125,978	7,330	10,608	7,889	318
Net gains/reductions	(3,813)	(290)	26,223	(79,214)	(17,694)	62,276	(249,179)	95,244	143,244	23,248	(5,715)	5,978	(308)
Closing stock (3st Dec. 1999)	2,979	542	143,633	44,422	156,115	142,169	86,948	193,683	1,533,245	55,057	12,325	2,827,198	9
Opening stock (1st Jan. 2000)	2,979	542	143,633	44,422	156,115	142,169	86,948	193,683	1,533,245	55,057	12,325	2,827,198	9
Additions	3,026	3,103	14,498	47,601	100,811	75,985	139,512	33,787	147,249	12,874	37,751	4,328	867
Reductions	2,262	320	71,082	30,216	97,937	94,107	38,496	43,823	203,153	24,300	1,876	13,810	10
Net gain/reductions	764	2,783	(56,584)	17,385	2,874	(18,122)	101,016	(10,036)	(55,904)	(11,426)	35,875	(9,482)	857
Closing stock (31st Dec. 2004)	3,745	3,324	87,049	61,806	158,990	124,048	187,965	183,647	1,477,341	43,628	48,201	2,817,716	868
Opening stock (1st Jan 2005)	3,745	3,324	87,049	61,806	158,990	124,048	187,965	183,647	1,477,341	43,628	48,201	2,817,716	868
Additions	1,358	643	16,782	14,259	13,705	22,656	14,913	5,914	109,754	4,879	1,583	1,962	428
Reductions	3,028	1,106	33,514	49,699	121,489	-	-	-	-	-	-	-	-
Net gain/reductions	(1,670)	(463)	(16,732)	(35,440)	(107,784)	22,656	14,913	5,914	109,754	4,879	1,583	1,962	428
Closing stock (31st Dec. 2009)	6,768	6,990	77,182	37,901	119,155	106,253	143,615	193,749	1,587,080	49,203	51,345	2,816,857	2,228
Opening stock (1st Jan 2010)													
Additions	2,237	913	2,297	15,491	7,445	20,750	15,087	4,781	52,822	2,659	963	3,718	76
Reductions	3,019	1,255	28,385	21,923	74,657	-	-	-	-	-	-	-	-
Net gain/reductions	(782)	(342)	(26,088)	(6,432)	(67,212)	20,750	15,087	4,781	52,822	2,659	963	3,718	76
Closing stock (31st Dec. 2014)	14,435	13,467	52,715	35,398	80,047	119,169	172,553	181,644	1,557,675	64,260	73,289	2,832,579	1,095
Opening stock (1st Jan. 2015)	14,435	13,467	52,715	35,398	80,047	119,169	172,553	181,644	1,557,675	64,260	73,289	2,832,579	1,095

The trends of land cover change in the Lake Victoria Crescent show the dominance of small scale farmlands (Figure 2.12). The small scale and commercial farmlands, forest plantations and built up areas increased between 1990 and 2010 while all other land covers reduced. There was increased utilisation of land with a reduction of grasslands and bushlands. The Lake Victoria Crescent is the most settled part of the country as it hosts the Capital City Kampala and the metropolitan areas of the surrounding Districts. Commercial agriculture, improved small scale farms and built up areas are expected to continue to increase as the urbanisation rate increases. Indeed, between 2010 and 2015, the shift seemed to be a reduction, albeit a small one, in small scale farms while the commercial farmlands area rose rapidly from 2000 to 2015.



	1990	2000	2005	2010	2015
Forest plantations (ha)	7,624	3,521	7,069	13,758	27,902
THF (ha)	241,041	188,055	148,855	115,083	88,113
Bushland (ha)	79,893	142,169	124,048	106,253	119,169
Grassland (ha)	336,128	86,948	187,965	143,615	172,553
Small scale farmland (ha)	1,390,003	1,533,245	1,477,341	1,587,080	1,557,675
Commercial farmland (ha)	31,809	55,057	43,628	49,203	64,260
Built up area (ha)	18,039	12,325	48,201	51,345	73,289

Figure 2.12: Trends of land cover for Lake Victoria Crescent for 1990 to 2015

2.3.5 National Land Accounts for the Northern Moist Landscapes

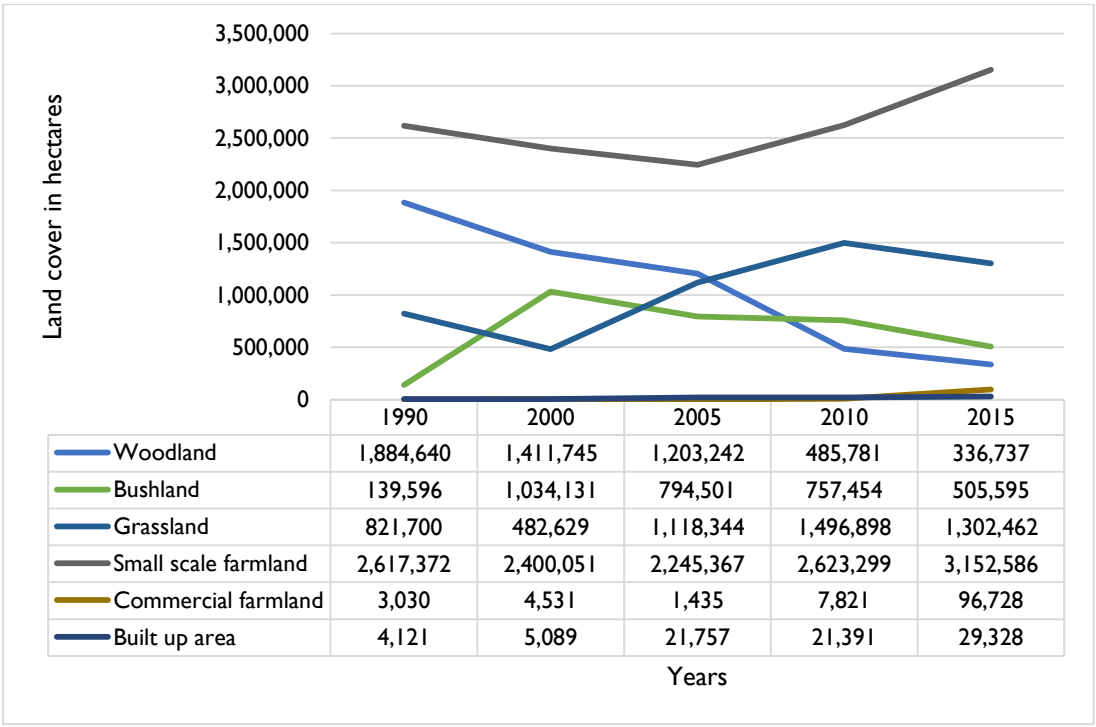
Table 2.11 shows the Land Physical Accounts for the Northern Moist landscape. The stand out transition in the land accounts for the Northern Moist landscape was the reduction in woodland cover from 1.88 million ha to 336,737 ha. Conversely, grasslands and small scale farmlands increased from 821,700 to 1.30 million ha and 2.62 to 3.15 million ha, respectively. The land cover for THF low stocked and commercial farmlands increased by 426 times and 32 times respectively while built up areas increased by seven-times and conifers by four times. In 1990, the 1.88 million ha of woodlands in Northern Uganda represented 47.4% of the total woodland cover (3.97 million ha) of the country. The reduction in woodland cover that occurred between 1990 and 2015 was equivalent to a reduction of 38.9% of the woodland cover of the country. Expansion of small scale farmlands in the Northern Moist landscape represented a consistent shift observed across the country. For 1990 and 2015 respectively, small scale farm lands in the Northern Moist landscape increased steadily and were equivalent to 31% of the national small scale farmlands even though the national small scale farm land increased from 8.4 to 10.3 million ha.

Table 2.11: Land Physical Accounts for Northern Moist Farmland Landscape (in hectares)

Northern Moist Farmland	Broad leaved plantation	Coni-ferous plantation	THF well stocked	THF low stocked	Wood-land	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impe men
Opening stock (1st Jan. 1990)	2,488	1,180	1,458	5	1,884,640	139,596	821,700	61,456	2,617,372	3,030	4,121	151,996	1
Additions	675	173	770	579	472,605	981,400	365,366	158,386	440,700	3,575	3,854	15,758	
Reductions	2,172	723	274	5	945,499	86,865	704,437	23,846	658,023	2,074	2,886	16,061	1
Net gain/reductions	(1,497)	(550)	496	574	(472,894)	894,535	(339,071)	134,540	(217,323)	1,501	968	(303)	(9
Closing stock (3st Dec. 1999)	990	629	1,954	579	1,411,745	1,034,131	482,629	195,998	2,400,051	4,531	5,089	151,694	
Opening stock (1st Jan. 2000)	990	629	1,954	579	1,411,745	1,034,131	482,629	195,998	2,400,051	4,531	5,089	151,694	
Additions	4,258	726	1,052	216	486,443	540,559	899,881	57,786	421,607	950	19,079	21,820	2
Reductions	718	204	617	576	694,946	780,190	264,164	128,082	576,291	4,046	2,411	4,492	
Net gain/reductions	3,540	522	435	(360)	(208,503)	(239,631)	635,717	(70,296)	(154,684)	(3,096)	16,668	17,328	2
Closing stock (31st Dec. 2004)	4,530	1,152	2,388	219	1,203,242	794,501	1,118,344	125,704	2,245,367	1,435	21,757	169,021	2
Opening stock (1st Jan 2005)	4,530	1,152	2,388	219	1,203,242	794,501	1,118,344	125,704	2,245,367	1,435	21,757	169,021	2
Additions	388	140	486	443	404	249,974	316,966	3,823	314,820	1,301	690	262	
Reductions	3,454	679	979	220	884,734	-	-	-	-	-	-	-	
Net gain/reductions	(3,066)	(539)	(493)	223	(884,330)	249,974	316,966	3,823	314,820	1,301	690	262	
Closing stock (31st Dec. 2009)	2,661	4,260	2,405	2,244	485,781	757,454	1,496,898	133,226	2,623,299	7,821	21,391	150,497	2
Opening stock (1st Jan 2010)	2,661	4,260	2,405	2,244	485,781	757,454	1,496,898	133,226	2,623,299	7,821	21,391	150,497	2
Additions	406	132	21	1,568	551	66,094	83,099	1,691	99,691	7,878	196	1,414	
Reductions	1,096	969	2,186	1,812	256,823	-	-	-	-	-	-	-	
Net gain/reductions	(690)	(837)	(2,165)	(244)	(256,272)	66,094	83,099	1,691	99,691	7,878	196	1,414	
Closing stock (31st Dec. 2014)	4,354	4,659	269	2,131	336,737	505,595	1,302,462	80,979	3,152,586	96,728	29,328	172,788	1
Opening stock (1st Jan. 2015)	4,354	4,659	269	2,131	336,737	505,595	1,302,462	80,979	3,152,586	96,728	29,328	172,788	1

In 1990, the land cover in the Northern Moist landscape was dominated by small scale farmlands and woodlands (Figure 2.13). By 2015, the small scale farmlands stood out as the major beneficiaries of the reduction in land cover for all other large land cover. The woodlands and bushlands reduced while grasslands increased. The increase in small scale farmlands was largely driven by an increase number of people opening up land for crop production (MWE 2016), while the increase in bushland area is a sign of degradation of other land covers. Bushlands are generally unutilised areas mainly used to gather fuel wood and as a habitat for small size wildlife.

The woodlands suffered considerable destruction in the Northern Moist landscape losing over 750,000 ha in a five-year time span between 2005 and 2010 and continuing to lose cover. Most of the reduction in woodlands was attribute to wood fuel production, particularly charcoal production (NEMA et al. 2017). Commercial agriculture and built up areas are also experiencing accelerated growth in the Northern Moist landscape.



	1990	2000	2005	2010	2015
Woodland	1,884,640	1,411,745	1,203,242	485,781	336,737
Bushland	139,596	1,034,131	794,501	757,454	505,595
Grassland	821,700	482,629	1,118,344	1,496,898	1,302,462
Small scale farmland	2,617,372	2,400,051	2,245,367	2,623,299	3,152,586
Commercial farmland	3,030	4,531	1,435	7,821	96,728
Built up area	4,121	5,089	21,757	21,391	29,328

Figure 2.13: Trends of land cover for the Northern Moist landscape 1990 to 2015

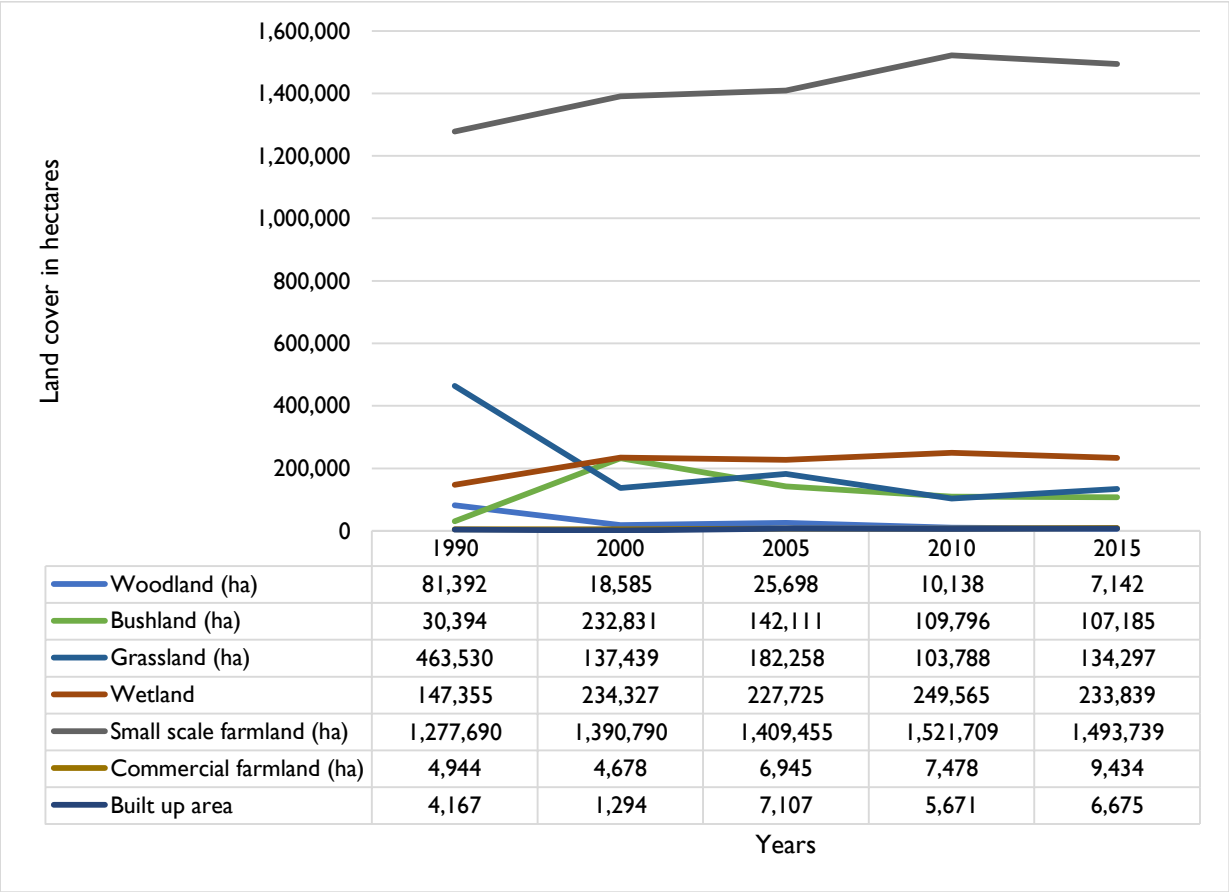
2.3.6 National Land Accounts for South East Lake Kyoga Flood Plain

The South East Lake Kyoga Flood Plain Landscape is located in on the Eastern side of the Lake Kyoga. This relatively small landscape covering only 2.2 million ha was dominated by the small scale farmlands which are three times larger than the second largest land cover of grasslands in 1990. The small scale farmlands increased from 1.28 million to 1.49 million ha between 1990 and 2015 while grasslands and woodlands reduced (Table 2.12). Whereas it occupies only 9% of the country's land cover, the North-South-East Lake Kyoga Flood Plains had Uganda's largest wetland area, by landscape, in 1990 with 147,000 ha equivalent to 30.4% of national wetland cover. The wetland cover increased to 233,839 ha (32.68% of national wetland cover) in 2015. The Kyoga is a relatively shallow lake with several wetlands especially on its Eastern border (GoU 2017 – Wetland Atlas).

Table 2.12: Land Physical Accounts for South East Lake Kyoga Flood Plain Landscape (in ha)

South East L. Kyoga Flood Plain	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock (1st Jan. 1990)	716	308	576	44	81,392	30,394	463,530	147,355	1,277,690	4,944	4,167	170,615	232
Additions	247	404	148	-	11,962	229,458	28,458	115,179	207,819	1,836	661	17,482	254
Reductions	712	69	576	45	74,768	27,020	354,548	28,209	94,719	2,102	3,532	27,376	232
Net gains/reductions	(465)	335	(428)	(45)	(62,806)	202,438	(326,090)	86,970	113,100	(266)	(2,871)	(9,894)	22
Closing stock (3st Dec. 1999)	251	644	148	-	18,585	232,831	137,439	234,327	1,390,790	4,678	1,294	160,721	253
Opening stock (1st Jan. 2000)	251	644	148	-	18,585	232,831	137,439	234,327	1,390,790	4,678	1,294	160,721	253
Additions	170	42	-	-	21,524	81,857	132,436	46,042	119,628	4,149	6,383	25,432	412
Reductions	171	310	148	-	14,409	172,580	87,617	52,643	100,963	1,881	572	6,528	253
Net gains/reductions s	(1)	(268)	(148)	-	7,115	(90,723)	44,819	(6,601)	18,665	2,268	5,811	18,904	159
Closing stock (31st Dec. 2004)	249	376			25,698	142,111	182,258	227,725	1,409,455	6,945	7,107	179,624	412
Opening stock (1st Jan 2005)	249	376			25,698	142,111	182,258	227,725	1,409,455	6,945	7,107	179,624	412
Additions	41	3	144	-	16	2,558	6,054	1,457	13,940	-	20	28	-
Reductions	249	367	-	-	23,645	-	-	-	-	-	-	-	-
Net gains/reductions s	(208)	(364)	144	-	(23,629)	2,558	6,054	1,457	13,940	-	20	28	-
Closing stock (31st Dec. 2009)	63	335	148		10,138	109,796	103,788	249,565	1,521,709	7,478	5,671	173,122	149
Opening stock (1st Jan 2010)													
Additions	11	7	7	-	3,449	2,299	405	186	3,775	5	45	4	-
Reductions	3	51	-	10,139	-	-	-	-	-	-	-	-	-
Net gains/reductions	8	(44)	7	(10,139)	3,449	2,299	405	186	3,775	5	45	4	-
Closing stock (31st Dec. 2014)	297	588	168		7,142	107,185	134,297	233,839	1,493,739	9,434	6,675	188,593	3
Opening stock (1st Jan. 2015)	297	588	168		7,142	107,185	134,297	233,839	1,493,739	9,434	6,675	188,593	3

Whereas the small scale farmlands were dominant in the South and North East Lake Kyoga Flood Plains, the landscape covers over 50% of Uganda's wetlands (Figure 2.14). As the small scale farmlands expanded at the expense of other land cover, the area of wetlands increased by 58.7%. The expansion of wetlands is related to expansion of paddy rice and expansion of wetlands to channel irrigation for farmlands. Crop production and wetland and open water use are the most dominant land uses in the landscape. The continued rapid growth of the small scale farmlands is a major threat to other land use.



	1990	2000	2005	2010	2015
Woodland (ha)	81,392	18,585	25,698	10,138	7,142
Bushland (ha)	30,394	232,831	142,111	109,796	107,185
Grassland (ha)	463,530	137,439	182,258	103,788	134,297
Wetland	147,355	234,327	227,725	249,565	233,839
Small scale farmland (ha)	1,277,690	1,390,790	1,409,455	1,521,709	1,493,739
Commercial farmland (ha)	4,944	4,678	6,945	7,478	9,434
Built up area	4,167	1,294	7,107	5,671	6,675

Figure 2.14: Land cover trends for South and North East L. Kyoga Flood Plains, 1990 to 2015

2.3.7 National Land Accounts for the Southwest Rangeland Landscapes

The Southwest Rangelands are an important part of Uganda's cattle corridors and in 1990 were dominated by grasslands. IN 2015, much of the grassland area lost between 1990 and 2000 had been recovered although it was 171,169 ha less that what it was in 1990 (Table 2.13). On the other hand, land cover for small scale farmlands increased from 892,833 to 1,375,895 ha between 1990 and 2015.

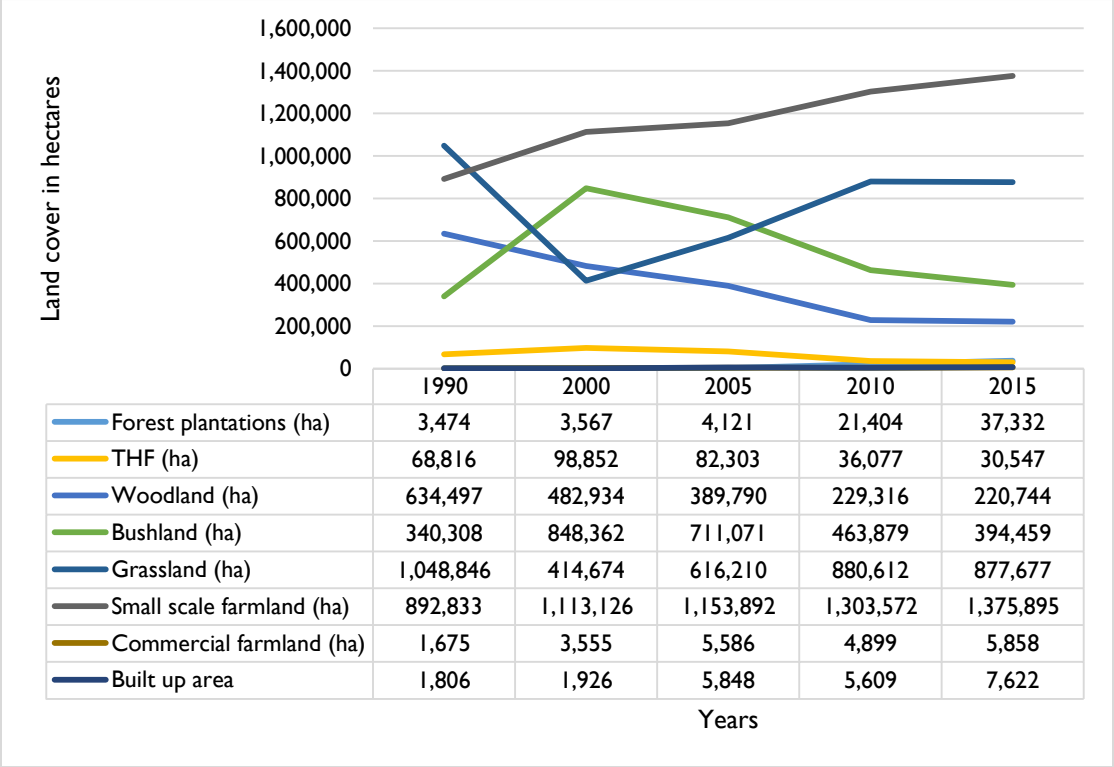
The Southwest Rangelands experienced a four-fold increase in built-up area to 7,622 ha in 2015. The woodland cover reduced by nearly three-fold from 634,497 to 220,744 ha. Similarly, tropical high forests also reduced with a larger decline for both THF well stocked and THF low stocked while the plantations increased.

Table 2.13: Land Physical Accounts for Southwest Rangeland Landscape (in hectares)

Southwest Rangeland	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock (1st Jan. 1990)	1,217	2,257	33,870	34,946	634,497	340,308	1,048,846	81,690	892,833	1,675	1,806	113,618	734
Additions	1,193	635	12,510	52,027	242,657	682,700	127,482	52,810	409,704	3,156	982	4,608	-
Reductions	1,214	519	13,540	20,961	394,221	174,648	761,655	21,197	189,411	1,275	862	10,226	735
Net gains/reductions	(21)	116	(1,030)	31,066	(151,564)	508,052	(634,173)	31,613	220,293	1,881	120	(5,618)	(735)
Closing stock (3st Dec. 1999)	1,195	2,372	32,839	66,013	482,934	848,362	414,674	113,301	1,113,126	3,555	1,926	107,998	
Opening stock (1st Jan. 2000)	1,195	2,372	32,839	66,013	482,934	848,362	414,674	113,301	1,113,126	3,555	1,926	107,998	
Additions	1,115	1,083	4,256	36,625	174,823	287,210	366,567	28,405	319,057	2,953	4,932	6,329	452
Reductions	1,195	451	12,136	45,291	267,968	424,502	165,031	30,560	278,292	921	1,009	6,451	-
Net gains/reductions	(80)	632	(7,880)	(8,666)	(93,145)	(137,292)	201,536	(2,155)	40,765	2,032	3,923	(122)	452
Closing stock (31st Dec. 2004)	1,116	3,005	24,958	57,345	389,790	711,071	616,210	111,148	1,153,892	5,586	5,848	107,875	453
Opening stock (1st Jan 2005)	1,116	3,005	24,958	57,345	389,790	711,071	616,210	111,148	1,153,892	5,586	5,848	107,875	453
Additions	639	5,443	2,920	1,290	6,674	105,042	90,669	5,218	128,499	723	319	88	466
Reductions	1,079	774	5,966	51,336	288,835	-	-	-	-	-	-	-	-
Net gains/reductions	(440)	4,669	(3,046)	(50,046)	(282,161)	105,042	90,669	5,218	128,499	723	319	88	466
Closing stock (31st Dec. 2009)	1,453	19,951	23,505	12,572	229,316	463,879	880,612	125,652	1,303,572	4,899	5,609	115,575	1,699
Opening stock (1st Jan 2010)													
Additions	2,564	2,871	518	3,439	414	35,100	31,836	2,464	53,704	823	97	70	66
Reductions	312	2,195	3,528	10,258	117,673	-	-	-	-	-	-	-	-
Net gains/reductionsNet gains/reductions	2,252	676	(3,010)	(6,819)	(117,259)	35,100	31,836	2,464	53,704	823	97	70	66
Closing stock (31st Dec. 2014)	7,651	29,681	21,608	8,939	220,744	394,459	877,677	119,587	1,375,895	5,858	7,622	117,884	690
Opening stock (1st Jan. 2015)	7,651	29,681	21,608	8,939	220,744	394,459	877,677	119,587	1,375,895	5,858	7,622	117,884	690

In the Southwest Rangelands, grasslands served as rangelands for the dominant land use of livestock production in 1990. However, like most of the country, crop production largely based on small scale farmlands increasingly became dominant. By 2015, 483,062 ha more hectares of land cover were under small scale farmlands than under grasslands (Figure 2.15). Forest plantations increased while the tropical forests continue to be deforested. The woodlands reduced to nearly one-third between 1990 and 2015. Conversely, bushlands more than doubled between 1990 and 2000, before gradually declining between 2000 and 2015.

The rapid expansion of small scale farmlands may be beginning to limit alternative land uses. Nonetheless, the bushland may still be recoverable for increased utility under some of the alternative land covers.



	1990	2000	2005	2010	2015
Forest plantations (ha)	3,474	3,567	4,121	21,404	37,332
THF (ha)	68,816	98,852	82,303	36,077	30,547
Woodland (ha)	634,497	482,934	389,790	229,316	220,744
Bushland (ha)	340,308	848,362	711,071	463,879	394,459
Grassland (ha)	1,048,846	414,674	616,210	880,612	877,677
Small scale farmland (ha)	892,833	1,113,126	1,153,892	1,303,572	1,375,895
Commercial farmland (ha)	1,675	3,555	5,586	4,899	5,858
Built up area	1,806	1,926	5,848	5,609	7,622

Figure 2.15: Trends of land cover for the Southwest Rangelands for 1990 to 2015

2.3.8 National Land Accounts for the Western Mid Altitude Farmland landscapes

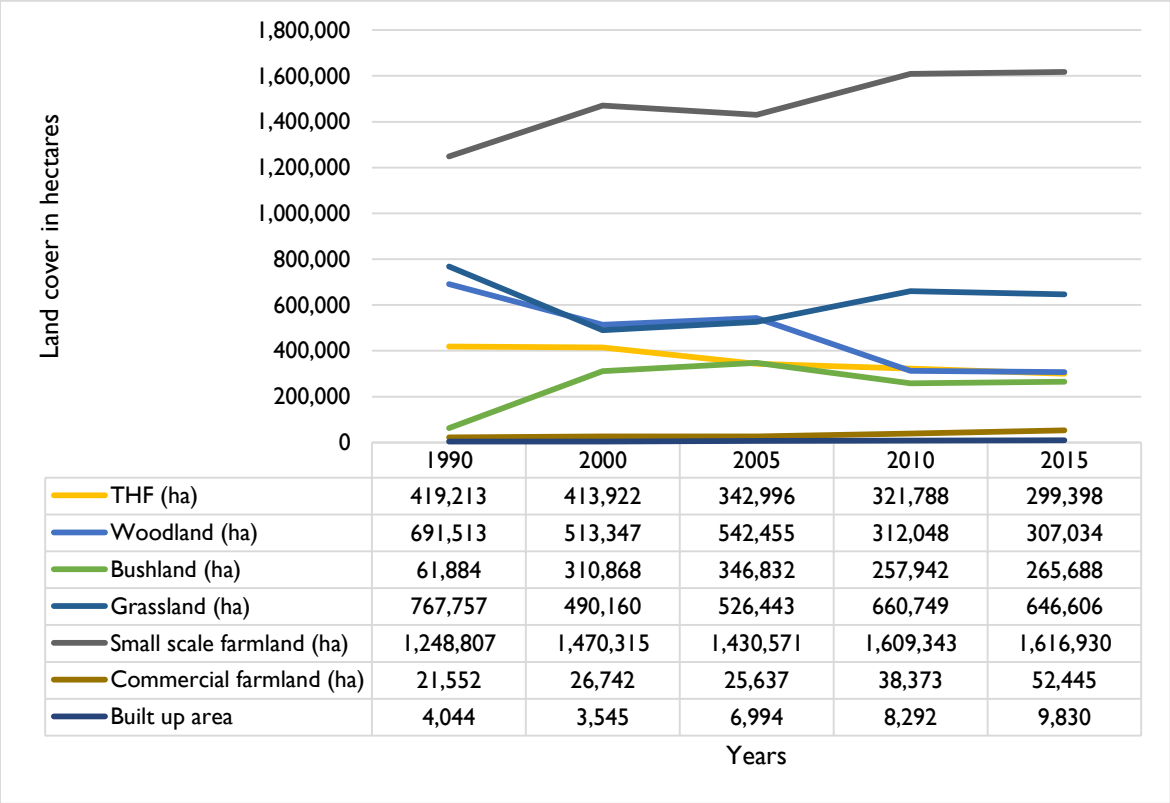
The Western Mid Altitude Farmlands are dominated by small scale farmlands, followed by grasslands and woodlands. The landscape accounted for 52% of all the THF well stocked in the country in 1990 and 50% in 2015. The landscape is located in the Albertine Rift landscape, the country's most important biodiversity conservation zone, and also host to the Albertine Graben, which hosts the country's oil and gas resources currently under development. The Western Mid Altitude Farmlands landscape, like all other landscapes, was characterised by an increase in plantation forest area, a decline in natural forest cover, and increases in the small scale farmlands, commercial farmlands and built up areas. The grasslands declined by 16% while bushlands increased by 329% (Table 2.14). The grasslands, woodlands and bushlands generally serve as protected areas (habitat) for wildlife, while grasslands additionally serve as rangelands for livestock production (GoU 2016 – NBSAP II). The largest reduction in land cover was for woodlands, which decreased from 691,513 to 307,034 ha, while the largest increase was for small scale farmlands, which increased from 1.25 million to 1.62 million ha.

Table 2.14: Land Physical Accounts for Western Mid Altitude Farmland Landscape (in hectares)

Western Mid-Altitude Farmland	Broad leaved plantation	Coniferous plantation	TTHF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock (1st Jan. 1990)	3,705	4,901	340,525	78,688	691,513	61,884	767,757	77,972	1,248,807	21,552	4,044	369,393	433
Additions	1,860	1,616	47,258	77,862	178,719	289,870	166,595	22,168	383,666	12,433	1,596	2,426	-
Reductions	3,551	2,105	78,333	52,080	356,888	40,886	444,190	32,495	162,157	7,243	2,095	3,615	431
Net gains/reductionsNet gains/reductions	(1,691)	(489)	(31,075)	25,782	(178,169)	248,984	(277,595)	(10,327)	221,509	5,190	(499)	(1,189)	(431)
Closing stock (3st Dec. 1999)	2,013	4,411	309,451	104,471	513,347	310,868	490,160	67,646	1,470,315	26,742	3,545	368,204	
Opening stock (1st Jan. 2000)	2,013	4,411	309,451	104,471	513,347	310,868	490,160	67,646	1,470,315	26,742	3,545	368,204	
Additions	3,230	1,432	26,452	40,537	216,952	206,202	200,798	30,550	216,366	6,468	4,150	3,408	1,211
Reductions	1,832	2,450	65,225	72,688	187,844	170,240	164,514	26,618	256,109	7,574	702	1,960	-
Net gains/reductionsNet gains/reductions	1,398	(1,018)	(38,773)	(32,151)	29,108	35,962	36,284	3,932	(39,743)	(1,106)	3,448	1,448	1,211
Closing stock (31st Dec. 2004)	3,410	3,394	270,678	72,318	542,455	346,832	526,443	71,578	1,430,571	25,637	6,994	369,653	1,211
Opening stock (1st Jan 2005)	3,410	3,394	270,678	72,318	542,455	346,832	526,443	71,578	1,430,571	25,637	6,994	369,653	1,211
Additions	644	779	29,421	25,892	16,554	99,509	104,816	10,368	172,310	6,275	478	495	238
Reductions	3,191	1,952	46,387	60,172	356,077	-	-	-	-	-	-	-	-
Net gains/reductionsNet gains/reductions	(2,547)	(1,173)	(16,966)	(34,280)	(339,523)	99,509	104,816	10,368	172,310	6,275	478	495	238
Closing stock (31st Dec. 2009)	4,288	6,366	267,772	54,016	312,048	257,942	660,749	79,945	1,609,343	38,373	8,292	370,169	1,871
Opening stock (1st Jan 2010)													
Additions	3,594	836	11,726	12,611	6,493	30,251	33,936	3,042	76,849	4,352	166	873	209
Reductions	2,321	2,339	26,100	38,140	116,038	-	-	-	-	-	-	-	-
Net gains/reductionsNet gains/reductions	1,273	(1,503)	(14,374)	(25,529)	(109,545)	30,251	33,936	3,042	76,849	4,352	166	873	209
Closing stock (31st Dec. 2014)	11,530	7,639	263,233	36,165	307,034	265,688	646,606	80,273	1,616,930	52,445	9,830	372,411	1,390
Opening stock (1st Jan. 2015)	11,530	7,639	263,233	36,165	307,034	265,688	646,606	80,273	1,616,930	52,445	9,830	372,411	1,390

The West Mid Altitude landscape, like the Southwest Rangelands, is located between Western and South Western Uganda. Unlike the Southwest Rangelands, small scale farmlands were the dominant land cover in 1990 and continued to increase throughout the period assessed (Figure 2.16). The grassland continued to be an important land cover, reducing by just over 100,000 ha over the 25-year timeline. The West Mid Altitude landscape, like the Afromontane, is also an important biodiversity area with protected areas such as the Murchison Falls National Park, Kibale National Park, Toro-Semliki Wildlife Reserve, Budongo and Bugoma Central Forest Reserves, among others. The protected areas provide protection for some of the land covers reviewed, including woodlands, bushlands, grasslands and tropical high forests.

Commercial farmlands doubled between 1990 and 2015, from 21,522 ha to 52,445 ha, while the built up areas gradually increased towards 10,000 ha of land cover, from 4,044 ha.



	1990	2000	2005	2010	2015
THF (ha)	419,213	413,922	342,996	321,788	299,398
Woodland (ha)	691,513	513,347	542,455	312,048	307,034
Bushland (ha)	61,884	310,868	346,832	257,942	265,688
Grassland (ha)	767,757	490,160	526,443	660,749	646,606
Small scale farmland (ha)	1,248,807	1,470,315	1,430,571	1,609,343	1,616,930
Commercial farmland (ha)	21,552	26,742	25,637	38,373	52,445
Built up area	4,044	3,545	6,994	8,292	9,830

Figure 2.16: Trends of land cover for the West Mid Altitude landscape for 1990 to 2015

2.4 Land cover series by Water Management Zone

2.4.1 Uganda's Water Management Zones

Water Resources Management (WRM) in Uganda is based on the Water Policy (1999) and the Water Act Cap 152. Both the Policy and the Act adopted an Integrated Water Resource Management (IWRM) approach based on the outcomes of the Water Action Plan in 1995. The 2005 Water Sector Reform Study and the subsequent 2006 Joint Sector Review (JSR) both recommended the implementation of IWRM at the catchment level (MWE 2011). The Reform Study led to preparation of a WRM reform strategy which provided for a paradigm shift in water resource management from centralised to catchment/basin level WRM. Four Water Management Zones (WMZ) were created for Uganda's eight water basins. These are; (i) Victoria Water Management Zone, (ii) Kyoga Water Management Zone, (iii)

Albert Water Management Zone and (iv) the Upper Nile Water Management Zone (Figure 2.17 and 2.18). The WMZs were created to maximise economic and social benefits for Ugandans from water/related resources management and development i.e. it is the best way to deliver benefits from the seven water/related resources for the people of Uganda.

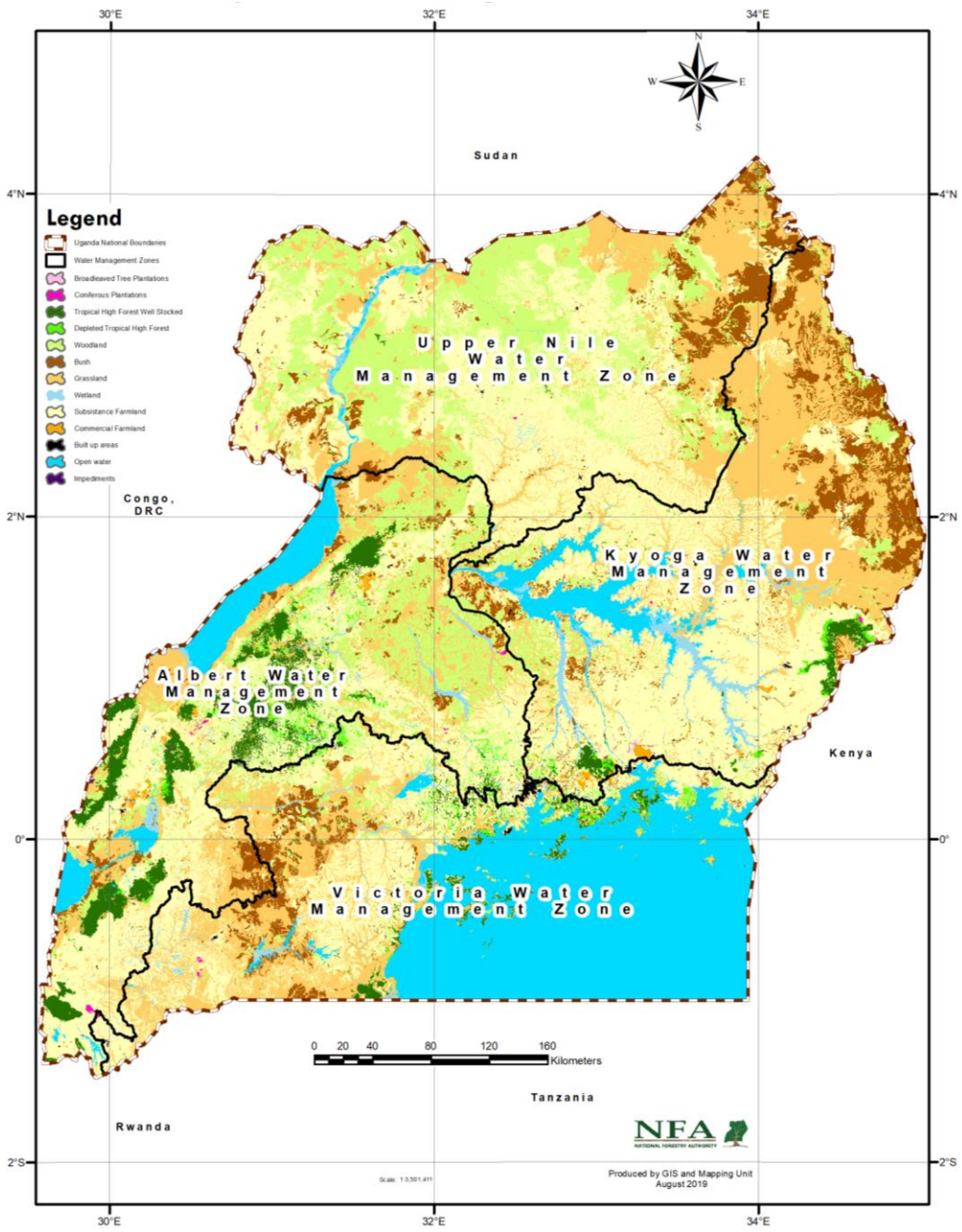


Figure 2.17: Land cover/ land use 1990 by Management Zones (WMZs)

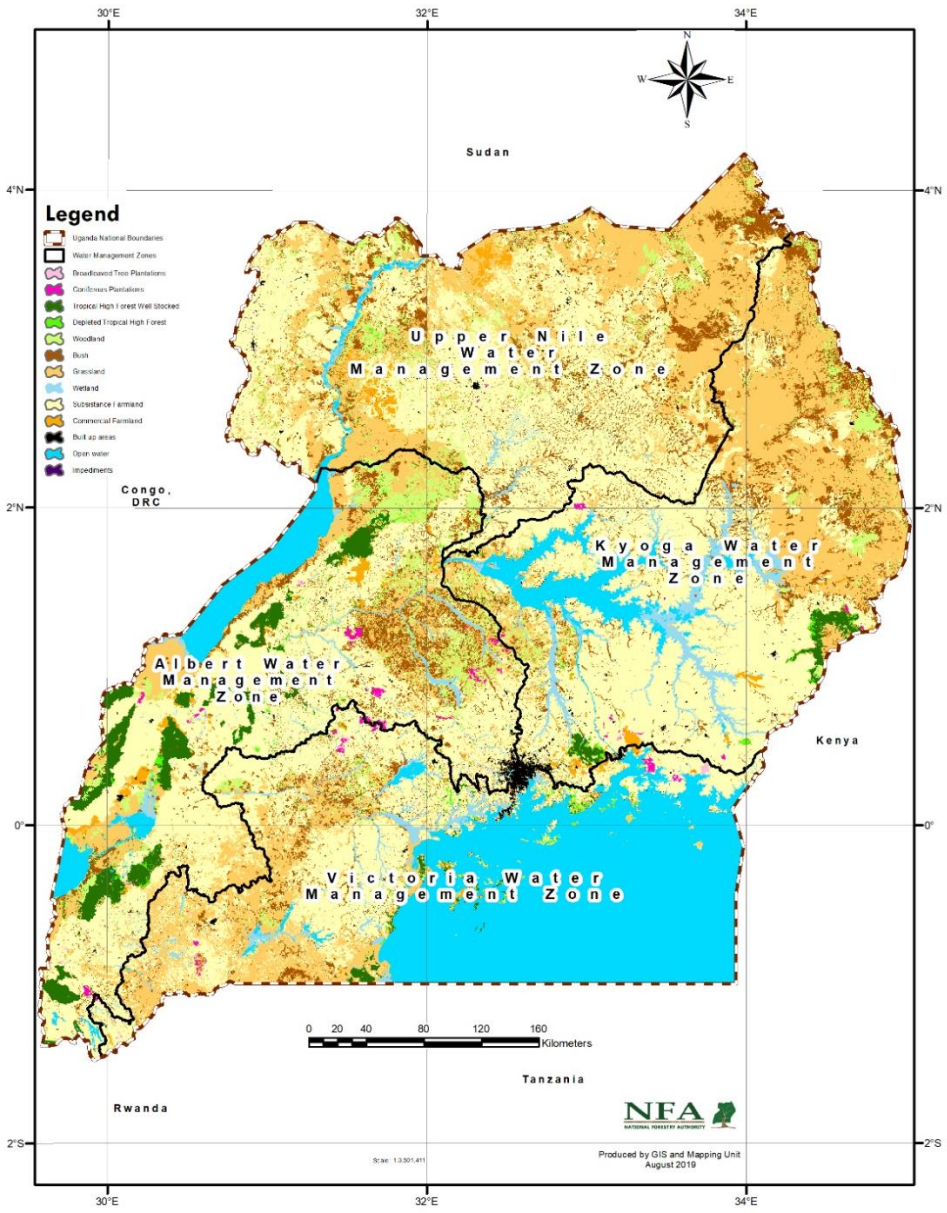


Figure 2.18: Land cover/ land use 2015 by Management Zones (WMZs)

2.4.2 National Land Accounts by Water Management Zones

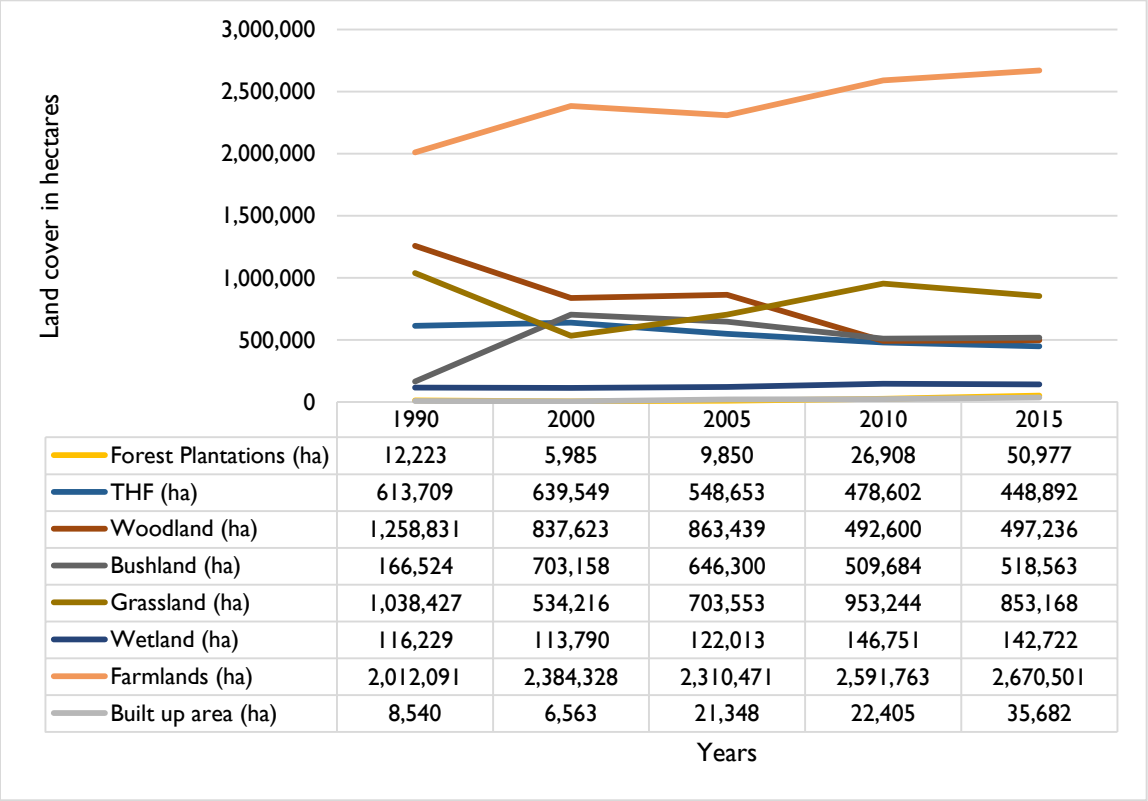
2.4.2.1 National land accounts for the Albert Water Management Zone

In 1990, the Albert WMZ was dominated by small scale farmlands, woodlands and grasslands with 1.98 million, 1.26 million and 1.04 million ha respectively (Table 2.15). Whereas THF well stocked and open water were also quite large, they were still over 500,000 ha less than the grasslands cover. Forest plantations were 12,223 ha and built up areas even smaller at 8,540 ha. By 2015, the water management zone had changed considerably and the small scale farmlands had increased to 2.59 million ha. Similarly, bushlands also increased from 166,524 ha to 518,563 ha between 1990 and 2015. Conversely, woodlands, grasslands and THF all reduced in size. The largest reduction was for woodlands, from 1.26 million to 497,236 ha. The THF well stocked was reduced by 90,812 ha while grasslands lost about 185,259 ha.

Table 2.15: Land Physical Accounts for the Albert Water Management Zone (in hectares)

Albert Water Management Zone	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock (1st Jan. 1990)	4,314	7,909	490,012	123,697	1,258,831	166,524	1,038,427	116,229	1,983,811	28,280	8,540	431,645	1,217
Additions	1,651	946	87,543	121,742	291,621	640,826	217,471	47,077	601,805	20,210	3,066	6,148	1,483
Reductions	4,156	4,683	97,842	85,605	712,830	104,191	721,682	49,515	237,875	11,900	5,044	5,107	1,159
Net gains/reductions	(2,505)	(3,737)	(10,299)	36,137	(421,209)	536,635	(504,211)	(2,438)	363,930	8,310	(1,978)	1,041	324
Closing stock (3st Dec. 1999)	1,811	4,174	479,714	159,835	837,623	703,158	534,216	113,790	2,347,741	36,587	6,563	432,685	1,540
Opening stock (1st Jan. 2000)	1,811	4,174	479,714	159,835	837,623	703,158	534,216	113,790	2,347,741	36,587	6,563	432,685	1,540
Additions	3,971	2,895	44,547	72,513	373,179	350,550	352,351	40,805	296,295	21,318	15,744	4,271	1,868
Reductions	1,417	1,586	96,895	111,059	347,364	407,410	183,013	32,582	380,737	10,732	959	5,232	1,321
Net gains/reductions	2,554	1,309	(52,348)	(38,546)	25,815	(56,860)	169,338	8,223	(84,442)	10,586	14,785	(961)	547
Closing stock (31st Dec. 2004)	4,365	5,485	427,366	121,287	863,439	646,300	703,553	122,013	2,263,298	47,173	21,348	431,723	2,086
Opening stock (1st Jan 2005)	4,365	5,485	427,366	121,287	863,439	646,300	703,553	122,013	2,263,298	47,173	21,348	431,723	2,086
Additions	766	4,143	34,242	29,409	34,966	191,052	181,886	14,603	273,179	7,687	934	681	520
Reductions	3,756	1,808	74,213	103,735	590,556	-	-	-	-	-	-	-	-
Net gains/reductions	(2,990)	2,335	(39,971)	(74,326)	(555,590)	191,052	181,886	14,603	273,179	7,687	934	681	520
Closing stock (31st Dec. 2009)	6,706	20,202	408,971	69,631	492,600	509,684	953,244	146,751	2,528,905	62,858	22,405	432,818	4,661
Opening stock (1st Jan 2010)	6,706	20,202	408,971	69,631	492,600	509,684	953,244	146,751	2,528,905	62,858	22,405	432,818	4,661
Additions	5,884	3,486	14,708	18,664	10,217	50,082	52,363	4,791	116,349	5,145	427	1,377	596
Reductions	4,018	2,904	37,462	50,844	188,861	-	-	-	-	-	-	-	-
Net gains/reductions	1,866	582	(22,754)	(32,180)	(178,644)	50,082	52,363	4,791	116,349	5,145	427	1,377	596
Closing stock (31st Dec. 2014)	20,392	30,585	399,200	49,692	497,236	518,563	853,168	142,722	2,590,678	79,823	35,682	437,209	4,484
Opening stock (1st Jan. 2015)	20,392	30,585	399,200	49,692	497,236	518,563	853,168	142,722	2,590,678	79,823	35,682	437,209	4,484

Figure 2.19 shows the expansion of small scale farmlands, and the influence on the other land cover classes. Much as, many of the land classes had reduced cover between 1990 and 2015, it is likely that the land cover change in favour of small scale farmlands would have been larger if the zone did not include protected areas of the Murchison Falls National Park (MFNP), Budongo CFR and Lake Albert, among others. The natural forest cover of woodlands and THF continued to decline while the plantation forest cover doubled across the period of 25 years.



	1990	2000	2005	2010	2015
Forest Plantations (ha)	12,223	5,985	9,850	26,908	50,977
THF (ha)	613,709	639,549	548,653	478,602	448,892
Woodland (ha)	1,258,831	837,623	863,439	492,600	497,236
Bushland (ha)	166,524	703,158	646,300	509,684	518,563
Grassland (ha)	1,038,427	534,216	703,553	953,244	853,168
Wetland (ha)	116,229	113,790	122,013	146,751	142,722
Farmlands (ha)	2,012,091	2,384,328	2,310,471	2,591,763	2,670,501
Built up area (ha)	8,540	6,563	21,348	22,405	35,682

Figure 2.19: Trends of land cover for the Albert WMZ for 1990 to 2015

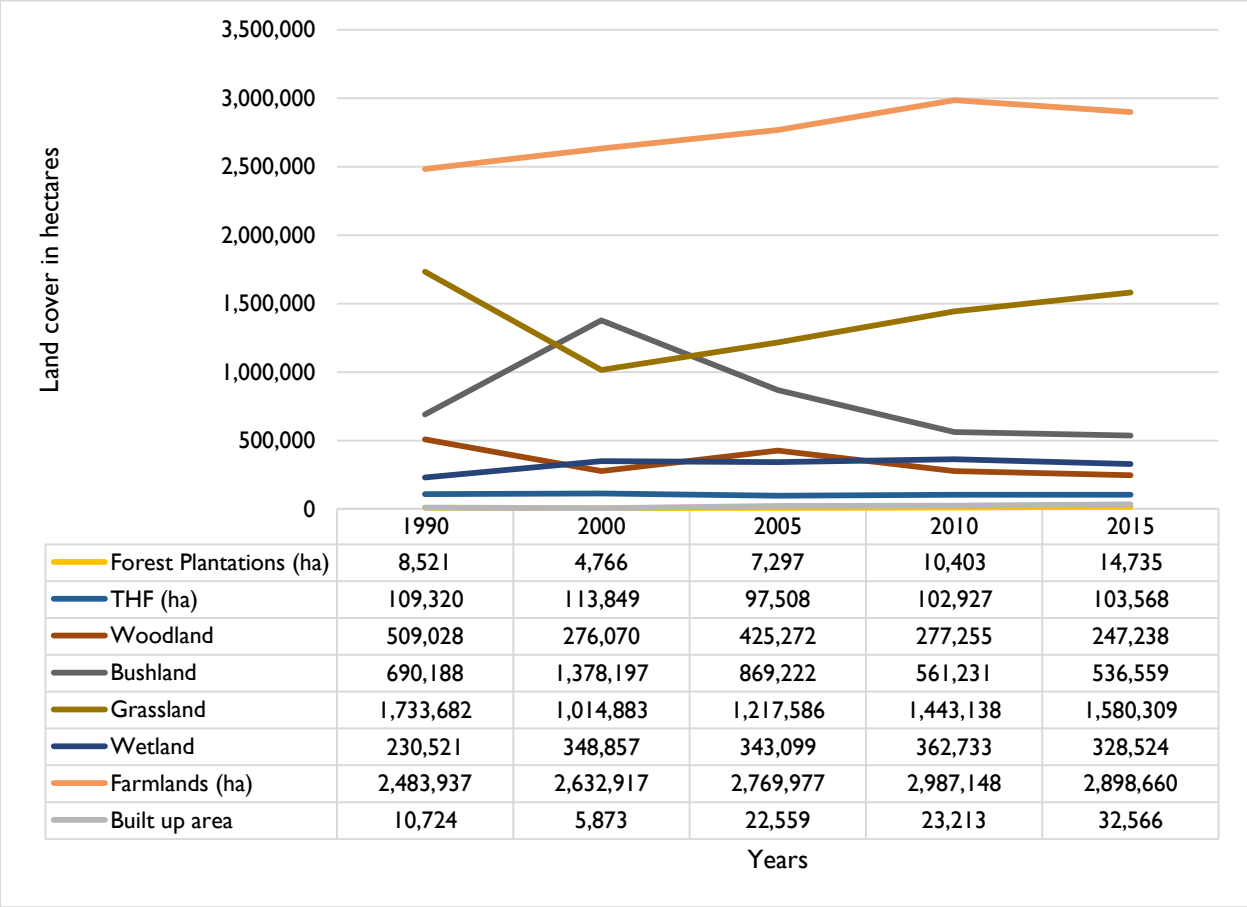
2.4.2.2 National land accounts for the Kyoga Water Management Zone

For the Kyoga WMZ, like the Albert WMZ, the small scale farmlands and the grasslands dominate all other land cover classes. The small scale farmlands increased from 2.46 million to 2.85 million ha (Table 2.16) while the grasslands decreased by 153,373 ha. Woodlands decreased by half from 509,028 ha to 247, 238 ha. Bushlands decreased from 690,188 to 536, 559 ha. The Kyoga WMZ had the largest wetland cover in the country. The wetlands for the WMZ increased from 230,521 to 328524 ha, between 1990 and 2015. There was a major addition to bushlands between 1990 and 2000 with a net increase of 688,010 ha against a net reduction of 718,802 ha for grasslands. Between 2000 and 2005, there was a net reduction of 508,972 ha for bushlands while the grasslands, woodlands and small scale farmlands gained 202,703, 149,202 and 140,553 ha, respectively. Between 2005 and 2010, woodlands had a net reduction of 297,923 ha while grasslands, bushlands and small scale farmlands increased by 150,729, 77,742 and 72,873 ha, respectively. Between 2010 and 2015, woodlands were the only land cover that lost over 100,000 ha. Bushlands, small scale farmland and grasslands gained by 39,023 ha, 31,138 ha and 42,736 ha, respectively.

Table 2.16: Land Physical Accounts for Kyoga WMZ (in hectares)

Kyoga WMZ	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock (1st Jan. 1990)	5,573	2,948	54,556	54,764	509,028	690,188	1,733,682	230,521	2,455,556	28,381	10,724	320,124	923
Additions	1,723	664	47,755	6,521	143,293	1,036,121	354,131	170,113	429,585	21,702	3,585	33,336	254
Reductions	4,445	1,696	7,614	42,133	376,251	348,111	1,072,933	51,777	294,826	7,483	8,435	32,155	924
Net gains/reductions	(2,722)	(1,032)	40,141	(35,612)	(232,958)	688,010	(718,802)	118,336	134,759	14,219	(4,850)	1,181	(670)
Closing stock (3st Dec. 1999)	2,851	1,915	94,698	19,151	276,070	1,378,197	1,014,883	348,857	2,590,316	42,601	5,873	321,304	253
Opening stock (1st Jan. 2000)	2,851	1,915	94,698	19,151	276,070	1,378,197	1,014,883	348,857	2,590,316	42,601	5,873	321,304	253
Additions	1,578	3,825	8,393	5,997	276,325	369,069	693,462	69,321	399,385	14,131	19,384	30,753	1,059
Reductions	2,241	632	14,772	15,960	127,123	878,041	490,759	75,081	258,832	17,621	2,697	8,670	253
Net gains/reductions	(663)	3,193	(6,379)	(9,963)	149,202	(508,972)	202,703	(5,760)	140,553	(3,490)	16,687	22,083	806
Closing stock (31st Dec. 2004)	2,189	5,108	88,320	9,188	425,272	869,222	1,217,586	343,099	2,730,867	39,110	22,559	343,389	1,059
Opening stock (1st Jan 2005)	2,189	5,108	88,320	9,188	425,272	869,222	1,217,586	343,099	2,730,867	39,110	22,559	343,389	1,059
Additions	483	461	7,043	10,718	4,614	77,742	150,729	3,245	72,873	885	969	98	69
Reductions	1,717	3,142	15,660	6,873	302,537	-	-	-	-	-	-	-	-
Net gains/reductions	(1,234)	(2,681)	(8,617)	3,845	(297,923)	77,742	150,729	3,245	72,873	885	969	98	69
Closing stock (31st Dec. 2009)	2,774	7,629	82,490	20,437	277,255	561,231	1,443,138	362,733	2,945,308	41,840	23,213	327,799	1,124
Opening stock (1st Jan 2010)	2,774	7,629	82,490	20,437	277,255	561,231	1,443,138	362,733	2,945,308	41,840	23,213	327,799	1,124
Additions	281	427	5,659	5,492	1,811	39,023	42,736	1,880	31,138	834	416	514	13
Reductions	1,129	1,401	7,336	7,158	113,200	-	-	-	-	-	-	-	-
Net gains/reductions	(848)	(974)	(1,677)	(1,666)	(111,389)	39,023	42,736	1,880	31,138	834	416	514	13
Closing stock (31st Dec. 2014)	4,410	10,325	82,941	20,627	247,238	536,559	1,580,309	328,524	2,848,670	49,990	32,566	354,348	462
Opening stock (1st Jan. 2015)	4,410	10,325	82,941	20,627	247,238	536,559	1,580,309	328,524	2,848,670	49,990	32,566	354,348	462

The trends show larger changes in the land covers between 1990 and 2010, and a more stable WMZ land cover system between 2010 and 2015. Nonetheless, the woodlands continued losing a lot of land, over 100,000 ha over the five-year period, while grasslands, bushlands and farmlands (combined small scale and commercial farmlands) continued to gain additional land. Grasslands showed a decline from 1990 to 2000 and gradual increase between 2000 and 2015 (Figure 2.20).



	1990	2000	2005	2010	2015
Forest Plantations (ha)	8,521	4,766	7,297	10,403	14,735
THF (ha)	109,320	113,849	97,508	102,927	103,568
Woodland	509,028	276,070	425,272	277,255	247,238
Bushland	690,188	1,378,197	869,222	561,231	536,559
Grassland	1,733,682	1,014,883	1,217,586	1,443,138	1,580,309
Wetland	230,521	348,857	343,099	362,733	328,524
Farmlands (ha)	2,483,937	2,632,917	2,769,977	2,987,148	2,898,660
Built up area	10,724	5,873	22,559	23,213	32,566

Years

Figure 2.20: Trends of land cover for the Kyoga WMZ for 1990 to 2015

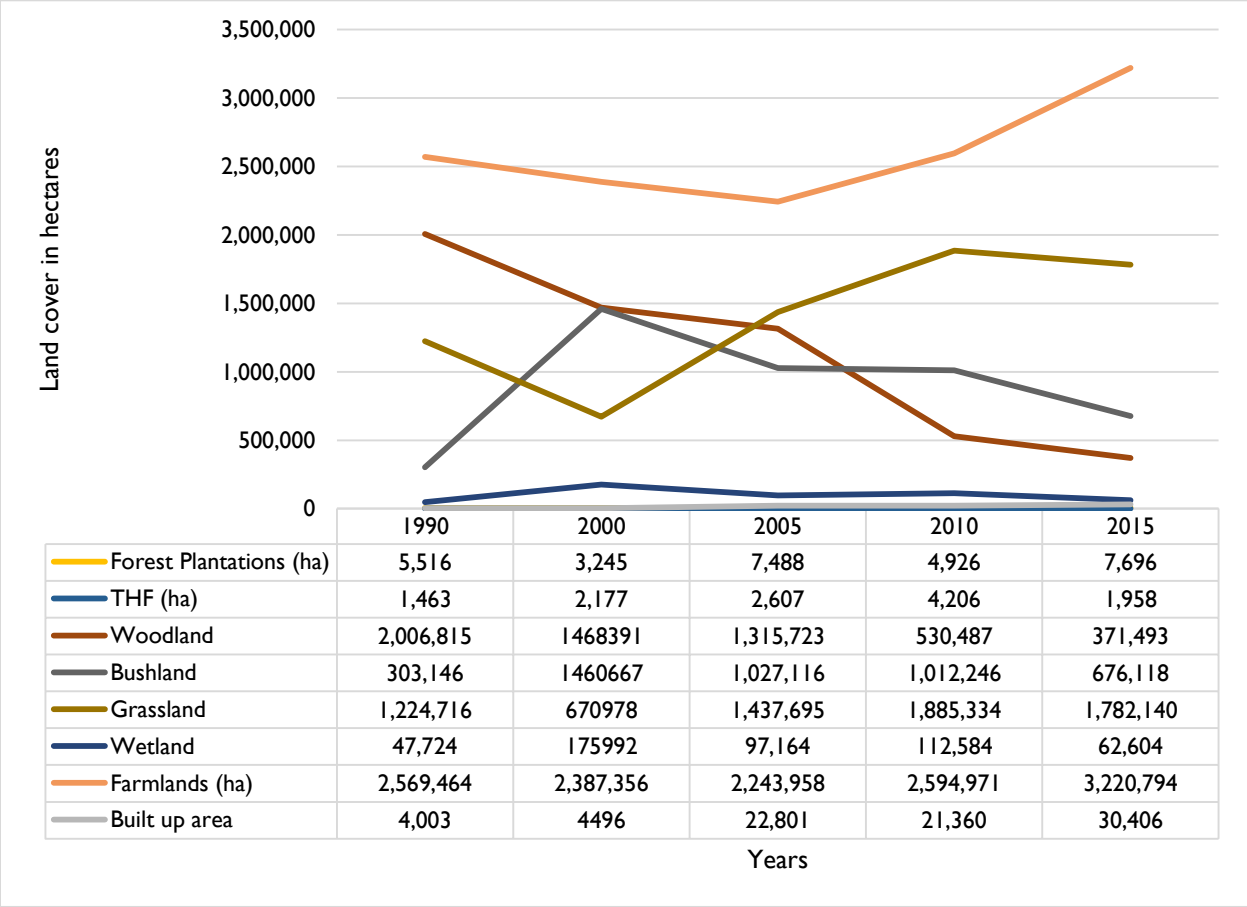
2.4.2.3 National land accounts for the Upper Nile Water Management Zone

The Upper Nile WMZ was dominated by the small scale farmlands. The grasslands also had over 1.0 million ha by 1990. Between 1990 and 2015, the small scale farmlands, bushlands and grasslands increased while the woodlands considerably decreased (Table 2.17).

Table 2.17: Land Physical Accounts for Upper Nile Water Management Zone (in hectares)

Upper Nile Water Management Zone	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock (1st Jan. 1990)	2,574	2,942	1,458	5	2,006,815	303,146	1,224,716	47,724	2,566,932	2,532	4,003	40,710	953
Additions	662	314	413	579	486,391	1,295,681	433,061	142,969	497,972	3,575	3,273	4,186	54
Reductions	2,256	991	274	5	1,024,815	138,160	986,798	14,702	682,079	1,577	2,778	13,742	953
Net gains/reductions	(1,594)	(677)	139	574	(538,424)	1,157,521	(553,737)	128,267	(184,107)	1,998	495	(9,556)	(899)
Closing stock (3st Dec. 1999)	980	2,265	1,598	579	1,468,391	1,460,667	670,978	175,992	2,382,825	4,531	4,496	31,154	54
Opening stock (1st Jan. 2000)													
Additions	4,445	815	1,052	216	564,246	615,519	1,128,008	54,196	471,742	960	20,204	18,708	3,458
Reductions	686	333	261	576	716,913	1,049,070	361,292	133,022	612,056	4,046	1,898	3,404	12
Net gains/reductions	3,759	482	791	(360)	(152,667)	(433,551)	766,716	(78,826)	(140,314)	(3,086)	18,306	15,304	3,446
Closing stock (31st Dec. 2004)	4,740	2,748	2,388	219	1,315,723	1,027,116	1,437,695	97,164	2,242,513	1,445	22,801	46,458	3,500
Opening stock (1st Jan 2005)	4,740	2,748	2,388	219	1,315,723	1,027,116	1,437,695	97,164	2,242,513	1,445	22,801	46,458	3,500
Additions	94	13	-	5	464	601	1,744	65	3,521	1	13	-	6
Reductions	3,624	1,704	979	220	-	-	-	-	-	-	-	-	-
Net gains/reductions	(3,530)	(1,691)	(979)	(215)	464	601	1,744	65	3,521	1	13	-	(6)
Closing stock (31st Dec. 2009)	3,071	1,855	2,394	1,812	530,487	1,012,246	1,885,334	112,584	2,587,139	7,832	21,360	35,964	2,434
Opening stock (1st Jan 2010)	3,071	1,855	2,394	1,812	530,487	1,012,246	1,885,334	112,584	2,587,139	7,832	21,360	35,964	2,434
Additions	496	181	21	1,568	582	76,563	95,210	707	99,503	7,878	148	940	147
Reductions	1,447	834	2,186	1,812	277,665	-	-	-	-	-	-	-	-
Net gains/reductions	(951)	(653)	(2,165)	(244)	(277,083)	76,563	95,210	707	99,503	7,878	148	940	147
Closing stock (31st Dec. 2014)	5,447	2,249	259	1,699	371,493	676,118	1,782,140	62,604	3,124,054	96,740	30,406	49,772	1,529
Opening stock (1st Jan. 2015)	5,447	2,249	259	1,699	371,493	676,118	1,782,140	62,604	3,124,054	96,740	30,406	49,772	1,529

The farmlands were the major land cover/ land use in the Upper Nile WMZ. In 1990, the farmlands were 22% larger in area than woodlands and just over twice as large as the grasslandsBy 2015 both the grassland and farmlands had increased, but the farmlands were still just under twice as large as the grasslands (Figure 2.21). On the other hand, the woodlands had reduced significantly that the woodland area was only 12% the size of the farmlands. The woodlands reduced by 2.4 million ha. The largest decline occurred between 2005 and 2010 with a 785,236 ha, i.e. equivalent to 157,047 ha/year. The bushlands sharply increased in between 1990 and 2000 and then gradually declined between 2000 and 2015.



	1990	2000	2005	2010	2015
Forest Plantations (ha)	5,516	3,245	7,488	4,926	7,696
THF (ha)	1,463	2,177	2,607	4,206	1,958
Woodland	2,006,815	1468391	1,315,723	530,487	371,493
Bushland	303,146	1460667	1,027,116	1,012,246	676,118
Grassland	1,224,716	670978	1,437,695	1,885,334	1,782,140
Wetland	47,724	175992	97,164	112,584	62,604
Farmlands (ha)	2,569,464	2,387,356	2,243,958	2,594,971	3,220,794
Built up area	4,003	4496	22,801	21,360	30,406

Figure 2.21: Trends of land cover for the Upper Nile WMZ for 1990 to 2015

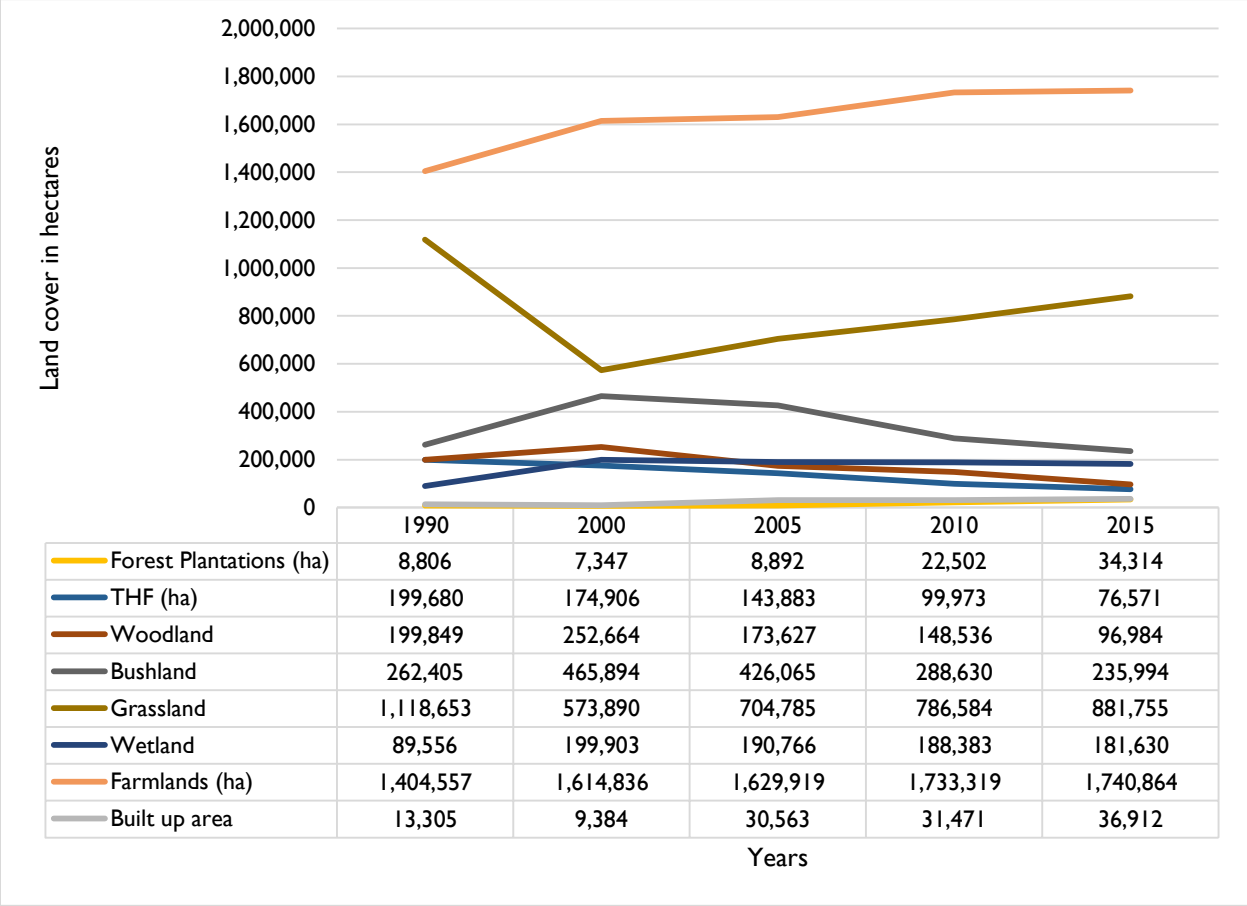
2.4.2.4 National and accounts for the Victoria Water Management Zone

The dominant land cover for the Victoria WMZ was open water comprising Lake Victoria and the River Nile with a cover of 2.9 million ha. The small scale farmlands and grasslands followed with over 1.0 million ha (Table 2.18). Between 1990 and 2015, the grasslands reduced from 1.12 million ha to 881,755 ha while the small scale farmlands increased from 1.4 million ha to 1.7 million ha. The other land covers were small, when compared to the dominant land covers, the bushlands, woodlands, THF well stocked and THF low stocked were 262,405, 199,849, 105,085 and 94,595 ha, respectively in 1990. All four land covers reduced by 2015. Whereas the bushlands reduced only slightly, by 26,411 ha, the woodlands reduced by over 100,000ha, and the THF well stocked and low stocked reduced by more than half.

Table 2.18: Land Physical Accounts for the Victoria WMZ (in hectares)

Victoria Water Management Zone	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock (1st Jan. 1990)	6,221	2,585	105,085	94,595	199,849	262,405	1,118,653	89,556	1,395,303	9,254	13,305	2,897,123	647
Additions	4,022	1,863	50,316	29,320	189,839	351,882	166,336	133,311	423,719	13,811	3,290	14,216	10
Reductions	6,042	1,304	27,479	76,930	137,024	148,394	711,099	22,965	223,793	3,456	7,213	15,589	647
Net gains/reductions	(2,020)	559	22,837	(47,610)	52,815	203,488	(544,763)	110,346	199,926	10,355	(3,923)	(1,373)	(637)
Closing stock (3st Dec. 1999)	4,203	3,144	127,921	46,985	252,664	465,894	573,890	199,903	1,595,227	19,609	9,384	2,895,749	9
Opening stock (1st Jan. 2000)	4,203	3,144	127,921	46,985	252,664	465,894	573,890	199,903	1,595,227	19,609	9,384	2,895,749	9
Additions	3,113	3,951	14,662	46,253	105,795	199,639	365,105	53,178	357,714	9,261	22,809	8,414	1,157
Reductions	3,825	1,696	59,699	32,240	184,829	239,467	234,208	62,317	341,921	9,969	1,629	19,241	10
Net gains/reductions	(712)	2,255	(45,037)	14,013	(79,034)	(39,828)	130,897	(9,139)	15,793	(708)	21,180	(10,827)	1,147
Closing stock (31st Dec. 2004)	3,492	5,400	82,884	60,999	173,627	426,065	704,785	190,766	1,611,017	18,902	30,563	2,884,920	1,159
Opening stock (1st Jan 2005)	3,492	5,400	82,884	60,999	173,627	426,065	704,785	190,766	1,611,017	18,902	30,563	2,884,920	1,159
Additions	1,447	2,392	14,035	11,074	14,758	23,534	31,465	6,319	114,121	4,322	746	2,031	593
Reductions	3,149	2,056	33,057	50,603	137,972	-	-	-	-	-	-	-	-
Net gains/reductions	(1,702)	336	(19,022)	(39,529)	(123,214)	23,534	31,465	6,319	114,121	4,322	746	2,031	593
Closing stock (31st Dec. 2009)	8,445	14,057	71,096	28,877	148,536	288,630	786,584	188,383	1,710,933	22,386	31,471	2,892,787	2,395
Opening stock (1st Jan 2010)	8,445	14,057	71,096	28,877	148,536	288,630	786,584	188,383	1,710,933	22,386	31,471	2,892,787	2,395
Additions	2,463	786	497	14,528	6,792	30,180	22,375	5,377	60,181	2,120	546	3,750	94
Reductions	4,294	2,656	26,794	18,263	97,682	-	-	-	-	-	-	-	-
Net gains/reductions	(1,831)	(1,870)	(26,297)	(3,735)	(90,890)	30,180	22,375	5,377	60,181	2,120	546	3,750	94
Closing stock (31st Dec. 2014)	13,987	20,327	46,724	29,847	96,984	235,994	881,755	181,630	1,711,567	29,297	36,912	2,908,252	1,304
Opening stock (1st Jan. 2015)	13,987	20,327	46,724	29,847	96,984	235,994	881,755	181,630	1,711,567	29,297	36,912	2,908,252	1,304

Generally, the farmlands and grasslands showed increasing trends over the 25-year period while all other land covers declined. the forest plantations and built up areas increased but the starting base was low. Even for built areas where the Victoria WMZ covers the urban areas of Kampala city and the metropolitan areas, the built up area only increased from 13,305 to 36,912 ha between 1990 and 2015 (Figure 2.22).



	1990	2000	2005	2010	2015
Forest Plantations (ha)	8,806	7,347	8,892	22,502	34,314
THF (ha)	199,680	174,906	143,883	99,973	76,571
Woodland	199,849	252,664	173,627	148,536	96,984
Bushland	262,405	465,894	426,065	288,630	235,994
Grassland	1,118,653	573,890	704,785	786,584	881,755
Wetland	89,556	199,903	190,766	188,383	181,630
Farmlands (ha)	1,404,557	1,614,836	1,629,919	1,733,319	1,740,864
Built up area	13,305	9,384	30,563	31,471	36,912

Years

Figure 2.22: Trends of land cover for the Victoria WMZ for 1990 to 2015

2.5 Physical accounts by Agro-Ecological Zone

2.5.1 Agro-Ecological Zones of Uganda

For purposes of land cover spatial surveying, Uganda is divided into four agro-ecological zones (NFA 2003; MWE 2016). Whereas, since 1987 the then Ministry of Agriculture and Forestry had divided the country into 11 agro-ecological zones based on crop and livestock enterprise suitability, in 2002, the Forest Department aggregated the agro-ecological zones into four that capture homogeneity of agricultural livelihoods (Forest Department/MWLE 2002). The subsequent National Biomass Survey reports for 2002 and 2009, and the National State of Forestry Resources Report (MWE 2016) have referred to the four agro-ecological zones for spatial land cover description. Figures 2.23 and 2.24 shows the four agro-ecological zones, and they are described as follows (Forest Department/MWLE 2002; MWE 2016).

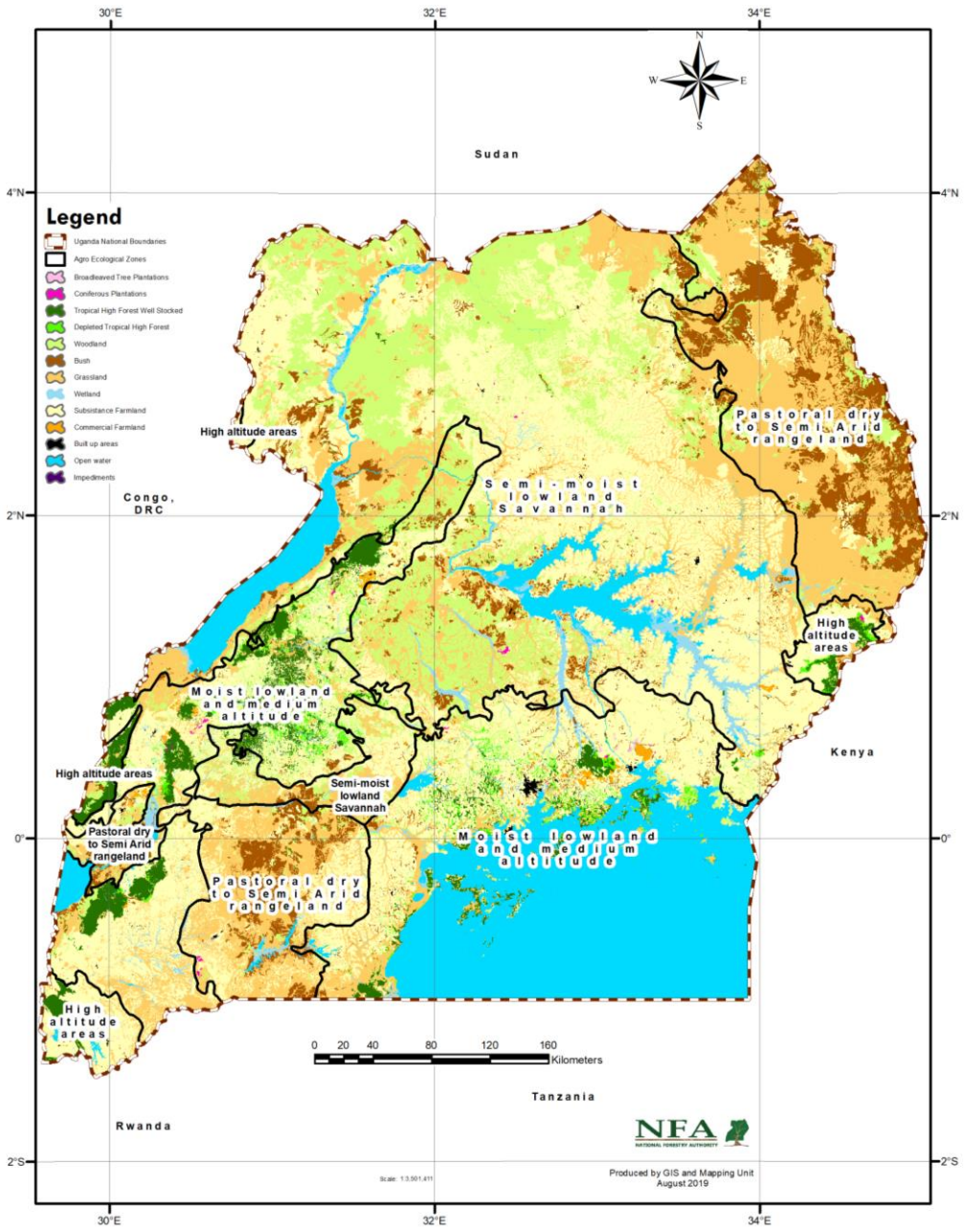


Figure 2.23: National land cover/land use 1990 by Agro-ecological zones

Agro-ecological zone 1 comprises, the high altitude areas covering South Western corner of Uganda (Kigezi/Kabale) and Mt. Rwenzori in Kabarole district; Mt. Elgon (in the East), and a small part of the West Nile (Zombo and Arua districts). Agro-ecological zone 2 covers the Pastoral dry to Semi-Arid rangeland areas of Mbarara and Western Masaka in the South West and Moroto and Kotido in the North East where the dominant agricultural system is pastoralism. Agro-ecological zone 3, Semi-moist lowland Savannah areas covers the Northern and Eastern Uganda districts of Arua, Adjumani, Moyo, Nebbi, Yumbe, Gulu, Kitgum and Lira, characterised by short grass and growing of cotton, millet and sorghum. Agro-ecological zone 4 consists of the moist lowland and medium altitude areas covering most of Southern and Western Uganda (it covers the Districts of Mpigi, Masaka, Kabarole, Hoima, Kabale, Kisoro and Mbale).

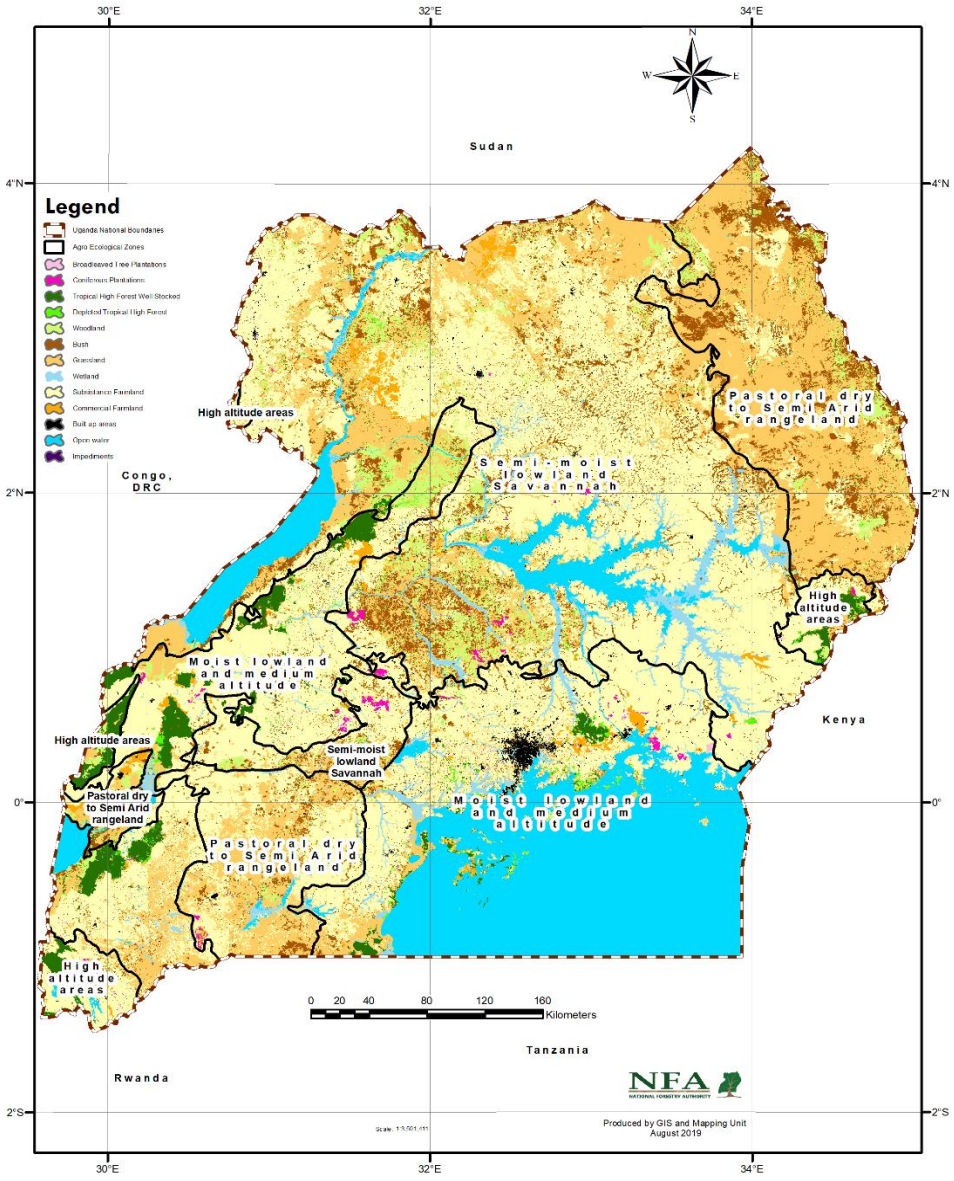


Figure 2.24: National land cover/land use 2015 by Agro-ecological zones

2.5.2 National land accounts by Agro-ecological zone

2.5.2.1 Land accounts by Agro-ecological zone 1

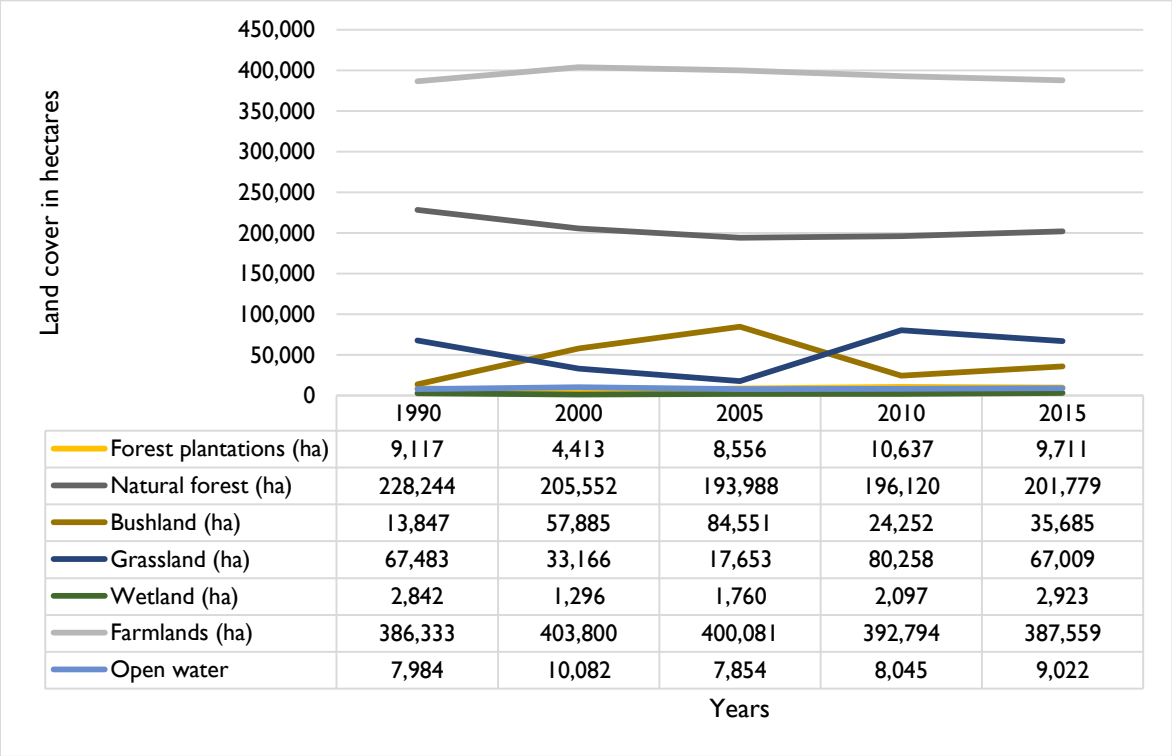
The Land Physical Accounts for Agro-ecological zone 1 covered only 3% of Uganda's land cover with a total area of just 718,060 ha in 1990. Nonetheless, small scale farmlands covered 54% of the Agro-ecological zone 1 while altogether natural forests (of tropical high forest and woodlands) covered 32% (228,244 ha) of the zone (Table 2.19). Grasslands covered 67,483 ha (9.4%) while open water covered 7.984 ha (1.1%) of the agro-ecological zone. In 2015, the agro-ecological zone had only change marginally in land cover and land use. The largest reduction was for woodlands. They reduced from 74,257 ha to 28,742 ha. Tropical high forests (low stocked) reduced by 18,260 ha between 1990 and 2015 while small farmlands reduced by 751 ha. On the other hand, commercial farm lands increased from 520 ha to 2,497 ha.

Table 2.19: Land Physical Accounts for Agro-ecological zone 1 (in hectares)

Agro-Ecological Zone 1	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Build up area	Open water	Impediments
Opening stock (1st Jan. 1990)	2,642	6,475	122,509	31,478	74,257	13,847	67,483	2,842	385,813	520	2,199	7,984	12
Additions	1,542	373	66,115	1,206	5,232	52,004	22,593	625	46,320	2,775	115	2,822	1,396
Reductions	2,489	4,130	6,029	24,738	64,478	7,966	56,911	2,170	31,110	519	1,843	723	12
Net gains/reductions	(947)	(3,757)	60,086	(23,532)	(59,246)	44,038	(34,318)	(1,545)	15,210	2,256	(1,728)	2,09)	1,384
Closing stock (3st Dec. 1999)	1,695	2,718	182,595	7,946	15,011	57,885	33,166	1,296	401,024	2,776	471	10,082	1,396
Opening stock (1st Jan. 2000)	1,695	2,718	182,595	7,946	15,011	57,885	33,166	1,296	401,024	2,776	471	10,082	1,396
Additions	980	5,049	17,229	0	12,918	44,002	12,898	1,238	31,365	682	2,908	244	179
Reductions	1,441	448	19,583	7,945	14,185	17,333	28,412	773	33,036	2,728	73	2,471	1264
Net gains/reductions	(461)	4,601	(2,354)	(7,945)	(1,267)	26,669	(15,514)	465	(1,671)	(2,046)	2,835	(2,227)	(1,085)
Closing stock (31st Dec. 2004)	1,235	7,321	180,244		13,744	84,551	17,653	1,760	399,351	730	3,307	7,854	310
Opening stock (1st Jan 2005)	1,235	7,321	180,244		13,744	84,551	17,653	1,760	399,351	730	3,307	7,854	310
Additions	95	84	4,345	5,885	16,270	3,961	6,544	201	9,592	21	49	15	0
Reductions	909	3,781	31,638	10,734	0	0	0	0	0	0	0	0	0
Net gains/reductions	(814)	(3,697)	(27,293)	(4,849)	16,270	3,961	6,544	201	9,592	21	49	15	0
Closing stock (31st Dec. 2009)	5,172	5,465	158,986	12,718	24,416	24,252	80,258	2,097	391,226	1,568	2,189	8,045	1,669
Opening stock (1st Jan 2010)	5,172	5,465	158,986	12,718	24,416	24,252	80,258	2,097	391,226	1,568	2,189	8,045	1,669
Additions	2,513	2,895	46,407	38,051	35,499	87,107	68,325	12,711	288,105	8,312	1,889	2,303	932
Reductions	6487	2114	87548	146821	352079	0	0	0	0	0	0	0	0
Net gains/reductions	(3,974)	781	(41,141)	(108,770)	(316,580)	87,107	68,325	12,711	288,105	8,312	1,889	2,303	932)
Closing stock (31st Dec. 2014)	3,094	6,617	159,819	13,218	28,742	35,685	67,009	2,923	385,062	2,497	2,116	9,022	2,257
Opening stock (1st Jan. 2015)	3,094	6,617	159,819	13,218	28,742	35,685	67,009	2,923	385,062	2,497	2,116	9,022	2,257

Generally, Agro-ecological zone showed considerable stability of land cover and land use. Despite the losses in woodlands and THF low stock, there were limited changes in the other land cover. The more significant changes were the five-fold increase in commercial farmlands and the three-fold increase in bushlands. However, commercial farmlands and bushlands remained a small part of the zone (Figure 2.25).

The stability of the system may be associated with the long-term perennial crops such as coffee and cocoa grown in the areas, which means that changes in land use usually take a long time. In the case of the Rwenzori and Elgon Mountain areas, they are both protected areas whose land use is restricted due to their importance for biodiversity conservation.



	1990	2000	2005	2010	2015
Forest plantations (ha)	9,117	4,413	8,556	10,637	9,711
Natural forest (ha)	228,244	205,552	193,988	196,120	201,779
Bushland (ha)	13,847	57,885	84,551	24,252	35,685
Grassland (ha)	67,483	33,166	17,653	80,258	67,009
Wetland (ha)	2,842	1,296	1,760	2,097	2,923
Farmlands (ha)	386,333	403,800	400,081	392,794	387,559
Open water	7,984	10,082	7,854	8,045	9,022

Figure 2.25: Trends of land cover for the AEZ 1 for 1990 to 2015

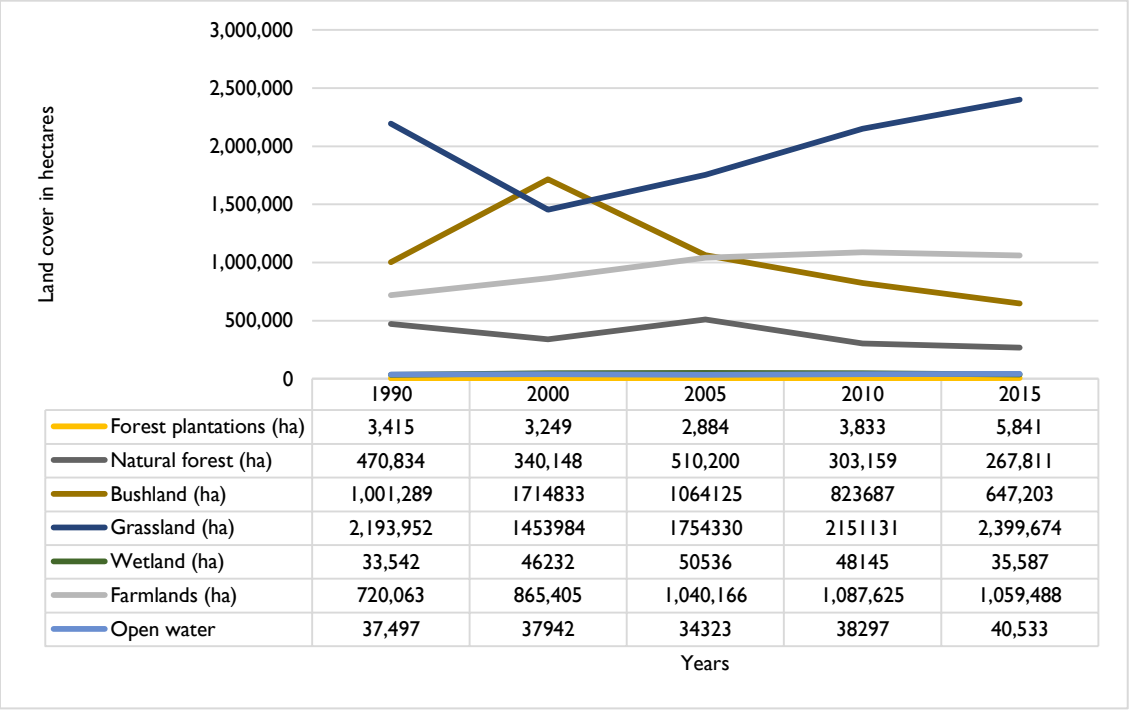
2.5.2.2 Land accounts by Agro-ecological zone 2

Agro-ecological zone covers an area of 4.46 million ha equivalent of 18.5% of the country's land area. The zone is dominated by grasslands followed by bushlands. Indeed, the grasslands are so dominant that they continued to increase during the time period of 1990 to 2015 having gained an additional 205,722 ha while the bushlands reduced by 354,086 ha (Table 2.20). Farmlands increased in the Agro-ecological zone 2 gaining 321,548 ha between 1990 and 2015. Similar to Agro-ecological zone 1, woodlands reduced by over 208,000 ha while the tropical high forests increased from a modest base of 1,576 ha to 7,398 ha over the assessment period.

Table 2.20: Land Physical Accounts for Agro-ecological zone 2 (in hectares)

Agro-Ecological Zone 2	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Build up area	Open water	Impediments
Opening stock (1st Jan. 1990)	1,567	1,848	1,060	516	469,258	1,001,289	2,193,952	33,542	714,989	5,074	2,942	37,497	913
Additions	611	1,290	505	1,546	188,095	1,174,422	527,325	23,875	388,176	3,623	1,193	2,068	141
Reductions	1,513	553	346	500	319,990	460,880	1,267,292	11,186	242,388	4,069	1,676	1,622	855
Net gains/reductions	(902)	737	159	1,046	(131,895)	713,542	(739,967)	12,689	145,788	(446)	(483)	446	(714)
Closing stock (3st Dec. 1999)	665	2,584	1,219	1,565	337,364	1,714,833	1,453,984	46,232	860,776	4,629	2,458	37,942	199
Opening stock (1st Jan. 2000)	665	2,584	1,219	1,565	337,364	1,714,833	1,453,984	46,232	860,776	4,629	2,458	37,942	199
Additions	658	856	359	30	342,597	429,994	961,545	24,270	437,721	15,880	3,660	1,384	2,359
Reductions	520	1,357	1,182	1,561	170,194	1,080,701	661,200	19,966	277,506	1,332	723	5,003	68
Net gains/reductions	138	(501)	(823)	(1,531)	172,403	(650,707)	300,345	4,304	160,215	14,548	2,937	(3,619)	2,291
Closing stock (31st Dec. 2004)	800	2,084	398	33	509,769	1,064,125	1,754,330	50,536	1,020,990	19,176	5,395	34,323	2,491
Opening stock (1st Jan 2005)	800	2,084	398	33	509,769	1,064,125	1,754,330	50,536	1,020,990	19,176	5,395	34,323	2,491
Additions	6	290	1,775	10	605	119,591	206,775	2,313	40,113	999	218	169	102
Reductions	794	1,007	378	33	370,754	-	-	-	-	-	-	-	-
Net gains/reductions	(788)	(717)	1,397	(23)	(370,149)	119,591	206,775	2,313	40,113	999	218	169	102
Closing stock (31st Dec. 2009)	385	3,448	3,148	140	299,871	823,687	2,151,131	48,145	1,063,966	23,659	7,374	38,297	1,198
Opening stock (1st Jan 2010)	385	3,448	3,148	140	299,871	823,687	2,151,131	48,145	1,063,966	23,659	7,374	38,297	1,198
Additions	145	95	5,727	3,937	3,025	3,279	2,405	321	7,503	104	9	69	310
Reductions	3,910	876	8,513	5,150	8,480	-	-	-	-	-	-	-	-
Net gains/reductions	(3,765)	(781)	(2,786)	(1,213)	(5,455)	3,279	2,405	321	7,503	104	9	69	310
Closing stock (31st Dec. 2014)	1,531	4,310	3,119	4,279	260,413	647,203	2,399,674	35,587	1,036,537	22,951	7,169	40,533	1,143
Opening stock (1st Jan. 2015)	1,531	4,310	3,119	4,279	260,413	647,203	2,399,674	35,587	1,036,537	22,951	7,169	40,533	1,143

The agro-ecological zone 2 hosts important grassland savannah of Kidepo Valley National Park in northwest Uganda and Lake Mburo and Queen Elizabeth National Parks in the southwest. These protected areas are dominated by grasslands that provide habitat and feed for the wildlife. The zone is also important for livestock production that comprises pastoralism in the Karamoja region of north western Uganda and increasingly sedentary livestock production in the south west. Farmlands are an increasingly important land use especially as the population increases especially in the southwest (Figure 2.26). The south west region is also the leading producer of the East African cooking bananas (matooke) (UBOS 2008.



	1990	2000	2005	2010	2015
Forest plantations (ha)	3,415	3,249	2,884	3,833	5,841
Natural forest (ha)	470,834	340,148	510,200	303,159	267,811
Bushland (ha)	1,001,289	1714833	1064125	823687	647,203
Grassland (ha)	2,193,952	1453984	1754330	2151131	2,399,674
Wetland (ha)	33,542	46232	50536	48145	35,587
Farmlands (ha)	720,063	865,405	1,040,166	1,087,625	1,059,488
Open water	37,497	37942	34323	38297	40,533

Years

Figure 2.26: Trends of land cover for the AEZ 2 for 1990 to 2015

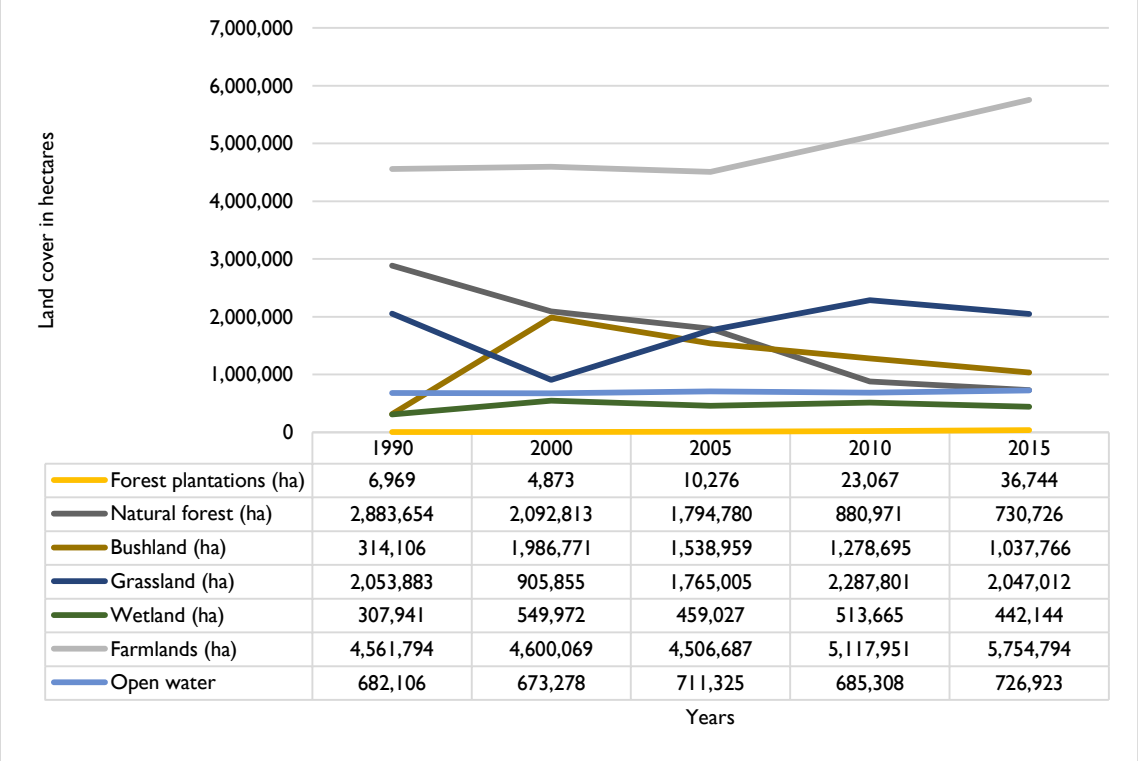
2.5.2.3 Land accounts by Agro-ecological zone 3

Agro-ecological zone 3 is the largest (44.8%) in the country with a land area of 10.8 million ha. The Land Physical Accounts for the zone showed dominance of small scale farmlands that were almost two times larger than the second largest land cover of woodlands and more than two times larger than grasslands in 1990 (Table 2.21). Small scale farmlands make up 42.0% of the agro-ecological zone followed by woodlands at 26.4% and grasslands which make up cover 19%. The three largest land covers made up 87.4% of the zone. The agro-ecological zone covers the West Nile, Northern Uganda, Central Uganda and parts of Eastern Uganda where crop production is the leading land use. The grasslands are important for livestock production and the dispersed protected areas. The northern Uganda part was an extensive woodland area in 1990. By 2015, the woodlands had reduced from the second largest land cover to the fifth with a loss of over 2.1 million ha of woodland cover. Conversely, the small scale farmlands increased to 5.6 million from 4.5 million ha. While some of the woodland may have been converted to small scale farmlands, the other is likely to have been degraded to bushlands. The grasslands were generally unchanged in land cover between 1990 and 2015. The built up area increased by four times from 9,986 ha to 44,030 ha while the plantation forest area increased fivefold from 6,969 to 36,744 ha between 1990 and 2015.

Table 2.21: Land Physical Accounts for Agro-ecological zone 3 (in hectares)

Agro-Ecological Zone 3	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Build up area	Open water	Impediments
Opening stock (1st Jan. 1990)	3,350	3,619	20,966	10,432	2,852,256	314,106	2,053,883	307,941	4,548,422	13,372	9,986	682,106	1,377
Additions	1,061	1,046	5,471	19,285	722,860	1,865,035	483,721	318,350	904,937	11,027	5,349	38,843	254
Reductions	3,000	1,200	11,004	6,630	1,520,825	192,370	1,631,751	76,318	871,604	6,085	7,402	47,674	1,376
Net gains/reductions	(1,939)	(154)	(5,533)	12,655	(797,965)	1,672,665	(1,148,030)	242,032	33,333	4,942	(2,053)	(8,831)	(1,122)
Closing stock (3st Dec. 1999)	1,409	3,464	15,434	23,088	2,054,291	1,986,771	905,855	549,972	4,581,756	18,313	7,934	673,278	253
Opening stock (1st Jan. 2000)	1,409	3,464	15,434	23,088	2,054,291	1,986,771	905,855	549,972	4,581,756	18,313	7,934	673,278	253
Additions	4,771	2,330	2,749	11,393	721,588	890,314	1,298,427	119,064	729,365	7,841	29,209	51,009	2,577
Reductions	1,035	666	6,454	19,264	1,008,045	1,338,123	439,278	210,011	819,010	11,575	3,959	12,964	253
Net gains/reductions	3,736	1,664	(3,705)	(7,871)	(286,457)	(447,809)	859,149	(90,947)	(89,645)	(3,734)	25,250	38,045	2,324
Closing stock (31st Dec. 2004)	5,147	5,129	11,730	15,216	1,767,834	1,538,959	1,765,005	459,027	4,492,109	14,578	33,183	711,325	2,577
Opening stock (1st Jan 2005)	5,147	5,129	11,730	15,216	1,767,834	1,538,959	1,765,005	459,027	4,492,109	14,578	33,183	711,325	2,577
Additions	548	3,872	3,271	4,268	3,587	380,756	443,620	13,944	436,459	4,873	1,103	593	534
Reductions	4,059	1,806	4,347	14,576	1,272,640	-	-	-	-	-	-	-	-
Net gains/reductions	(3,511)	2,066	(1,076)	(10,308)	(1,269,053)	380,756	443,620	13,944	436,459	4,873	1,103	593	534
Closing stock (31st Dec. 2009)	3,615	19,452	13,396	12,409	855,166	1,278,695	2,287,801	513,665	5,089,303	28,648	31,411	685,308	2,950
Opening stock (1st Jan 2010)	3,615	19,452	13,396	12,409	855,166	1,278,695	2,287,801	513,665	5,089,303	28,648	31,411	685,308	2,950
Additions	1,541	3,175	1,304	5,768	2,254	114,995	127,882	5,028	154,010	10,977	349	1,680	174
Reductions	1,362	2,313	5,953	6,614	412,895	-	-	-	-	-	-	-	-
Net gains/reductions	179	862	(4,649)	(846)	(410,641)	114,995	127,882	5,028	154,010	10,977	349	1,680	174
Closing stock (31st Dec. 2014)	8,418	28,326	9,456	13,780	707,490	1,037,766	2,047,012	442,144	5,625,569	129,225	44,030	726,923	1,678
Opening stock (1st Jan. 2015)	8,418	28,326	9,456	13,780	707,490	1,037,766	2,047,012	442,144	5,625,569	129,225	44,030	726,923	1,678

The trend lines for Agro-ecological zone 3 show that the small scale farmlands were by far the leading land use in the zone. The woodlands area was reduced as agricultural land and bushlands increased. The bushland area did not increase beyond 2010 only a slight decline occurred by 2015 while, farmlands continued to increase (Figure 2.27). Between 1990 and 2015, woodlands had the largest area of natural forest cover. Even with the large scale deforestation of woodlands, they remained the largest forest land cover due to the very small area allocated to plantations and tropical forests altogether less than 40,000 ha. Therefore, biodiversity conservation was not a major form of land use in the agro-ecological zone in the same way it was in zone 1 and zone 2.



	1990	2000	2005	2010	2015
Forest plantations (ha)	6,969	4,873	10,276	23,067	36,744
Natural forest (ha)	2,883,654	2,092,813	1,794,780	880,971	730,726
Bushland (ha)	314,106	1,986,771	1,538,959	1,278,695	1,037,766
Grassland (ha)	2,053,883	905,855	1,765,005	2,287,801	2,047,012
Wetland (ha)	307,941	549,972	459,027	513,665	442,144
Farmlands (ha)	4,561,794	4,600,069	4,506,687	5,117,951	5,754,794
Open water	682,106	673,278	711,325	685,308	726,923

Figure 2.27: Trends of land cover for the AEZ 3 for 1990 to 2015

2.5.2.4 Land accounts by Agro-ecological zone 4

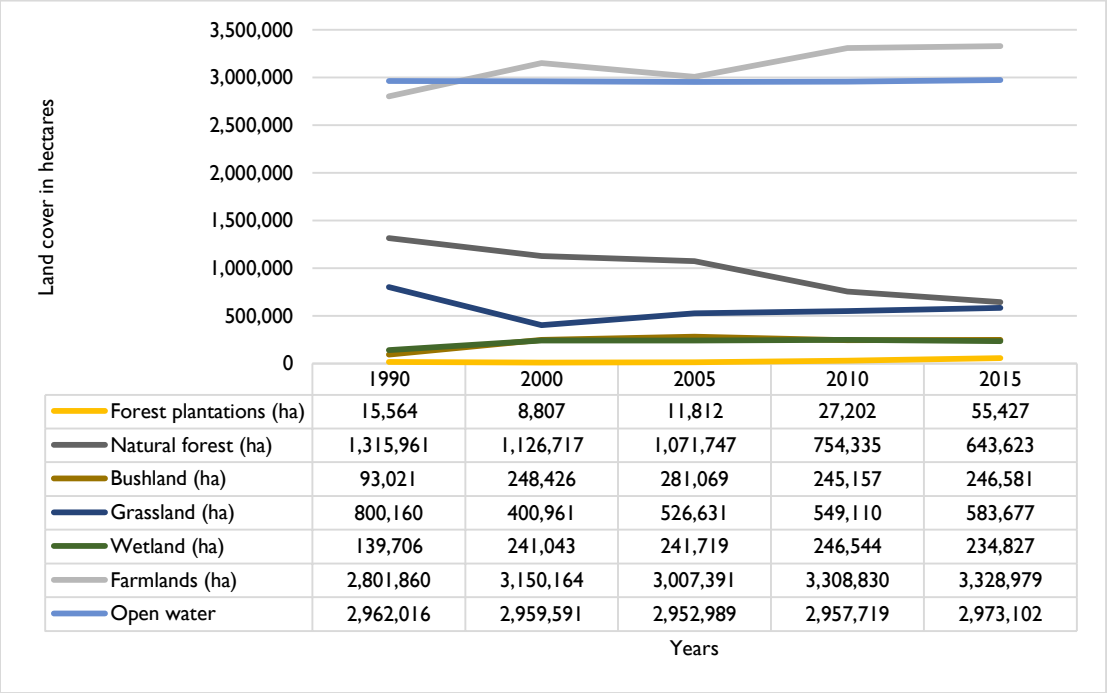
The Land Physical Accounts for Agro-ecological zone 4 had open water system as the leading land cover in 1990 but by 2015, small scale farmlands were the largest land cover. Across the four agro-ecosystems small scale farmlands were most dominant in zone 3 and 4. In zone 4, the small scale farm lands increased from 33.8% (2.75 million ha) of the land cover in 1990 to 40% (3.23 million) of the zone's land cover in 2015 (Table 2.22).

Agro-ecological zone 4, which is located in the Lake Victoria basin and parts of Western and South Western Uganda had a large tropical high forest area of 737,210 ha for both the low stocked and well stocked area. The zone had 79.8% tropical high forest area in the country in 1990. However, by 2015, the THF area had reduced by 309,893 ha. Grasslands were the third largest land cover in the zone and they reduced from 800,160 ha to 583,677 ha from 1990 to 2015. The grasslands in agro-ecological zone 4 may have provided land for livestock production and they also provide a buffer for the large area of open water. Like all other agro-ecological zones, the woodlands in the zone 4 also reduced. The woodlands reduced by two-thirds from 578,751 to 216,306 ha.

Table 2.22: Land Physical Accounts for Agro-ecological zone 4 (in hectares)

Agro-Ecological Zone 4	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Build up area	Open water	Impedi-ments
Opening stock (1st Jan. 1990)	11,122	4,442	506,575	230,635	578,751	93,021	800,160	139,706	2,752,379	49,481	21,445	2,962,016	1,439
Additions	4,847	1,078	113,938	136,126	194,960	233,049	137,357	150,622	613,644	41,872	6,554	14,151	10
Reductions	9,892	2790	115832	172,807	345,629	77,641	536,558	49,286	293,469	13,743	12,548	16,574	1439
Net gains/reductions	(5,045)	(1,712)	(1,894)	(36,681)	(150,669)	155,408	(399,201)	101,336	320,175	28,129	(5,994)	(2,423)	(1,429)
Closing stock (3st Dec. 1999)	6,075	2,732	504,682	193,953	428,082	248,426	400,961	241,043	3,072,554	77,610	15,453	2,959,591	9
Opening stock (1st Jan. 2000)	6,075	2,732	504,682	193,953	428,082	248,426	400,961	241,043	3,072,554	77,610	15,453	2,959,591	9
Additions	6,697	3,251	48,314	113,556	242,441	170,470	266,055	72,931	326,685	21,270	42,364	9,509	2,425
Reductions	5,170	1,775	144,408	131,065	183,808	137,828	140,384	72,251	463,992	26,736	2,431	16,110	10
Net gains/reductions s	1,527	1,476	(96,094)	(17,509)	58,633	32,642	125,671	680	(137,307)	(5,466)	39,933	(6,601)	2,415
Closing stock (31st Dec. 2004)	7,604	4,208	408,587	176,445	486,715	281,069	526,631	241,719	2,935,245	72,146	55,386	2,952,989	2,426
Opening stock (1st Jan 2005)	7,604	4,208	408,587	176,445	486,715	281,069	526,631	241,719	2,935,245	72,146	55,386	2,952,989	2,426
Additions	2,513	2,895	46,407	38,051	35,499	87,107	68,325	12,711	288,105	8,312	1,889	2,303	932
Reductions	6,487	2,114	87,548	146,821	352,079	0	0	0	0	0	0	0	0
Net gains/reductions	(3,974)	781	(41,141)	(108,770)	(316,580)	87,107	68,325	12,711	288,105	8,312	1,889	2,303	932
Closing stock (31st Dec. 2009)	11,823	15,379	389,421	95,489	269,425	245,157	549,110	246,544	3,227,789	81,041	57,476	2,957,719	4,797
Opening stock (1st Jan 2010)	11,823	15,379	389,421	95,489	269,425	245,157	549,110	246,544	3,227,789	81,041	57,476	2,957,719	4,797
Additions	7,289	1,226	12,812	28,338	13,313	33,115	32,166	6,869	124,607	4,750	1,112	4,446	292
Reductions	5,394	3,523	57,327	66,232	137,859	0	0	0	0	0	0	0	0
Net gains/reductions	1,895	(2,297)	(44,515)	(37,894)	(124,546)	33,115	32,166	6,869	124,607	4,750	1,112	4,446	292
Closing stock (31st Dec. 2014)	31,194	24,233	356,729	70,588	216,306	246,581	583,677	234,827	3,227,801	101,178	82,251	2,973,102	2,703
Opening stock (1st Jan. 2015)	31,194	24,233	356,729	70,588	216,306	246,581	583,677	234,827	3,227,801	101,178	82,251	2,973,102	2,703

The trend lines show how far above all other land covers open water and small scale farmlands were. The trends also show the reduction in natural forest area (tropical high forests and woodlands) between 1990 and 2015 (Figure 2.28). The other land covers only reduced and/or increased marginally indicating that the major reduction in other land cover classes may have because of the increase in the land under the small scale farmlands.



	1990	2000	2005	2010	2015
Forest plantations (ha)	15,564	8,807	11,812	27,202	55,427
Natural forest (ha)	1,315,961	1,126,717	1,071,747	754,335	643,623
Bushland (ha)	93,021	248,426	281,069	245,157	246,581
Grassland (ha)	800,160	400,961	526,631	549,110	583,677
Wetland (ha)	139,706	241,043	241,719	246,544	234,827
Farmlands (ha)	2,801,860	3,150,164	3,007,391	3,308,830	3,328,979
Open water	2,962,016	2,959,591	2,952,989	2,957,719	2,973,102

Years

Figure 2.28: Trends of land cover for the AEZ 4 for 1990 to 2015

2.6 Land cover series by Climate Zone

2.6.1 Climate zones of Uganda

Uganda has seven climate zones. The largest is the Tropical Montane which covers more 71% of the country cover followed by the Tropical Montane Dry and Tropical Moist with equivalent 11% cover of the country (Figures 2.29; 2.30 and 2.31). The other climate zones are the Tropical Dry, the Warm Temperate Moist, the Warm Temperate Dry and the Cool Temperate Moist. The climate zones were first introduced into land cover description with the National Biomass Survey of 2002 (MWLE/ Forest Department 2002). Subsequently, the zones were also used for the work done on the Experimental Ecosystem Accounts for Uganda (King et al. 2017). Whereas the seven climate zones are in Uganda, they are based on global climate zones that are also scoped downwards to the Africa region and therefore are quite compatible with global climate zoning.

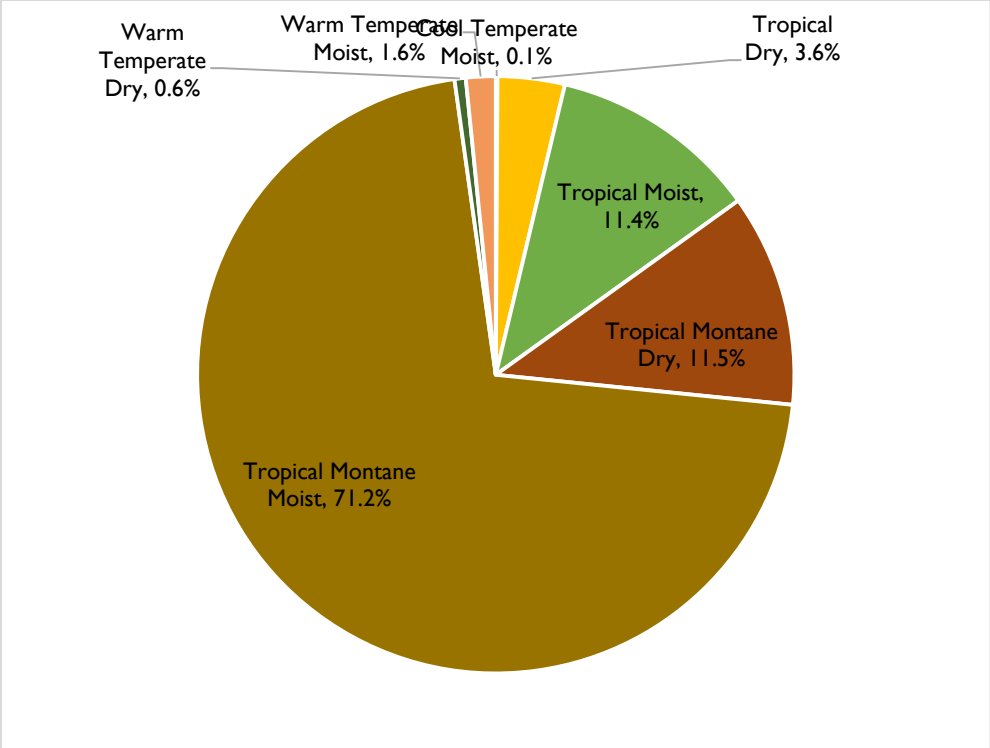


Figure 2.29: land cover of Uganda's climate zones by percentage

Source: adapted from NFA (2019)

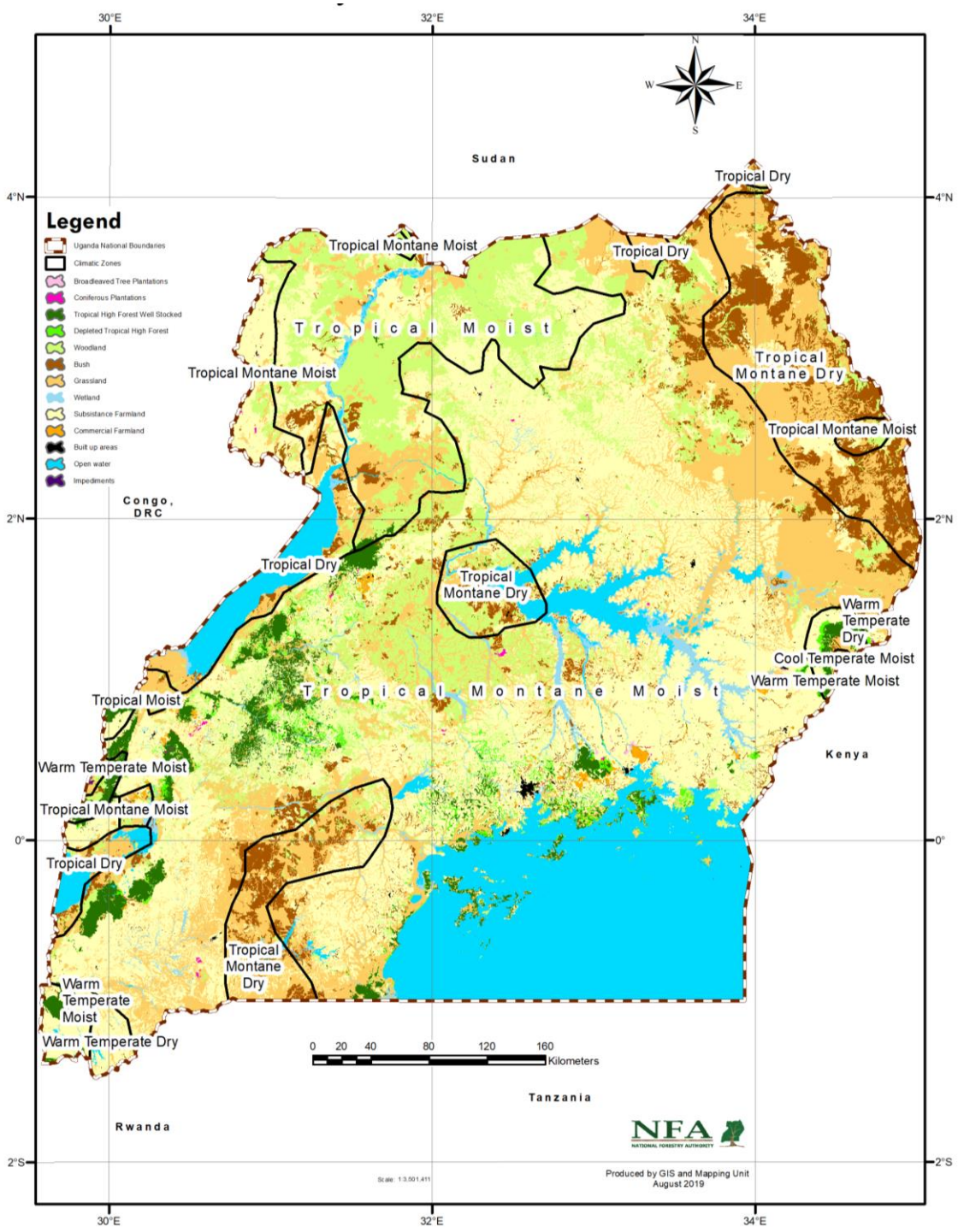


Figure 2.30 Land cover/ land use by Climate Zone 1990

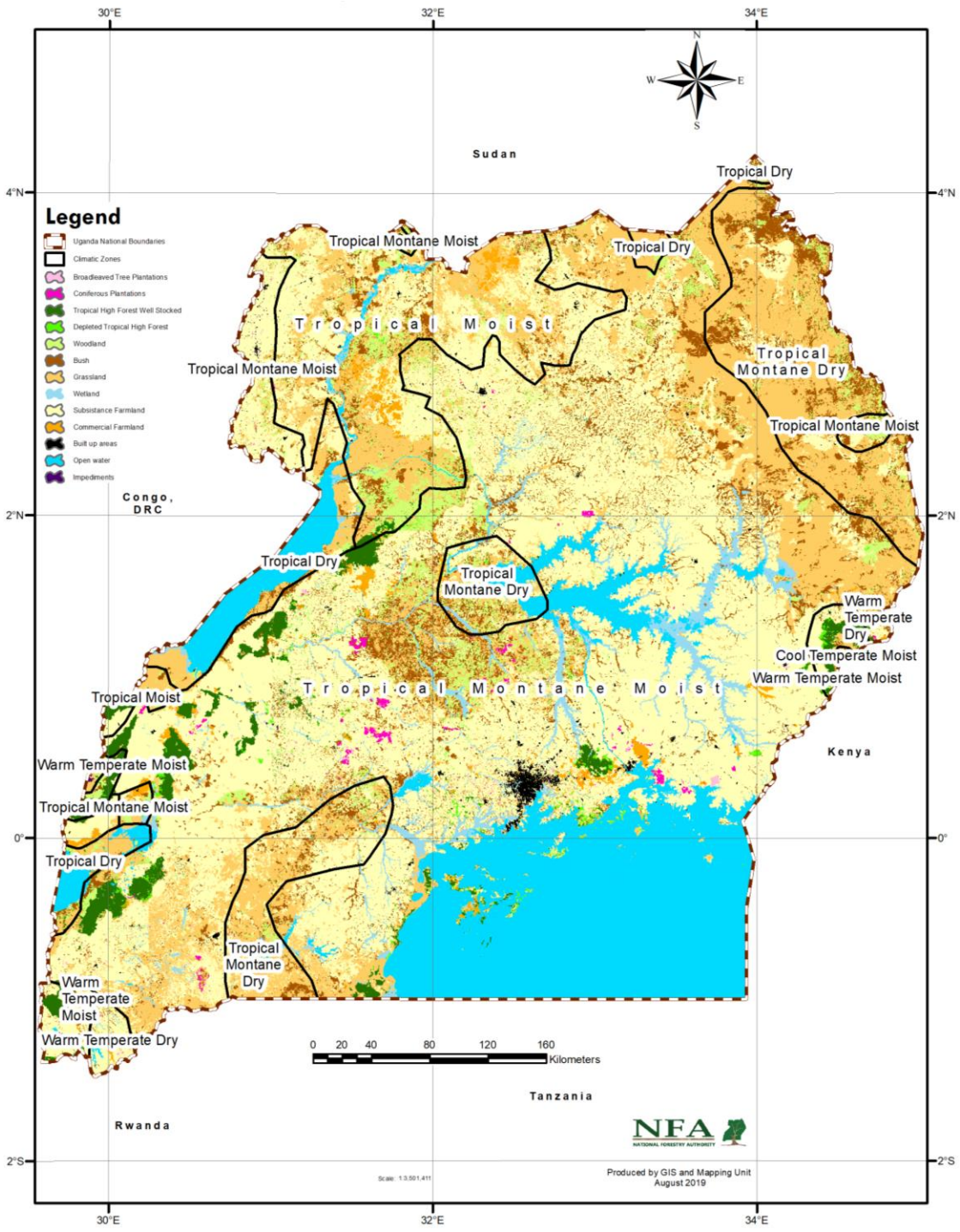


Figure 2.31: Land cover/ land use by Climate Zone 2015

2.6.2 National Land Accounts by Climate Zone

2.6.2.1 Land accounts for the Cool Temperate Moist climate zone

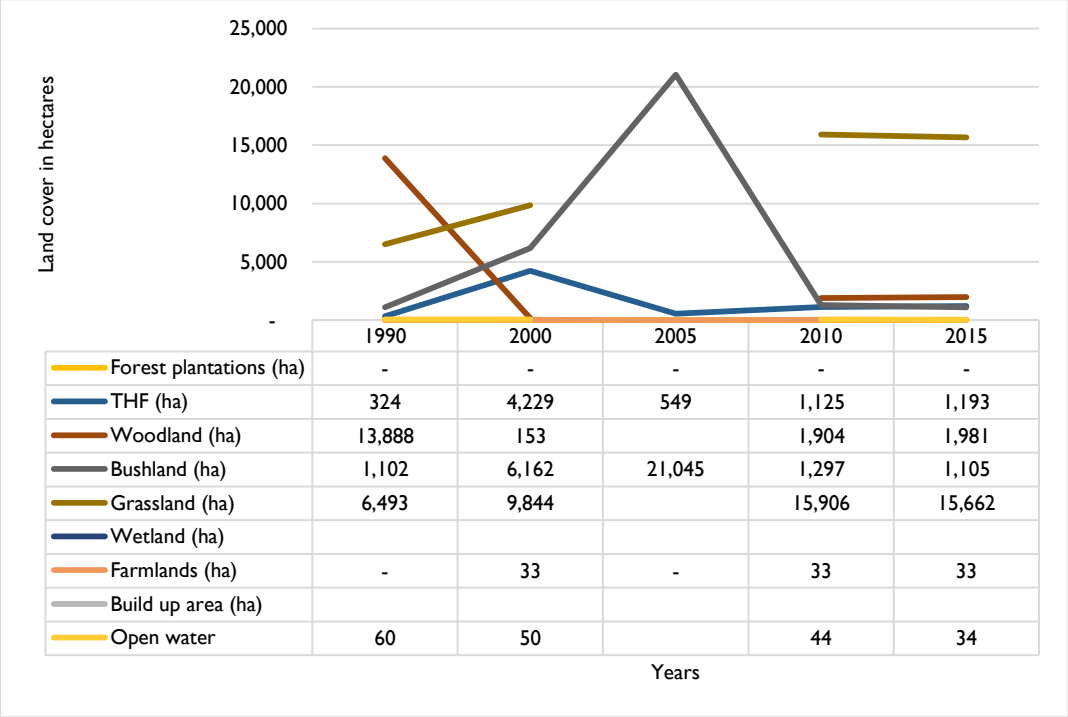
The Cool Temperate Moist is the small zone in the country with a land cover of only 0.09% (21,867 ha). The land covers comprised woodlands with 13,888 ha (63.5%) followed by grasslands (6,493 ha) and bushlands (1,102 ha) in 1990. By 2015, most of the woodlands had been converted and instead the grasslands had increased to 15,662 ha (71.2%) of the zone's land cover. The largest reduction of woodlands in the climate zone occurred between 1990 and 2000 when more than 95% of the woodlands were converted. Over the same timeline there were increases for bushlands (5,061 ha), grasslands (3,352 ha) and THF well stocked (3,904 ha). On the one hand, the forest stock increased in density to THF well stocked while the rest was degraded into bushlands, grasslands and impediments (Table 2.23).

The Cool Temperate Moist is largely located on the peaks of the Mount Rwenzori and was historically characterised by snow-capped mountains. There is little or no farmlands in the climate zone although limited farmland activity occurred over the course of the assessment period.

Table 2.23: Land Physical Accounts for Cool Temperate Moist climate zone (in hectares)

Cool Temperate Moist 1990	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Build up area	Open water	Impediments
Opening stock (1st Jan. 1990)			324		13,888	1,102	6,493		-			60	
Additions	-	-	3,944	-	40	5,923	8,322	-	33	-	-	50	1,396
Reductions	-	-	40	-	13,776	862	4,970	-	-	-	60	-	-
Net gains/reductions	-	-	3,904	-	(13,736)	5,061	3,352	-	33	-	(60)	50	1,396
Closing stock (3st Dec. 1999)			4,229		153	6,162	9,844		33			50	1,396
Opening stock (1st Jan. 2000)			4,229		153	6,162	9,844		33			50	1,396
Additions	-	-	128	-	-	14,882	-	-	-	-	-	-	142
Reductions	-	-	3,809	-	153	-	9,843	-	33	-	-	50	1,264
Net gains/reductions	-	-	(3,681)	-	(153)	14,882	(9,843)	-	(33)	-	-	(50)	(1,122)
Closing stock (31st Dec. 2004)			549			21,045			-				274
Opening stock (1st Jan 2005)			549			21,045			-				274
Additions	-	-	-	-	353	-	75	-	1	-	-	-	-
Reductions	-	-	429	-	-	-	-	-	-	-	-	-	-
Net gains/reductions	-	-	(429)	-	353	-	75	-	1	-	-	-	-
Closing stock (31st Dec. 2009)			1,125		1,904	1,297	15,906		33			44	1,558
Opening stock (1st Jan 2010)			1,125		1,904	1,297	15,906		33			44	1,558
Additions	-	-	175	-	121	-	453	-	-	-	-	-	114
Reductions	-	-	390	-	473	-	-	-	-	-	-	-	-
Net gains/reductions	-	-	(215)	-	(352)	-	453	-	-	-	-	-	114
Closing stock (31st Dec. 2014)			1,193		1,981	1,105	15,662		33			34	1,860
Opening stock (1st Jan. 2015)			1,193		1,981	1,105	15,662		33			34	1,860

The trends point to stable land covers for THF well stocked, woodlands, bushlands and grasslands (Figure 2.32). There were broken activities elsewhere. Typically, the climate zone would be a conservation zone as it is too small and conditions too severe to have sustainable farming and other economically productive land use activities. However, the increased reduction of woodlands particularly to bushlands and grasslands indicates presence of economic activity and the likely degradation of conserved ecosystems in the climate zone.



	1990	2000	2005	2010	2015
Forest plantations (ha)	-	-	-	-	-
THF (ha)	324	4,229	549	1,125	1,193
Woodland (ha)	13,888	153		1,904	1,981
Bushland (ha)	1,102	6,162	21,045	1,297	1,105
Grassland (ha)	6,493	9,844		15,906	15,662
Wetland (ha)					
Farmlands (ha)	-	33	-	33	33
Build up area (ha)					
Open water	60	50		44	34

Figure 2.32: Trends of land cover for Cool Temperate Moist climate zone for 1990 to 2015

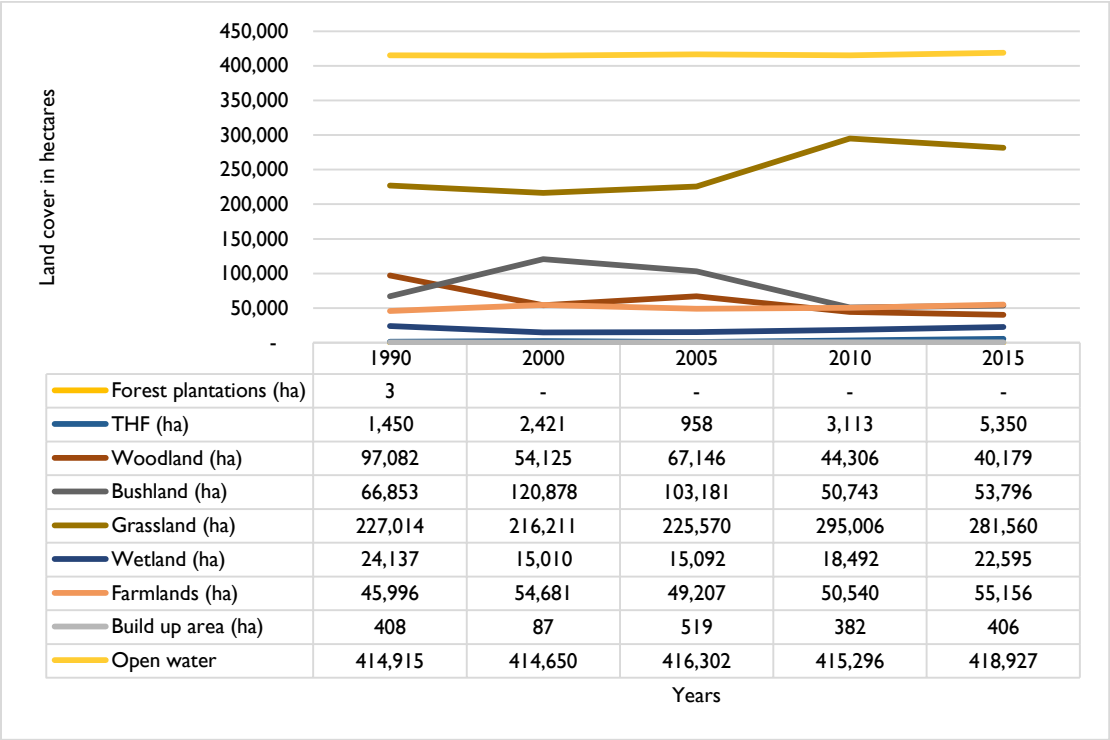
2.6.2.2 Land accounts for the Tropical Dry climate zone

The Tropical Dry climate zone makes up 3.6% of the land cover of Uganda equivalent to 878,062 ha. The main land cover class in the climate zone if open water with a cover of 414,915 ha in 1990, which increased by just over 4,012 ha to 418,927 ha in 2015. The second largest land cover were grasslands which also increased over the assessment period from 227,014 ha to 281,560 ha. Woodlands, bushlands and wetlands were also important land covers. Small scale farmlands were relatively small with only 45,996 ha in 1990 which increased by just under 8,610 ha to 54,597 ha in 2015. Like Cool Temperate Moist there was activity of woodland conversion with over 56,903 ha lost over the 25-year timeline. Bushlands and wetlands reduced slightly while grassland increased by over 50,000 ha (Table 2.24).

Table 2.24: Land Physical Accounts for Tropical Dry climate zone (in hectares)

Tropical Dry	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Build up area	Open water	Imped
Opening stock (1st Jan. 1990)	3		1,325	125	97,082	66,853	227,014	24,137	45,996		408	414,915	
Additions	-	-	272	1,260	20,548	91,186	77,925	4,093	23,296	3	79	2,083	
Reductions	2	-	437	126	63,505	37,165	88,726	13,220	14,614	-	398	2,347	
Net gains/reductions	(2)	-	(165)	1,134	(42,957)	54,021	(10,801)	(9,127)	8,682	3	(319)	(264)	
Closing stock (3st Dec. 1999)			1,160	1,261	54,125	120,878	216,211	15,010	54,678	3	87	414,650	
Opening stock (1st Jan. 2000)			1,160	1,261	54,125	120,878	216,211	15,010	54,678	3	87	414,650	
Additions	-	-	38	3	45,979	59,566	64,347	10,047	10,020	1,241	510	3,111	
Reductions	-	-	249	1,254	32,959	77,261	54,988	9,966	16,735	-	78	1,457	
Net gains/reductions	-	-	(211)	(1,251)	13,020	(17,695)	9,359	81	(6,715)	1,241	432	1,654	
Closing stock (31st Dec. 2004)			948	10	67,146	103,181	225,570	15,092	47,963	1,244	519	416,302	
Opening stock (1st Jan 2005)			948	10	67,146	103,181	225,570	15,092	47,963	1,244	519	416,302	
Additions	-	-	725	74	31	11,046	31,468	1,896	1,762	8	11	210	
Reductions	-	-	58	9	47,175	-	-	-	-	-	-	-	
Net gains/reductions	-	-	667	65	(47,144)	11,046	31,468	1,896	1,762	8	11	210	
Closing stock (31st Dec. 2009)			2,772	341	44,306	50,743	295,006	18,492	49,666	874	382	415,296	
Opening stock (1st Jan 2010)			2,772	341	44,306	50,743	295,006	18,492	49,666	874	382	415,296	
Additions	-	-	611	1,343	524	2,744	8,238	478	876	19	13	669	
Reductions	-	-	861	303	14,361	-	-	-	-	-	-	-	
Net gains/reductions	-	-	(250)	1,040	(13,837)	2,744	8,238	478	876	19	13	669	
Closing stock (31st Dec. 2014)			2,862	2,488	40,179	53,796	281,560	22,595	54,597	559	406	418,927	
Opening stock (1st Jan. 2015)			2,862	2,488	40,179	53,796	281,560	22,595	54,597	559	406	418,927	

The increase in grasslands was the stand out change in the land trends for the Tropical Dry climate zone (Figure 2.33). The tropical dry areas are located in the Karamoja region in Uganda and represent areas of limited small scale farmlands and areas that serve as habitats for wildlife while also providing pasture for livestock under the pastoral farming system.



	1990	2000	2005	2010	2015
Forest plantations (ha)	3	-	-	-	-
THF (ha)	1,450	2,421	958	3,113	5,350
Woodland (ha)	97,082	54,125	67,146	44,306	40,179
Bushland (ha)	66,853	120,878	103,181	50,743	53,796
Grassland (ha)	227,014	216,211	225,570	295,006	281,560
Wetland (ha)	24,137	15,010	15,092	18,492	22,595
Farmlands (ha)	45,996	54,681	49,207	50,540	55,156
Build up area (ha)	408	87	519	382	406
Open water	414,915	414,650	416,302	415,296	418,927

Years

Figure 2.33: Trends of land cover for the Tropical Dry climate zone for 1990 to 2015

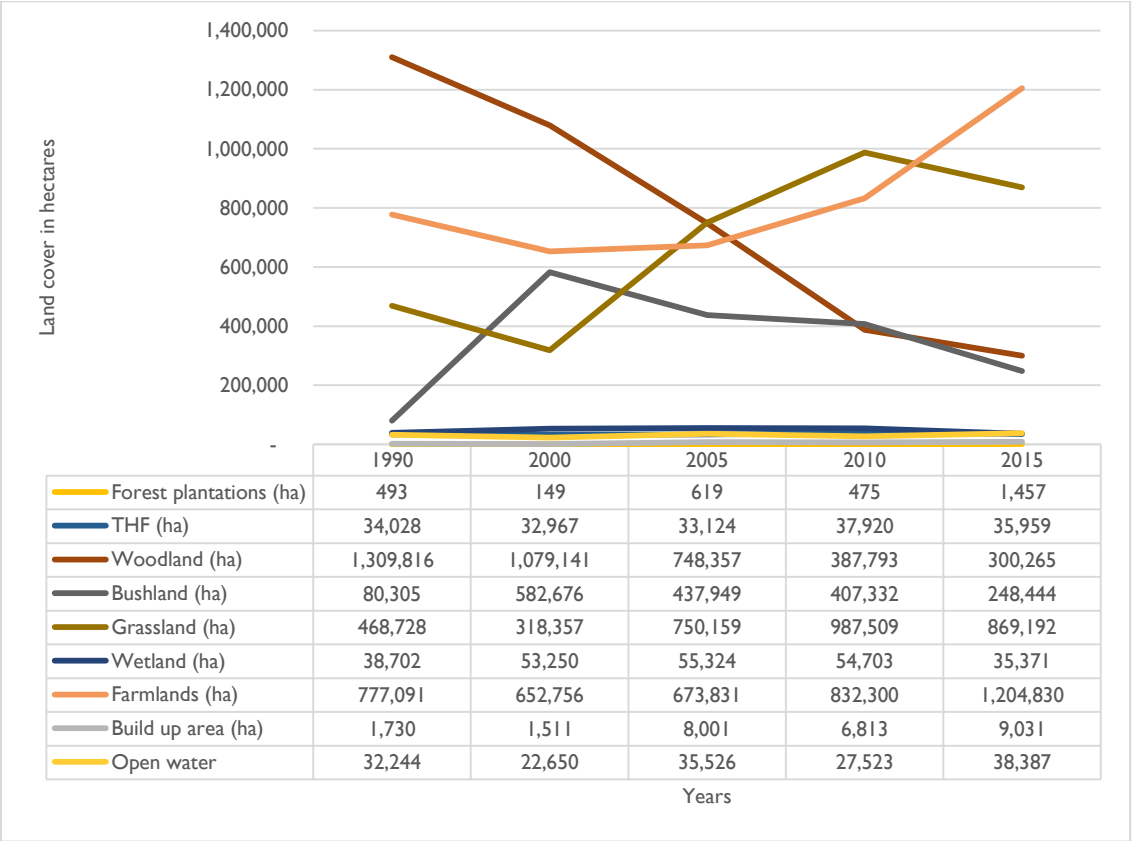
2.6.2.3 Land accounts for the Tropical Moist climate zone

The Tropical Moist climate zone covers 11.4% of the total land cover of Uganda. The zone was dominated by woodlands in 1990 with 48% of the cover followed by small scale farmlands with 28% of the land cover (Table 2.25). However, by 2015, the small scale farmlands had replaced woodlands as the largest land cover. Small scale farmlands increased from 772,295 to 1,100,022 ha while the grasslands increased by 400,464 ha.

Table 2.25: Land Physical Accounts for Tropical Moist climate zone (in hectares)

Tropical Moist	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Build up area	Open water	Impediments
Opening stock (1st Jan. 1990)	491	2	31,828	2,200	1,309,816	80,305	468,728	38,702	772,295	4,796	1,730	32,244	459
Additions	87	63	2,217	870	309,667	548,713	221,730	24,882	192,970	4,605	828	3,911	83
Reductions	490	2	2,212	1,937	540,341	46,341	372,100	10,333	318,238	3,674	1,048	13,506	404
Net gains/reductions	(403)	61	5	(1,067)	(230,674)	502,372	(150,370)	14,549	(125,268)	931	(220)	(9,595)	(321)
Closing stock (3st Dec. 1999)	86	63	31,832	1,135	1,079,141	582,676	318,357	53,250	647,027	5,729	1,511	22,650	139
Opening stock (1st Jan. 2000)	86	63	31,832	1,135	1,079,141	582,676	318,357	53,250	647,027	5,729	1,511	22,650	139
Additions	620	-	2,255	74	232,623	327,998	579,190	23,509	211,219	5,754	6,888	16,257	623
Reductions	86	63	1,206	965	563,409	472,725	147,389	21,436	192,975	2,923	397	3,381	55
Net gains/reductions	534	(63)	1,049	(891)	(330,786)	(144,727)	431,801	2,073	18,244	2,831	6,491	12,876	568
Closing stock (31st Dec. 2004)	619		32,880	244	748,357	437,949	750,159	55,324	665,270	8,561	8,001	35,526	706
Opening stock (1st Jan 2005)	619		32,880	244	748,357	437,949	750,159	55,324	665,270	8,561	8,001	35,526	706
Additions	27	101	2,170	1,891	1,489	155,387	207,316	2,731	109,661	1,108	167	589	237
Reductions	526	-	3,282	244	478,822	-	-	-	-	-	-	-	-
Net gains/reductions	(499)	101	(1,112)	1,647	(477,333)	155,387	207,316	2,731	109,661	1,108	167	589	237
Closing stock (31st Dec. 2009)	361	114	33,041	4,879	387,793	407,332	987,509	54,703	816,805	15,495	6,813	27,523	1,226
Opening stock (1st Jan 2010)	361	114	33,041	4,879	387,793	407,332	987,509	54,703	816,805	15,495	6,813	27,523	1,226
Additions	22	48	1,307	3,270	2,497	47,548	71,821	366	52,967	7,752	67	1,079	110
Reductions	166	3	4,220	3,902	180,563	-	-	-	-	-	-	-	-
Net gains/reductions	(144)	45	(2,913)	(632)	(178,066)	47,548	71,821	366	52,967	7,752	67	1,079	110
Closing stock (31st Dec. 2014)	1,017	440	30,830	5,129	300,265	248,444	869,192	35,371	1,100,022	104,808	9,031	38,387	660
Opening stock (1st Jan. 2015)	1,017	440	30,830	5,129	300,265	248,444	869,192	35,371	1,100,022	104,808	9,031	38,387	660

The trends shown in Figure 2.34 show how the woodlands reduced rapidly as grasslands and small scale farmlands surged in area cover. Woodlands reduced by over 1.0 million ha over the 25 timeline. Most of the reduction in woodland occurred between 1990 and 2010. There was consistent targeting of woodlands for reduction to be replaced with other land covers. The bushlands and grasslands had the largest additions as the woodlands reduced even though the small scale farmlands also concurrent increased over the assessment period.



	1990	2000	2005	2010	2015
Forest plantations (ha)	493	149	619	475	1,457
THF (ha)	34,028	32,967	33,124	37,920	35,959
Woodland (ha)	1,309,816	1,079,141	748,357	387,793	300,265
Bushland (ha)	80,305	582,676	437,949	407,332	248,444
Grassland (ha)	468,728	318,357	750,159	987,509	869,192
Wetland (ha)	38,702	53,250	55,324	54,703	35,371
Farmlands (ha)	777,091	652,756	673,831	832,300	1,204,830
Build up area (ha)	1,730	1,511	8,001	6,813	9,031
Open water	32,244	22,650	35,526	27,523	38,387

Years

Figure 2.34: Trends of land cover for the Tropical Moist climate zone for 1990 to 2015

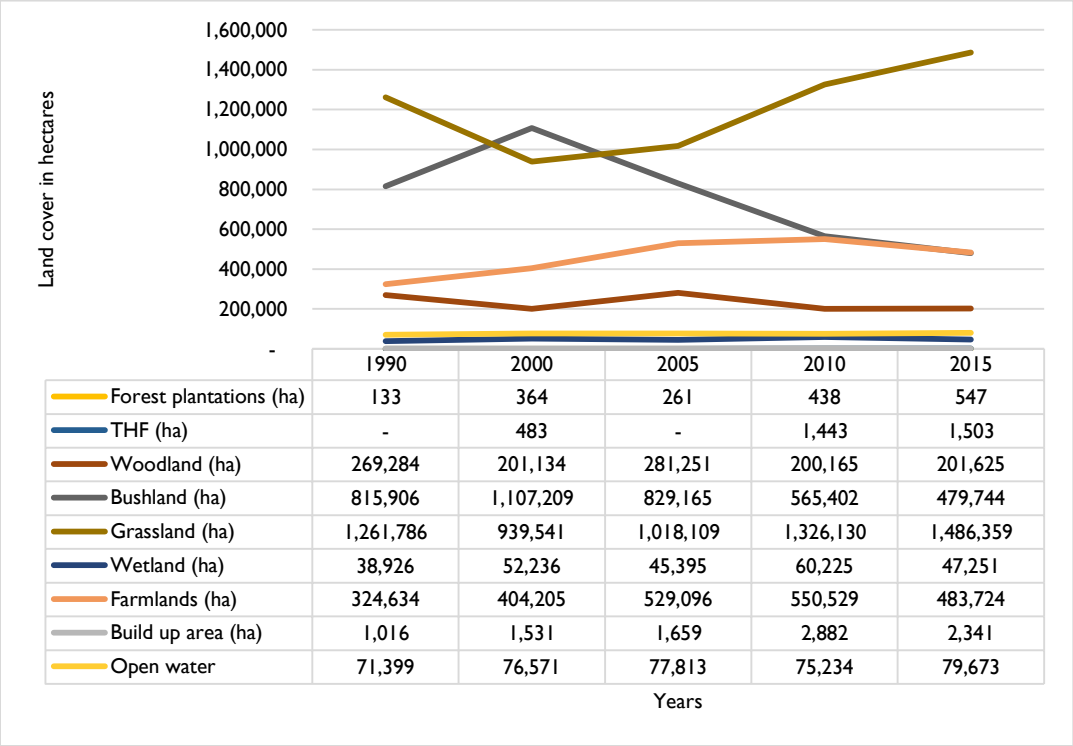
2.6.2.4 Land accounts for the Tropical Montane Dry climate zone

Tropical Montane dry land cover was 11.6% of the total country land cover. The Land Physical Accounts (Table 2.26) showed that the dominant cover was that of grasslands and bushlands which accounted for 75% of the land cover under the climate zone in 1990. At the same time, small scale farmlands, woodlands and open water accounted for 24% of the land cover. The remaining land cover was for forest plantations, wetlands, built up areas, commercial farmlands and impediments accounted for just over 1%. By 2015, the area of grasslands and small scale farmlands had increased while the land area of woodlands and bushlands had decreased. The small scale farmlands had an additional aggregate land cover of 158,119 ha while grasslands had a larger aggregate increase of 224,573 ha. The woodlands decreased by about 68,000 ha over the assessment period. Therefore, most of the gains observed in the farmlands and grasslands were associated with the reduction of woodlands. This implied a likely increase in utilisation of land under the climate zone.

Table 2.26: Land Physical Accounts for Tropical Montane Dry climate zone (in hectares)

Tropical Montane Dry	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Build up area	Open water	Impediments
Opening stock (1st Jan. 1990)	133				269,284	815,906	1,261,786	38,926	324,227	407	1,016	71,399	189
Additions	39	324	483	-	135,610	675,755	353,975	27,275	230,208	323	974	9,771	-
Reductions	132	-	-	-	203,761	384,452	676,220	13,965	150,555	407	457	4,599	189
Net gains/reductions	(93)	324	483	-	(68,151)	291,303	(322,245)	13,310	79,653	(84)	517	5,172	(189)
Closing stock (3st Dec. 1999)	39	325	483		201,134	1,107,209	939,541	52,236	403,882	323	1,531	76,571	
Opening stock (1st Jan. 2000)	39	325	483		201,134	1,107,209	939,541	52,236	403,882	323	1,531	76,571	
Additions	261	-	-	-	215,112	319,857	517,804	8,367	280,442	151	1,346	3,006	526
Reductions	39	325	483	-	134,994	597,901	439,236	15,209	155,379	323	1,219	1,764	-
Net gains/reductions	222	(325)	(483)	-	80,118	(278,044)	78,568	(6,842)	125,063	(172)	127	1,242	526
Closing stock (31st Dec. 2004)	261				281,251	829,165	1,018,109	45,395	528,944	152	1,659	77,813	526
Opening stock (1st Jan 2005)	261				281,251	829,165	1,018,109	45,395	528,944	152	1,659	77,813	526
Additions	-	-	175	420	-	73,680	126,410	681	21,593	1	210	64	43
Reductions	261	-	-	-	223,016	-	-	-	-	-	-	-	-
Net gains/reductions	(261)	-	175	420	(223,016)	73,680	126,410	681	21,593	1	210	64	43
Closing stock (31st Dec. 2009)	79	359	532	911	200,165	565,402	1,326,130	60,225	549,856	673	2,882	75,234	824
Opening stock (1st Jan 2010)	79	359	532	911	200,165	565,402	1,326,130	60,225	549,856	673	2,882	75,234	824
Additions	25	8	-	253	262	32,704	31,608	1,013	15,241	221	41	245	20
Reductions	22	328	395	15	80,881	-	-	-	-	-	-	-	-
Net gains/reductions	3	(320)	(395)	238	(80,619)	32,704	31,608	1,013	15,241	221	41	245	20
Closing stock (31st Dec. 2014)	326	221	137	1,366	201,625	479,744	1,486,359	47,251	482,346	1,378	2,341	79,673	506
Opening stock (1st Jan. 2015)	326	221	137	1,366	201,625	479,744	1,486,359	47,251	482,346	1,378	2,341	79,673	506

The trends show the importance of grasslands in the climate zone. The grasslands dipped in the first five years of the assessment but recovered and increased steadily between 2000 and 2015 (Figure 2.35). Conversely, the bushlands increased in the first five years and then decreased for the rest of the timeline. The initial surge in the area of the bushlands may have been associated with a reduction in the grassland area. However, in the subsequent period the grasslands recovered.



	1990	2000	2005	2010	2015
Forest plantations (ha)	133	364	261	438	547
THF (ha)	-	483	-	1,443	1,503
Woodland (ha)	269,284	201,134	281,251	200,165	201,625
Bushland (ha)	815,906	1,107,209	829,165	565,402	479,744
Grassland (ha)	1,261,786	939,541	1,018,109	1,326,130	1,486,359
Wetland (ha)	38,926	52,236	45,395	60,225	47,251
Farmlands (ha)	324,634	404,205	529,096	550,529	483,724
Build up area (ha)	1,016	1,531	1,659	2,882	2,341
Open water	71,399	76,571	77,813	75,234	79,673

Years

Figure 2.35: Trends of land cover for Tropical Montane Dry climate zone for 1990 to 2015

2.6.2.5 Land accounts for the Tropical Montane Moist climate zone

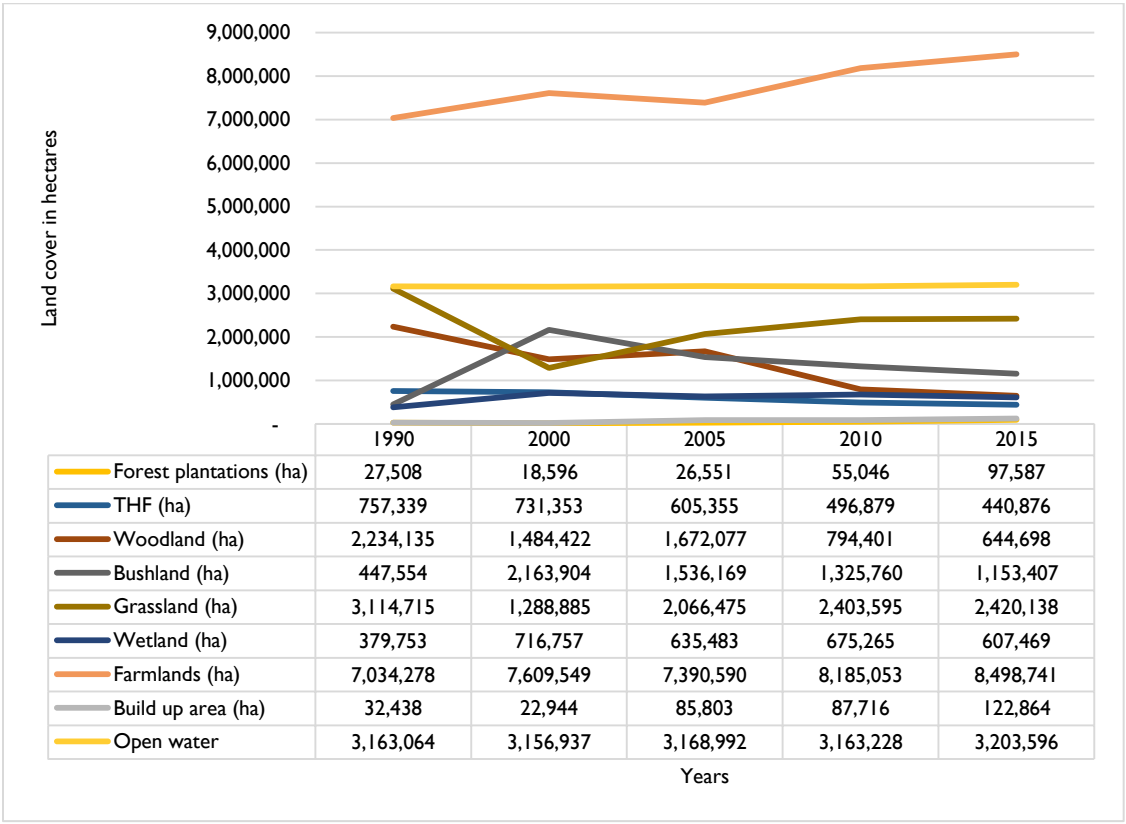
The Tropical Montane Moist climate zone covers the largest land cover amongst the climate zones in Uganda with 71% of all national land cover. The four largest land covers in 1990 of small scale farmlands, open water, grasslands and woodlands occupied 90% of all the land cover while bushland, tropical high forests and wetlands occupied 9% of the land cover (Table 2.27). The major changes in land cover between 1990 and 2015 was due to the expansion of the small scale farmlands, bushlands and wetlands and decrease of woodlands, grasslands and tropical high forests decreased. By 2015. Small scale farmlands, open water and grasslands were still the three largest land covers. Whereas, the small scale farmlands had surged by nearly 1.6 million ha, the woodlands had reduced by near 1.6 million ha while the tropical high forests had reduced by 316,463 ha.

The built up areas increased fourfold from 32,438 ha to 122,864 ha while forest plantations increased by over three and a half times from 27,508 ha to 97,587 ha over the assessment period from 1990 to 2015. The wetland area increased by 78%from 379,753 to 607,469 ha during the same period.

Table 2.27: Land Physical Accounts for Tropical Montane Moist climate zone (in hectares)

Tropical Montane Moist	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Build up area	Open water	Impediments
Opening stock (1st Jan. 1990)	15,921	11,587	513,251	244,088	2,234,135	447,554	3,114,715	379,753	6,971,838	62,440	32,438	3,163,064	2,886
Additions	6,746	3,231	126,397	154,773	638,784	1,979,487	496,899	436,603	1,473,335	51,637	11,241	39,294	321
Reductions	14,156	4,732	124,885	182,273	1,388,497	263,137	2,322,727	99,601	930,168	19,533	20,736	45,420	2,883
Net gains/reductions	(7,410)	(1,501)	1,512	(27,500)	(749,713)	1,716,350	(1,825,828)	337,002	543,167	32,104	(9,495)	(6,126)	(2,562)
Closing stock (3st Dec. 1999)	8,510	10,086	514,764	216,589	1,484,422	2,163,904	1,288,885	716,757	7,515,004	94,545	22,944	3,156,937	322
Opening stock (1st Jan. 2000)	8,510	10,086	514,764	216,589	1,484,422	2,163,904	1,288,885	716,757	7,515,004	94,545	22,944	3,156,937	322
Additions	11,562	6,888	51,071	124,902	816,997	786,874	1,374,988	174,352	992,423	36,840	68,295	39,528	6,129
Reductions	6,887	3,607	151,922	150,049	629,343	1,414,609	597,399	255,627	1,211,824	36,398	5,438	27,472	274
Net gains/reductions	4,675	3,281	(100,851)	(25,147)	187,654	(627,735)	777,589	(81,275)	(219,401)	442	62,857	12,056	5,855
Closing stock (31st Dec. 2004)	13,185	13,366	413,914	191,441	1,672,077	1,536,169	2,066,475	635,483	7,295,602	94,988	85,803	3,168,992	6,177
Opening stock (1st Jan 2005)	13,185	13,366	413,914	191,441	1,672,077	1,536,169	2,066,475	635,483	7,295,602	94,988	85,803	3,168,992	6,177
Additions	3,134	6,920	48,964	42,386	39,355	347,727	355,013	23,787	635,853	13,077	2,857	2,185	1,278
Reductions	10,798	6,156	94,065	161,179	1,250,338	-	-	-	-	-	-	-	-
Net gains/reductions	(7,664)	764	(45,101)	(118,793)	(1,210,983)	347,727	355,013	23,787	635,853	13,077	2,857	2,185	1,278
Closing stock (31st Dec. 2009)	16,427	38,619	392,189	104,690	794,401	1,325,760	2,403,595	675,265	8,069,856	115,197	87,716	3,163,228	6,725
Opening stock (1st Jan 2010)	16,427	38,619	392,189	104,690	794,401	1,325,760	2,403,595	675,265	8,069,856	115,197	87,716	3,163,228	6,725
Additions	8,974	4,768	14,450	32,465	13,262	109,843	99,241	10,586	232,034	7,888	1,415	4,520	399
Reductions	7,240	7,081	60,969	69,858	394,697	-	-	-	-	-	-	-	-
Net gains/reductions	1,734	(2,313)	(46,519)	(37,393)	(381,435)	109,843	99,241	10,586	232,034	7,888	1,415	4,520	399
Closing stock (31st Dec. 2014)	41,037	56,550	358,312	82,564	644,698	1,153,407	2,420,138	607,469	8,353,731	145,010	122,864	3,203,596	4,295
Opening stock (1st Jan. 2015)	41,037	56,550	358,312	82,564	644,698	1,153,407	2,420,138	607,469	8,353,731	145,010	122,864	3,203,596	4,295

The trends show the dominance of small scale farmlands and the gradual and consistent increase between 1990 and 2015 with a slight dip in 2005 as in Figure 2.36. The woodlands cover seems to have been lost to both the increase in small scale farmlands and bushlands. The grasslands are also likely to have lost land cover to the expansion of farmlands. In the largest climate zone in the country, small scale farmlands were the dominant land cover/ land use. Therefore, it can be safe to conclude that the major concern for climate would be on how it influences land use for agricultural production.



	1990	2000	2005	2010	2015
Forest plantations (ha)	27,508	18,596	26,551	55,046	97,587
THF (ha)	757,339	731,353	605,355	496,879	440,876
Woodland (ha)	2,234,135	1,484,422	1,672,077	794,401	644,698
Bushland (ha)	447,554	2,163,904	1,536,169	1,325,760	1,153,407
Grassland (ha)	3,114,715	1,288,885	2,066,475	2,403,595	2,420,138
Wetland (ha)	379,753	716,757	635,483	675,265	607,469
Farmlands (ha)	7,034,278	7,609,549	7,390,590	8,185,053	8,498,741
Build up area (ha)	32,438	22,944	85,803	87,716	122,864
Open water	3,163,064	3,156,937	3,168,992	3,163,228	3,203,596

Years

Figure 2.36: Trend of land cover for Tropical Montane Moist climate zone for 1990 to 2015

2.6.2.6 Land accounts for the Warm Temperate Dry climate zone

The Warm Temperate Dry climate zone covers only 0.6% of Uganda land cover equivalent to 146,896 ha. The dominant land cover was the small scale farmlands in 1990 and 2015. The bushlands increased 10-fold, the woodlands doubled and while the THF well stocked increased by457 ha, THF low stocked by more than double from 2,697 to 904 ha between 1990 and 2015.

All land cover classes occurred under the Warm Temperate Dry climate zone but in small areas of land area. The built up area declined, the only decline in built up area across the seven climate zones. The woodlands increased while grasslands decreased. Wetlands were generally unchanged over the assessment period (Table 2.28).

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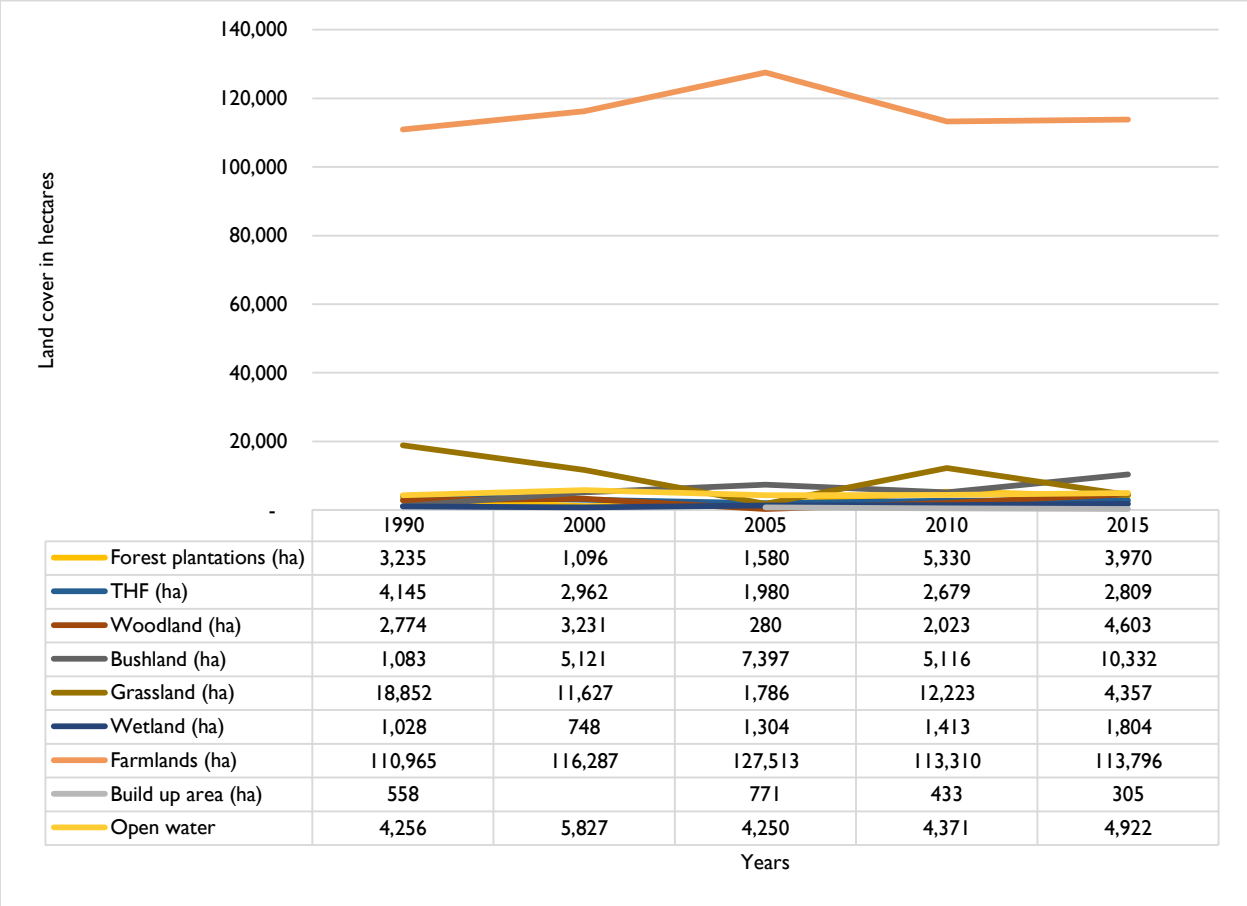
Table 2.28: Land Physical Accounts for Warm Temperate Dry climate zone (in hectares)

Warm Temperate Dry	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock (1st Jan. 1990)	1,543	1,692	1,448	2,697	2,774	1,083	18,852	1,028	110,423	542	558	4,256	
Additions	833	108	388	378	2,392	5,007	7,476	317	15,763	2,683	-	2,053	
Reductions	1,524	1,556	29	1,922	1,935	970	14,701	597	12,581	542	558	483	-
Net gains/reductions	(691)	(1,448)	359	(1,544)	457	4,037	(7,225)	(280)	3,182	2,141	(558)	1,570	-
Closing stock (3st Dec. 1999)	854	242	1,808	1,154	3,231	5,121	11,627	748	113,604	2,683		5,827	
Opening stock (1st Jan. 2000)	854	242	1,808	1,154	3,231	5,121	11,627	748	113,604	2,683		5,827	
Additions	279	1,234	270	-	236	4,190	1,137	782	19,049	1,254	771	98	36
Reductions	800	231	98	1,154	3,185	1,914	10,979	225	6,394	2,683	-	1,673	-
Net gains/reductions	(521)	1,003	172	(1,154)	(2,949)	2,276	(9,842)	557	12,655	(1,429)	771	(1,575)	36
Closing stock (31st Dec. 2004)	334	1,246	1,980		280	7,397	1,786	1,304	126,259	1,254	771	4,250	36
Opening stock (1st Jan 2005)	334	1,246	1,980		280	7,397	1,786	1,304	126,259	1,254	771	4,250	36
Additions	-	122	-	562	186	76	271	-	592	10	-	-	-
Reductions	287	449	822	-	261	-	-	-	-	-	-	-	-
Net gains/reductions	(287)	(327)	(822)	562	(75)	76	271	-	592	10	-	-	-
Closing stock (31st Dec. 2009)	3,836	1,494	1,187	1,492	2,023	5,116	12,223	1,413	111,548	1,762	433	4,371	
Opening stock (1st Jan 2010)	3,836	1,494	1,187	1,492	2,023	5,116	12,223	1,413	111,548	1,762	433	4,371	
Additions	98	32	807	167	509	448	49	66	3,523	88	1	38	-
Reductions	3,188	121	173	906	1,438	-	-	-	-	-	-	-	-
Net gains/reductions	(3,090)	(89)	634	(739)	(929)	448	49	66	3,523	88	1	38	-
Closing stock (31st Dec. 2014)	1,600	2,370	1,905	904	4,603	10,332	4,357	1,804	110,452	3,344	305	4,922	
Opening stock (1st Jan. 2015)	1,600	2,370	1,905	904	4,603	10,332	4,357	1,804	110,452	3,344	305	4,922	

The trends show a very large margin between the small scale farmlands and other land covers/ land uses (Figure 2.37). generally, there were very small changes along the time horizon most of the land covers/ land use were quite stable.



	1990	2000	2005	2010	2015
Forest plantations (ha)	3,235	1,096	1,580	5,330	3,970
THF (ha)	4,145	2,962	1,980	2,679	2,809
Woodland (ha)	2,774	3,231	280	2,023	4,603
Bushland (ha)	1,083	5,121	7,397	5,116	10,332
Grassland (ha)	18,852	11,627	1,786	12,223	4,357
Wetland (ha)	1,028	748	1,304	1,413	1,804
Farmlands (ha)	110,965	116,287	127,513	113,310	113,796
Build up area (ha)	558		771	433	305
Open water	4,256	5,827	4,250	4,371	4,922

Figure 2.37: Trend of land cover for Warm Temperate Dry climate zone for 1990 to 2015

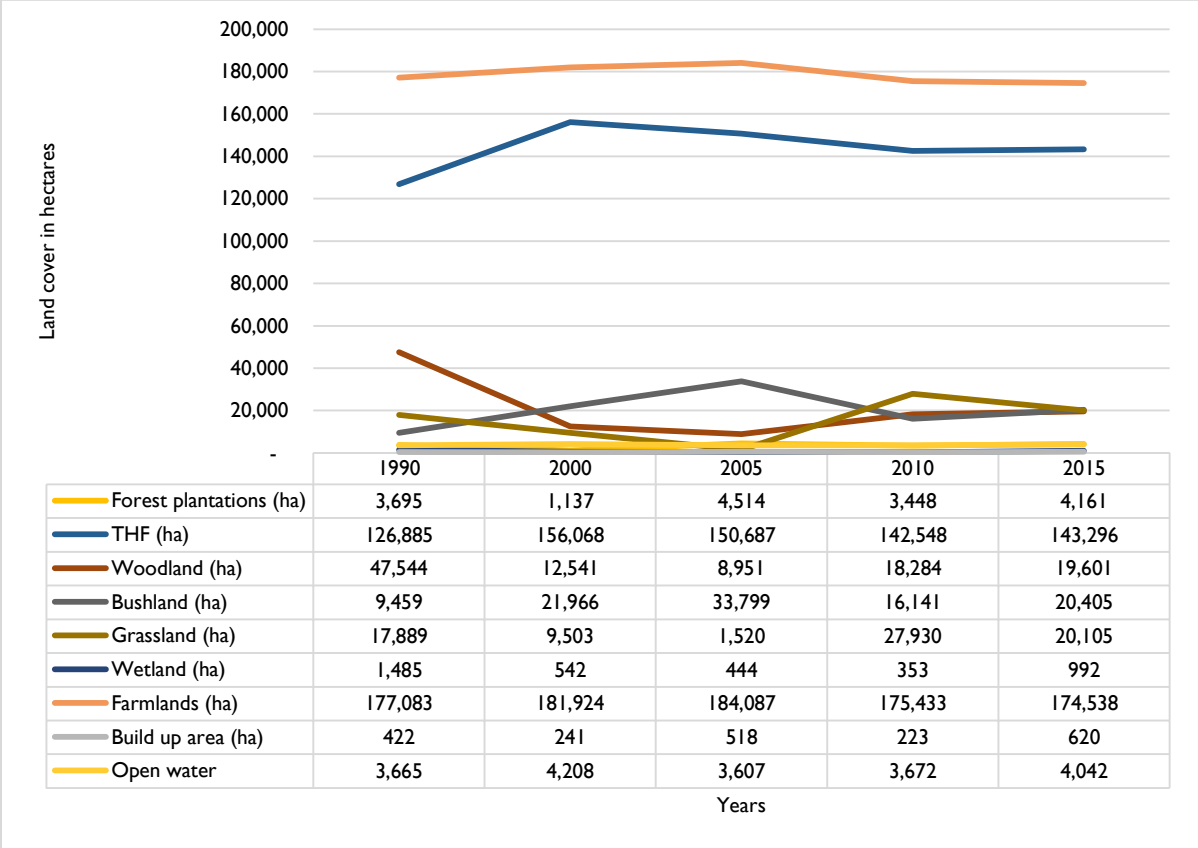
2.6.2.7 Land accounts for the Warm Temperate Moist climate zone

The Warm Temperate Moist climate zone covers 1.6% (388,128 ha) of the national land cover. The small scale farmlands and THF well stocked had the largest land cover. IThe combined tropical high forests and small scale farmlands accounted for over 78% of the total land cover the climate zone. woodlands and grasslands covered 47,544 ha and 17,889 ha, respectively, in 1990. By 2015, THF well stocked had increased by over 30,000 ha while THF low stocked and woodlands had declined by over 14,000 ha and nearly 28,000 ha, respectively as in Table 2.29.

Table 2.29: Land Physical Accounts for Warm Temperate Moist climate zone (in hectares)

Warm Temperate Moist	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Build up area	Open water	Impediments
Opening stock (1st Jan. 1990)	591	3,104	102,934	23,951	47,544	9,459	17,889	1,485	176,822	261	422	3,665	1
Additions	353	60	52,327	880	4,101	18,437	4,678	301	17,472	44	91	720	-
Reductions	587	2,383	5,606	18,418	39,106	5,931	13,062	1,245	12,417	261	270	177	1
Net gains/reductions	(234)	(2,323)	46,721	(17,538)	(35,005)	12,506	(8,384)	(944)	5,055	(217)	(179)	543	(1)
Closing stock (3st Dec. 1999)	355	782	149,655	6,413	12,541	21,966	9,503	542	181,880	44	241	4,208	
Opening stock (1st Jan. 2000)	355	782	149,655	6,413	12,541	21,966	9,503	542	181,880	44	241	4,208	
Additions	385	3,368	14,893	-	8,600	21,409	1,456	444	11,982	431	330	150	-
Reductions	355	22	13,859	6,412	12,191	9,576	9,440	541	10,205	43	54	750	-
Net gains/reductions	30	3,346	1,034	(6,412)	(3,591)	11,833	(7,984)	(97)	1,777	388	276	(600)	-
Closing stock (31st Dec. 2004)	385	4,129	150,687		8,951	33,799	1,520	444	183,656	431	518	3,607	
Opening stock (1st Jan 2005)	385	4,129	150,687		8,951	33,799	1,520	444	183,656	431	518	3,607	
Additions	-	-	3,764	5,893	13,390	3,498	4,712	77	4,810	2	14	32	-
Reductions	379	2,104	25,256	-	8,453	-	-	-	-	-	-	-	-
Net gains/reductions	(379)	(2,104)	(21,492)	5,893	4,937	3,498	4,712	77	4,810	2	14	32	-
Closing stock (31st Dec. 2009)	291	3,157	134,105	8,443	18,284	16,141	27,930	353	174,519	914	223	3,672	97
Opening stock (1st Jan 2010)	291	3,157	134,105	8,443	18,284	16,141	27,930	353	174,519	914	223	3,672	97
Additions	5	25	3,534	2,754	2,226	2,555	1,275	249	2,528	9	-	31	197
Reductions	270	264	6,769	3,094	4,991	-	-	-	-	-	-	-	-
Net gains/reductions	(265)	(239)	(3,235)	(340)	(2,765)	2,555	1,275	249	2,528	9	-	31	197
Closing stock (31st Dec. 2014)	256	3,905	133,884	9,412	19,601	20,405	20,105	992	173,786	752	620	4,042	368
Opening stock (1st Jan. 2015)	256	3,905	133,884	9,412	19,601	20,405	20,105	992	173,786	752	620	4,042	368

The trends from Figure 2.38 showefair stability in land covers. Small scale farmlands were generally unchanged between 1990 and 2015. The THF well stocked increased rapidly in the first five years of the assessment period before stabilising and slightly dipping between 2010 and 2015. There were fluctuations in the land cover of grasslands, woodlands and bushlands but over a narrow range of under 20,000 ha.



	1990	2000	2005	2010	2015
Forest plantations (ha)	3,695	1,137	4,514	3,448	4,161
THF (ha)	126,885	156,068	150,687	142,548	143,296
Woodland (ha)	47,544	12,541	8,951	18,284	19,601
Bushland (ha)	9,459	21,966	33,799	16,141	20,405
Grassland (ha)	17,889	9,503	1,520	27,930	20,105
Wetland (ha)	1,485	542	444	353	992
Farmlands (ha)	177,083	181,924	184,087	175,433	174,538
Build up area (ha)	422	241	518	223	620
Open water	3,665	4,208	3,607	3,672	4,042

Years

Figure 2.38: Trend of land cover for Warm Temperate Moist climate zone for 1990 to 2015

2.7 Land Cover by Administrative System

Uganda's Land Cover is also defined by administrative system. There are five systems of administration; (i) administration by Local Governments (LGs) and Forestry Sector Support Department (FSSD) for Local Forest Reserves (LFRs), (ii) administration by National Forestry Authority (NFA) for Central Forest Reserves (CFRs), (iii) administration by Uganda Wildlife Authority (UWA) for National Parks, Wildlife Reserves, Community Wildlife Reserves and Wildlife Sanctuaries, (iv) administration by UWA and NFA for Dual Joint Management (DJM) areas. DJM areas are zones which intersect between CFRs and areas under the management of UWA. They are managed jointly by the NFA and UWA, and (v) administration under Private. All the other remaining land is covered under administration named private. Private land belongs to individuals, government institutions, cultural institutions, companies and communities, among others. The classification under private was to distinguish it from land used for conservation purposes.

Private land administration is the largest form of administration in the country with nearly 83% of all the land in the country, followed by that under the management of UWA. The smallest area is that reserved for local forest reserves at just 0.02% (Figures 2.39, 2.40 and 2.41). The CFRs, LFRs, DJM and National

Parks, Wildlife Reserves, Community Wildlife Reserves and Wildlife Sanctuaries make up Uganda's protected areas (GoU 2012).

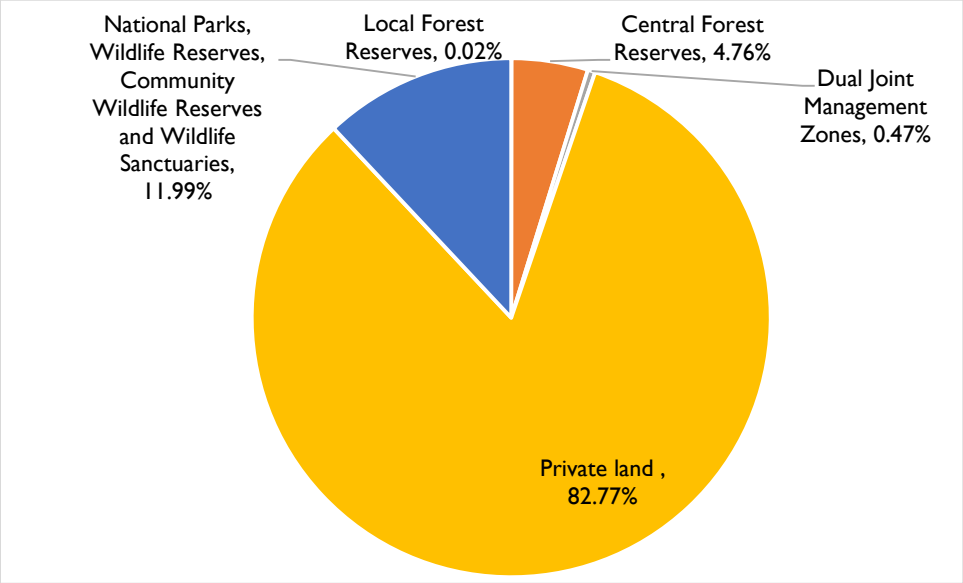


Figure 2.39: Percentage land cover by administrative zone

Figure 2.40: Land cover/ land use by protected areas in 1990

Figure 2.41: Land cover/ land use by protected areas in 2015

2.7.1 Protected Areas (PAs)

Uganda's Protected Areas (PAs) are in form of Central Forest Reserves and Local Forest Reserves, National Parks, Wildlife Reserves, Wildlife Sanctuaries and Community Wildlife Areas. Since 2014, the Government initiated a process for enhancing the conservation status of wetlands. Currently, however, the current area of PAs covers the LFRs, CFRs and areas under UWA.

2.7.1.1 Central Forest Reserves

The Total area of gazetted CFR is 1.148 million ha equivalent to 4.76% of Uganda's aggregate land cover. Between 1990 and 2015, there was aggregate net increases in land cover for plantations, bushlands, grasslands, wetlands, small scale farmlands, commercial farm lands, built up area and open water (Figures 2.42 and 2.43).

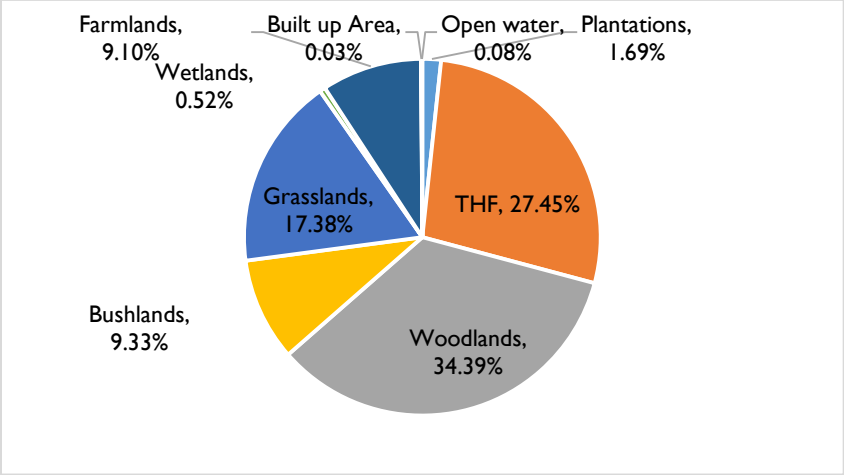


Figure 2.42: Central Forest Reserves land cover by percentage 1990

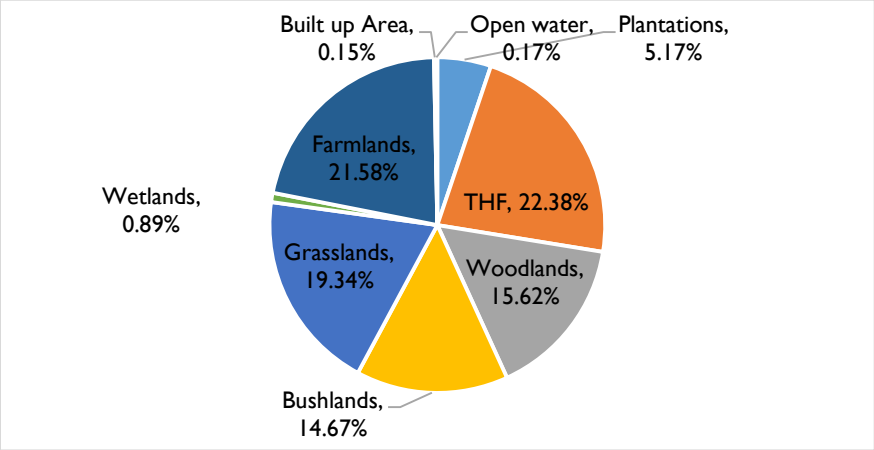


Figure 2.43: Central Forest Reserves land cover by percentage 2015

There was aggregate net reduction in land cover for tropical high forests, woodlands and impediments (bare lands). The largest land cover changes were the loss of 215,685 ha of woodlands followed by the 138,790 ha increase in small scale farmlands under CFRs (Table 2.31). Bushlands gained an additional 61,273 ha, grasslands gained 22,559 ha, wetlands gained 4,353 ha. Broad leaved plantations and coniferous plantations gained 4,256 ha and 35,729 ha respectively while commercial farmlands increased by 4,607 ha while built up areas in CFRs increased by 1,404 ha. Tropical high forests well stocked and low stocked lost 30,912 ha and 27,399 ha, respectively.

Table 2.31: Land cover accounts for Central Forest Reserves (in hectares)

	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediment
1990-2000													
Opening stock	6,041	13,395	257,847	57,551	395,117	107,216	199,617	5,924	103,306	1,203	321	901	377
Additions	1,980	2,690	40,735	22,766	93,265	195,686	46,509	5,678	77,010	1,800	286	906	10
Reductions	4,742	6,688	23,153	45,023	163,253	44,032	158,492	2,369	39,836	784	245	326	378
Net gains/reductions	(2,762)	(3,998)	17,582	(22,257)	(69,988)	151,654	(111,983)	3,309	37,174	1,016	41	580	(368)
Closing stock	**3,280**	**9,398**	**275,429**	**35,296**	**325,128**	**258,869**	**87,636**	**9,230**	**140,479**	**2,219**	**362**	**1,481**	**9**
2000-2005													
Opening stock	3,280	9,398	275,429	35,296	325,128	258,869	87,636	9,230	140,479	2,219	362	1,481	9
Additions	4,064	7,753	17,051	27,167	94,355	87,442	133,679	3,998	70,970	1,675	955	207	1,146
Reductions	2,482	3,060	49,229	25,775	110,790	159,855	43,197	4,162	49,951	916	234	801	10
Net gains/reductions	1,582	4,693	(32,178)	1,392	(16,435)	(72,413)	90,482	(164)	21,019	759	721	(594)	1,136
Closing stock	**4,863**	**14,091**	**243,252**	**36,688**	**308,692**	**186,455**	**178,119**	**9,065**	**161,497**	**2,977**	**1,084**	**889**	**1,145**
2005-2010													
Opening stock	4,863	14,091	243,252	36,688	308,692	186,455	178,119	9,065	161,497	2,977	1,084	889	1,145
Additions	4,015	27,047	34,536	20,206	79,633	107,418	140,035	5,540	121,557	2,878	582	419	655
Reductions	3,813	4,973	31,554	30,554	179,224	133,589	88,466	3,970	64,995	1,228	741	309	1,105
Net gains/reductions	202	22,074	2,982	(10,348)	(99,591)	(26,171)	51,569	1,570	56,562	1,650	(159)	110	(450)
Closing stock	**5,064**	**36,166**	**246,234**	**26,339**	**209,102**	**160,285**	**229,688**	**10,634**	**218,059**	**4,626**	**926**	**1,000**	**694**
2010-2015													
Opening stock	5,064	36,166	246,234	26,339	209,102	160,285	229,688	10,634	218,059	4,626	926	1,000	694
Additions	6,490	18,367	10,628	18,570	43,641	87,235	84,479	3,971	77,346	3,268	1,207	1,104	256
Reductions	1,258	5,410	29,929	14,753	73,311	79,033	91,990	4,325	53,312	2,085	407	124	625
Net gains/reductions	5,232	12,957	(19,301)	3,817	(29,670)	8,202	(7,511)	(354)	24,034	1,183	800	980	(369)
Closing stock	**10,297**	**49,123**	**226,935**	**30,153**	**179,433**	**168,487**	**222,175**	**10,279**	**242,096**	**5,810**	**1,725**	**1,978**	**325**
1990-2015													
Opening stock	6,041	13,395	257,847	57,551	395,117	107,216	199,617	5,924	103,306	1,203	321	901	377
Additions	9,135	41,568	29,254	20,997	58,939	133,146	146,168	7,041	178,041	5,404	1,656	1,391	306
Reductions	4,879	5,839	60,166	48,396	274,624	71,873	123,609	2,688	39,251	797	252	315	357
Net gains/reductions	(4,256)	(35,729)	30,912	27,399	215,685	(61,273)	(22,559)	(4,353)	(138,790)	(4,607)	(1,404)	(1,076)	51
Closing stock	**10,297**	**49,123**	**226,935**	**30,153**	**179,433**	**168,487**	**222,175**	**10,279**	**242,096**	**5,810**	**1,725**	**1,978**	**325**

2.7.1.2 National Parks and Wildlife Reserves

National Parks, Wildlife Reserves, Community Wildlife Reserves and Wildlife Sanctuaries occupy 12% of Uganda's total cover equivalent to 2.895 ha (Figure 2.44 and 2.45).

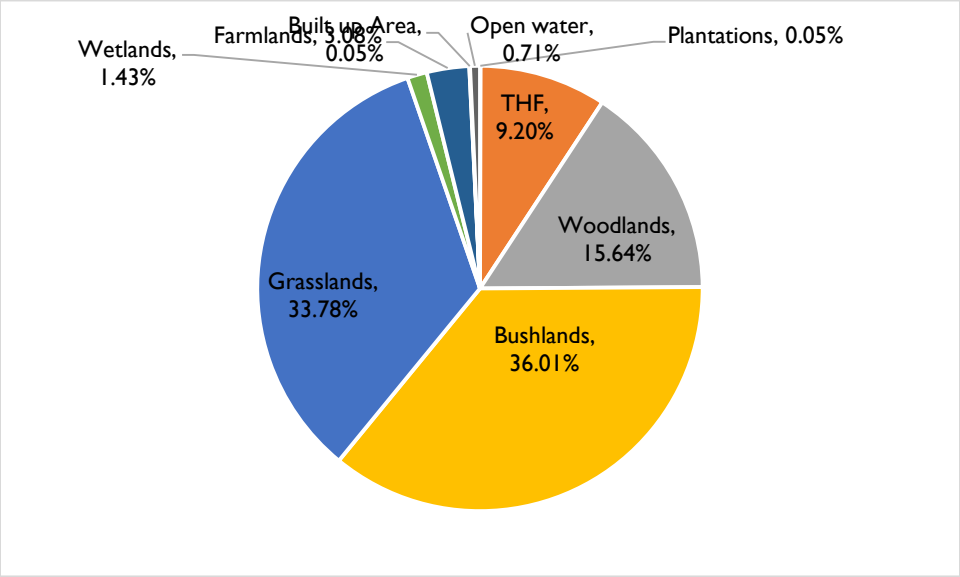


Figure2.44: National and Wildlife Reserves land cover by percentage 1990

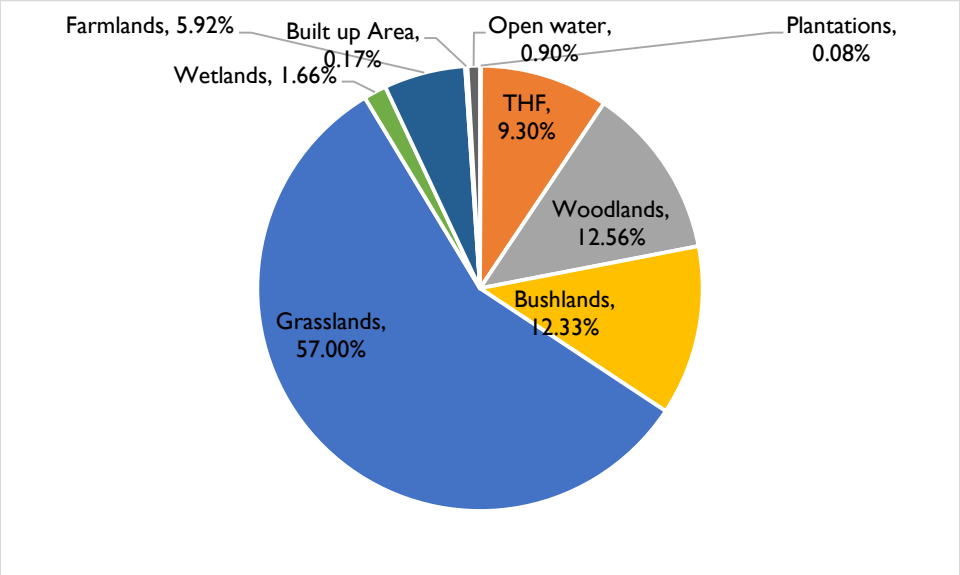


Figure 2.45: National and Wildlife Reserves land cover by percentage 2015

The major land cover changes within the national parks and wildlife reserve systems were the 298,592 ha increase in grasslands as well as a 221,057 ha and 172,148 ha decrease in woodlands and bushland cover. The topical high forest well stocked increased by 49,132 ha while THF low stocked decreased by 7,706 ha. Small scale farmlands increased by 31,675 ha an indication of additional encroachment equivalent to 1% of the total area under UWA's administration.

Table 2.34: Land cover accounts for National Parks and Wildlife Reserves (in hectares)

	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commer-cial farmland	Built up area	Open water	Impedim ent
1990-2000													
Opening stock	42	2,273	190,678	37,320	584,580	529,032	1,351,646	41,268	131,759	276	3,668	22,261	606
Additions	487	110	70,336	3,324	169,892	763,040	384,663	22,005	52,937	896	679	2,811	1,439
Reductions	43	1,519	7,241	27,994	301,683	249,468	758,350	21,834	96,546	172	2,801	4,402	566
Net gains/reductions	444	(1,409)	63,095	(24,670)	(131,791)	513,572	(373,687)	171	(43,609)	724	(2,122)	(1,591)	873
Closing stock	**486**	**865**	**253,774**	**12,648**	**452,788**	**1,042,603**	**977,959**	**41,439**	**88,150**	**998**	**1,549**	**20,669**	**1,479**
2000-2005													
Opening stock	486	865	253,774	12,648	452,788	1,042,603	977,959	41,439	88,150	998	1,549	20,669	1,479
Additions	62	1,748	20,957	1,586	314,651	282,827	657,257	18,751	128,384	956	3,171	4,790	895
Reductions	486	183	24,644	12,426	159,878	758,959	418,244	18,821	37,973	419	477	2,239	1,286
Net gains/reductions	(424)	1,565	(3,687)	(10,840)	154,773	(476,132)	239,013	(70)	90,411	537	2,694	2,551	(391)
Closing stock	**62**	**2,430**	**250,085**	**1,810**	**607,559**	**566,470**	**1,216,973**	**41,369**	**178,563**	**1,535**	**4,242**	**23,221**	**1,089**
2005-2010													
Opening stock	62	2,430	250,085	1,810	607,559	566,470	1,216,973	41,369	178,563	1,535	4,242	23,221	1,089
Additions	42	312	24,794	25,784	151,364	317,216	626,872	18,151	93,120	657	1,284	2,684	2,885
Reductions	54	1,801	38,132	863	390,984	424,057	309,010	11,256	81,131	1,328	2,151	3,468	930
Net gains/reductions	(12)	(1,489)	(13,338)	24,921	(239,620)	(106,841)	317,862	6,895	11,989	(671)	(867)	(784)	1,955
Closing stock	**49**	**943**	**236,748**	**26,732**	**367,939**	**459,627**	**1,534,832**	**48,265**	**190,554**	**864**	**3,376**	**22,435**	**3,045**
2010-2015													
Opening stock	49	943	236,748	26,732	367,939	459,627	1,534,832	48,265	190,554	864	3,376	22,435	3,045
Additions	650	760	17,663	16,293	107,224	153,636	311,630	11,725	60,141	7,514	2,957	6,087	1,044
Reductions	43	72	14,602	13,444	111,639	256,376	196,225	12,036	87,259	447	1,428	2,489	1,264
Net gains/reductions	607	688	3,061	2,849	(4,415)	(102,740)	115,405	(311)	(27,118)	7,067	1,529	3,598	(220)
Closing stock	**656**	**1,630**	**239,808**	**29,584**	**363,524**	**356,887**	**1,650,239**	**47,954**	**163,435**	**7,930**	**4,905**	**26,033**	**2,825**
1990-2015													
Opening stock	656	1,630	239,808	29,584	363,524	356,887	1,650,239	47,954	163,435	7,930	4,905	26,033	2,825
Additions	653	383	64,171	20,861	154,770	248,323	607,101	22,706	94,938	7,825	2,735	7,001	2,821
Reductions	39	1,027	15,039	28,597	375,827	420,471	308,509	16,021	63,263	170	1,495	3,227	603
Net gains/reductions	614	(644)	49,132	(7,736)	(221,057)	(172,148)	298,592	6,685	31,675	7,655	1,240	3,774	2,218
Closing stock	**656**	**1,630**	**239,808**	**29,584**	**363,524**	**356,887**	**1,650,239**	**47,954**	**163,435**	**7,930**	**4,905**	**26,033**	**2,825**

2.7.1.3 *Dual Joint Management (DJM) area*

The DJM occupies only 0.476% of total cover of Uganda equivalent to 112,980 ha. The composition of the DJM land cover had an increase in grasslands, bushlands and tropical high forests. The woodlands decreased by one-quarter to accommodate the increase in grasslands, bushlands and tropical high forests. Farmlands decreased from 1.28% of the total cover of the DJM to just 0.24% an indication of increased conservation action (Figures 2.46 and 2.47).

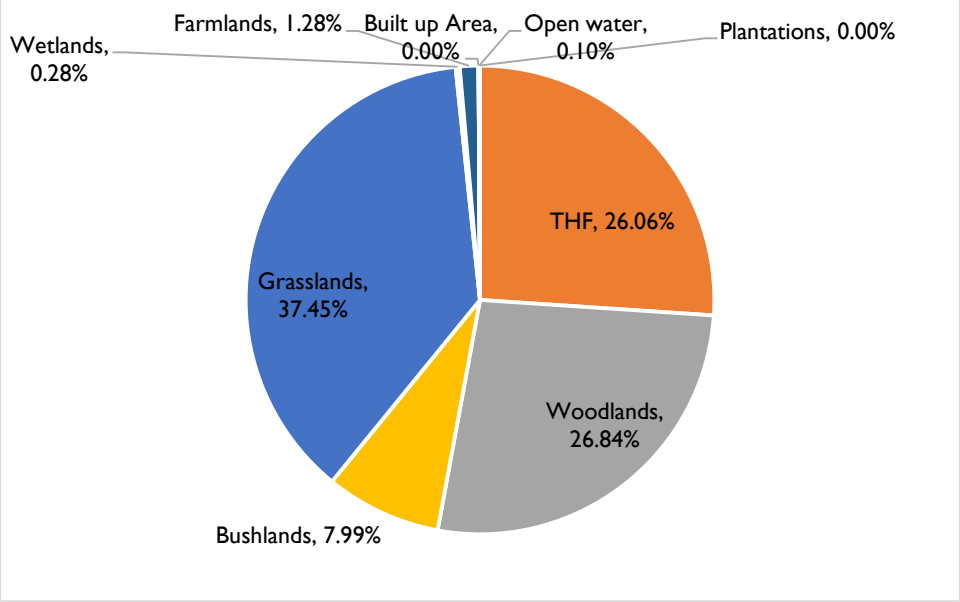


Figure 2.46: Dual Joint Management land cover by percentage 1990

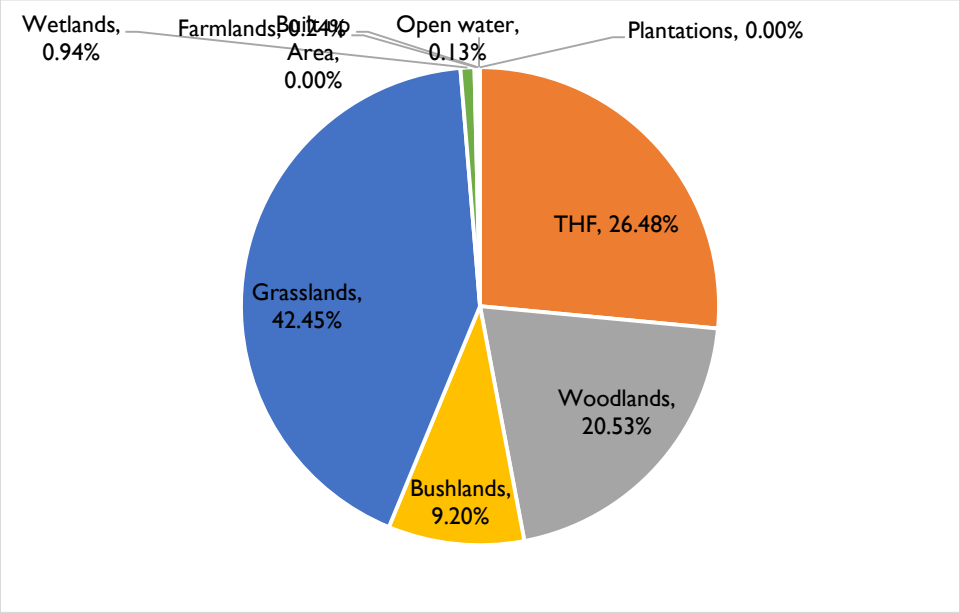


Figure 2.47: Dual Joint Management land cover by percentage 2015

Table 2.32: Land cover accounts for Dual Joint Management (in hectares)

NFA &UWA	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediment	Total
1990-2000														
Opening stock			27,850	1,587	30,325	9,025	42,309	318	1,451			113		112,980
Additions	-	-	909	138	5,519	41,125	2,957	771	34	-	-	38	4	51,495
Reductions			1,320	1,335	6,484	916	40,368	273		794		5		51,495
Net gains/reductions	-	-	(411)	(1,197)	(965)	40,209	(37,411)	498	34	(794)	-	33	4	-
Closing stock			**27,438**	**389**	**29,360**	**49,235**	**4,898**	**816**	**692**			**146**	**4**	**112,980**
2000-2005														
Opening stock			27,438	389	29,360	49,235	4,898	816	692			146	4	112,980
Additions	-	-	3,073	27	5,176	6,993	43,345	1,530	164	56	-	13	114	60,491
Reductions			3,818	388	10,582	42,744	2,686	152	109			10	2	60,491
Net gains/reductions	-	-	(745)	(361)	(5,406)	(35,751)	40,659	1,378	55	56	-	3	112	-
Closing stock	**-**	**-**	**26,695**	**27**	**23,954**	**13,483**	**45,556**	**2,196**	**748**	**56**	**-**	**149**	**116**	**112,980**
2005-2010														
Opening stock			26,695	27	23,954	13,483	45,556	2,196	748	56		149	116	112,980
Additions	-	-	4,103	1,477	11,761	6,326	5,437	206	131	19	5	19	59	29,543
Reductions			3,203	27	9,393	8,486	6,053	1,448	737	34		51	111	29,543
Net gains/reductions	-	-	900	1,450	2,368	(2,160)	(616)	(1,242)	(606)	(15)	5	(32)	(52)	-
Closing stock	**-**	**-**	**27,595**	**1,478**	**26,321**	**11,325**	**44,939**	**954**	**140**	**41**	**5**	**118**	**65**	**112,980**
2010-2015														
Opening stock			27,595	1,478	26,321	11,325	44,939	954	140	41	5	118	65	112,980
Additions	-	-	1,026	1,277	2,058	3,415	5,447	151	156	18	-	41	19	13,608
Reductions			800	655	5,190	4,346	2,427	42	62	16	5	13	52	13,608
Net gains/reductions	-	-	226	622	(3,132)	(931)	3,020	109	94	2	(5)	28	(33)	-
Closing stock	**-**	**-**	**27,820**	**2,102**	**23,191**	**10,394**	**47,958**	**1,062**	**232**	**43**	**-**	**145**	**32**	**112,980**
1990-2015														
Opening stock			27,850	1,587	30,325	9,025	42,309	318	1,451			113		112,980
Additions	-	-	1,497	1,564	4,389	9,701	14,142	977	210	43	-	47	32	32,602
Reductions			1,527	1,048	11,523	8,333	8,493	232	1,431			15		32,602
Net gains/reductions	-	-	(30)	516	(7,134)	1,368	5,649	745	(1,221)	43	-	32	32	-
Closing stock	**-**	**-**	**27,820**	**2,102**	**23,191**	**10,394**	**47,958**	**1,062**	**232**	**43**	**-**	**145**	**32**	**112,980**

2.7.1.4 *Local Forest Reserves*

Local Forest Reserves occupy only 0.02% of the total cover of the country equivalent to 4,996 ha. Whereas local forest reserves are meant for forest conservation in District Local Governments between 1990 and 2015, there was a 40% increase in allocation of local forest reserve land to farmlands. as the local forest reserve land under farmlands increased the proportion of tropical high forests, woodlands and forest plantations decreased. The area of grasslands and woodlands in local forest reserves halves, that for tropical high forests reduced by 86%, for bushlands by one-quarter (Figures 2.48 and 2.49).

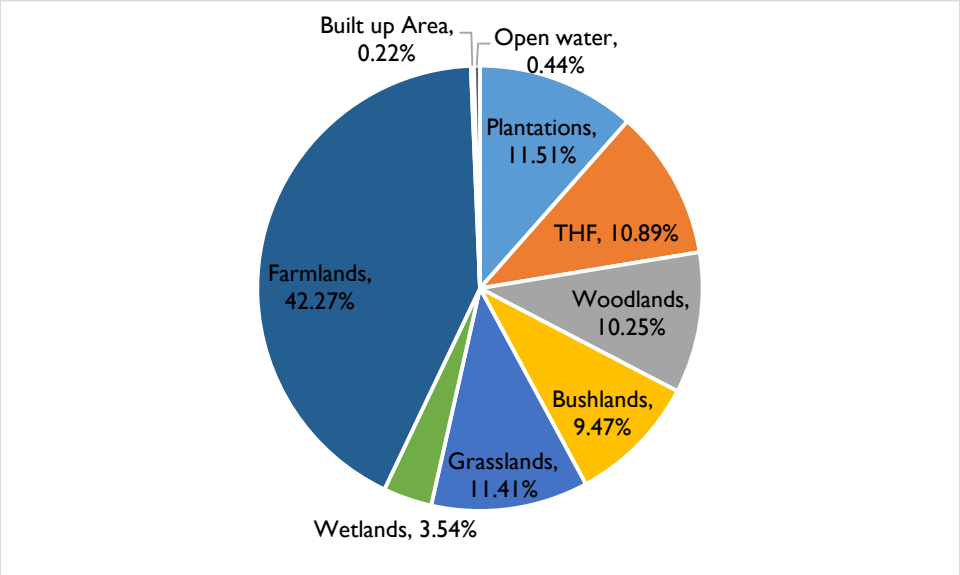


Figure 2.48: Local Forest Reserves land cover by percentage 1990

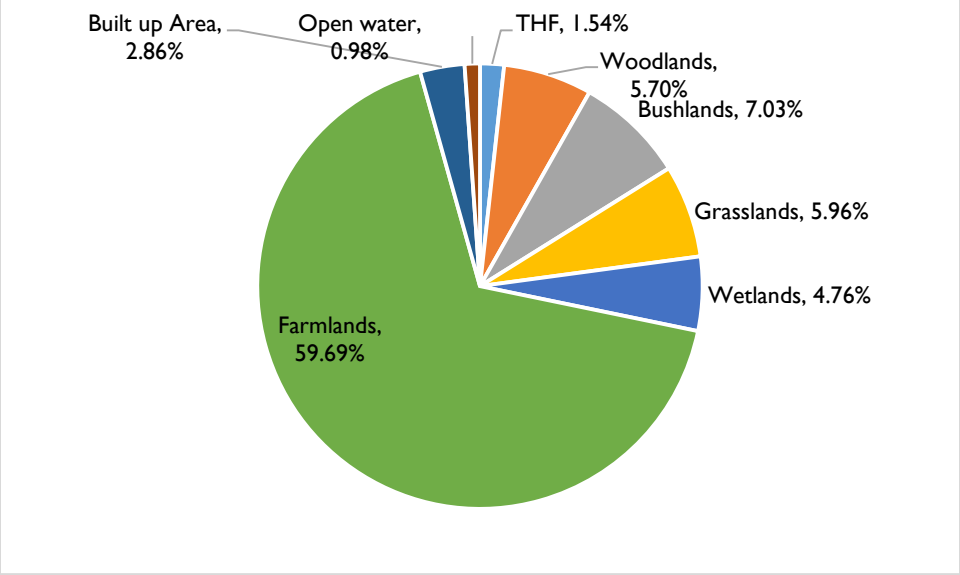


Figure 2.49: Local Forest Reserves land cover by percentage 2015

Table 2.30: Land cover accounts for Local Forest Reserves (in hectares)

FSSD/LG	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediment	Total
1990-2000														
Opening stock	560	15	309	235	512	473	570	177	2,108	4	11	22	1	4,996
Additions	76	5	237	75	381	401	49	148	1,082	38	37	13	-	2,542
Reductions	525	16	168	219	292	309	553	104	342	4	7	3	-	2,542
Net gains/reductions	(449)	(11)	69	(144)	89	92	(504)	44	740	34	30	10	-	-
Closing stock	**111**	**5**	**379**	**91**	**599**	**567**	**66**	**220**	**2,847**	**38**	**41**	**32**		**4,996**
2000-2005														
Opening stock	111	5	379	91	599	567	66	220	2,847	38	41	32		**4,996**
Additions	241	19	21	104	455	278	171	138	414	6	90	2	-	1,939
Reductions	17	5	276	74	442	433	35	60	534	37	14	12		1,939
Net gains/reductions	224	14	(255)	30	13	(155)	136	78	(120)	(31)	76	(10)	-	-
Closing stock	**335**	**19**	**123**	**120**	**614**	**413**	**202**	**296**	**2,725**	**6**	**118**	**24**		**4,996**
2005-2010														
Opening stock	335	19	123	120	614	413	202	296	2,725	6	118	24		**4,996**
Additions	260	155	7	76	137	190	172	158	716	32	45	8	2	1,958
Reductions	147	11	30	85	396	377	125	98	605	6	76	2	-	1,958
Net gains/reductions	113	144	(23)	(9)	(259)	(187)	47	60	111	26	(31)	6	2	-
Closing stock	**447**	**164**	**100**	**110**	**358**	**226**	**249**	**356**	**2,835**	**31**	**87**	**29**	**2**	**4,996**
2010-2015														
Opening stock	447	164	100	110	358	226	249	356	2,835	31	87	29	2	**4,996**
Additions	98	25	-	10	115	244	211	47	556	2	72	20	-	1,400
Reductions	143	16	67	75	190	118	164	166	411	30	18	-	2	1,400
Net gains/reductions	(45)	9	#VALUE!	(65)	(75)	126	47	(119)	145	(28)	54	20	(2)	-
Closing stock	**401**	**173**	**33**	**44**	**285**	**351**	**298**	**238**	**2,979**	**3**	**143**	**49**		**4,996**
1990-2015														
Opening stock	560	15	309	235	512	473	570	177	2,108	4	11	22	1	**4,996**
Additions	353	160	33	35	239	261	200	174	1,484	2	136	29	-	3,106
Reductions	511	3	310	226	465	383	474	112	611	3	5	2	1	3,106
Net gains/reductions	(158)	157	(277)	(191)	(226)	(122)	(274)	62	873	(1)	131	27	(1)	-
Closing stock	**401**	**173**	**33**	**44**	**285**	**351**	**298**	**238**	**2,979**	**3**	**143**	**49**		**4,996**

2.7.2 Private Land

Private land cover is equivalent to 19.993 million ha which is equivalent to 82.8% of the total cover of the country. Private land comprises all land outside protected areas. In 1990, 41% of the private land was farmlands. Open water occupied 18%, grasslands 17.6%, woodlands 14.8% and bushlands 3.9% (Figure 2.50).

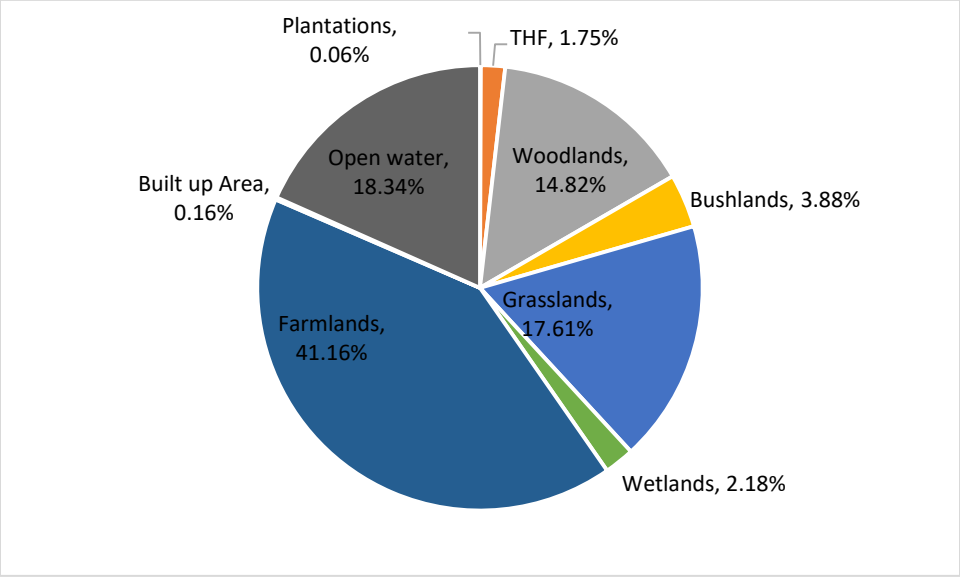


Figure 2.50: Private land cover by percentage 1990

By 2015, the farmlands cover had increased to over half of the private land. The open water was expectedly stable (Figure 2.51). Farmlands increased at the expense of woodlands, tropical high forests and grasslands. Wetlands and bushlands increased. Wetlands increased by 50% while bushlands increased by 83%.

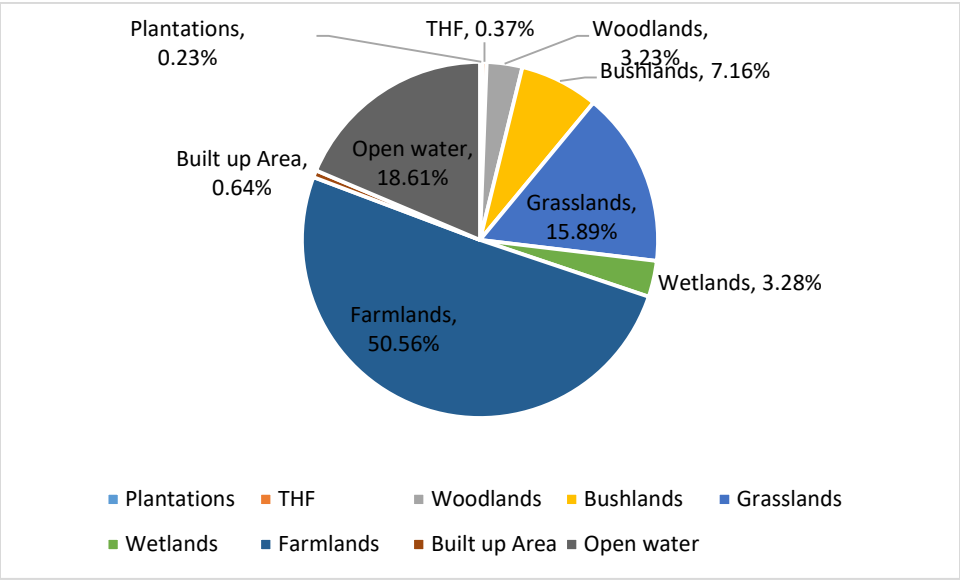


Figure 2.51 Private land cover by percentage 2015

Table 2.33: Land cover accounts for private land (in hectares)

	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ment	Total
1990-2000														
Opening stock	12,039	701	174,427	176,369	2,963,988	776,518	3,521,334	436,344	8,162,978	66,964	32,572	3,666,305	2,757	19,993,296
Additions	5,513	979	73,809	131,859	842,093	2,324,258	736,820	464,871	1,822,018	56,564	12,210	54,117	347	6,525,458
Reductions	11,585	452	101,330	130,101	1,779,207	444,132	2,534,747	114,378	1,301,055	23,453	20,420	61,858	2,740	6,525,458
Net gains/reductions	(6,072)	527	(27,521)	1,758	(937,114)	1,880,126	(1,797,927)	350,493	520,963	33,111	(8,210)	(7,741)	(2,393)	-
Closing stock	**5,968**	**1,230**	**146,910**	**178,127**	**2,026,872**	**2,656,641**	**1,723,407**	**786,836**	**8,683,941**	**100,072**	**24,363**	**3,658,563**	**364**	**19,993,295**
2000-2005														
Opening stock	5,968	1,230	146,910	178,127	2,026,872	2,656,641	1,723,407	786,836	8,683,941	100,072	24,363	3,658,563	364	19,993,295
Additions	8,742	1,967	27,551	96,092	904,910	1,157,241	1,704,475	193,086	1,325,201	42,980	73,926	57,133	5,386	5,598,690
Reductions	5,182	997	93,657	121,173	1,094,541	1,611,995	805,112	279,806	1,504,981	40,997	6,463	33,490	296	5,598,690
Net gains/reductions	3,560	970	(66,106)	(25,081)	(189,631)	(454,754)	899,363	(86,720)	(179,780)	1,983	67,463	23,643	5,090	-
Closing stock	**9,527**	**2,201**	**80,804**	**153,049**	**1,837,241**	**2,201,883**	**2,622,769**	**700,116**	**8,504,162**	**102,055**	**91,827**	**3,682,208**	**5,454**	**19,993,295**
2005-2010														
Opening stock	9,527	2,201	80,804	153,049	1,837,241	2,201,883	2,622,769	700,116	8,504,162	102,055	91,827	3,682,208	5,454	19,993,295
Additions	14,142	6,193	24,463	42,949	435,979	1,161,908	1,871,570	271,974	2,113,288	62,277	46,129	32,122	5,396	6,088,390
Reductions	8,235	1,923	50,992	129,901	1,428,063	1,623,460	1,235,744	221,849	1,256,754	34,980	43,902	48,543	4,044	6,088,390
Net gains/reductions	5,907	4,270	(26,529)	(86,952)	(992,084)	(461,552)	635,826	50,125	856,534	27,297	2,227	(16,421)	1,352	-
Closing stock	**15,434**	**6,470**	**54,275**	**66,098**	**845,157**	**1,740,328**	**3,258,593**	**750,240**	**9,360,696**	**129,353**	**94,056**	**3,665,787**	**6,807**	**19,993,295**
2010-2015														
Opening stock	15,434	6,470	54,275	66,098	845,157	1,740,328	3,258,593	750,240	9,360,696	129,353	94,056	3,665,787	6,807	19,993,295
Additions	26,891	8,387	8,634	23,034	288,441	849,691	1,164,314	145,537	1,644,070	142,455	66,553	65,371	3,640	4,437,018
Reductions	9,441	2,296	28,378	49,153	487,077	1,158,904	1,246,205	239,829	1,138,539	29,745	31,815	9,783	5,853	4,437,018
Net gains/reductions	(17,450)	(6,091)	19,744	26,119	198,636	309,213	81,891	94,292	(505,531)	(112,710)	(34,738)	(55,588)	2,213	-
Closing stock	**32,883**	**12,561**	**34,529**	**39,981**	**646,518**	**1,431,116**	**3,176,702**	**655,947**	**9,866,227**	**242,063**	**128,794**	**3,721,377**	**4,597**	**19,993,295**
1990-2015														
Opening stock	12,039	701	174,427	176,369	2,963,988	776,518	3,521,334	436,344	8,162,978	66,964	32,572	3,666,305	2,757	19,993,295
Additions	32,071	12,366	16,946	31,700	288,729	1,306,143	1,666,781	370,092	2,875,031	194,627	109,809	79,640	4,515	6,988,450
Reductions	11,225	505	156,843	168,089	2,606,197	651,544	2,011,417	150,487	1,171,785	19,526	13,589	24,569	2,674	6,988,450
Net gains/reductions	20,846	11,861	(139,897)	(136,389)	(2,317,468)	654,599	(344,636)	219,605	1,703,246	175,101	96,220	55,071	1,841	-
Closing stock	**32,883**	**12,561**	**34,529**	**39,981**	**646,518**	**1,431,116**	**3,176,702**	**655,947**	**9,866,227**	**242,063**	**128,794**	**3,721,377**	**4,597**	**19,993,295**

CHAPTER 3
LAND ACCOUNTS BY REGION

3.1 Regions of Uganda

The regions of Uganda are known as Central, Western, Eastern, and Northern. These four regions are in turn divided into districts (MoLG 2018). The largest territory lies in Northern Uganda with 35% of the country's land cover, followed by central Uganda with 26%, the western region with 23% and the small land area by region is eastern Uganda with only 16% of the country's total area (UBOS 2018).

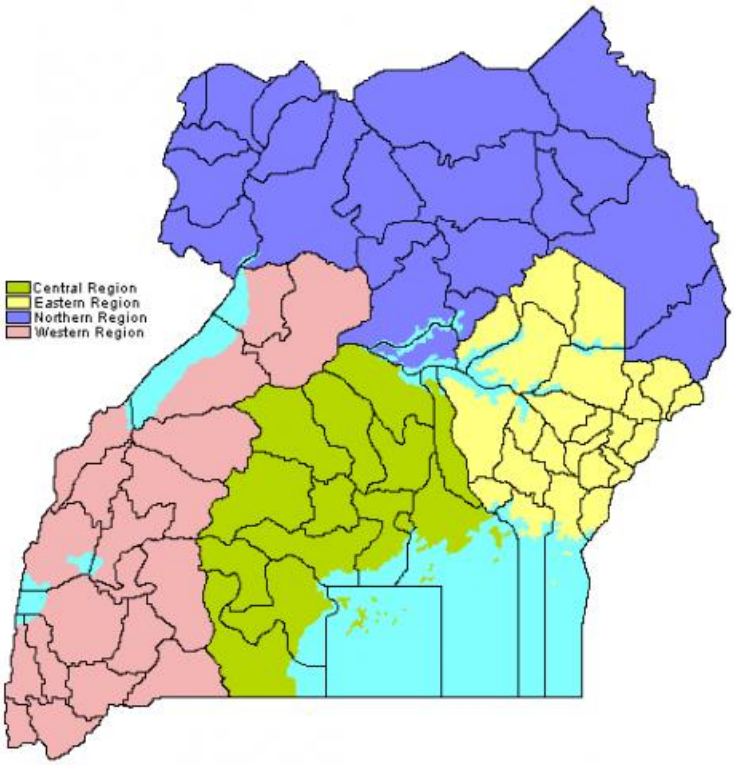


Figure 3.1: Map of Uganda showing the four Regions
Source: MoLG (2018)

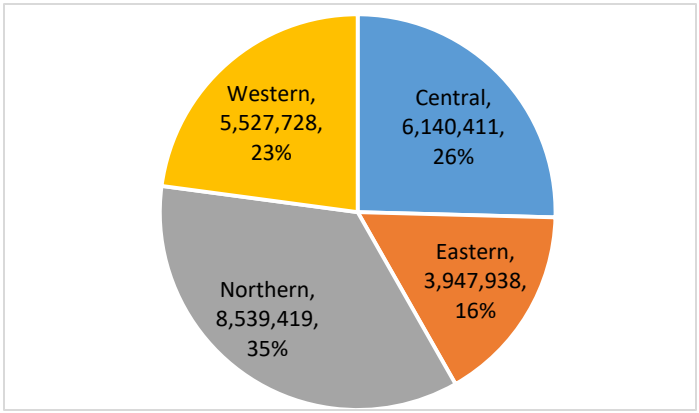


Figure 3.2: Region land cover for Uganda by hectares and percentage

3.2 Regional Land Physical Accounts

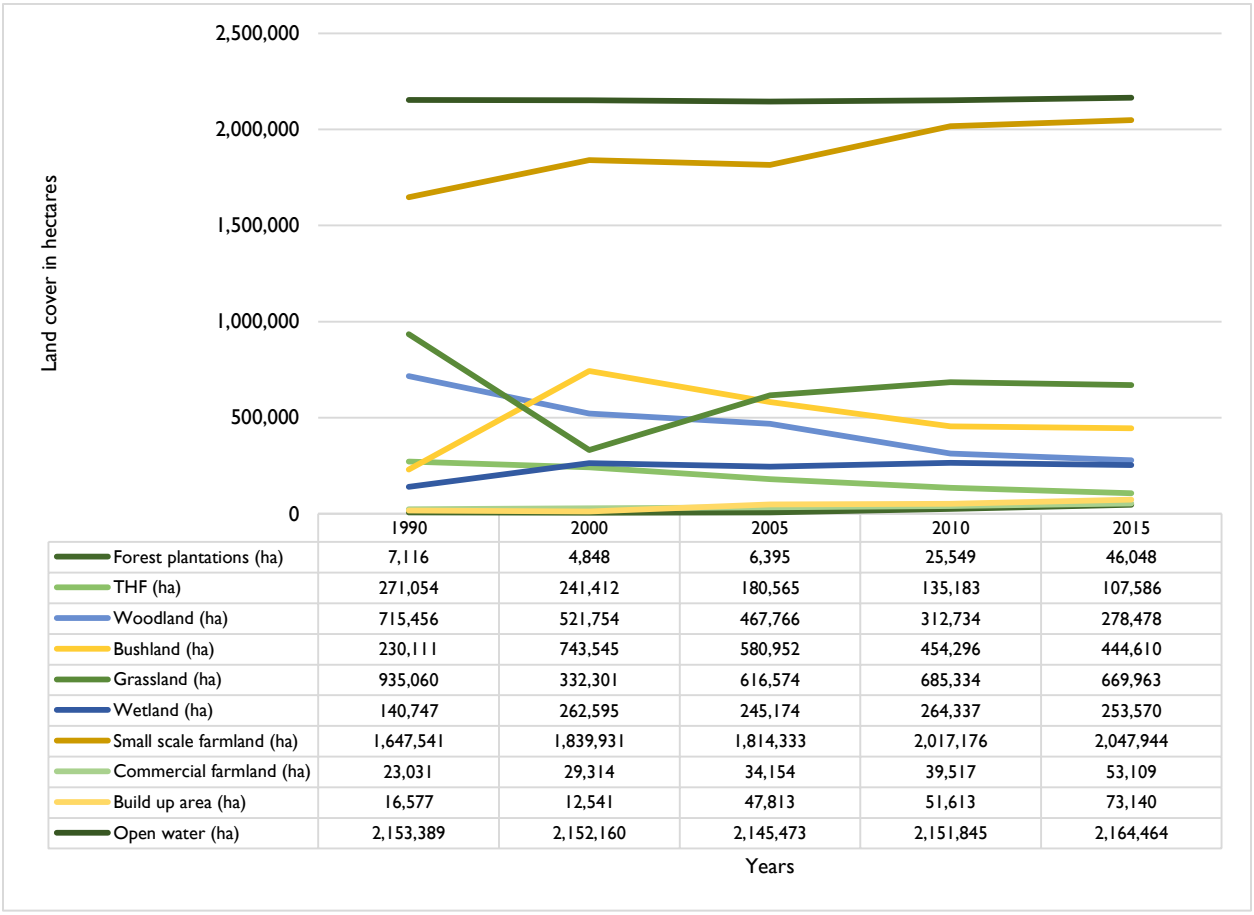
3.2.1 Central Regional Land Physical Accounts

Nearly 90% of the central region land cover in 1990 was concentrated in open water, small scale farmlands, grasslands and woodlands; 35% open water, 27% small scale farmlands, 15% grasslands and 12% woodlands (Table 3.1). By 2015, the land cover had transitions. Whereas the open water was the dominant land cover, the 553,625 ha increase in small scale farmlands was the largest increase followed by the 114,500 ha increase in bushlands. Conversely, woodlands reduced by 436,977 ha while grasslands reduced by 265,097 ha between 1990.

Table 3.1: Land Physical Accounts for the Central Region of Uganda (in hectares)

Central Region	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock 1st Jan. 1990	4,370	2,746	137,832	133,222	715,456	230,111	935,060	140,747	1,647,541	23,031	16,577	2,153,389	327
Additions	2,458	565	62,590	49,493	241,726	659,753	117,580	151,663	429,312	13,663	4,818	13,480	9
Reductions	4,281	1,010	34,965	106,759	435,428	146,319	720,339	29,815	236,922	7,380	8,854	14,709	327
Net gains/reductions	(1,823)	(445)	27,625	(57,266)	(193,702)	513,434	(602,759)	121,848	192,390	6,283	(4,036)	(1,229)	(318)
Closing stock 31st Dec. 1999	2,547	2,301	165,457	75,955	521,754	743,545	332,301	262,595	1,839,931	29,314	12,541	2,152,160	9
Opening stock 1st Jan. 2000	2,547	2,301	165,457	75,955	521,754	743,545	332,301	262,595	1,839,931	29,314	12,541	2,152,160	9
Additions	3,110	1,083	17,366	53,080	234,343	246,007	407,671	49,338	323,647	12,942	37,843	8,606	1,210
Reductions	2,267	380	75,688	55,604	288,331	408,600	123,397	66,759	349,244	8,102	2,571	15,293	9
Net gains/reductions	843	703	(58,322)	(2,524)	(53,988)	(162,593)	284,274	(17,421)	(25,597)	4,840	35,272	(6,687)	1,201
Closing stock 31st Dec. 2004	3,390	3,005	107,134	73,431	467,766	580,952	616,574	245,174	1,814,333	34,154	47,813	2,145,473	1,210
Opening stock 1st Jan. 2005	3,390	3,005	107,134	73,431	467,766	580,952	616,574	245,174	1,814,333	34,154	47,813	2,145,473	1,210
Additions	5,066	17,776	26,656	25,573	183,080	303,988	407,871	78,936	547,421	17,983	18,159	16,045	2,693
Reductions	2,914	774	36,939	60,672	338,113	430,644	339,111	59,773	344,579	12,621	14,360	9,673	1,076
Net gains/reductions	2,152	17,002	(10,283)	(35,099)	(155,033)	(126,656)	68,760	19,163	202,842	5,362	3,799	6,372	1,617
Closing stock 31st Dec. 2009	5,543	20,006	96,851	38,332	312,734	454,296	685,334	264,337	2,017,176	39,517	51,613	2,151,845	2,827
Opening stock 1st Jan. 2010	5,543	20,006	96,851	38,332	312,734	454,296	685,334	264,337	2,017,176	39,517	51,613	2,151,845	2,827
Additions	11,154	14,236	4,848	21,963	128,905	260,103	274,650	55,421	338,915	21,340	32,841	15,820	1,264
Reductions	2,860	2,031	30,811	23,598	163,160	269,788	290,021	66,188	308,147	7,748	11,313	3,201	2,593
Net gains/reductions	8,294	12,205	(25,963)	(1,635)	(34,255)	(9,685)	(15,371)	(10,767)	30,768	13,592	21,528	12,619	(1,329)
Closing stock 31st Dec. 2014	13,837	32,211	70,888	36,697	278,479	444,611	669,963	253,570	2,047,944	53,109	73,141	2,164,464	1,498
Opening stock 1st Jan. 20102015	13,837	32,211	70,888	36,697	278,479	444,611	669,963	253,570	2,047,944	53,109	73,141	2,164,464	1,498

The trends of land cover change in the Land Physical Accounts for the central region of Uganda show the dominance of the open water and the small scale farmlands. The small scale farmlands continue to increase as the other land covers decline, with the exception of grasslands which increased between 2000 and 2015 (Figure 3.3). Bushlands also increased even though the peak land cover was in 2000 followed by a decline between 2000 and 2010. Commercial farmlands doubled, build up areas increased four-fold, forest plantations increased by over six-times while wetlands increased by 80% over the assessment period. On the other hand, tropical high forests reduced by 60%



	1990	2000	2005	2010	2015
Forest plantations (ha)	7,116	4,848	6,395	25,549	46,048
THF (ha)	271,054	241,412	180,565	135,183	107,586
Woodland (ha)	715,456	521,754	467,766	312,734	278,478
Bushland (ha)	230,111	743,545	580,952	454,296	444,610
Grassland (ha)	935,060	332,301	616,574	685,334	669,963
Wetland (ha)	140,747	262,595	245,174	264,337	253,570
Small scale farmland (ha)	1,647,541	1,839,931	1,814,333	2,017,176	2,047,944
Commercial farmland (ha)	23,031	29,314	34,154	39,517	53,109
Build up area (ha)	16,577	12,541	47,813	51,613	73,140
Open water (ha)	2,153,389	2,152,160	2,145,473	2,151,845	2,164,464

Figure 3.3: Trends of land cover for Central Region for 1990 - 2015

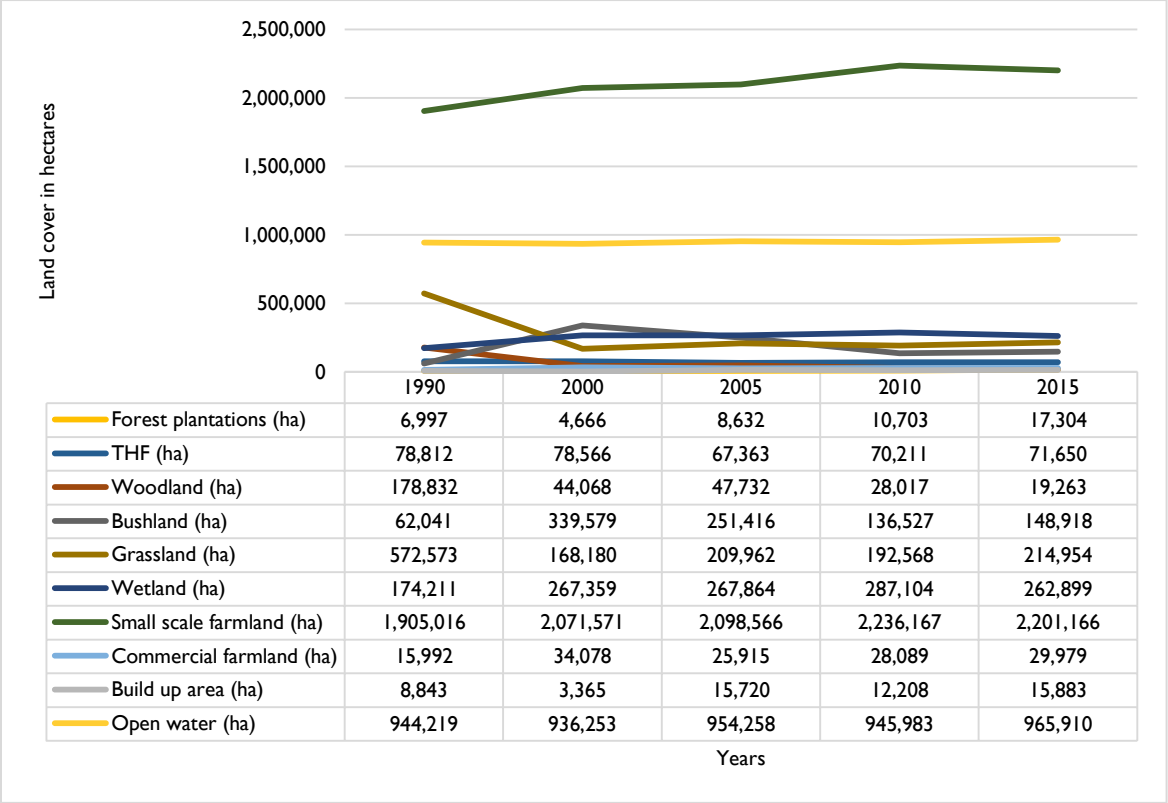
3.2.2 Eastern Regional Land Physical Accounts

The eastern region of Uganda is dominated by small scale farmlands. Open water was the second largest cover while the grasslands were also a relatively large land cover with an area of 572,573 ha in 1990. Woodland was the largest of the 10 remaining land cover classes at 178,832 ha, the tropical high forests covered only 78,812 ha. By 2015, the small scale farmlands had increased to 2.2 million ha from 1.9 million ha in 1990 (Table 3.2). Grasslands reduced by more than half, from 572,573 to 214,954 ha, while woodlands reduced by nine-times, from 178,832 to 19,263 ha from 1990 to 2015. Wetlands increased by nearly 90,000 ha. Tropical high forests well stocked doubled over the assessment period from 29,986 to 58,635 ha while THF low stocked decreased to one quarter of the land cover in 1990 from 48,826 to 13,015 ha.

Table 3.2: Land Physical Accounts for the Eastern Region of Uganda (in hectares)

Eastern Region	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock 1st Jan. 1990	4,856	2,141	29,986	48,826	178,832	62,041	572,573	174,211	1,905,016	15,992	8,843	944,219	404
Additions	1,716	843	41,778	2,108	25,228	329,653	38,539	130,911	300,323	22,006	1,791	21,694	253
Reductions	3,723	1,169	4,792	39,339	159,992	52,114	442,931	37,763	133,768	3,920	7,270	29,660	404
Net gains/reductions	(2,007)	(326)	36,986	(37,231)	(134,764)	277,539	(404,392)	93,148	166,555	18,086	(5,479)	(7,966)	(151)
Closing stock 31st Dec. 1999	2,850	1,816	66,971	11,595	44,068	339,579	168,180	267,359	2,071,571	34,078	3,365	936,253	253
Opening stock 1st Jan. 2000	2,850	1,816	66,971	11,595	44,068	339,579	168,180	267,359	2,071,571	34,078	3,365	936,253	253
Additions	1,368	5,428	6,110	1,081	34,946	118,221	149,250	60,547	169,447	10,847	13,277	26,736	509
Reductions	2,215	614	7,096	11,298	31,282	206,383	107,468	60,042	142,453	19,010	922	8,731	253
Net gains/reductions	(847)	4,814	(986)	(10,217)	3,664	(88,162)	41,782	505	26,994	(8,163)	12,355	18,005	256
Closing stock 31st Dec. 2004	2,003	6,629	65,985	1,378	47,732	251,416	209,962	267,864	2,098,566	25,915	15,720	954,258	509
Opening stock 1st Jan. 2005	2,003	6,629	65,985	1,378	47,732	251,416	209,962	267,864	2,098,566	25,915	15,720	954,258	509
Additions	2,879	4,536	3,944	13,503	22,550	100,201	128,714	88,825	249,777	10,739	6,548	7,808	291
Reductions	1,570	3,775	13,221	1,378	42,265	215,091	146,108	69,586	112,175	8,565	10,059	16,083	439
Net gains/reductions	1,309	761	(9,277)	12,125	(19,715)	(114,890)	(17,394)	19,239	137,602	2,174	(3,511)	(8,275)	(148)
Closing stock 31st Dec. 2009	3,313	7,390	56,708	13,503	28,017	136,527	192,568	287,104	2,236,167	28,089	12,208	945,983	361
Opening stock 1st Jan. 2010	3,313	7,390	56,708	13,503	28,017	136,527	192,568	287,104	2,236,167	28,089	12,208	945,983	361
Additions	2,233	6,081	5,368	3,566	8,782	106,439	90,705	46,563	98,841	8,477	8,567	23,023	6
Reductions	601	1,111	3,442	4,055	17,536	94,047	68,319	70,767	133,843	6,587	4,893	3,096	354
Net gains/reductions	1,632	4,970	1,926	(489)	(8,754)	12,392	22,386	(24,204)	(35,002)	1,890	3,674	19,927	(348)
Closing stock 31st Dec. 2014	4,945	12,359	58,635	13,015	19,263	148,918	214,954	262,899	2,201,166	29,979	15,883	965,910	13
Opening Stock 2015	4,945	12,359	58,635	13,015	19,263	148,918	214,954	262,899	2,201,166	29,979	15,883	965,910	13

The trends of land cover for the eastern region show that small scale farmlands are the dominant land cover/ land use. The eastern region had only 3.9 million ha as cover of which 1.9 million ha in 1990 and 2.2 million ha in 2015 were covered by small scale farmlands (Figure 3.4). There were important and significant increases for commercial farmlands which doubled over the assessment period. The grasslands area dipped by more than half while wetlands increased by more than 50%. There was a small base of tropical high forests and the area of THF remained fairly stable while the forest plantations increased two and a half times. The increase in small scale farmlands is largely determined by population growth, and the average national population growth of 3.0% and the more than 79% rural population (UBOS 2018). The total working population was estimated at 15 million in 2016/17 (UBOS/UNHS 2017).



	1990	2000	2005	2010	2015
Forest plantations (ha)	6,997	4,666	8,632	10,703	17,304
THF (ha)	78,812	78,566	67,363	70,211	71,650
Woodland (ha)	178,832	44,068	47,732	28,017	19,263
Bushland (ha)	62,041	339,579	251,416	136,527	148,918
Grassland (ha)	572,573	168,180	209,962	192,568	214,954
Wetland (ha)	174,211	267,359	267,864	287,104	262,899
Small scale farmland (ha)	1,905,016	2,071,571	2,098,566	2,236,167	2,201,166
Commercial farmland (ha)	15,992	34,078	25,915	28,089	29,979
Build up area (ha)	8,843	3,365	15,720	12,208	15,883
Open water (ha)	944,219	936,253	954,258	945,983	965,910

Years

Figure 3.4: Trends of land cover for Eastern Region for 1990 - 2015

3.2.3 Northern Regional Land Physical Accounts

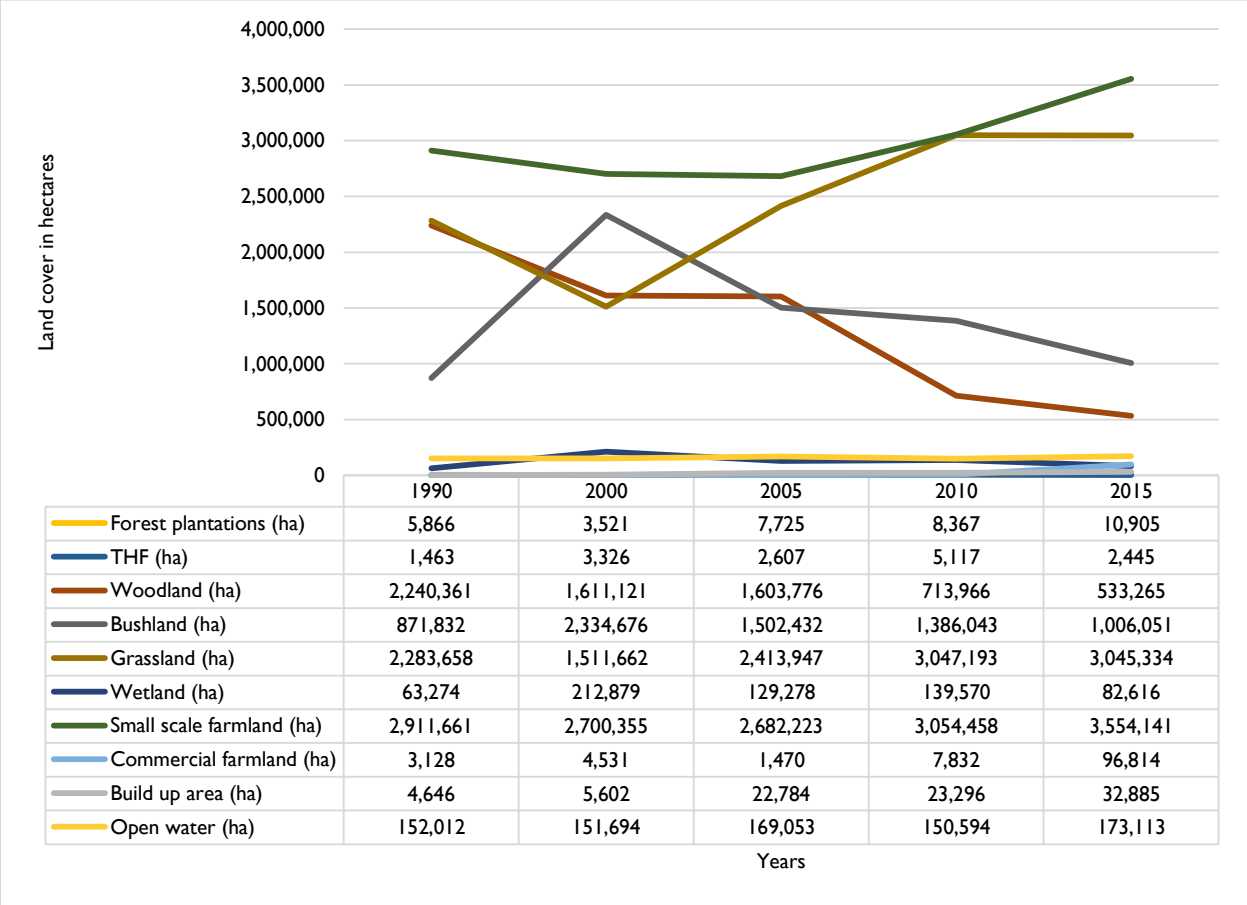
The Northern region showed dominance of the small scale farmlands, grasslands and the woodlands in 1990 and how the dominance transformed over the course of the 25-year assessment period. Small scale farmlands and grasslands maintained their dominance while by 2015 the woodlands had been reduced to only 23.8% of the cover in 1990. Grasslands surged from 2.28 million to 3.05 million ha and the small scale farmlands gained more than 600,000 ha over the assessment period. There were significant increases in land cover for commercial farmlands, built up areas, wetlands, and forest plantations. The commercial farmlands gained 93,684 ha, built up areas gained 28,239 ha, wetlands gained 19,342 ha, and forest plantations gained 5,039 ha.

Table 3.3: Land Physical Accounts for the Northern Region of Uganda (in hectares)

Northern	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock 1st Jan. 1990	2,628	3,238	1,458	5	2,240,361	871,832	2,283,658	63,274	2,911,661	3,128	4,646	152,012	1,518
Additions	703	414	814	1,328	566,534	1,864,695	746,865	174,542	593,196	3,574	4,361	15,758	54
Reductions	2,282	1,180	274	5	1,195,774	401,851	1,518,861	24,936	804,503	2,171	3,405	16,076	1,518
Net gains/reductions	(1,579)	(766)	540	1,323	(629,240)	1,462,844	(771,996)	149,606	(211,307)	1,403	956	(318)	(1,464)
Closing Stock	1,049	2,472	1,998	1,328	1,611,121	2,334,676	1,511,662	212,879	2,700,355	4,531	5,602	151,694	54
Opening stock 1st Jan. 2000	1,049	2,472	1,998	1,328	1,611,121	2,334,676	1,511,662	212,879	2,700,355	4,531	5,602	151,694	54
Additions	4,444	971	1,051	216	768,302	817,479	1,643,479	60,662	666,678	985	19,963	21,851	4,081
Reductions	753	458	662	1,325	775,647	1,649,723	741,193	144,262	684,809	4,046	2,780	4,492	11
Net gains/reductions	3,691	513	389	(1,109)	(7,345)	(832,244)	902,286	(83,600)	(18,131)	(3,061)	17,183	17,359	4,070
Closing Stock	4,740	2,985	2,388	219	1,603,776	1,502,432	2,413,947	129,278	2,682,223	1,470	22,784	169,053	4,124
Opening stock 1st Jan. 2005	4,740	2,985	2,388	219	1,603,776	1,502,432	2,413,947	129,278	2,682,223	1,470	22,784	169,053	4,124
Additions	1,986	3,998	1,455	2,253	290,690	928,657	1,493,710	75,094	930,731	7,591	15,856	3,628	2,230
Reductions	3,625	1,715	980	219	1,180,500	1,045,045	860,464	64,802	558,496	1,229	15,345	22,088	3,371
Net gains/reductions	(1,639)	2,283	475	2,034	(889,810)	(116,388)	633,246	10,292	372,235	6,362	511	(18,460)	(1,141)
Closing stock	3,100	5,267	2,864	2,253	713,966	1,386,043	3,047,193	139,570	3,054,458	7,832	23,296	150,594	2,983
Opening stock 1st Jan. 2010	3,100	5,267	2,864	2,253	713,966	1,386,043	3,047,193	139,570	3,054,458	7,832	23,296	150,594	2,983
Additions	3,897	1,625	50	1,699	161,476	510,120	871,569	24,051	956,288	93,482	20,867	24,742	1,403
Reductions	1,449	1,535	2,599	1,821	342,178	890,113	873,429	81,005	456,605	4,500	11,278	2,223	2,534
Net gains/reductions	2,448	90	(2,549)	(122)	(180,702)	(379,993)	(1,860)	(56,954)	499,683	88,982	9,589	22,519	(1,131)
Closing stock	5,548	5,357	314	2,131	533,265	1,006,051	3,045,334	82,616	3,554,141	96,814	32,885	173,113	1,851
Opening stock 2015	5,548	5,357	314	2,131	533,265	1,006,051	3,045,334	82,616	3,554,141	96,814	32,885	173,113	1,851

The trend lines show that the small scale farmlands have steadily increased as the largest land cover. However, the grasslands surged over the course of the assessment period and in 2010 grasslands and small scale farmlands were nearly matched. However, the grasslands reduced while the small scale farmlands continued growing (Figure 3.5).

For Northern Uganda some of the transformation observed especially for the woodland cover was related to the transitions in security status of the landscape. Whereas small scale farmlands were always an important primary source of livelihoods, the region suffered armed conflict for an extended period between 1987 and 2004. When the insurgency ended the communities left the internally displaced people (IDP) camps and returned to their farmlands. It was documented that charcoal burning surged between 2005 and 2010 and the charcoal burning took a heavy toll on the woodlands as they were the primary source of wood used for charcoal production (IUCN 2015; NEMA 2017). The rate of woodland deforestation for charcoal production exceeded the rate of conversion of woodlands into economically active land uses such as farmlands, and therefore, the woodlands stayed as bushlands until the communities transformed them into farmlands, and/or they recovered as woodlands or grasslands.



	1990	2000	2005	2010	2015
Forest plantations (ha)	5,866	3,521	7,725	8,367	10,905
THF (ha)	1,463	3,326	2,607	5,117	2,445
Woodland (ha)	2,240,361	1,611,121	1,603,776	713,966	533,265
Bushland (ha)	871,832	2,334,676	1,502,432	1,386,043	1,006,051
Grassland (ha)	2,283,658	1,511,662	2,413,947	3,047,193	3,045,334
Wetland (ha)	63,274	212,879	129,278	139,570	82,616
Small scale farmland (ha)	2,911,661	2,700,355	2,682,223	3,054,458	3,554,141
Commercial farmland (ha)	3,128	4,531	1,470	7,832	96,814
Build up area (ha)	4,646	5,602	22,784	23,296	32,885
Open water (ha)	152,012	151,694	169,053	150,594	173,113

Figure 3.5: Trends of land cover for Northern Region for 1990 - 2015

3.2.4 Western Regional Land Physical Accounts

The western region like the rest of the country has the small scale farmlands as the largest land cover. However, there is an important contrast between the western region and the other regions. The grasslands and tropical high forest were more stable in the western region because they largely occur in protected areas of national parks, wildlife reserves and central forest reserves.

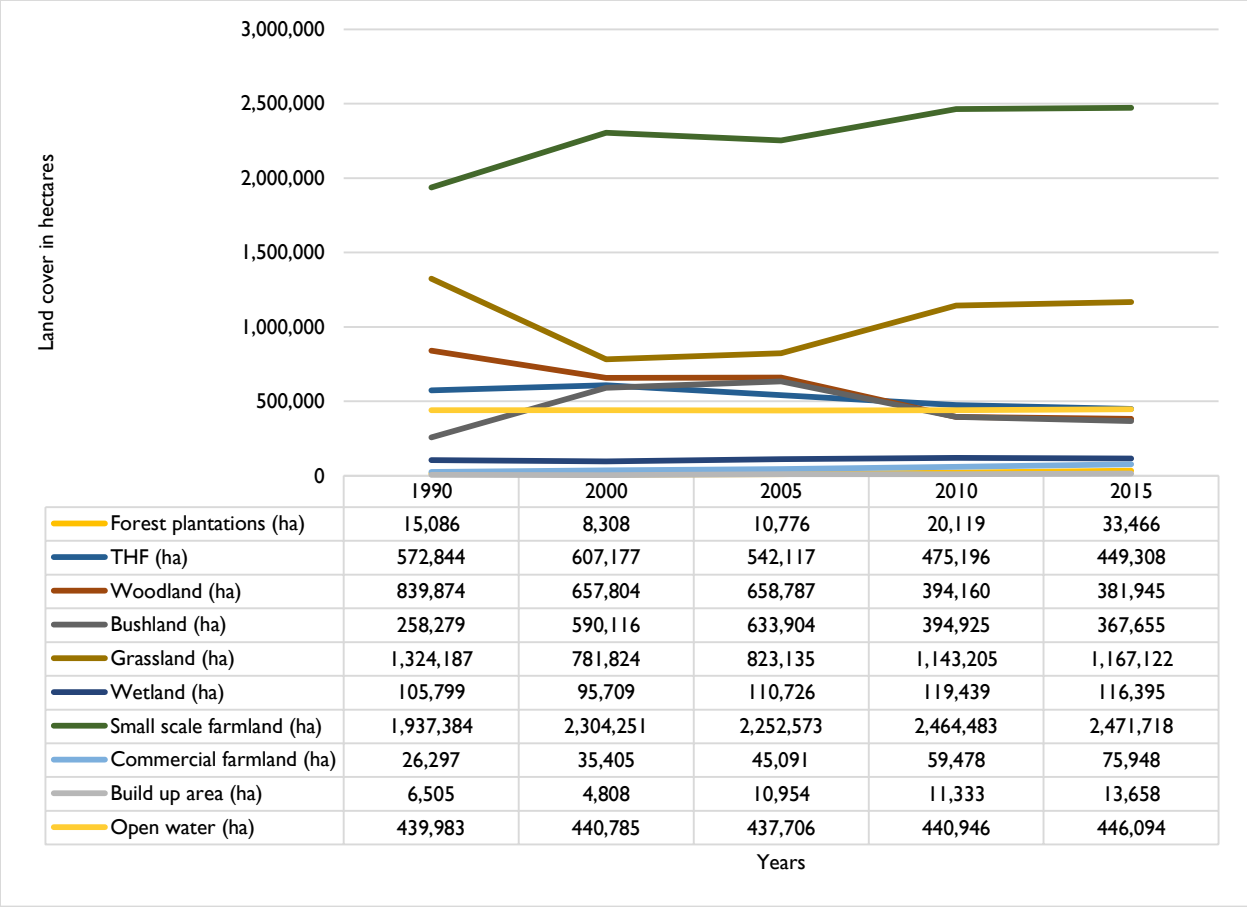
The small scale farmlands increased from 1.94 million to 2.47 million ha between 1990 and 2015 largely on the back of thriving smallholder farming systems for the East African highland bananas (matooke) and perennial tea estates and food crops production (UBOS 2018). Indeed, given the commercial success of the small scale farmlands, they are expected to continue expanding at the expense of other land covers/ land uses.

Woodlands reduced by nearly 60% between 1990 and 2015, bushlands edged up by 109,376 ha, and commercial farmlands increased threefold from 26,297 ha to 75,948 ha (Table 3.4). Forest plantations doubled over the 25 years, while the tropical high forests declined by 123,536 ha about one-fifth of the THF cover in 1990. Built up areas only doubled even though the region holds some of the most commercially success land use options. The lower than expected growth of the built up area might be an indication of the relative stability of existing land use options.

Table 3.4: Land Physical Accounts for the Western Region of Uganda (in hectares)

Western Region	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock 1st Jan. 1990	6,827	8,259	481,835	91,009	839,874	258,279	1,324,187	105,799	1,937,384	26,297	6,505	439,983	1,491
Additions	3,182	1,965	80,848	105,234	277,657	470,409	268,016	36,356	630,249	20,053	2,243	6,951	1,483
Reductions	6,610	5,314	93,178	58,570	459,726	138,573	810,379	46,446	263,381	10,945	3,940	6,148	1,433
Net gains/reductions	(3,428)	(3,349)	(12,330)	46,664	(182,069)	331,836	(542,363)	(10,090)	366,868	9,108	(1,697)	803	50
Closing stock	3,399	4,909	469,504	137,673	657,804	590,116	781,824	95,709	2,304,251	35,405	4,808	440,785	1,540
Opening stock 1st Jan. 2000	3,399	4,909	469,504	137,673	657,804	590,116	781,824	95,709	2,304,251	35,405	4,808	440,785	1,540
Additions	4,184	4,007	44,127	70,601	281,956	353,070	338,526	46,955	365,362	20,898	7,059	4,954	1,742
Reductions	2,931	2,794	88,180	91,609	280,973	309,282	297,215	31,939	417,041	11,212	912	8,033	1,321
Net gains/reductions	1,253	1,213	(44,053)	(21,008)	983	43,788	41,311	15,016	(51,679)	9,686	6,147	(3,079)	421
Closing stock	4,653	6,123	425,451	116,666	658,787	633,904	823,135	110,726	2,252,573	45,091	10,954	437,706	1,962
Opening stock 1st Jan. 2005	4,653	6,123	425,451	116,666	658,787	633,904	823,135	110,726	2,252,573	45,091	10,954	437,706	1,962
Additions	8,529	7,401	55,848	49,165	182,557	260,213	613,789	53,175	600,881	29,548	7,485	7,769	3,787
Reductions	4,142	2,443	72,771	99,163	447,184	499,192	293,719	44,462	388,970	15,160	7,106	4,529	1,305
Net gains/reductions	4,387	4,958	(16,923)	(49,998)	(264,627)	(238,979)	320,070	8,713	211,911	14,388	379	3,240	2,482
Closing stock 31st Dec. 2009	9,039	11,080	408,528	66,668	394,160	394,925	1,143,205	119,439	2,464,483	59,478	11,333	440,946	4,443
Opening stock 1st Jan. 2010	9,039	11,080	408,528	66,668	394,160	394,925	1,143,205	119,439	2,464,483	59,478	11,333	440,946	4,443
Additions	16,844	5,596	27,684	31,958	142,317	217,559	329,158	35,396	388,223	29,959	8,514	9,037	2,289
Reductions	5,976	3,117	36,925	48,605	154,532	244,830	305,241	38,440	380,988	13,489	6,189	3,889	2,314
Net gains/reductions	10,868	2,479	(9,241)	(16,647)	(12,215)	(27,271)	23,917	(3,044)	7,235	16,470	2,325	5,148	(25)
Closing stock 31st Dec. 2014	19,907	13,559	399,287	50,021	381,945	367,655	1,167,122	116,395	2,471,718	75,948	13,658	446,094	4,418

The western region of Uganda has a significant contrast to the rest of the country. A lot of the grasslands cover occurs in the key protected areas located in the region. Western Uganda hold eight of Uganda's 10 national parks. Therefore, grasslands are an important habitat for wildlife. The large area of small scale farmlands was determined by the importance of the western region as a major food crop and commercial crop production base for the country (MAAIF 2016). The trends also show that even though grasslands fluctuated considerably over the 25-timeline, they are still an important component of the region's land cover and had the second largest land cover (Figure 3.6).



	1990	2000	2005	2010	2015
Forest plantations (ha)	15,086	8,308	10,776	20,119	33,466
THF (ha)	572,844	607,177	542,117	475,196	449,308
Woodland (ha)	839,874	657,804	658,787	394,160	381,945
Bushland (ha)	258,279	590,116	633,904	394,925	367,655
Grassland (ha)	1,324,187	781,824	823,135	1,143,205	1,167,122
Wetland (ha)	105,799	95,709	110,726	119,439	116,395
Small scale farmland (ha)	1,937,384	2,304,251	2,252,573	2,464,483	2,471,718
Commercial farmland (ha)	26,297	35,405	45,091	59,478	75,948
Build up area (ha)	6,505	4,808	10,954	11,333	13,658
Open water (ha)	439,983	440,785	437,706	440,946	446,094

Years

Figure 3.6: Trends of land cover for Western Region for 1990 - 2015

CHAPTER 4
LAND ACCOUNTS BY SUB-REGION

4.1 Sub-regions of Uganda

In order to facilitate analysis of sub-national activity and manage the larger number of districts in the country, the Uganda Bureau of Statistics initially grouped the country into 11 sub-regions (UBOS/UNHS 2012) and later into 15 sub-regions with similar characteristics (Figures 4.1 and 4.2).

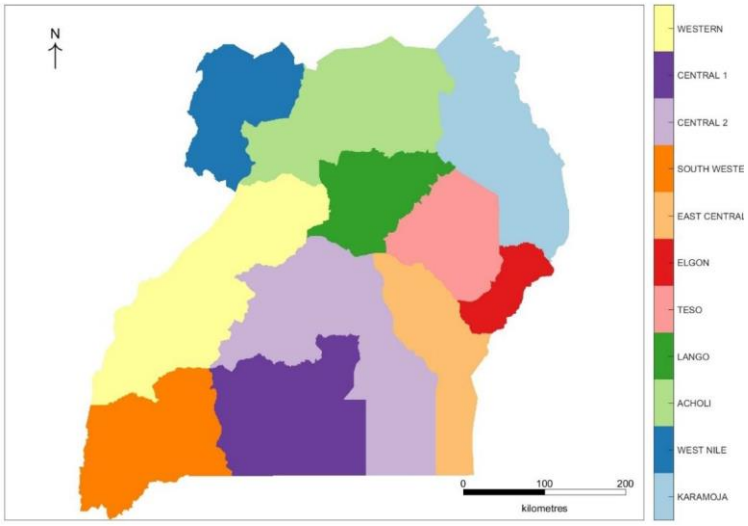


Figure 4.1: Sub-regions of Uganda in 2011
Source: NFA 2019; King et al. 2017

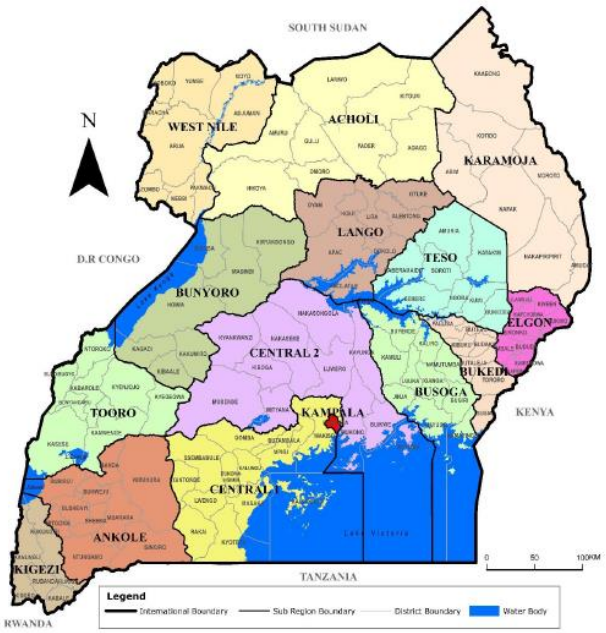


Figure 4.2: Sub-regions of Uganda in 2016
Source: UBOS (2017)

The initial land accounts report for Uganda adopted the 11 sub-region with recommendations to quickly update the land accounts to the 15 land cover classes used in the Uganda National Household Survey (2016/17) (UBOS 2017). The 11 sub-regions used are 1. Acholi, 2. Central North, 3. Central South, 4. East Central, 5. Elgon, 6. Karamoja, 7. Lango, 8. Southwestern, 9. Lango, 10. West Nile and 11. Western (NFA 2019).

4.2 Sub-Region Land Physical Accounts

4.2.1 Acholi sub-region Land Physical Accounts

The Land Physical Accounts of the Acholi sub-region show two major trends. First, is the excess pressure put on woodlands in the landscape. More than 85% of the woodland area in the landscape was lost over the 25-year timeline. The second major trend is the resilience of the small scale farmlands as the major land use within the Acholi sub-region. The woodlands declined through the 25-year assessment period, even though the intensity was highest in the period after 2005 when the communities had undeterred access to the whole landscape with the end of the insurgency. Therefore, woodland harvest for wood fuel was always an important source of livelihood although the harvest effort intensified due to specific events and drivers. There are additional efforts through legislation, enforcement and other policy instruments that would be needed to slow down and even reverse some of the woodland losses given that the woodlands clearly have an important economic contribution for the landscape.

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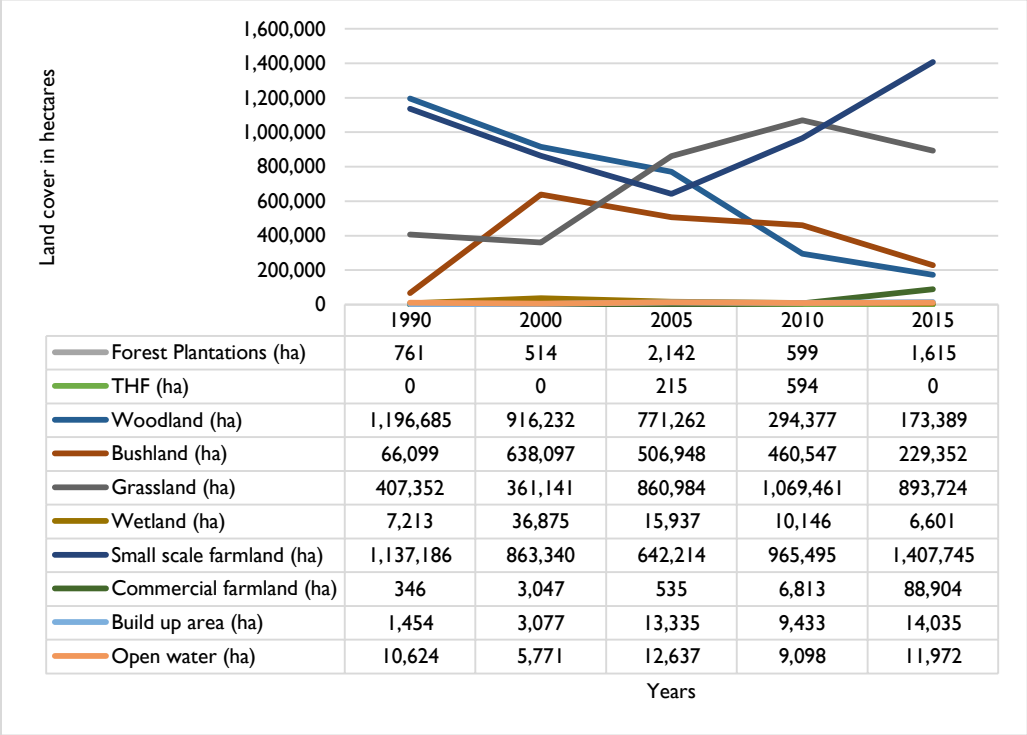
Table 4.1: Land Physical Accounts for the Acholi Sub-Region of Uganda (in hectares)

Acholi	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Build up area	Open water	Impediments
Opening stock 1st Jan. 1990	275	486			1,196,685	66,099	407,352	7,213	1,137,186	346	1,454	10,624	411
Additions	430	4	-	-	323,084	616,116	303,020	30,967	178,282	2,900	2,569	384	71
Reductions	202	479			603,536	44,117	349,231	1,305	452,128	199	945	5,236	411
Net gains/reductions	228	(475)	-	-	(280,452)	571,999	(46,211)	29,662	(273,846)	2,701	1,624	(4,852)	(340)
Closing stock 31st Dec. 1999	504	10			916,232	638,097	361,141	36,875	863,340	3,047	3,077	5,771	35
Opening stock *2000*	504	10			916,232	638,097	361,141	36,875	863,340	3,047	3,077	5,771	35
Additions	1,621	505	-	215	356,181	366,163	689,400	9,785	192,082	370	11,972	7,244	3,808
Reductions	495	2			501,152	497,312	189,557	30,723	413,208	2,882	1,715	378	3
Net gains/reductions	1,126	503	-	215	(144,971)	(131,149)	499,843	(20,938)	(221,126)	(2,512)	10,257	6,866	3,805
Closing stock 31st Dec. 2004	1,629	513		215	771,262	506,948	860,984	15,937	642,214	535	13,335	12,637	1,921
Opening stock 1st Jan. 2005	1,629	513		215	771,262	506,948	860,984	15,937	642,214	535	13,335	12,637	1,921
Additions	98	991	206	981	416,250	797,675	1,630,030	14,155	1,494,869	13,593	14,754	10,245	2,575
Reductions	1,629	266		215	598,758	383,530	352,093	9,800	206,094	501	9,222	4,686	1,348
Net gains/reductions	(1,531)	725	206	766	(182,508)	414,145	1,277,937	4,355	1,288,775	13,092	5,532	5,559	1,227
Closing stock 31st Dec. 2009	98	501	103	491	294,377	460,547	1,069,461	10,146	965,495	6,813	9,433	9,098	1,567
Opening stock 1st Jan. 2010	98	501	103	491	294,377	460,547	1,069,461	10,146	965,495	6,813	9,433	9,098	1,567
Additions	756	589	-	-	49,833	136,869	295,111	1,667	591,557	86,071	9,205	4,093	1,423
Reductions	77	252	103	491	170,820	368,064	470,848	5,212	149,307	3,981	4,604	1,218	1,406
Net gains/reductions	679	337	(103)	(491)	(120,987)	(231,195)	(175,737)	(3,545)	442,250	82,090	4,601	2,875	17
Closing stock 31st Dec. 2014	777	838			173,389	229,352	893,724	6,601	1,407,745	88,904	14,035	11,972	792

The Acholi sub-region was the epicentre of the insurgency in northern Uganda. The reduction in small scale farmlands between 1990 and 2005 coincided with intensity of the insurgency (Figure 4.3). After 2005, the insurgency had been overcome and the communities could return to their farming activities. Even at the peak of the insurgency when the lowest land cover was under small scale farmlands 642,214 ha or 23% out of the 2.83 ha of the sub-region were under production. At full production in 2015, as much as 1.4 million ha (50%) of the sub-region was under small scale farming systems, underlining the important of this land cover for the land use within the sub-region. Since 2005, there was a large bump in commercial farmlands increasing from just 6,813 ha to 88,904 ha, a 13-fold increase. The increase is extremely significant as it is likely that the investments from outside the sub-region and the importance of improving local livelihoods is also considered. Open water is limited therefore, there are likely to be challenges of water for production in agriculture, utility supply for industry and domestic use, among others.



	1990	2000	2005	2010	2015
Forest Plantations (ha)	761	514	2,142	599	1,615
THF (ha)	0	0	215	594	0
Woodland (ha)	1,196,685	916,232	771,262	294,377	173,389
Bushland (ha)	66,099	638,097	506,948	460,547	229,352
Grassland (ha)	407,352	361,141	860,984	1,069,461	893,724
Wetland (ha)	7,213	36,875	15,937	10,146	6,601
Small scale farmland (ha)	1,137,186	863,340	642,214	965,495	1,407,745
Commercial farmland (ha)	346	3,047	535	6,813	88,904
Build up area (ha)	1,454	3,077	13,335	9,433	14,035
Open water (ha)	10,624	5,771	12,637	9,098	11,972

Figure 4.3: Trends of land cover for Acholi Sub-Region for 1990 - 2015

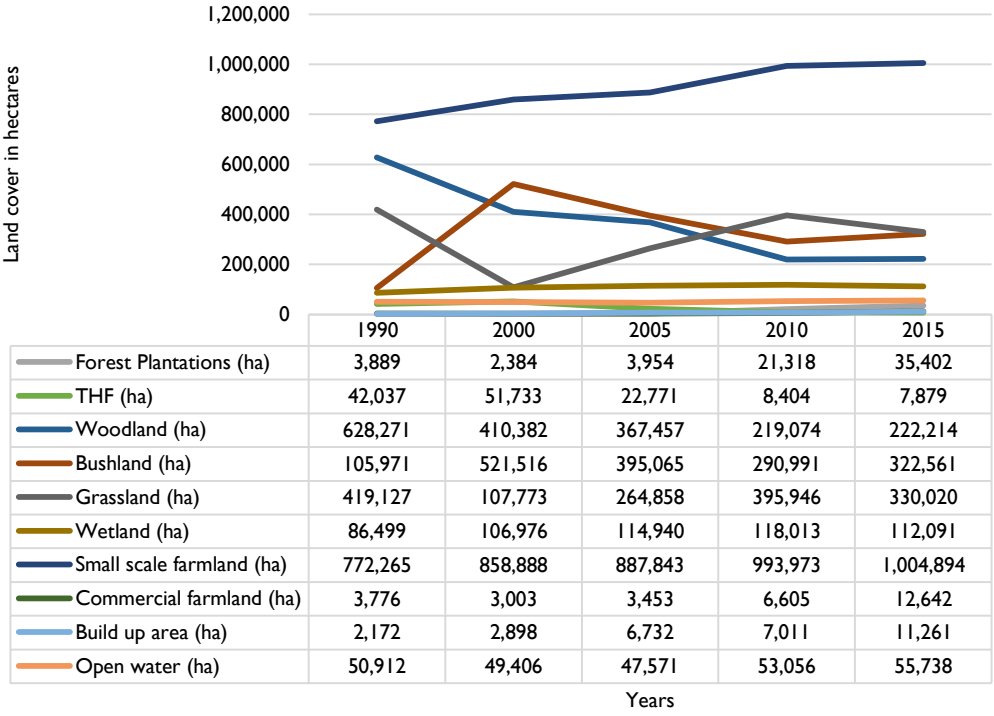
4.2.2 Central North sub-region Land Physical Accounts

The Central North sub-region is one of two regions in the central part of the country and lies alongside the Central South region. The small-scale farmlands are not only the leading land cover of the sub-region; they have also been growing rapidly increasing from 772,265 to 1.0 million ha in the 25-time line. In 1990, the land cover was largely spread between small scale farmlands, woodlands and grasslands as the three leading land cover classes which cover 86% of the region's land cover. By 2015, the woodlands had reduced to 36% of their cover in 1990 and grasslands had reduced by 89,107 (21%), while over the same period bushlands had increased three- fold from 105,971 ha to 322,561 ha. There were significant increases in the area of forest plantations, commercial farmlands and built up areas while the tropical high forests reduced to one-fifth of their land cover in 2015 from the 1990 cover.

Table 4.2: Land Physical Accounts for the Central North Sub-Region of Uganda (in hectares)

Central North	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock 1st Jan. 1990	1,380	2,509	8,263	33,774	628,271	105,971	419,127	86,499	772,265	3,776	2,172	50,912	39
Additions	90	537	10,114	29,582	158,397	475,091	51,566	37,190	216,576	1,207	1,695	4,242	-
Reductions	1,359	772	4,912	25,087	376,286	59,546	362,920	16,713	129,953	1,981	969	5,748	39
Net gains/reductions	(1,269)	(235)	5,202	4,495	(217,889)	415,545	(311,354)	20,477	86,623	(774)	726	(1,506)	(39)
Closing stock 31st Dec. 1999	110	2,274	13,464	38,269	410,382	521,516	107,773	106,976	858,888	3,003	2,898	49,406	
Opening stock *2000*	110	2,274	13,464	38,269	410,382	521,516	107,773	106,976	858,888	3,003	2,898	49,406	
Additions	935	1,083	2,652	8,419	156,294	164,761	195,885	21,976	167,334	1,599	5,121	2,174	631
Reductions	96	352	8,064	31,969	199,219	291,212	38,800	14,012	138,379	1,150	1,286	4,009	-
Net gains/reductions	839	731	(5,412)	(23,550)	(42,925)	(126,451)	157,085	7,964	28,955	449	3,835	(1,835)	631
Closing stock 31st Dec. 2004	949	3,005	8,052	14,719	367,457	395,065	264,858	114,940	887,843	3,453	6,732	47,571	316
Opening stock 1st Jan. 2005	949	3,005	8,052	14,719	367,457	395,065	264,858	114,940	887,843	3,453	6,732	47,571	316
Additions	1,590	17,355	1,505	4,412	110,297	198,702	263,264	34,267	269,893	4,744	4,453	8,088	1,106
Reductions	807	774	5,968	14,315	258,680	302,776	132,176	31,194	163,762	1,592	4,175	2,602	289
Net gains/reductions	783	16,581	(4,463)	(9,903)	(148,383)	(104,074)	131,088	3,073	106,131	3,152	278	5,486	817
Closing stock 31st Dec. 2009	1,732	19,586	3,589	4,815	219,074	290,991	395,946	118,013	993,973	6,605	7,011	53,056	566
Opening stock 1st Jan. 2010	1,732	19,586	3,589	4,815	219,074	290,991	395,946	118,013	993,973	6,605	7,011	53,056	566
Additions	3,642	12,750	611	4,407	104,609	185,755	130,555	27,859	159,209	7,748	7,204	3,852	453
Reductions	435	1,874	2,593	2,950	101,469	154,185	196,482	33,781	148,288	1,711	2,953	1,170	509
Net gains/reductions	3,207	10,876	(1,982)	1,457	3,140	31,570	(65,927)	(5,922)	10,921	6,037	4,251	2,682	(56)
Closing stock 31st Dec. 2014	4,940	30,462	1,607	6,272	222,214	322,561	330,020	112,091	1,004,894	12,642	11,261	55,738	255

The trends of land cover change point to the increasing important of small scale farmlands. the rate of expansion of commercial farmlands is still quite slow and started from a low base and this has not been adequate to change the trajectory of growth for the small scale farmlands (Figure 4.4). All three major land covers, aside from bushlands declined. The woodlands continued to decline largely because they are targeted for wood fuel. Grasslands declined by less than 90,000 ha and continued to be an important land cover for the sub-region. The wetlands gained an additional 36,000 ha over the course of the assessment period.



	1990	2000	2005	2010	2015
Forest Plantations (ha)	3,889	2,384	3,954	21,318	35,402
THF (ha)	42,037	51,733	22,771	8,404	7,879
Woodland (ha)	628,271	410,382	367,457	219,074	222,214
Bushland (ha)	105,971	521,516	395,065	290,991	322,561
Grassland (ha)	419,127	107,773	264,858	395,946	330,020
Wetland (ha)	86,499	106,976	114,940	118,013	112,091
Small scale farmland (ha)	772,265	858,888	887,843	993,973	1,004,894
Commercial farmland (ha)	3,776	3,003	3,453	6,605	12,642
Build up area (ha)	2,172	2,898	6,732	7,011	11,261
Open water (ha)	50,912	49,406	47,571	53,056	55,738

Figure 4.4: Trends of land cover for Central North Sub-Region for 1990 - 2015

4.2.3 Central South sub-region Land Physical Accounts

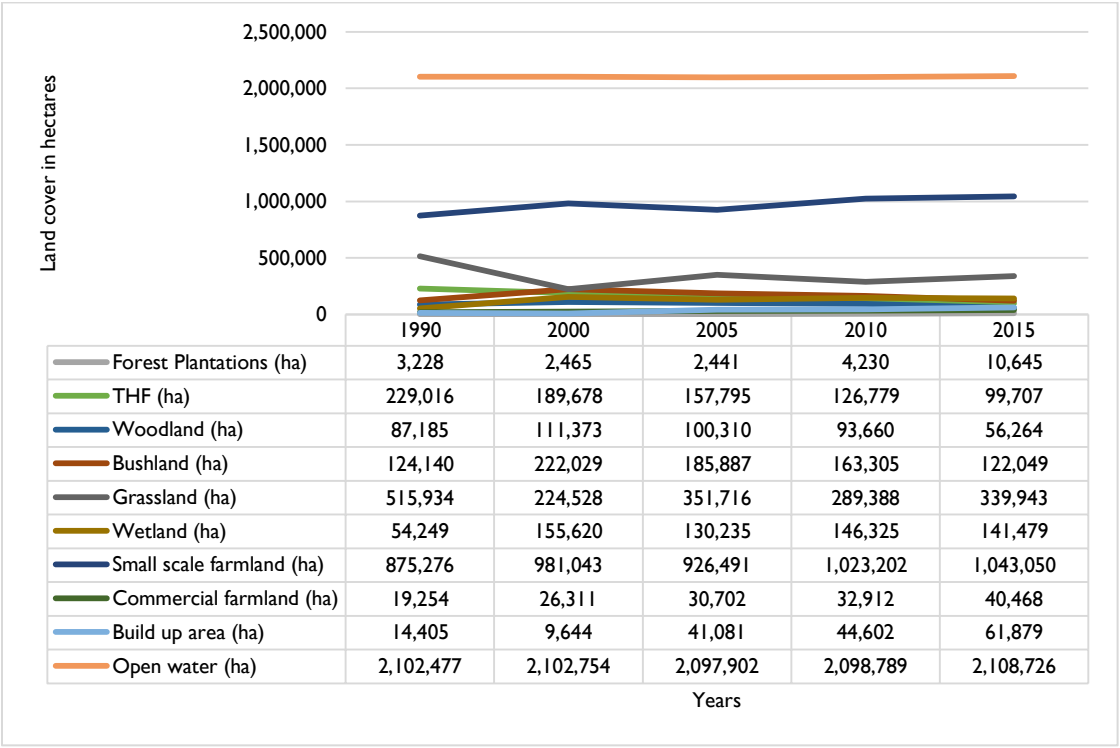
The Central South covers an area of 4.0 million hectares almost double the land cover of the Central North which had a cover of 2.1 million ha. More than half (52.5%) of the sub-region's territory is covered by open water of the Lake Victoria and the River Nile basin in Uganda. After open water, small scale farmlands and grasslands are the other land cover classes. The small scale farmlands follow a similar trajectory under the Central South as was the case for the Central North. Small scale farmlands increased from 875,276 ha to 1.04 million ha, grasslands decreased 175,991 ha while bushlands lost just 2,000 ha over the course of the assessment period (Table 4.3).

Table 4.3: Land Physical Accounts for the Central South Sub-Region of Uganda (in hectares)

Central South	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock 1st Jan. 1990	2,990	238	129,569	99,447	87,185	124,140	515,934	54,249	875,276	19,254	14,405	2,102,477	288
Additions	2,368	28	52,476	19,911	83,329	184,662	66,014	114,473	212,736	12,456	3,123	9,238	19
Reductions	2,922	238	30,053	81,672	59,142	86,773	357,420	13,102	106,969	5,400	7,885	8,961	288
Net gains/reductions	(554)	(210)	22,423	(61,761)	24,187	97,889	(291,406)	101,371	105,767	7,056	(4,762)	277	(269)
Closing stock 31st Dec. 1999	2,437	28	151,992	37,686	111,373	222,029	224,528	155,620	981,043	26,311	9,644	2,102,754	9
Opening stock *2000*	2,437	28	151,992	37,686	111,373	222,029	224,528	155,620	981,043	26,311	9,644	2,102,754	9
Additions	2,175	-	14,714	44,661	78,049	81,246	211,786	27,362	156,313	11,343	32,722	6,432	1,788
Reductions	2,171	28	67,625	23,635	89,112	117,388	84,598	52,747	210,865	6,952	1,284	11,284	9
Net gains/reductions	4	(28)	(52,911)	21,026	(11,063)	(36,142)	127,188	(25,385)	(54,552)	4,391	31,438	(4,852)	1,779
Closing stock 31st Dec. 2004	2,441		99,082	58,713	100,310	185,887	351,716	130,235	926,491	30,702	41,081	2,097,902	894
Opening stock 1st Jan. 2005	2,441		99,082	58,713	100,310	185,887	351,716	130,235	926,491	30,702	41,081	2,097,902	894
Additions	3,475	420	25,151	21,161	72,783	105,286	144,607	44,669	277,529	13,239	13,706	7,958	4,414
Reductions	2,106	-	30,971	46,357	79,433	127,868	206,935	28,579	180,817	11,029	10,186	7,070	787
Net gains/reductions	1,369	420	(5,820)	(25,196)	(6,650)	(22,582)	(62,328)	16,090	96,712	2,210	3,520	888	3,627
Closing stock 31st Dec. 2009	3,810	420	93,262	33,517	93,660	163,305	289,388	146,325	1,023,202	32,912	44,602	2,098,789	2,260
Opening stock 1st Jan. 2010	3,810	420	93,262	33,517	93,660	163,305	289,388	146,325	1,023,202	32,912	44,602	2,098,789	2,260
Additions	7,511	1,486	4,237	17,556	24,296	74,348	144,095	27,561	179,707	13,593	25,638	11,968	2,308
Reductions	2,426	157	28,218	20,648	61,692	115,603	93,540	32,407	159,859	6,037	8,361	2,031	2,083
Net gains/reductions	5,085	1,329	(23,981)	(3,092)	(37,396)	(41,255)	50,555	(4,846)	19,848	7,556	17,277	9,937	225
Closing stock 31st Dec. 2014	8,896	1,749	69,282	30,425	56,264	122,049	339,943	141,479	1,043,050	40,468	61,879	2,108,726	1,242

The trends for the Central South sub-region show the dominance of the open water and the steady gradual increase of farmlands (Figure 4.5). The sub-region had limited opportunities to provide additional land for the increasing small scale farmland as built up areas and commercial farmlands are increasing concurrently with the small scale farmlands. The sub-region likely experiences conflict and competition over land uses, particularly with the very large small scale farmlands, and the growing urban populations in the Lake Victoria basin areas including Kampala City and the other metropolitan areas. The growth of commercial farmlands may be out of necessity as the options for expanding small scale farmlands reduce.

By 2015, the tropical high forests reduced by 56% from the levels of 1990 while the forest plant cover had increased by 7,417 ha. Wetlands increased 2.6 times from 54,249 ha to 141,479 ha and the built up areas increased from 14,405 to 61,879 ha between 1990 and 2015.



	1990	2000	2005	2010	2015
Forest Plantations (ha)	3,228	2,465	2,441	4,230	10,645
THF (ha)	229,016	189,678	157,795	126,779	99,707
Woodland (ha)	87,185	111,373	100,310	93,660	56,264
Bushland (ha)	124,140	222,029	185,887	163,305	122,049
Grassland (ha)	515,934	224,528	351,716	289,388	339,943
Wetland (ha)	54,249	155,620	130,235	146,325	141,479
Small scale farmland (ha)	875,276	981,043	926,491	1,023,202	1,043,050
Commercial farmland (ha)	19,254	26,311	30,702	32,912	40,468
Build up area (ha)	14,405	9,644	41,081	44,602	61,879
Open water (ha)	2,102,477	2,102,754	2,097,902	2,098,789	2,108,726

Figure 4.5: Trends of land cover for Central South Sub-Region for 1990 - 2015

4.2.4 East Central sub-region Land Physical Accounts

The stand out land covers for the East Central sub-region in 1990 are the open water and the small scale farmlands with a cover of 838,779 ha and 749,221 ha, respectively. All the other land covers were under 75,000 ha the largest of which was wetlands with 74,669 ha followed by woodlands with 70,358 ha. Bushlands had a land cover of 31,206 while commercial farmlands had a cover of 10,064 ha. By 2015, the small scale farmlands had increased to 855,918 ha at the expense of woodlands and grasslands which dwindled to 2,583 ha and 9,982 ha, respectively (Table 4.4).

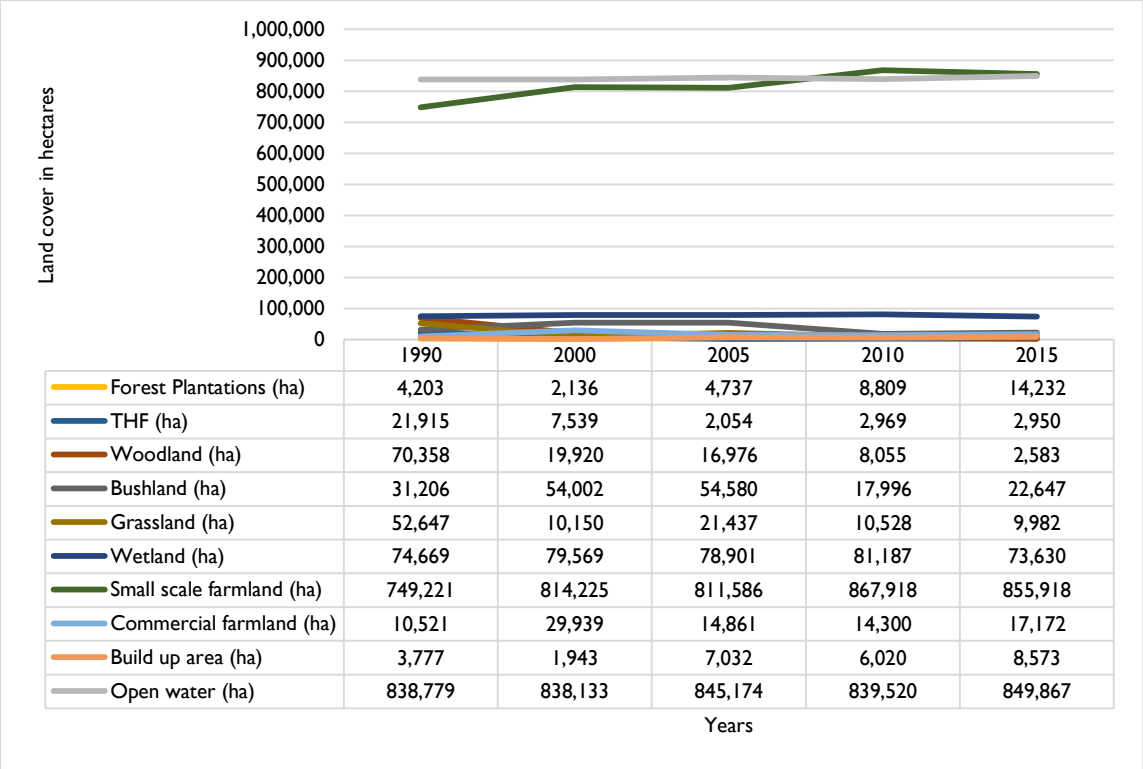
The further expansion of small scale farmlands will lead to complete conversion of woodlands and grasslands. Indeed, the THF well stocked land cover can be completed converted and only 2,950 ha of THF low stocked remained in 2015. The expanding built up areas and the commercial farmlands will also be in conflict with other land cover/ land uses within the sub-region.

Table 4.4: Land Physical Accounts for the East Central Sub-Region of Uganda (in hectares)

East Central	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock 1st Jan. 1990	3,841	362	3,754	18,161	70,358	31,206	52,647	74,669	749,221	10,521	3,777	838,779	258
Additions	726	382	1,023	1,987	12,256	52,560	6,242	21,354	120,663	20,709	1,161	10,064	-
Reductions	2,828	349	2,412	14,974	62,694	29,764	48,739	16,454	55,659	1,291	2,994	10,710	258
Net gains/reductions	(2,102)	33	(1,389)	(12,987)	(50,438)	22,796	(42,497)	4,900	65,004	19,418	(1,833)	(646)	(258)
Closing stock 31st Dec. 1999	3,841	362	3,754	18,161	70,358	31,206	52,647	74,669	749,221	10,521	3,777	838,779	258
Opening stock *2000*	3,841	362	3,754	18,161	70,358	31,206	52,647	74,669	749,221	10,521	3,777	838,779	258
Additions	904	3,102	125	1,081	8,228	26,714	17,824	10,311	50,591	2,681	5,442	11,053	435
Reductions	1,231	174	1,814	4,877	11,172	26,136	6,537	10,978	53,230	17,758	353	4,013	-
Net gains/reductions	(327)	2,928	(1,689)	(3,796)	(2,944)	578	11,287	(667)	(2,639)	(15,077)	5,089	7,040	435
Closing stock 31st Dec. 2004	1,413	3,324	676	1,378	16,976	54,580	21,437	78,901	811,586	14,861	7,032	845,174	218
Opening stock 1st Jan. 2005	1,413	3,324	676	1,378	16,976	54,580	21,437	78,901	811,586	14,861	7,032	845,174	218
Additions	2,360	3,951	163	2,806	5,379	13,828	6,971	22,227	87,740	2,421	3,306	2,076	447
Reductions	1,134	1,106	676	1,378	14,300	50,412	17,880	19,942	31,408	2,983	4,318	7,730	156
Net gains/reductions	1,226	2,845	(513)	1,428	(8,921)	(36,584)	(10,909)	2,285	56,332	(562)	(1,012)	(5,654)	291
Closing stock 31st Dec. 2009	2,639	6,170	163	2,806	8,055	17,996	10,528	81,187	867,918	14,300	6,020	839,520	255
Opening stock 1st Jan. 2010	2,639	6,170	163	2,806	8,055	17,996	10,528	81,187	867,918	14,300	6,020	839,520	255
Additions	1,759	5,092	-	408	1,477	17,566	6,275	10,927	30,187	4,299	4,943	10,787	-
Reductions	429	998	163	264	6,949	12,914	6,821	18,484	42,187	1,427	2,390	440	255
Net gains/reductions	1,330	4,094	(163)	144	(5,472)	4,652	(546)	(7,557)	(12,000)	2,872	2,553	10,347	(255)
Closing stock 31st Dec. 2014	3,968	10,264		2,950	2,583	22,647	9,982	73,630	855,918	17,172	8,573	849,867	-

The trajectories for the land physical accounts for the East Central clearly show that the sub-region is getting to the point where there is no additional land for expansion of small scale farmlands. already, the increasing small scale farmlands are likely to completely convert tropical high forests, woodlands and grasslands within the next five to 10 years (Figure 4.6).

More than any other sub-region, great attention needs to be put to land use planning including allocation of quotas to the different land uses. In 2015, it was unlikely that the region had sufficient land cover to provide sufficient wood fuel, wood for timber, and grass for livestock, among other. The land cover and land use practices are unlikely to be adequate for sustainable livelihoods within the sub-region.



	1990	2000	2005	2010	2015
Forest Plantations (ha)	4,203	2,136	4,737	8,809	14,232
THF (ha)	21,915	7,539	2,054	2,969	2,950
Woodland (ha)	70,358	19,920	16,976	8,055	2,583
Bushland (ha)	31,206	54,002	54,580	17,996	22,647
Grassland (ha)	52,647	10,150	21,437	10,528	9,982
Wetland (ha)	74,669	79,569	78,901	81,187	73,630
Small scale farmland (ha)	749,221	814,225	811,586	867,918	855,918
Commercial farmland (ha)	10,521	29,939	14,861	14,300	17,172
Build up area (ha)	3,777	1,943	7,032	6,020	8,573
Open water (ha)	838,779	838,133	845,174	839,520	849,867

Figure 4.6: Trends of land cover for East Central Sub-Region for 1990 - 2015

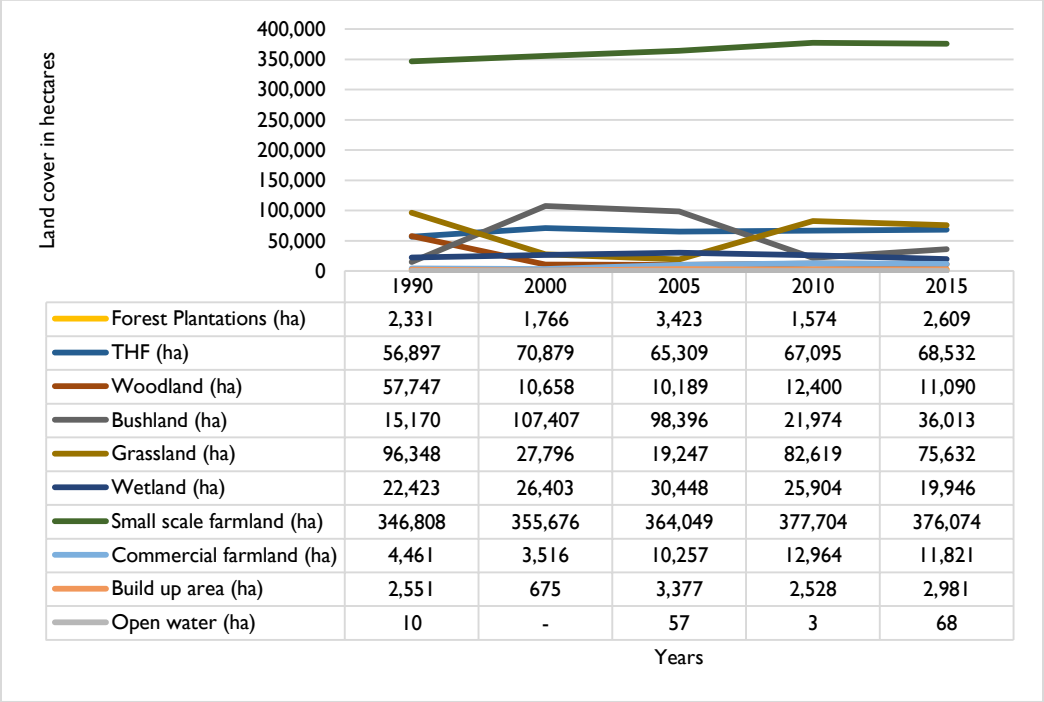
4.2.5 Elgon sub-regional Land Physical Accounts

The Elgon sub-region is the smallest in the country with an area of only 604,776 ha, i.e. about 2.5% of the country's land cover. Even though, 57% of the sub-region was covers by small scale farmlands in 1990 there was still an increase to 62% land cover for small scale farmlands between 1990 and 2015. In 1990, the rest of the land was under grasslands at 96,348 ha, woodlands 57,747 topical high forests 56,897 ha and wetlands and bushlands at 22,423 ha and 15,170 ha, respectively (4.5). By 2015, the woodlands had reduced to one-fifth of its land cover for 1990 while grasslands declined. Despite the small land area, THF well stocked increased by more than 32,000 ha even though THF low stocked reduced by 20,600 ha between 1990 and 2015. Bushlands doubled from 15,170 to 36,013 ha, and both commercial farmlands and built up areas also increased.

Table 4.5: Land Physical Accounts for the Elgon Sub-Region of Uganda (in hectares)

Elgon	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock 1st Jan. 1990	839	1,492	26,232	30,665	57,747	15,170	96,348	22,423	346,808	4,461	2,551	10	29
Additions	870	57	40,606	121	4,719	101,080	8,845	8,558	33,126	903	240	0	0
Reductions	719	773	2,380	24,364	51,809	8,843	77,397	4,578	24,258	1,848	2,116	10	29
Net gains/reductions	151	(716)	38,226	(24,243)	(47,090)	92,237	(68,552)	3,980	8,868	(945)	(1,876)	(10)	(29)
Closing stock 31st Dec. 1999	990	776	64,458	6,421	10,658	107,407	27,796	26,403	355,676	3,516	675		
Opening stock *2000*	990	776	64,458	6,421	10,658	107,407	27,796	26,403	355,676	3,516	675		
Additions	368	2,283	5,984	0	8,673	26,715	9,914	11,525	30,774	7,392	2,791	57	47
Reductions	864	130	5,133	6,421	9,141	35,726	18,463	7,481	22,401	651	89	0	0
Net gains/reductions	(496)	2,153	851	(6,421)	(468)	(9,011)	(8,549)	4,044	8,373	6,741	2,702	57	47
Closing stock 31st Dec. 2004	494	2,929	65,309		10,189	98,396	19,247	30,448	364,049	10,257	3,377	57	24
Opening stock 1st Jan. 2005	494	2,929	65,309		10,189	98,396	19,247	30,448	364,049	10,257	3,377	57	24
Additions	456	336	3,633	10,698	10,980	10,393	69,644	7,468	32,310	7,497	1,185	1	20
Reductions	340	2,302	12,545		8,769	86,816	6,272	12,011	18,655	4,790	2,034	55	24
Net gains/reductions	116	(1,966)	(8,912)	10,698	2,211	(76,423)	63,372	(4,543)	13,655	2,707	(849)	(54)	(4)
Closing stock 31st Dec. 2009	611	963	56,397	10,698	12,400	21,974	82,619	25,904	377,704	12,964	2,528	3	10
Opening stock 1st Jan. 2010	611	963	56,397	10,698	12,400	21,974	82,619	25,904	377,704	12,964	2,528	3	10
Additions	447	838	5,348	3,158	4,913	25,066	11,193	3,895	19,071	3,574	1,520	66	14
Reductions	168	82	3,279	3,791	6,223	11,026	18,181	9,854	20,700	4,717	1,068	1	5
Net gains/reductions	279	756	2,069	(633)	(1,310)	14,040	(6,988)	(5,959)	(1,629)	(1,143)	452	65	9
Closing stock 31st Dec. 2014	890	1,719	58,467	10,065	11,090	36,013	75,632	19,946	376,074	11,821	2,981	68	10

The trend lines show dominant small scale farmlands which was increasing further. Like the East Central, the Elgon land limited land for additional expansion of the farmlands (Figure 4.7). The Elgon region which also hosts the Mt. Elgon National Park is already under limited in terms of area available for woodlands, tropical high forests and wetlands, among others. Like in the previous case land cover/ land use planning is needed to be able to allow for optimal land use. In addition, external and internal interventions of regulatory reforms and enforcement may be needed to optimally and sustainably utilise the land in the sub-region.



	1990	2000	2005	2010	2015
Forest Plantations (ha)	2,331	1,766	3,423	1,574	2,609
THF (ha)	56,897	70,879	65,309	67,095	68,532
Woodland (ha)	57,747	10,658	10,189	12,400	11,090
Bushland (ha)	15,170	107,407	98,396	21,974	36,013
Grassland (ha)	96,348	27,796	19,247	82,619	75,632
Wetland (ha)	22,423	26,403	30,448	25,904	19,946
Small scale farmland (ha)	346,808	355,676	364,049	377,704	376,074
Commercial farmland (ha)	4,461	3,516	10,257	12,964	11,821
Build up area (ha)	2,551	675	3,377	2,528	2,981
Open water (ha)	10	-	57	3	68

Figure 4.7: Trends of land cover for Elgon Sub-Region for 1990 - 2015

4.2.6 Karamoja sub-regional Land Physical Accounts

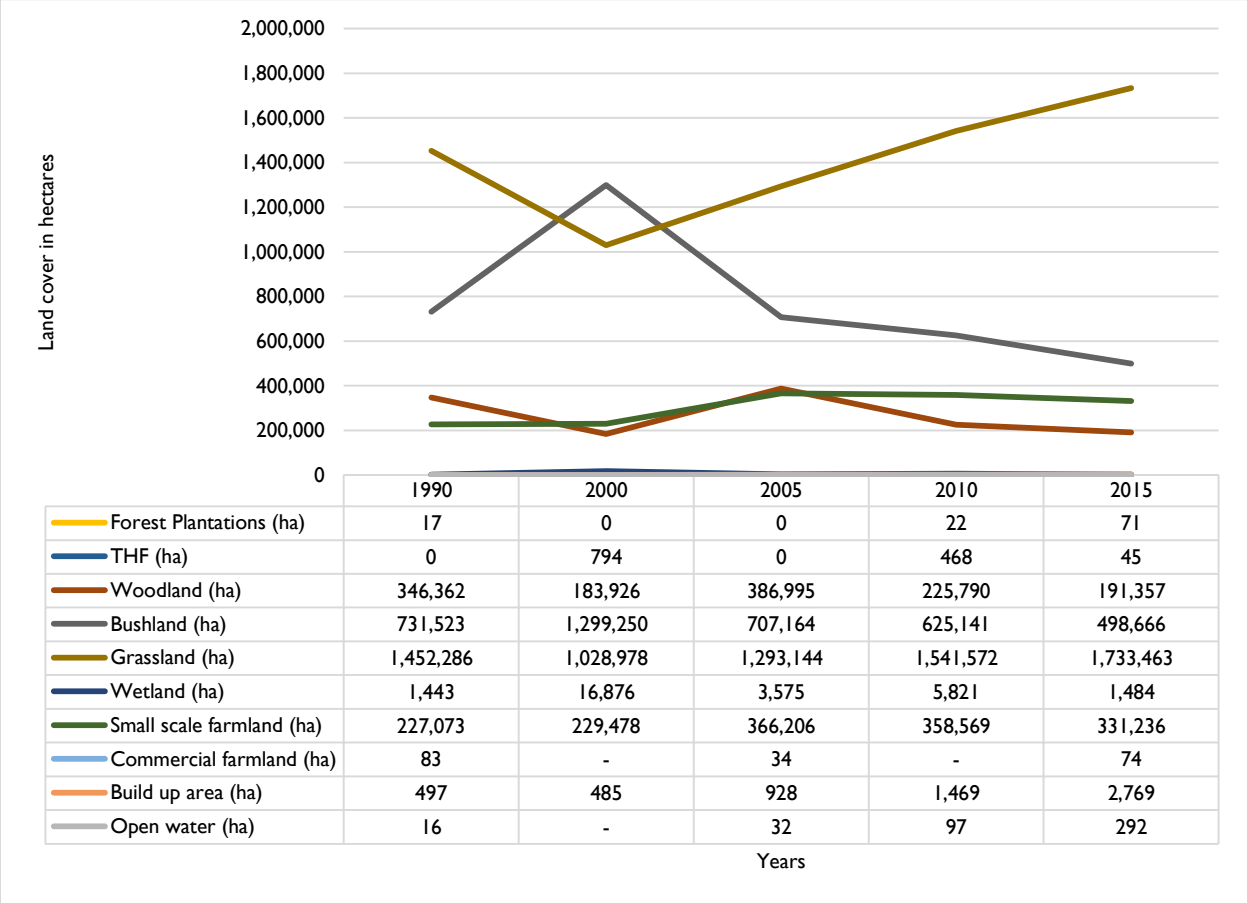
The Karamoja sub-region is the third largest behind the Western and Acholi sub-regions. It had an area of 2.766 ha, i.e. about 11.4% of the national land cover. In 1990, the sub-region was dominated by grasslands (1.45 million ha) of the Kidepo Conservation Area and the livestock pastoral areas of Karamoja. Bushlands were a distant second with 731,523 ha, woodlands covered 346,362 ha while small scale farmlands cover only 227,073 ha as the fourth largest land cover. Unlike all the other sub-regions, small scale farmlands were not the major livelihood/ land use in Karamoja in 1990. Even though, they expanded in area, the small scale farmlands were still less than grasslands and bushlands but they had exceeded the woodlands. The woodlands reduced by 45% between 1990 and 2015 while the small scale farmlands increased by 46%. Bushland declined by 232,857 ha while grasslands increased further by 281,177 ha. Other important changes in land cover were the fivefold increase in built up area and the persistent of broadleaved plantations and THF low stocked in the sub-region.

Table 4.6: Land Physical Accounts for the Karamoja Sub-Region of Uganda (in hectares)

Karamoja	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock 1st Jan. 1990	17				346,362	731,523	1,452,286	1,443	227,073	83	497	16	506
Additions	0	0	45	749	85,509	882,000	381,444	16,149	144,294	0	485	0	37
Reductions	17				247,945	314,273	804,752	716	141,888	83	497	16	506
Net gains/reductions	(17)	-	45	749	(162,436)	567,727	(423,308)	15,433	2,406	(83)	(12)	(16)	(469)
Closing stock 31st Dec. 1999			45	749	183,926	1,299,250	1,028,978	16,876	229,478		485		19
Opening stock *2000*			45	749	183,926	1,299,250	1,028,978	16,876	229,478		485		19
Additions	0	0	0	0	279,959	276,314	741,139	2,875	240,902	34	802	32	3,446
Reductions			45	749	76,890	868,401	476,973	16,176	104,174		360		8
Net gains/reductions	-	-	(45)	(749)	203,069	(592,087)	264,166	(13,301)	136,728	34	442	32	3,438
Closing stock 31st Dec. 2004					386,995	707,164	1,293,144	3,575	366,206	34	928	32	1,728
Opening stock 1st Jan. 2005					386,995	707,164	1,293,144	3,575	366,206	34	928	32	1,728
Additions	18	4	459	9	122,128	377,910	627,775	5,040	125,239	0	1,223	78	1,573
Reductions					283,334	459,933	379,346	2,793	132,875	34	681	13	1,589
Net gains/reductions	18	4	459	9	(161,206)	(82,023)	248,429	2,247	(7,636)	(34)	542	65	(16)
Closing stock 31st Dec. 2009	18	4	459	9	225,790	625,141	1,541,572	5,821	358,569		1,469	97	856
Opening stock 1st Jan. 2010	18	4	459	9	225,790	625,141	1,541,572	5,821	358,569		1,469	97	856
Additions	55	0	0	0	49,346	196,661	393,037	956	111,163	74	2,060	213	520
Reductions	2	4	414	9	83,778	323,136	201,147	5,293	138,497		761	18	674
Net gains/reductions	53	(4)	(414)	(9)	(34,432)	(126,475)	191,890	(4,337)	(27,334)	74	1,299	195	(154)
Closing stock 31st Dec. 2014	71		45		191,357	498,666	1,733,463	1,484	331,236	74	2,769	292	351

The trends show the dominance of grasslands in the Karamoja sub-region. There was an increase of the bushland area between 1990and 2000, which resulted into bushlands briefly overtaking the grasslands as the leading land cover. However, the grassland cover was restored by 2005 (Figure 4.8). The increase in bushlands could have been related to a degradation of the grassland cover due to natural factors such as fires. Because pastoralism is the leading land use system, there is frequent burning to disrupt pest cycles and continuous movement of livestock across the landscape.

Small scale farmlands are an increasingly important source of livelihoods aimed at supporting the pastoral livelihoods. However, the cattle remain the major cultural and livelihoods driver within the sub-region. The sub-region still had additional land cover to expand smallholder farmlands and commercial farmlands. nonetheless, the area of open water is quite small at just 292 ha in 2015. Therefore, increased land use particularly for farmlands expansion will also require efforts to include water for production within the sub-region. In recent times, the region has also been associated with a growing mining industry that will contribute to future livelihoods.



	1990	2000	2005	2010	2015
Forest Plantations (ha)	17	0	0	22	71
THF (ha)	0	794	0	468	45
Woodland (ha)	346,362	183,926	386,995	225,790	191,357
Bushland (ha)	731,523	1,299,250	707,164	625,141	498,666
Grassland (ha)	1,452,286	1,028,978	1,293,144	1,541,572	1,733,463
Wetland (ha)	1,443	16,876	3,575	5,821	1,484
Small scale farmland (ha)	227,073	229,478	366,206	358,569	331,236
Commercial farmland (ha)	83	-	34	-	74
Build up area (ha)	497	485	928	1,469	2,769
Open water (ha)	16	-	32	97	292

Years

Figure 4.8: Trends of land cover for Karamoja Sub-Region for 1990 - 2015

4.2.7 Lango sub-region Land Physical Accounts

The Lango sub-region also in northern Uganda is dominated by small scale farmlands which cover 894,390 ha equivalent to 65% of the 1.37 million ha of land cover for the sub-region. In 1990, the small scale farmlands were nearly five times larger than the second largest land cover of grasslands and eight-times

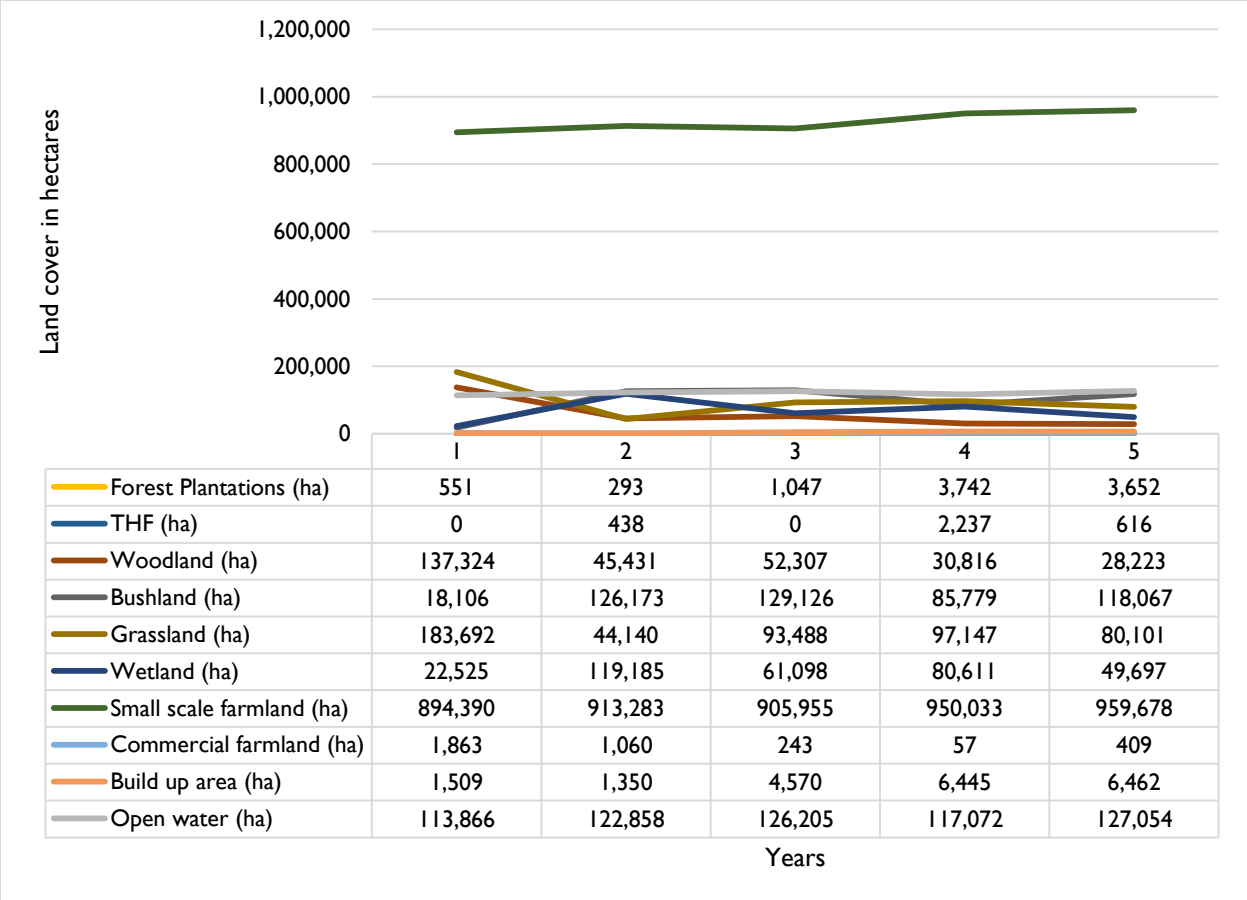
larger than the third largest land cover of woodlands. The open water area occupied about 12.7% of the entire sub-region; therefore, it would be possible to introduce irrigation using surface water for the farmlands. The relatively large commercial farmlands of 1,863 ha in 1990 may have relied on irrigation water; however, by 2015, the commercial farmlands had reduced to just 409 ha. Instead the built up area increased by four times over from 1,509 ha to 6,462 ha between 1990 and 2015. The sub-region had little natural forest cover outside of woodlands in 1990. But by 2015, even the woodlands had been converted into other land coves and only 28,223 ha, on fifth of the woodland land cover in 1990, was left. Tropical high forests were not reported in 1990 but by 2015, 616 ha of THF was recorded. For forest plantations, the coniferous plantations increased from 298 ha to 3,324 ha while the broadleaved forests increase by just 75 ha between 1990 and 2015 (Table 4.7).

Table 4.7: Land Physical Accounts for the Lango Sub-Region of Uganda (in hectares)

Lango	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Build up area	Open water	Impediments
Opening stock 1st Jan. 1990	253	298	0	0	137,324	18,106	183,692	22,525	894,390	1,863	1,509	113,866	386
Additions	43	99	438	0	22,830	124,154	24,302	111,249	89,302	454	853	11,836	0
Reductions	209	191			114,723	16,087	163,855	14,590	70,408	1,257	1,011	2,843	386
Net gains/reductions	(166)	(92)	438	-	(91,893)	108,067	(139,553)	96,659	18,894	(803)	(158)	8,993	(386)
Closing stock 31st Dec. 1999	87	206	438		45,431	126,173	44,140	119,185	913,283	1,060	1,350	122,858	0
Opening stock 2000	87	206	438		45,431	126,173	44,140	119,185	913,283	1,060	1,350	122,858	0
Additions	810	156	0	0	22,070	73,708	77,314	21,853	69,893	111	3,796	4,651	350
Reductions	87	125	438		15,194	70,756	27,966	79,940	77,222	929	576	1,305	0
Net gains/reductions	723	31	(438)	-	6,876	2,952	49,348	(58,087)	(7,329)	(818)	3,220	3,346	350
Closing stock 31st Dec. 2004	810	237			52,307	129,126	93,488	61,098	905,955	243	4,570	126,205	175
Opening stock 1st Jan. 2005	810	237			52,307	129,126	93,488	61,098	905,955	243	4,570	126,205	175
Additions	124	3,393	484	1,753	17,518	56,315	83,782	51,553	139,634	57	4,950	885	517
Reductions	810	12			39,009	99,662	80,123	32,041	95,555	243	3,075	10,017	147
Net gains/reductions	(686)	3,381	484	1,753	(21,491)	(43,347)	3,659	19,512	44,079	(186)	1,875	(9,132)	370
Closing stock 31st Dec. 2009	124	3,618	484	1,753	30,816	85,779	97,147	80,611	950,033	57	6,445	117,072	273
Opening stock 1st Jan. 2010	124	3,618	484	1,753	30,816	85,779	97,147	80,611	950,033	57	6,445	117,072	273
Additions	213	408	0	91	12,315	82,246	52,840	17,773	100,615	398	3,611	10,471	436
Reductions	9	702	392	1,321	14,907	49,958	69,886	48,687	90,971	46	3,594	489	201
Net gains/reductions	204	(294)	(392)	(1,230)	(2,592)	32,288	(17,046)	(30,914)	9,644	352	17	9,982	235
Closing stock 31st Dec. 2014	328	3,324	93	523	28,223	118,067	80,101	49,697	959,678	409	6,462	127,054	254

A relatively large area of the sub-region was covered by small scale farmlands. The pressure to expand the farmlands means that the woodlands and grasslands have been traded off while bushlands have expanded (Figure 4.9). The rapid dwindling of woodlands may be in part because they are targeted for wood fuel, but also because a combination of unsustainable exploitation and the rapid expansion of farmlands means that woodlands have to continually be ceded to allow for small scale farmland expansion. When woodlands are cleared of trees for wood fuel they are converted into farmlands or degrade to bushlands.

The Lango region may not be under as much pressure as the East central but it is also getting to a point where the unfettered expansion of small scale farmlands leaves no land for alternative land uses while also leaving no land for future generations to engage in agricultural livelihoods that are causing the rapid land conversion in the first place. Reforms in the land use, land use planning including regulatory and other policy incentives would be needed. At the core of the interventions would be increasing land use efficiency so that less than is required for farmland and allowing sustainable restoration of other land covers that are critical to other livelihood needs such as wood fuel, timber, forest and wetland products, among others.



	1	2	3	4	5
Forest Plantations (ha)	551	293	1,047	3,742	3,652
THF (ha)	0	438	0	2,237	616
Woodland (ha)	137,324	45,431	52,307	30,816	28,223
Bushland (ha)	18,106	126,173	129,126	85,779	118,067
Grassland (ha)	183,692	44,140	93,488	97,147	80,101
Wetland (ha)	22,525	119,185	61,098	80,611	49,697
Small scale farmland (ha)	894,390	913,283	905,955	950,033	959,678
Commercial farmland (ha)	1,863	1,060	243	57	409
Build up area (ha)	1,509	1,350	4,570	6,445	6,462
Open water (ha)	113,866	122,858	126,205	117,072	127,054

Years

Figure 4.9: Trends of land cover for Lango Sub-Region for 1990 - 2015

4.2.8 South Western sub-regional Land Physical Accounts

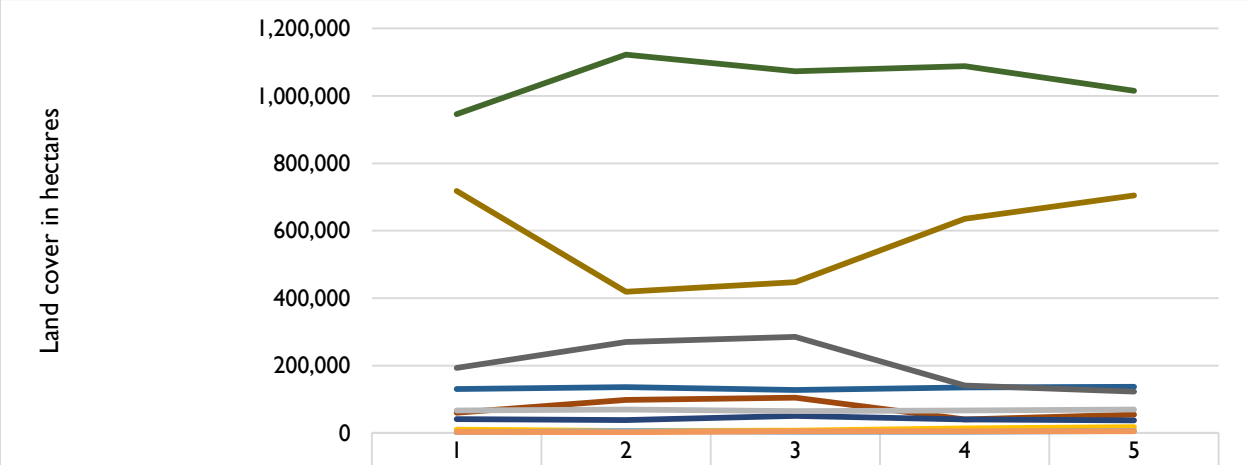
The South-western sub-region covers an important agriculture and tourism zone for the country. According to the 2008 Agriculture Crop Census (UBOS 2008), the south west produced over 60% of all the East African highland cooking bananas (matooke) in the country. The region is also the leading area for production of tea. The grasslands and tropical high forests in the sub-region are also part of important protected areas that include the Queen Elizabeth National Park, Lake Mburo National Park, Bwindi Impenetrable National Park and Mgahinga Gorilla National Park.

The small scale farmland areas covered 44% of the land cover of the sub-region in 1990 but by 2015, the small scale farmlands had expanded beyond 1.0 million hectares and cover 47% of the land cover of the sub-region (Table 4.8). The grasslands remained fairly stable with a cover of 717,515 and 704,346 ha in 1990 and 2015, respectively. There were relatively small changes in land cover across the major land cover classes. The largest changes were the four-fold increase in commercial farmlands, and doubling of the built up area.

Table 4.8: Land Physical Accounts for the South Western Sub-Region of Uganda (in hectares)

South Western	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock 1st Jan. 1990	5,202	4,938	125,854	4,386	60,202	192,687	717,515	40,655	945,607	1,607	2,798	66,910	195
Additions	3,103	1,458	7,477	4,546	73,502	171,533	112,300	11,027	296,656	5,598	1,002	4,348	-
Reductions	5,052	3,521	3,858	1,998	35,600	94,095	410,701	13,094	119,570	949	1,704	2,212	195
Net gains/reductions	(1,949)	(2,063)	3,619	2,548	37,902	77,438	(298,401)	(2,067)	177,086	4,649	(702)	2,136	(195)
Closing stock 31st Dec. 1999	3,253	2,876	129,473	6,933	98,104	270,125	419,115	38,588	1,122,693	6,256	2,096	69,045	
Opening stock 1st Jan. 2000	3,253	2,876	129,473	6,933	98,104	270,125	419,115	38,588	1,122,693	6,256	2,096	69,045	
Additions	2,037	3,431	10,689	591	72,078	138,269	191,143	21,998	173,424	1,792	3,593	1,402	104
Reductions	2,870	1,495	13,467	6,538	65,421	123,156	162,562	10,236	222,845	5,364	501	6,047	
Net gains/reductions	(833)	1,936	(2,778)	(5,947)	6,657	15,113	28,581	11,762	(49,421)	(3,572)	3,092	(4,645)	104
Closing stock 31st Dec. 2004	2,420	4,812	126,696	986	104,761	285,237	447,696	50,350	1,073,272	2,685	5,189	64,401	52
Opening stock 1st Jan. 2005	2,420	4,812	126,696	986	104,761	285,237	447,696	50,350	1,073,272	2,685	5,189	64,401	52
Additions	6,369	3,968	15,543	3,412	27,610	74,495	355,426	15,414	239,778	1,968	3,574	3,871	491
Reductions	2,122	1,498	11,014	873	92,094	219,203	167,908	25,354	224,655	1,943	3,398	1,560	52
Net gains/reductions	4,247	2,470	4,529	2,539	(64,484)	(144,708)	187,518	(9,940)	15,123	25	176	2,311	439
Closing stock 31st Dec. 2009	6,668	7,282	131,224	3,525	40,277	140,529	635,215	40,410	1,088,395	2,711	5,365	66,712	245
Opening stock 1st Jan. 2010	6,668	7,282	131,224	3,525	40,277	140,529	635,215	40,410	1,088,395	2,711	5,365	66,712	245
Additions			45	20	3	6	21	-	58			73	20
Reductions	5,024	1,429	8,654	1,290	20,358	92,745	155,082	15,515	229,870	1,083	3,194	759	226
Net gains/reductions	(5,024)	(1,429)	(8,609)	(1,270)	(20,355)	(92,739)	(155,061)	(15,515)	(229,812)	(1,083)	(3,194)	(686)	(206)
Closing stock 31st Dec. 2014	7,779	9,592	127,786	8,849	54,207	122,881	704,346	37,482	1,014,834	5,962	4,690	69,851	300

The trends show only a gentle increase in small scale farmlands, and grasslands. Woodlands also declined gently, and the only large decrease was for bushlands which decreased by 68,000 ha (Figure 4.10). The relative stability of the sub-region indicates stable land cover/ land use patterns. The crop and livestock enterprises are fairly stable and managed and fairly homogenous across the sub-region; therefore, land cover and land use are stable and predictable. The long-term nature of the small scale farmland enterprises also means that the communities have learned to integrate the need for wood fuel, timber, pastures and sustainable water resources into their land use plans. The challenge for the sub-region is that a considerable area lies within the protected areas listed above. Therefore, future population increases are likely to result into migration from the sub-region to other sub-region in order to establish and mean livelihood needs. The sub-region may be close to full saturation between land use and current inhabitants.



	1	2	3	4	5
Forest Plantations (ha)	10,140	6,129	7,232	13,950	17,371
THF (ha)	130,240	136,406	127,682	134,749	136,635
Woodland (ha)	60,202	98,104	104,761	40,277	54,207
Bushland (ha)	192,687	270,125	285,237	140,529	122,881
Grassland (ha)	717,515	419,115	447,696	635,215	704,346
Wetland (ha)	40,655	38,588	50,350	40,410	37,482
Small scale farmland (ha)	945,607	1,122,693	1,073,272	1,088,395	1,014,834
Commercial farmland (ha)	1,607	6,256	2,685	2,711	5,962
Build up area (ha)	2,798	2,096	5,189	5,365	4,690
Open water (ha)	66,910	69,045	64,401	66,712	69,851

Years

Figure 4.10: Trends of land cover for South Western Sub-Region for 1990 - 2015

4.2.9 Teso sub-regional Land Physical Accounts

The Teso sub-region lies in eastern Uganda. The sub-region occupies 1.49 million hectares where 54% was under small scale farmlands in 1990 although that increased to 65% by 2015 (Table 4.9). Therefore, small scale farmlands were the dominant land cover in the sub-region. Grasslands were the second largest land cover with 423,577 ha but by 2015 the grassland cover had reduced to 129,340 ha, a 70% reduction in grassland cover. Similarly, woodlands reduced from 50,727 ha in 1990 to 5,590 ha. In contrast, wetlands increased by in more than 219% from 77,118 ha to 169,3224 ha. The Teso sub-region is regularly floods in the rain season and rain water trapped in grasslands with clayey soils could become seasonal or permanent wetlands.

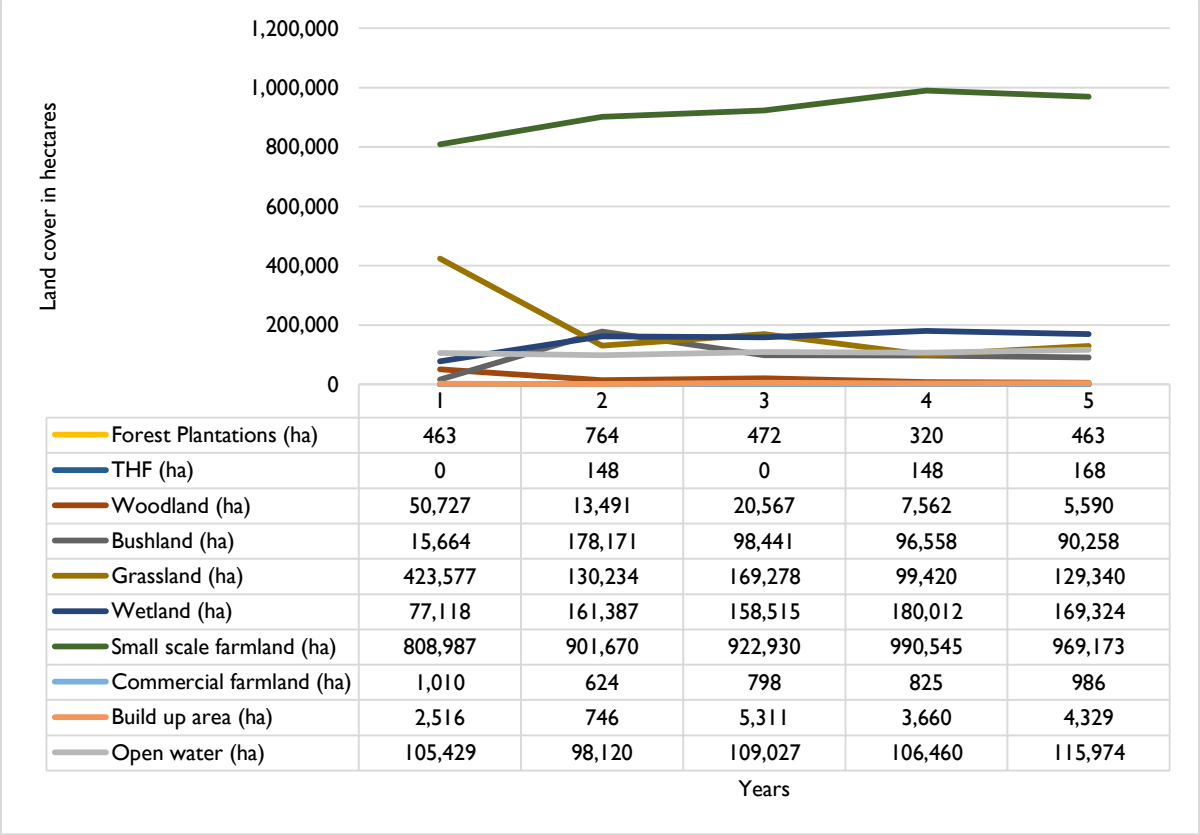
Table 4.9: Land Physical Accounts for the Teso Sub-Region of Uganda (in hectares)

Teso	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Build up area	Open water	Impedi-ments
Opening stock 1st Jan. 1990	176	287			50,727	15,664	423,577	77,118	808,987	1,010	2,516	105,429	117
Additions	120	404	148	0	8,253	176,013	23,452	101,000	146,534	394	390	11,630	507
Reductions	176	47			45,489	13,507	316,795	16,731	53,851	781	2,159	18,940	117
Net gains/reductions	(56)	357	148	-	(37,236)	162,506	(293,343)	84,269	92,683	(387)	(1,769)	(7,310)	390
Closing stock 31st Dec. 1999	120	644	148		13,491	178,171	130,234	161,387	901,670	624	746	98,120	253
Opening stock *2000*	120	644	148		13,491	178,171	130,234	161,387	901,670	624	746	98,120	253
Additions	96	42	0	0	18,045	64,792	121,512	38,711	88,082	774	5,044	15,625	536
Reductions	120	310	148		10,968	144,521	82,468	41,583	66,822	600	480	4,718	253
Net gains/reductions	(24)	(268)	(148)	-	7,077	(79,729)	39,044	(2,872)	21,260	174	4,564	10,907	283
Closing stock 31st Dec. 2004	96	376			20,567	98,441	169,278	158,515	922,930	798	5,311	109,027	268
Opening stock 1st Jan. 2005	96	376			20,567	98,441	169,278	158,515	922,930	798	5,311	109,027	268
Additions	63	248	148	0	6,190	75,980	52,099	59,130	129,728	820	2,057	5,730	184
Reductions	96	367			19,196	77,863	121,956	37,633	62,112	793	3,707	8,298	260
Net gains/reductions	(33)	(119)	148	-	(13,006)	(1,883)	(69,857)	21,497	67,616	27	(1,650)	(2,568)	(76)
Closing stock 31st Dec. 2009	63	257	148		7,562	96,558	99,420	180,012	990,545	825	3,660	106,460	96
Opening stock 1st Jan. 2010	63	257	148		7,562	96,558	99,420	180,012	990,545	825	3,660	106,460	96
Additions	27	151	20	0	2,392	63,807	73,236	31,741	49,584	604	2,104	12,169	5
Reductions	3	32			4,364	70,107	43,317	42,430	70,956	443	1,436	2,655	95
Net gains/reductions	24	119	20	-	(1,972)	(6,300)	29,919	(10,689)	(21,372)	161	668	9,514	(90)
Closing stock 31st Dec. 2014	87	376	168		5,590	90,258	129,340	169,324	969,173	986	4,329	115,974	3

The trend lines show that the small scale farmlands are the major influence within the sub-region. The rapid 37,236 ha reduction in woodlands between 1990 and 2005 was also a major feature and main deforestation action shown over the 25-year assessment period (Figure 4.11). The other land cover systems were fairly stable with minimal changes with the exception of wetlands that experience a large increase.

The Teso sub-region is a key crop farming area of the country. The dominant crops are the legumes and oil seeds that comprise groundnuts, sunflower, cow peas, pigeon peas and cereals such as millet. The region became an important fruit production area since the early 2000s with leading production of citrus and mangoes (UBOS 2018; 2008).

Whereas a large area of the sub-region is used for small scale farmlands, and alternative land covers are small, the increase in bushlands from 15,664 ha to 90,258 suggests that in addition to future limitations of land, that there may be challenges with both land productivity and utilisation in the short to medium term. However, allocation of 65% of the land to small scale farmlands means that there is limited land for other land uses and both efficiency in land use and a growing population that relies on small scale farmlands for livelihoods will increase conflict over land and result into migration to other areas in search of land for production.



	1	2	3	4	5
Forest Plantations (ha)	463	764	472	320	463
THF (ha)	0	148	0	148	168
Woodland (ha)	50,727	13,491	20,567	7,562	5,590
Bushland (ha)	15,664	178,171	98,441	96,558	90,258
Grassland (ha)	423,577	130,234	169,278	99,420	129,340
Wetland (ha)	77,118	161,387	158,515	180,012	169,324
Small scale farmland (ha)	808,987	901,670	922,930	990,545	969,173
Commercial farmland (ha)	1,010	624	798	825	986
Build up area (ha)	2,516	746	5,311	3,660	4,329
Open water (ha)	105,429	98,120	109,027	106,460	115,974

Figure 4.11: Trends of land cover for Teso Sub-Region for 1990 - 2015

4.2.10 West Nile sub-regional Land Physical Accounts

The West Nile sub-region occupies an area of 1.58 million ha, equivalent to 6.5% of the national land cover. The sub-region had two dominant land covers in 1990 small scale farmlands and woodlands with 653,013 ha (41.4% of the sub-region) and 559,990 ha (35.5% of the sub-region), respectively; altogether the two land covers occupied 77% of the sub-region. Grasslands occupied 15% of the sub-region and only 7% of the sub-region was occupied by the other 10 land covers. However, by 2015, the land cover distribution had transformed. Small scale farmlands and grasslands occupied 855,483 ha (54%) and 338,046 ha (21.4%), respectively while woodlands had reduced to 140,295 ha i.e. 8.9% of the land cover for the sub-region (Table 4.10).

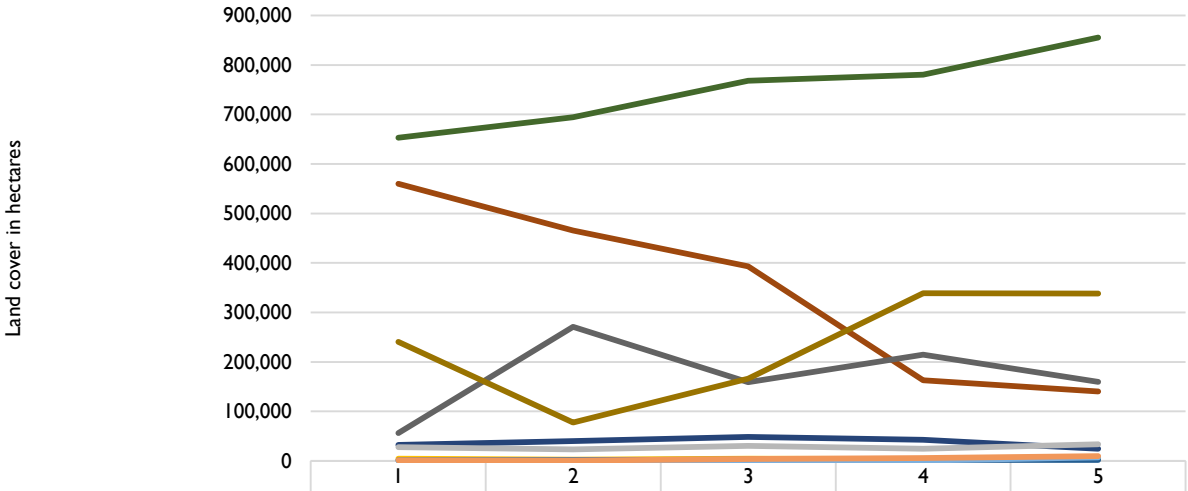
The conversion of woodlands in the West Nile sub-region follows a similar pattern of woodland conversion observed in the northern and eastern parts of the country. The woodlands were generally converted to provided wood fuel and they either degraded to woodlands or were converted into small scale farmlands.

Table 4.10: Land Physical Accounts for the West Nile Sub-Region of Uganda (in hectares)

West Nile	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Build up area	Open water	Impediments
Opening stock 1st Jan. 1990	2,083	2,454	1,458	5	559,990	56,104	240,327	32,092	653,013	836	1,187	27,507	216
Additions	229	311	331	579	135,112	242,426	38,098	16,176	181,319	220	454	3,538	0
Reductions	1,855	509	274	5	229,570	27,374	201,022	8,326	140,079	632	951	7,980	216
Net gains/reductions	(1,626)	(198)	57	574	(94,458)	215,052	(162,924)	7,850	41,240	(412)	(497)	(4,442)	(216)
Closing stock 31st Dec. 1999	458	2,256	1,516	579	465,532	271,155	77,403	39,943	694,253	424	689	23,065	
Opening stock *2000*	458	2,256	1,516	579	465,532	271,155	77,403	39,943	694,253	424	689	23,065	
Additions	2,014	310	1,051	1	110,092	101,294	135,626	26,149	163,801	469	3,392	9,924	599
Reductions	171	330	179	576	182,412	213,255	46,698	17,423	90,206	235	130	2,809	
Net gains/reductions	1,843	(20)	872	(575)	(72,320)	(111,961)	88,928	8,726	73,595	234	3,262	7,115	599
Closing stock 31st Dec. 2004	2,301	2,235	2,388	4	393,212	159,194	166,332	48,669	767,848	658	3,952	30,180	300
Opening stock 1st Jan. 2005	2,301	2,235	2,388	4	393,212	159,194	166,332	48,669	767,848	658	3,952	30,180	300
Additions	1,746	347	410	0	29,171	157,303	221,584	14,492	136,484	754	4,362	1,518	562
Reductions	1,186	1,438	980	4	259,399	101,921	48,902	20,169	123,972	450	2,366	7,371	287
Net gains/reductions	560	(1,091)	(570)	(4)	(230,228)	55,382	172,682	(5,677)	12,512	304	1,996	(5,853)	275
Closing stock 31st Dec. 2009	2,860	1,144	1,818		162,984	214,576	339,014	42,992	780,361	961	5,948	24,327	287
Opening stock 1st Jan. 2010	2,860	1,144	1,818		162,984	214,576	339,014	42,992	780,361	961	5,948	24,327	287
Additions	2,873	628	50	1,607	49,984	94,344	130,581	3,655	152,953	6,939	5,991	9,965	875
Reductions	1,361	577	1,691		72,672	148,954	131,548	21,813	77,830	473	2,319	498	254
Net gains/reductions	1,512	51	(1,641)	1,607	(22,688)	(54,610)	(967)	(18,158)	75,123	6,466	3,672	9,467	621
Closing stock 31st Dec. 2014	4,372	1,195	177	1,607	140,295	159,966	338,046	24,834	855,483	7,427	9,620	33,795	454

The trends for land cover change reinforce the dominance of the small scale farmlands and the decline of woodlands within the sub-region. The West Nile region has over the last 25 years been a refugee hosting and areas and recent results show that refugee influxes have led to considerable deforestation for wood fuel and charcoal (NEMA 2017).

The sub-region is small in area despite the high demand on land based resources (Figure 4.12). The West Nile region may not be at risk of saturation of land cover and land use but there are indications that the land use patterns do not provide efficiency. The rapid loss of natural forest cover means a deficit of wood fuel would be expected in future and the expansion of bushlands suggests that some of the land is underutilised. The area for forest plantations is quite low and unlikely to mean that needs for timber for the sub-region therefore, timber would have to be imported into the sub-region.



	1	2	3	4	5
Forest Plantations (ha)	4,537	2,714	4,536	4,004	5,567
THF (ha)	1,463	2,095	2,392	1,818	1,784
Woodland (ha)	559,990	465,532	393,212	162,984	140,295
Bushland (ha)	56,104	271,155	159,194	214,576	159,966
Grassland (ha)	240,327	77,403	166,332	339,014	338,046
Wetland (ha)	32,092	39,943	48,669	42,992	24,834
Small scale farmland (ha)	653,013	694,253	767,848	780,361	855,483
Commercial farmland (ha)	836	424	658	961	7,427
Build up area (ha)	1,187	689	3,952	5,948	9,620
Open water (ha)	27,507	23,065	30,180	24,327	33,795

Years

Figure 4.12: Trends of land cover for West Nile Sub-Region for 1990 - 2015

4.2.11 Western sub-regional Land Physical Accounts

The Western sub-region is the largest in the country with an area of 3.36 million ha equivalent to about 14% of the national land cover. The Western sub-region lies along Uganda's border with the Democratic Republic of Congo (DRC). The sub-region is also the centre component of Uganda's Albertine Graben where most of Uganda's current oil discoveries under development are located. The region hosts key protected areas including Murchison Falls National Park, Budongo and Bugoma Central Forest Reserves, Toro Semliki Wildlife Reserve, and Semuliki National Park, among others.

The land cover patterns for the Western sub-region (Table 4.11) show that in 1990 five land covers were dominant, small scale farmlands, woodlands, grasslands open water and THF well stocked, altogether the five land cover classes accounted for 92.5% of the land cover in the sub-region. The largest land cover were small scale farmlands with 991,776 ha.

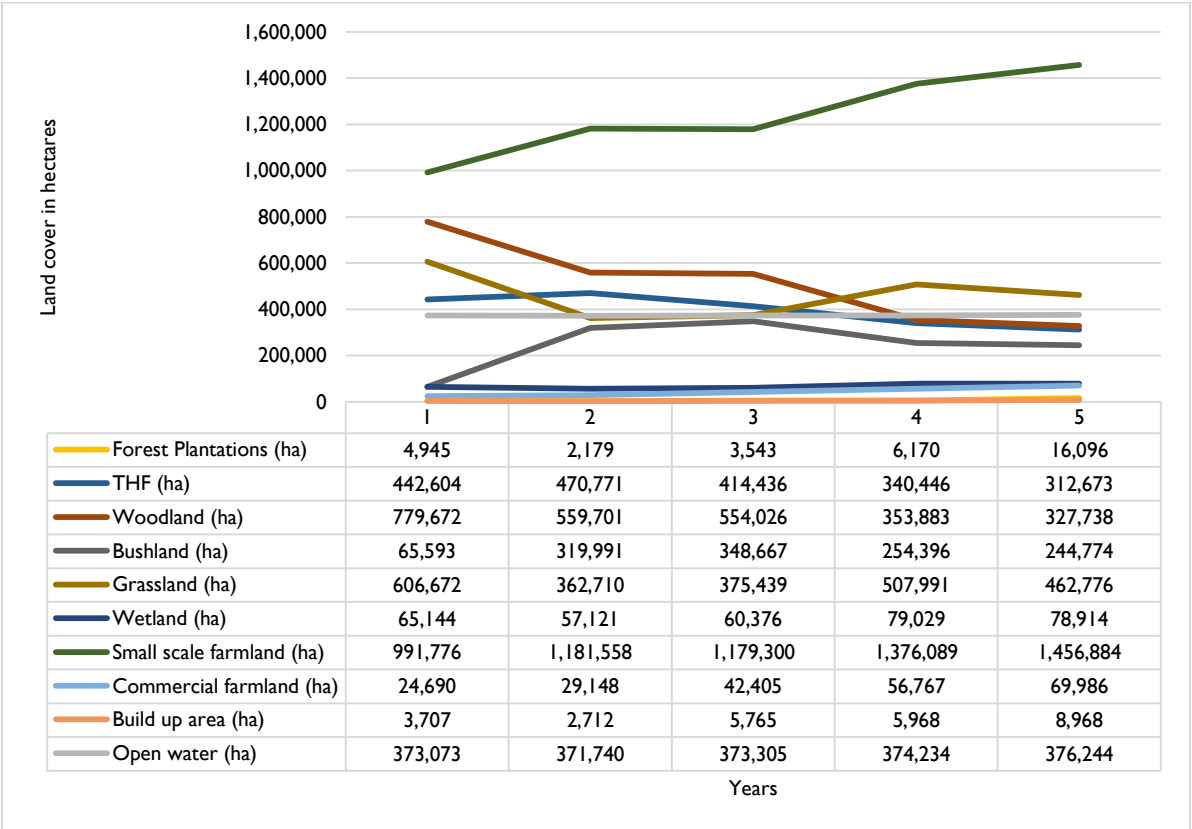
By 2015, the small scale farmlands had surged to 1.46 million ha, a 47% increase from their cover in 1990. In 2015, small scale farmland accounted for 43.5% of the land cover in the Western sub-region. Concurrently, woodlands had a net reduction of 58% of the woodlands cover from 1990. Grasslands reduced by 23% and THF well stocked had also reduced by 23%. The transformation of land cover also included a 283% increase in commercial farmlands, a 242% increase in built up area a 52% reduction in THF well stock and a three-fold increase in forest plantation cover.

Table 4.11: Land Physical Accounts for the western sub-region of Uganda (in hectares)

Western	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock 1st Jan. 1990	1,625	3,320	355,980	86,624	779,672	65,593	606,672	65,144	991,776	24,690	3,707	373,073	1,295
Additions	79	507	73,371	100,688	204,154	298,876	155,716	25,329	333,593	14,455	1,241	2,603	3,023
Reductions	1,558	1,793	89,321	56,572	424,126	44,478	399,677	33,352	143,811	9,996	2,236	3,936	1,238
Net gains/reductions	(1,479)	(1,286)	(15,950)	44,116	(219,972)	254,398	(243,961)	(8,023)	189,782	4,459	(995)	(1,333)	1,785
Closing Stock 2000	146	2,033	340,031	130,740	559,701	319,991	362,710	57,121	1,181,558	29,148	2,712	371,740	1,540
Opening stock 1st Jan. 2000	146	2,033	340,031	130,740	559,701	319,991	362,710	57,121	1,181,558	29,148	2,712	371,740	1,540
Additions	2,147	576	33,438	70,010	209,877	214,801	147,382	24,957	191,939	19,106	3,465	3,551	3,599
Reductions	61	1,299	74,713	85,071	215,552	186,126	134,653	21,703	194,196	5,849	412	1,986	1,321
Net gains/reductions	2,086	(723)	(41,275)	(15,061)	(5,675)	28,675	12,729	3,254	(2,257)	13,257	3,053	1,565	2,278
Closing Stock 2005	2,232	1,311	298,756	115,680	554,026	348,667	375,439	60,376	1,179,300	42,405	5,765	373,305	1,909
Opening stock 1st Jan. 2005	2,232	1,311	298,756	115,680	554,026	348,667	375,439	60,376	1,179,300	42,405	5,765	373,305	1,909
Additions	2,160	3,433	40,305	45,753	154,947	185,718	258,363	37,761	361,103	27,580	3,911	3,898	7,739
Reductions	2,021	945	61,757	98,290	355,090	279,988	125,812	19,108	164,315	13,218	3,708	2,969	1,253
Net gains/reductions	139	2,488	(21,452)	(52,537)	(200,143)	(94,270)	132,551	18,653	196,788	14,362	203	929	6,486
Closing stock 31st Dec. 2009	2,371	3,799	277,303	63,143	353,883	254,396	507,991	79,029	1,376,089	56,767	5,968	374,234	4,198
Opening stock 1st Jan. 2010	2,371	3,799	277,303	63,143	353,883	254,396	507,991	79,029	1,376,089	56,767	5,968	374,234	4,198
Additions	10,709	1,857	22,469	25,344	108,030	142,462	104,944	22,810	231,913	25,625	5,994	5,139	6,128
Reductions	2,021	945	61,757	98,290	355,090	279,988	125,812	19,108	164,315	13,218	3,708	2,969	1,253
Net gains/reductions	8,688	912	(39,288)	(72,946)	(247,060)	(137,526)	(20,868)	3,702	67,598	12,407	2,286	2,170	4,875
Closing stock 31st Dec. 2014	12,129	3,967	271,501	41,172	327,738	244,774	462,776	78,914	1,456,884	69,986	8,968	376,244	4,119

The trend line for the sub-region's land cover shows the steady increase of small scale farmlands while the grasslands, tropical high forests, and woodlands (Figure 4.13). Wetland cover, forest plantations, commercial farmlands and built up areas increased. The Western sub-region is traditionally important in the production of maize and sugarcane, and several food crops (UBOS 2008, 2018). However, the area is an important conservation zone that now also hosts the key oil and gas development activities in the country. From the perspective of the land accounts, the optimal use planning is critical to the success of the land uses within the sub-region. The rapid expansion of agriculture may be related to the industrial need of sugarcane for the sugar industry and cogeneration of electricity while the expansion of food crop may be for both subsistence needs and commercial maize, cassava and beans production, among others.

Given the large size of the sub-region, there is a risk of assuming that small scale farmlands can be expanded continuous. However, the distribution of land covers in 1990 showed a more even distribution between farmlands and other land covers for which land was allocated to protected areas and some of the land provided wood fuel, timber and other ecosystem services to communities. The concentration of large economic activities of tourism, oil and gas, small scale and commercial farmlands may overwhelm the sub-region and lead to poor land use and risks of pollution, especially within the protected areas and the large open water system comprising Lake Albert and associated rivers and catchments. The Government developed a Physical Development Plan for the Albertine Graben (GoU/ MoLHUD 2016) that shows the Government's priorities on land use. However, the plan was not implemented. The plan did not benefit from detailed natural capital accounts for the sub-region and may lead to sub-optimal outcomes if it is not reinforced.



	1	2	3	4	5
Forest Plantations (ha)	4,945	2,179	3,543	6,170	16,096
THF (ha)	442,604	470,771	414,436	340,446	312,673
Woodland (ha)	779,672	559,701	554,026	353,883	327,738
Bushland (ha)	65,593	319,991	348,667	254,396	244,774
Grassland (ha)	606,672	362,710	375,439	507,991	462,776
Wetland (ha)	65,144	57,121	60,376	79,029	78,914
Small scale farmland (ha)	991,776	1,181,558	1,179,300	1,376,089	1,456,884
Commercial farmland (ha)	24,690	29,148	42,405	56,767	69,986
Build up area (ha)	3,707	2,712	5,765	5,968	8,968
Open water (ha)	373,073	371,740	373,305	374,234	376,244

Years

Figure 4.13: Trends of land cover for Western Sub-Region for 1990 - 2015

CHAPTER 5
LAND ACCOUNTS BY DISTRICT

5.1 Districts of Uganda

At independence in 1962, Uganda had 17 Districts. The original 17 Districts (or provinces) were; Acholi, Ankole, Bugisu, Bukedi, Bunyoro, Busoga, Karamoja, Kigezi, Lango, Madi, Masaka, Mbale Town, Mengo, Mubende, Teso, Toro and West Nile. By July 2018, the number of Districts had increased to 127 (UBOS 2018).

In July 2019, nine additional Districts started operating after approval by the Parliament of Uganda (MFPED 2019). The Land Physical Accounts of Uganda was based on data collected as part of the 2015 National Biomass Survey. The set of Districts adopted were for July 2010 when the country had 112 operational Districts (NFA 2019). Based on the four regions of the country, eastern Uganda had the largest number of Districts at 33 while Central Uganda had the lowest number with 24,

Central	Eastern	Northern	Western
1. Bukomansimbi	1. Amuria	1. Abim	1. Buhweju
2. Butambala	2. Budaka	2. Adjumani	2. Buliisa
3. Buvuma	3. Bududa	3. Agago	3. Bundibugyo
4. Buikwe	4. Bugiri	4. Alebtong	4. Bushenyi
5. Gomba	5. Bukedea	5. Amolatar	5. Hoima
6. Kalangala	6. Bukwo	6. Amudat	6. Ibanda
7. Kalungu	7. Bulambuli	7. Amuru	7. Isingiro
8. Kampala	8. Busia	8. Apac	8. Kabale
9. Kayunga	9. Butaleja	9. Arua	9. Kabarole
10. Kiboga	10. Buyende	10. Dokolo	10. Kamwenge
11. Kyankwanzi	11. Iganga	11. Gulu	11. Kanungu
12. Luwero	12. Jinja	12. Kaabong	12. Kasese
13. Lwengo	13. Kaberamaido	13. Kitgum	13. Kibale
14. Lyantonde	14. Kaliro	14. Koboko	14. Kiruhura
15. Masaka	15. Kamuli	15. Kole	15. Kiryandongo
16. Mityana	16. Kapchorwa	16. Kotido	16. Kisoro
17. Mpigi	17. Katakwi	17. Lamwo	17. Kyegegwa
18. Mubende	18. Kibuku	18. Lira	18. Kyenjojo
19. Mukono	19. Kumi	19. Maracha	19. Masindi
20. Nakaseke	20. Kween	20. Moroto	20. Mbarara
21. Nakasongola	21. Luuka	21. Moyo	21. Mitooma
22. Rakai	22. Manafwa	22. Nakapiriprit	22. Ntoroko
23. Sembabule	23. Mayuge	23. Napak	23. Ntungamo
24. Wakiso	24. Mbale	24. Nebbi	24. Rubirizi
	25. Namayingo	25. Nwoya	25. Rukungiri
	26. Namutumba	26. Otuke	
	27. Ngora	27. Oyam	
	28. Pallisa	28. Pader	
	29. Serere	29. Yumbe	
	30. Sironko	31. Zombo	
	32. Soroti		
	33. Tororo		

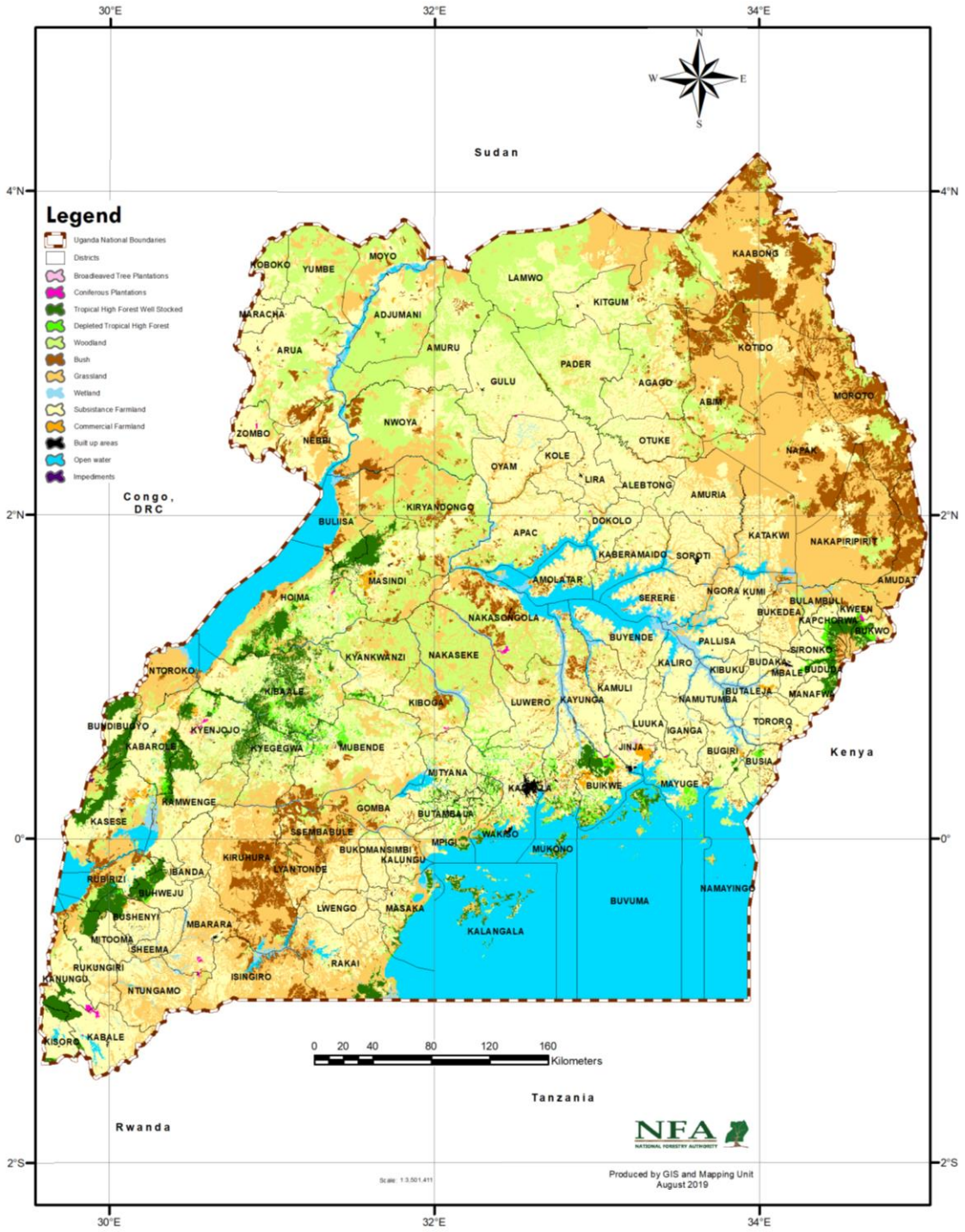


Figure 5.1: Land cover/ land use 1990 by District

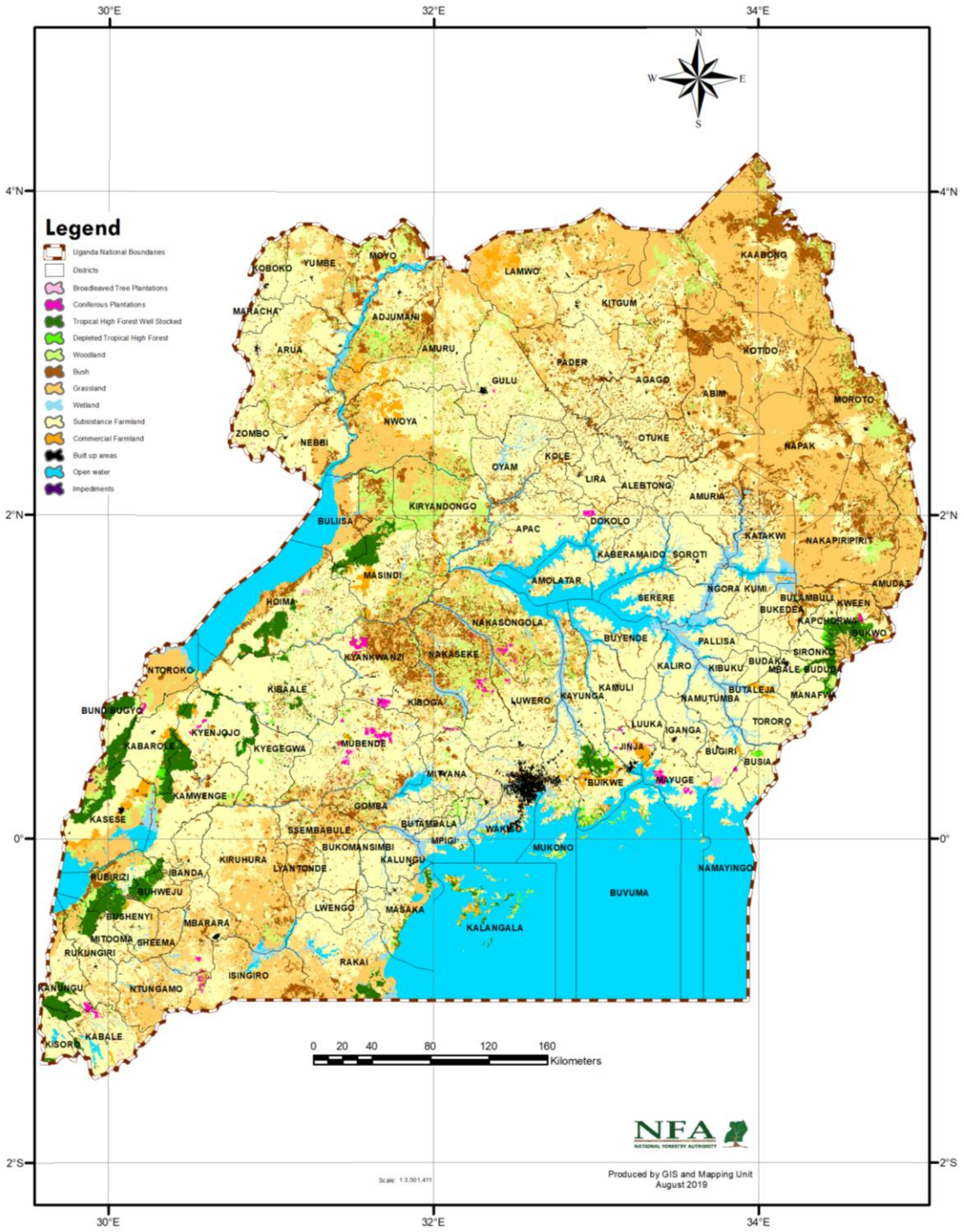


Figure 5.2: Land cover/ land use 2015 by District

5.2 Physical land cover/and use accounts for Districts

5.2.1 Land Physical Accounts for Abim District

Abim District is located in Northern Uganda. The land cover/land use for Abim District is concentrated in woodlands, bushlands, grasslands, wetlands, small scale farmlands, built up areas, open water and impediments (Table 5.1). Out of a total area of 235,271 ha, 44.5% (104,793 ha) was under woodlands in 1990. By 2015, 92.5% of the woodlands had been converted and only 7,851 ha of woodlands remained. Conversely, bushlands increased by 41,053 h (or 5,000%), grasslands increased by 38,956ha or 39.8%, wetlands by 288 ha and small scale farmlands from 15,530 ha (or 49.2%), built up areas by 1,212 ha (8,700%) and open water by 16 ha (260%).

Table 5.1: Land cover/ land use for Abim District (in hectares)

1990 to 2015	Forest plantation	Tropical High Forests	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	-	-	104,793	833	97,904	-	31,597	-	14	10	119
Additions	-	-	1,161	41,757	57,716	288	25,349	-	1,222	16	6
Reductions	-	-	98,103	704	18,758	-	9,819	-	10	0	119
Closing stock	-	-	*7,851*	*41,886*	*136,862*	*288*	*47,127*	-	*1,226*	*26*	*6*
Net gains/reductions	-	-	*(96,942)*	*41,053*	*38,958*	*288*	*15,530*	-	*1,212*	*16*	*(113)*

The largest transition in land cover/ land use change was degradation and conversion of woodlands into bushlands, grasslands, and small scale farmlands, among others. There was a noticeable increase in surface water retention that lead to an increase in the wetland areas and the open water cover (Figure 5.3). Small scale farmlands occupied only 13.4% of the land cover in 1990 compared to 41.6% for grasslands suggesting livestock production was likely a more important source of livelihoods. Even though farmlands increased by nearly 50%, the increase was small in hectares compared to that of bushlands and grasslands, therefore livestock production was likely higher than crop production.

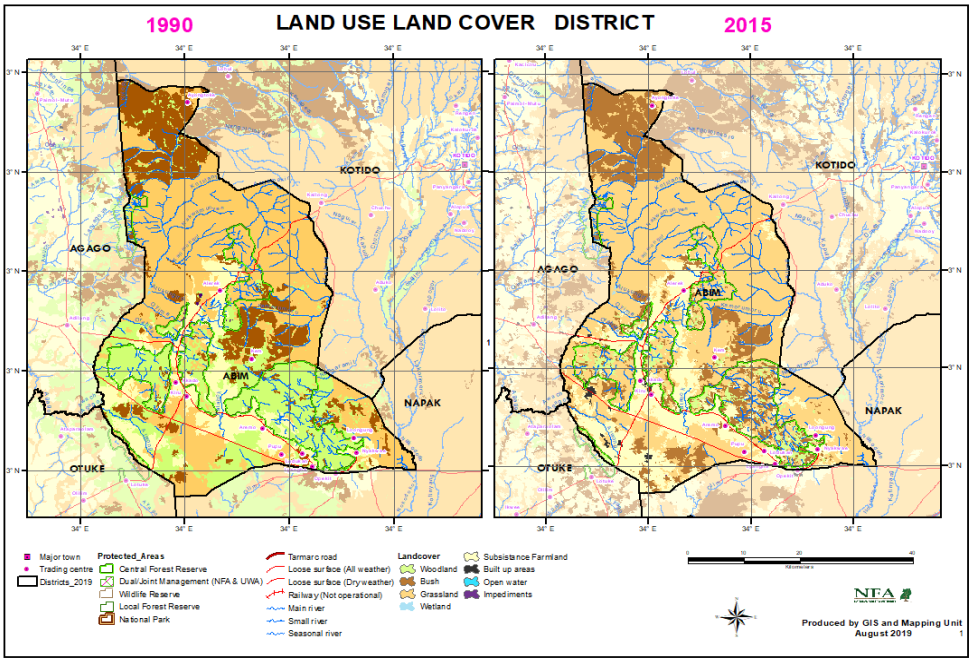


Figure 5.3: Land cover/ land use for Abim District 1990 and 2015

5.2.2 Land Physical Accounts for Adjumani District

Adjumani District had a total land cover of 308,702.5 ha and like Abim District, the District did not have any forest plantations but there were tropical high forests. Indeed, while THF well stock declined, THF low stocked increased (Table 5.2). In 1990, the major land cover/ land uses in Adjumani were woodlands (149,852 ha) 48.5% and small scale farmlands (96,708 ha) 31.3% followed with a large difference by grasslands (43,258 ha) 14% The major land cover/ land use change for Adjumani, between 1990 and 2015, was loss of 64.7% of the woodland cover between 1990 and 2015. Similarly, 86% of the THF well stocked was lost while THF low stocked gained 1,607 ha much was likely from degradation of the THF well stocked while wetlands also decreased by 24.2%. in contrast, bushlands increased 30-fold, grasslands increased by 69.5% and small scale farmlands and commercial farmlands increased by 11.6% and 1,078%, respectively albeit the commercial farmlands increased from a lower base of only 605 ha in 1990. The built up areas increased by 244% from 320 ha to 782 ha.

Table 5.2: Land cover/ land use for Adjumani District (in hectares)

1990 to 2015	Forest plantations	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	-	1,268	0	149,852	1,630	43,258	9,428	96,708	605	320	5,615	19
Additions	-	177	1,607	9,774	50,740	58,457	1,575	39,900	6,408	665	2,501	3
Reductions	-	1,268	0	106,705	1371	28,386	3,852	28,688	493	203	824	19
Closing stock	-	*177*	*1,607*	*52,922*	*50,999*	*73,329*	*7,151*	*107,919*	*6,521*	*782*	*7,292*	*3*
Net gains/reductions	-	*(1,091)*	*1,607*	*(96,931)*	*49,369*	*30,071*	*(2,277)*	*11,212*	*5,915*	*462*	*1,677*	*(16)*

Adjumani District experienced a large loss of woodlands over the 25-year period (Figure 5.4). The woodlands were most likely replaced by bushlands, grasslands and small scale farmlands. The larger proportion of land converted to bushlands and grasslands compared to small scale and commercial farmlands suggests that livestock production is particularly strong on the one hand, and that there is slack in crop production, which means communities are willing to leave land to degrade to bushlands rather than use it for crop production.

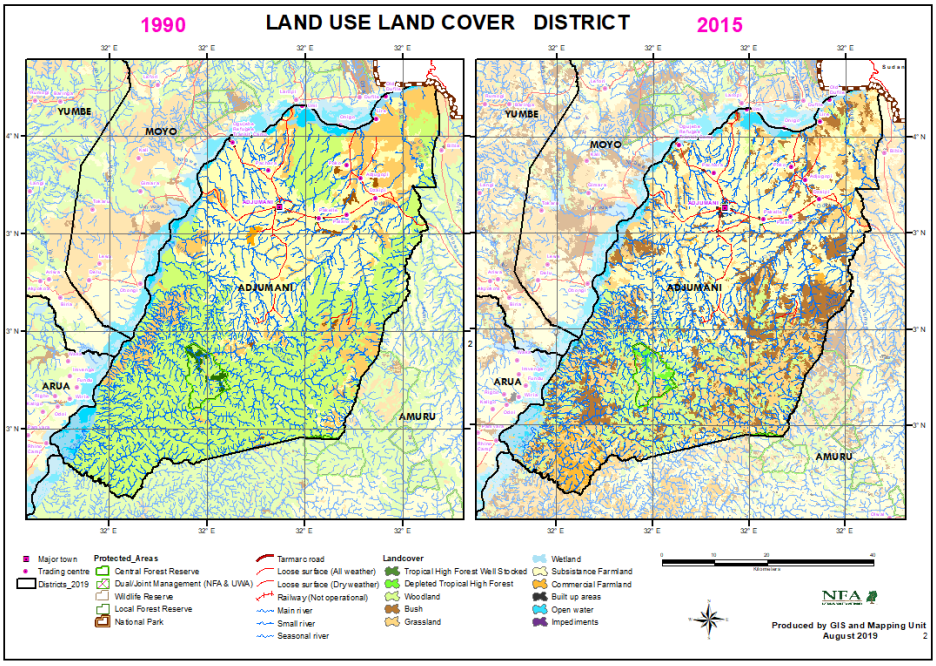


Figure 5.4: Land cover/ land use for Adjumani District 1990 and 2015

5.2.3 Land Physical Accounts for Agago District

Agago District's total land cover of 350,244.1 ha was in 1990 dominated by small scale farmlands (186,644 ha) 53.3% and woodlands (114,410 ha) 32.7%. By 2015, the small scale farmlands had increased by 12.2% while the woodlands decreased by 91.1%. on the other hand, bushlands increased from just 224 ha to 50,520 ha while grasslands also increased from 48,471 ha to 78,333 ha (Table 5.3, Figure 5.5). Built-up areas increased seven-fold from 206 ha to 1,420 ha.

Table 5.3: Land cover/ land use for Agago District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High Forests	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	1	-	-	114,410	224	48,471	-	186,644	-	206	-	287
Additions	8	-	-	4,429	50,517	62,865	88	59,947	58	1,521	-	96
Reductions	1	-	-	108,662	221	33,003	-	37,253	-	101	-	287
Closing Stock	8	-	-	10,177	50,520	78,333	88	209,338	58	1,626	-	96
Net gains/reductions	7	-	-	*(104,233)*	*50,296*	*29,86)*	*88*	*22,694*	*58*	*1,420*	-	*(191)*

The decline in woodlands in Agago District followed the trend of woodland degradation observed in Northern Uganda. For Agago District, small scale farmlands were leading land use and there was increasing demand of land for agriculture. Bushlands generally represent land left to fallow while grasslands may be land used for livestock production.

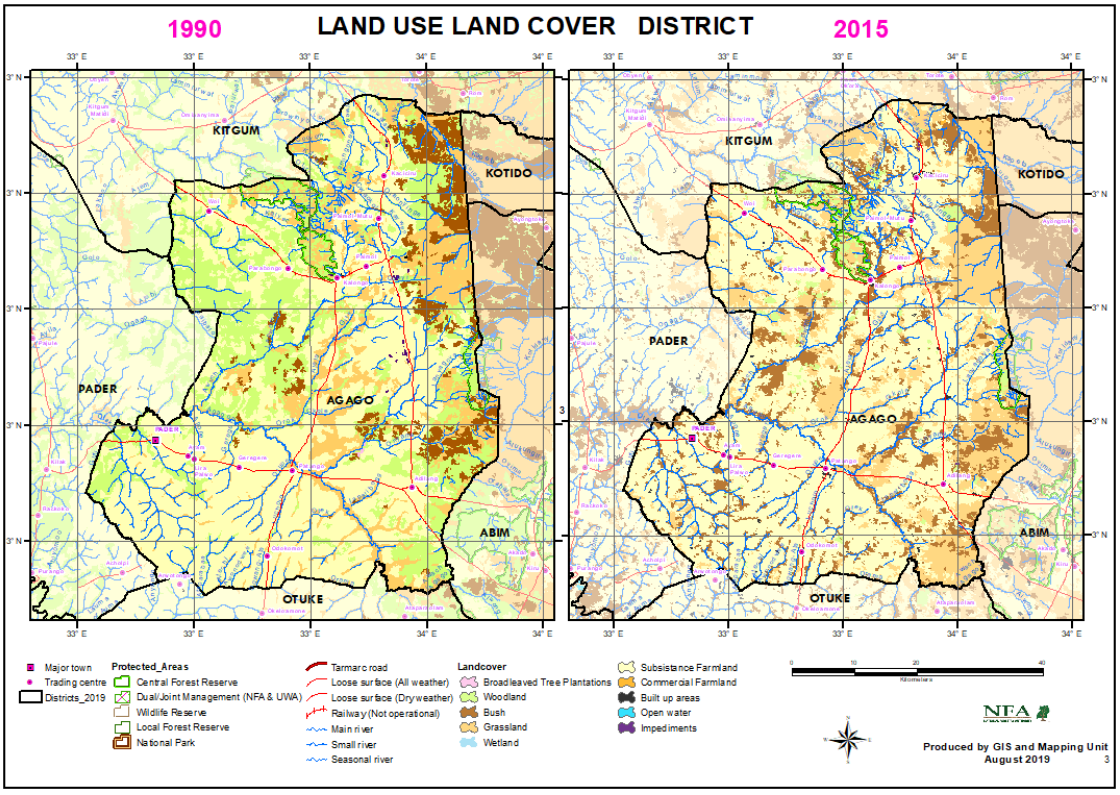


Figure 5.5: Land cover/ land use for Agago District 1990 and 2015

5.2.4 Land Physical Accounts for Alebtong District

The total land cover of Alebtong District is 152,953.1 ha. In 1990, 82.2% of the land cover was under small scale farmlands (Table 5.4, Figure 5.6). While grasslands and woodlands occupied 13% and 4.5%, respectively. Between 1990 and 2015, the largest increase in land cover was for bushlands. Whereas bushlands were not recorded in 1990, by 2015, the bushland had grown to 12,124 ha while small scale farmlands increased by 5,886 ha and in 2015 occupied 86% of the District's land cover. Even for such a small land cover of only 13% of the Districts land cover, Alebtong lost 91.8% of its woodland cover leaving a woodland cover of only 617 ha by 2015.

Table 5.4: Land cover/ land use for Alebtong District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High Forests	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	7	-	-	6,898	0	19,889	0	125,685	217	214	41	2
Additions	5	-	-	559	12,124	2,717	1,184	15,606	0	300	483	96
Reductions	7	-	-	6,839	0	15,999	0	9,719	217	152	41	2
Closing Stock	5	-	-	617	12,124	6,607	1,184	131,572	0	362	483	0
Net gains/reductions	*(2)*	-	-	*(6,280)*	*12,124*	*(13,282)*	*1,184*	*5,886*	*(217)*	*148*	*441*	*95*

Whereas Alebtong was generally under small holder production, the increase of bushlands suggests technical production challenges that means that some land is allowed to convert to bushlands perhaps from the lost woodlands. Small scale farmlands are a very dominant livelihood that there is a very strong likelihood that alternative ecosystem services and livelihoods could be limited.

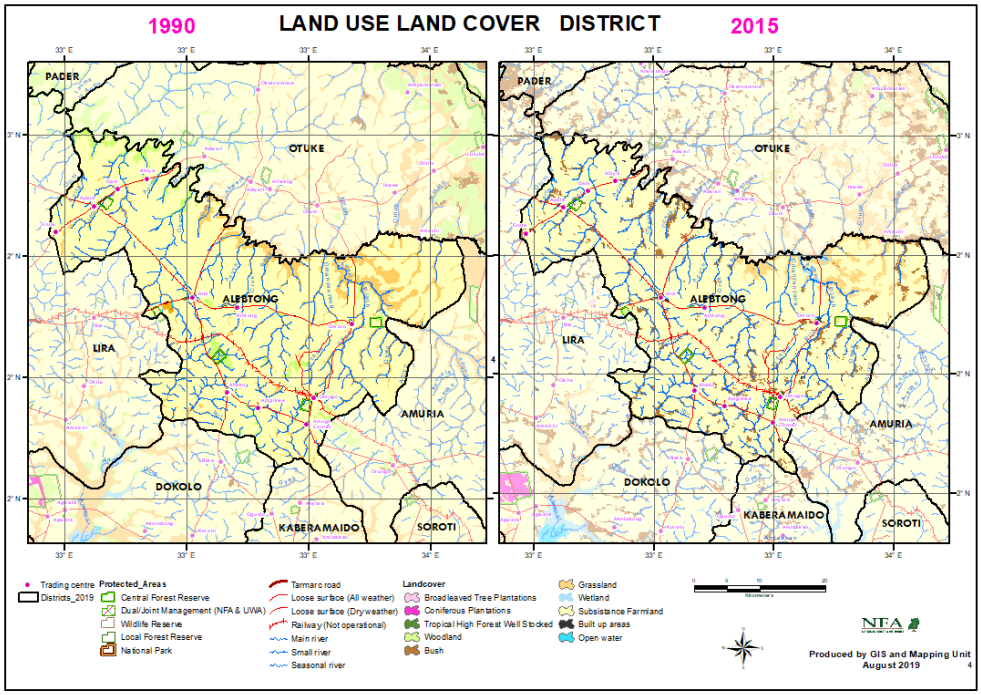


Figure 5.6: Land cover/ land use for Alebtong District

5.2.5 Land Physical Accounts for Amolatar District

Amolatar District is one of the Districts in the Lango sub-region. The District had a land cover of 170,944.3 ha. In 1990, 41.2% of the District's cover was under open water and 33.7% under small scale farmlands (Table 5.5, Figure 5.7). The District is surrounded by Lake Kwania on the northern side and Lake Kioga on the southern side. Small holder crop farming and capture fisheries are likely the most important source of livelihood for the people living in the District.

Table 5.5: Land cover/ land use for Amolatar District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High Forests	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	16	-	-	13,587	7,226	12,945	8,798	57,578	80	119	70,502	95
Additions	-	-	-	3,140	7,319	1,767	12,235	13,580	-	351	7,505	-
Reductions	16	-	-	12,834	6,478	12,942	6,881	5,100	80	119	1,353	95
Closing stock	-	-	-	3,893	8,067	1,770	14,152	66,058	-	351	76,654	-
Net gains/reductions	*(16)*	-	-	*(9,694)*	*842*	*(11,175)*	*5,354*	*8,480*	*(80)*	*232*	*6,152*	*(95)*

Small scale farmlands, wetlands, bushlands and built up areas increased between 1990 and 2015 at the expense of woodlands and grasslands. Small scale farmlands increased by 8,480 ha or 8% of all the land in the District, while wetlands expanded by 60.9% and bushlands increased by 842 ha. Woodlands decreased by 71.4% from 13,587 ha to 3,893 ha.

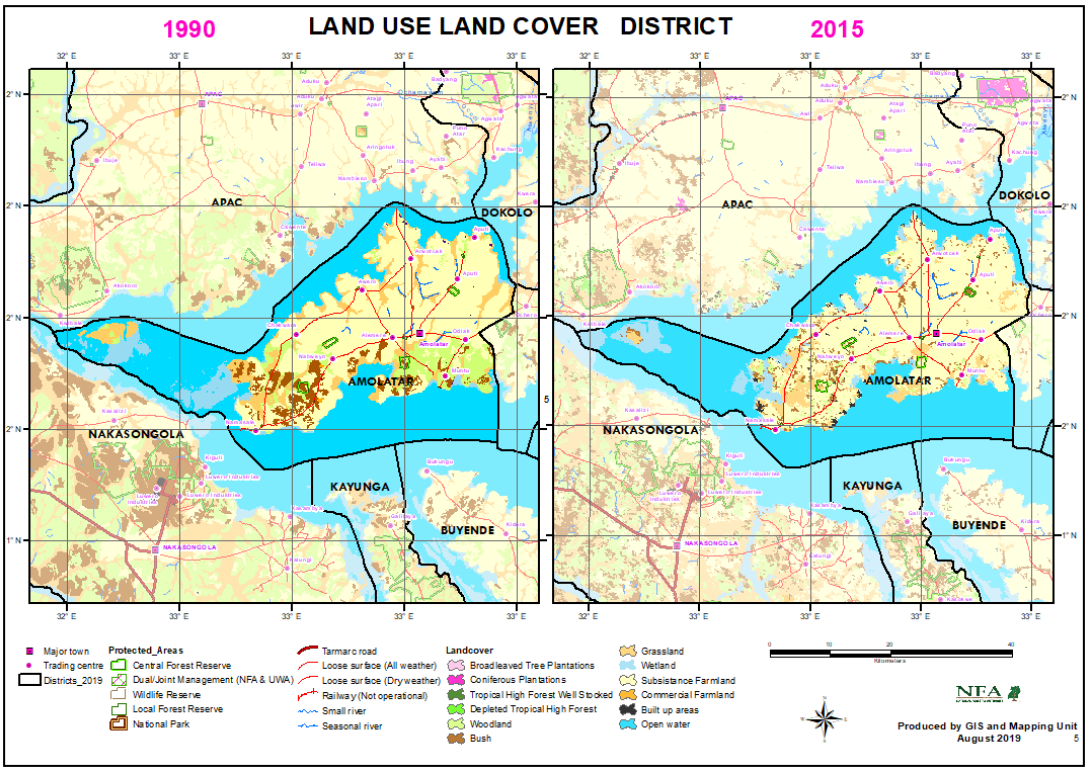


Figure 5.7: Land cover/ land use for Amolatar District

5.2.6 Land Physical Accounts for Amudat District

Amudat District had a total cover of 163,670 ha. In 1990, 50.6% was under bushlands and 44% was under grasslands (Table 5.6). Only 383 ha or 0.2% was under small scale farmlands while woodlands occupied 5% of the land cover. By 2015, small scale farmlands had increased 26-fold to 10,037 ha while woodlands also increased by 6,869 ha. Grasslands continued to increase at the expense of bushlands. The bushlands decreased by 75.7%.

Table 5.6: Land cover/ land use for Amudat District (in hectares)

1990 to 2015	Forest plantations	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi ments
Opening stock	-	-	-	8,133	82,753	72,514	26	383	-	62	-	-
Additions	-	45	-	12,779	12,274	68,447	0	9,900	-	134	-	-
Reductions	-	-	-	5,910	74,920	22,415	26	246	-	62	-	-
Closing stock	-	45	-	15,001	20,107	118,546	0	10,037	-	134	-	-
Net gains/reductions	-	45	-	6,869	(62,646)	46,032	(26)	9,655	-	72	-	-

The land cover transformation in Amudat was the increased diversification in use of land as an asset. Whereas in 1990 the land was generally under the cover of bushlands and grasslands, by 2015 the land cover/ land use had changed (Figure 5.8). Grassland dominance had increased but small scale farmlands, and woodlands had increased in prominence.

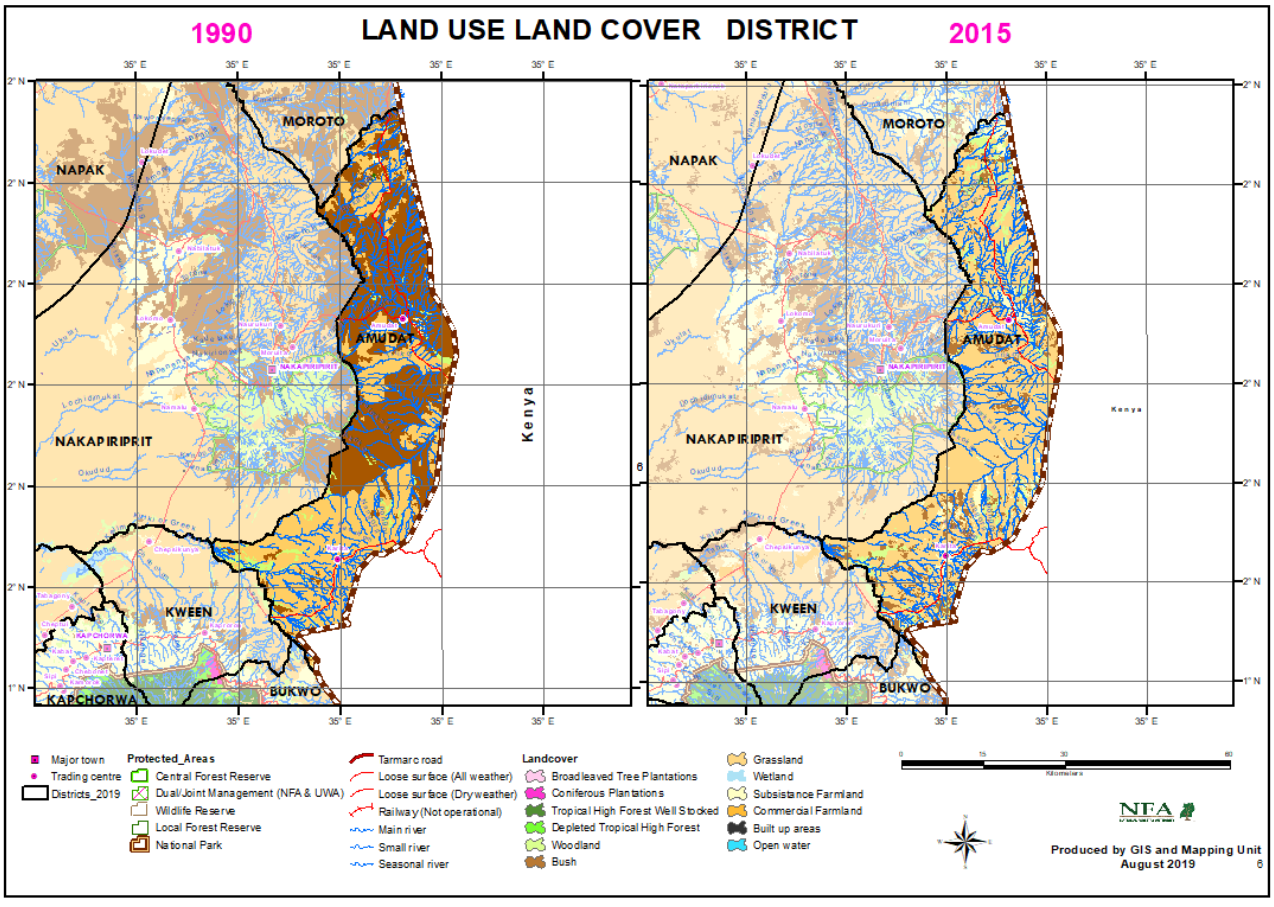


Figure 5.8: Land cover/ land use for Amudat District

5.2.7 Land Physical Accounts for Amuria District

Amuria District is located in eastern Uganda and it covers 258,298.1 ha. The small scale farmlands occupied 53.6% of the land cover 1990 and by 2015, the small scale farmlands had increased to 64.7% of the land cover. Alongside farmlands, grasslands occupied 43.2% of the land cover in 1990 but by 2015, the grasslands had reduced by 61,956 ha. Conversely, bushlands which occupied only 283 ha in 1990 expanded to 22,114 ha. Even though woodlands were only 5,604 ha in 1990, between 1990 and 2015 83.2% of the woodlands were lost. Wetlands expanded 15-fold from 1,186 ha to 17,308 ha.

Table 5.7: Land cover/ land use for Amuria District

1990 to 2015	Forest Plantations	Tropical High Forests	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	2	-	5,604	283	111,524	1,186	138,464	-	296	926	13
Additions	-	-	649	22,114	7,017	17,877	40,115	-	-	2	-
Reductions	2	-	5,309	283	68,973	569	11,435	-	296	894	13
Closing stock	-	-	943	22,114	49,569	18,494	167,145	-	-	33	-
Net gains/reductions	*(2)*	-	*(4,660)*	*21,831*	*(61,956)*	*17,308*	*28,680*	-	*(296)*	*(893)*	*(13)*

The decline in grassland cover may also be an indication that livestock production livelihoods have generally transitioned and the dominance of crop production livelihoods increased (Figure 5.9). The woodlands continued to decline across the landscape an indication of the high rate of woody biomass harvest rate exceeding growth of available woody biomass resources. Amuria had only 2 ha of forest plantation and no tropical high forests.

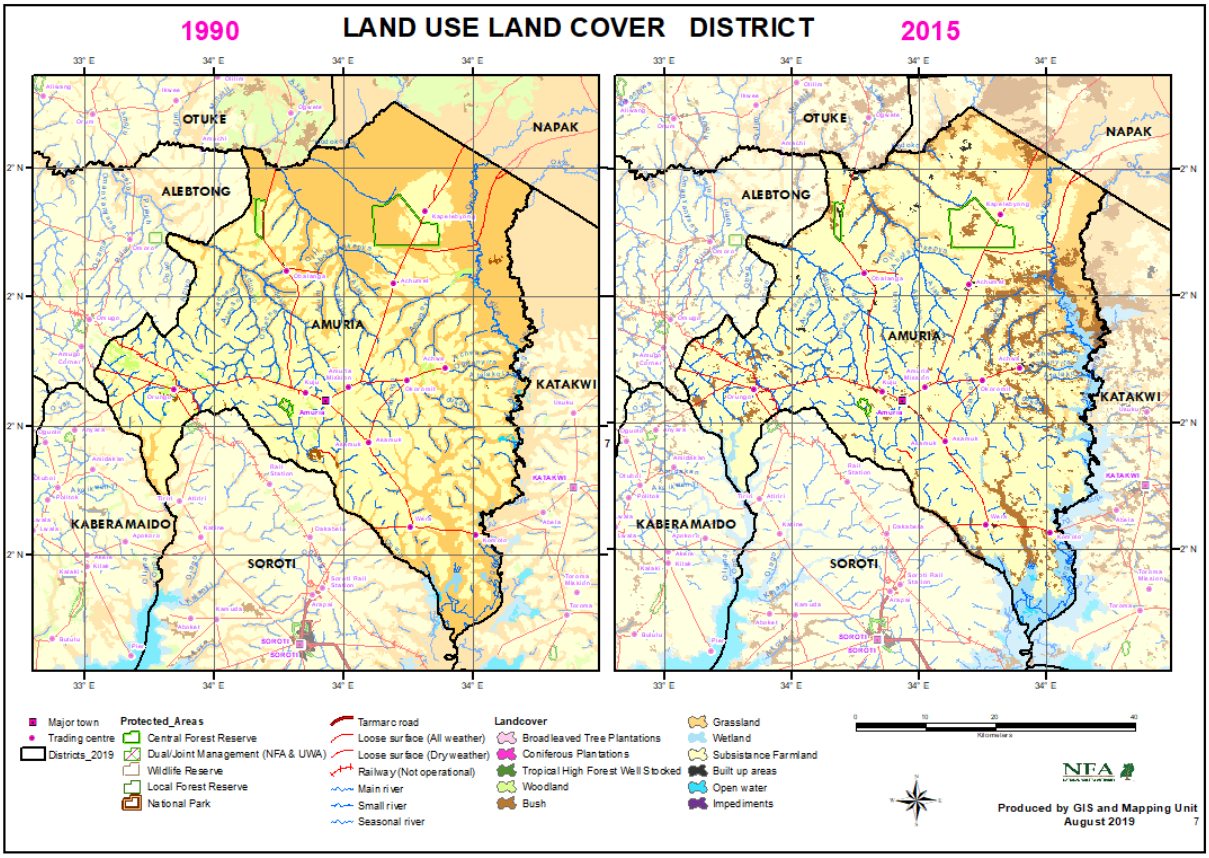


Figure 5.9: Land cover/ land use for Amuria District

5.2.8 Land Physical Accounts for Amuru District

Amuru District had a cover of 434,293.5 ha. In 1990, 57.5% of the District was covered by woodlands and small scale farmlands were a distant second largest land cover with 29.9% of the District (Table 5.8). By 2015, woodlands had been reduced to only 34,310 or 13.7% of the woodland cover in 1990. Conversely, small scale farmlands had expanded by 79,038 ha. In addition, an additional 33,152 ha of land had been converted to commercial farmlands. Altogether, farmlands increased by 112,190 ha equivalent to 25% of the District's total cover. Alongside farmlands, grasslands increased by 91,102 ha while bushlands increased by 10,215 ha. Whereas the District does not have tropical high forests, the area under forest plantations increased by 154 ha and 129 ha for broadleaved plantations and coniferous plantations, respectively.

Table 5.8: Land cover/ land use for Amuru District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High Forest	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	14	7	-	249,751	1,5305	32,675	4,157	129,686	-	90	2,558	50
Additions	167	137	-	8,053	21,119	105,406	528	97,693	33,152	1,539	1,314	263
Reductions	14	7	-	223,495	10,905	14,304	1,454	18,654	-	34	454	50
Closing stock	167	137	-	34,310	25,519	123,776	3,231	208,724	33,152	1,595	3,418	263
Net gains/reductions	154	129	-	(215,442)	10,215	91,102	(927)	79,038	33,152	1,505	860	213

The increase of farmlands in Amuru from about 30% to 55.7% of the land cover was a major transition. The agricultural increase of 25% was dwarfed by the loss of woodland. The area of woodland cut over the 25 years was equivalent to 50% of the entire District's land cover (Figure 5.10).

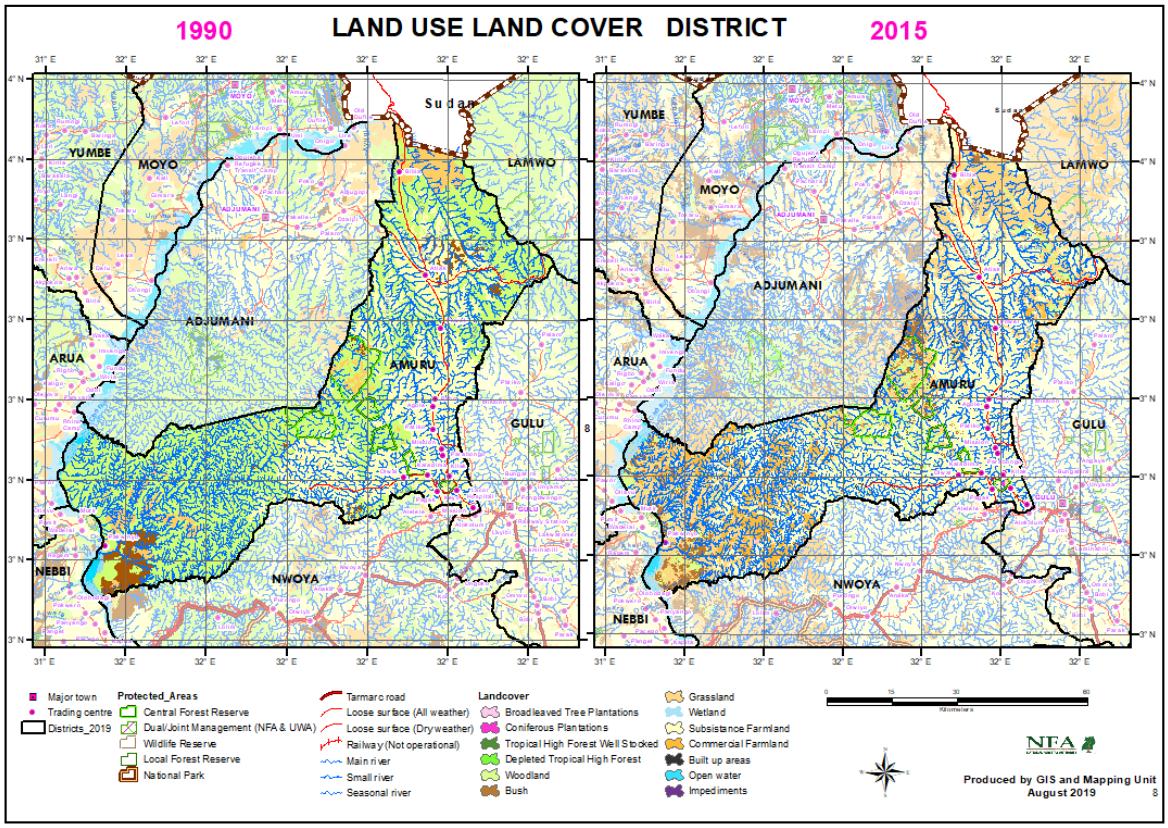


Figure 5.10: Land cover/ land use for Amuru District

5.2.9 Land Physical Accounts for Apac District

Apac District had a land area of 328,499.1 ha and in 1990 51.8% of that was under small scale farmlands. Woodlands covered 20.9% (63,649 ha) while open water was 10.6% (34,969 ha). Between 1990 and 2015, the small scale farmlands gained an additional 39,242 ha while woodlands lost 48,883 of their cover in the District. The loss in woodlands was equivalent to 76.8% of the District woodland cover in1990. The other forest covers also declined. There were additions for THF well stocked and THF low stocked in Apac District. The THF was likely achieved as part of forest regeneration where a mature canopy was achieved either from previous woodlands and/or bushlands over the 25-year timeline. Bushlands increased threefold from 8,419 to 24,668 ha while wetlands doubled from 6,558 to 13,079 ha. In contrast, grasslands declined by 17,288, about 40% of the grassland cover in 1990 (Table 5.9).

Table 5.9: Land cover/ land use for Apac District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	38	-	-	-	63,649	8,419	43,631	6,558	170,169	657	239	34,969	170
Additions	17	386	93	432	7,537	24,078	16,104	9,714	57,332	-	1,583	3,556	43
Reductions	34	-	-	-	56,420	7,829	33,392	3,192	18,090	657	216	874	170
Closing stock	22	386	93	432	14,766	24,668	26,343	13,079	209,411	-	1,606	3,7651	43
Net gains/reductions	(16)	386	93	432	(48,883)	16,249	(17,288)	6,522	39,242	(657)	1,368	2,682	(127)

The major transition in Apac District was the decline of woodland cover from 20.9% of District land cover to 4.5% while farmlands increased from 51.8% of land cover to 63.7%. Bushlands, wetlands, built up areas and open water also increased in cover (Figure 5.11). The decline in woodlands and grasslands means a reduction in production of woody biomass and grass for feeding livestock. All the commercial farmlands that was available in 1990 was completely lost by 2015.

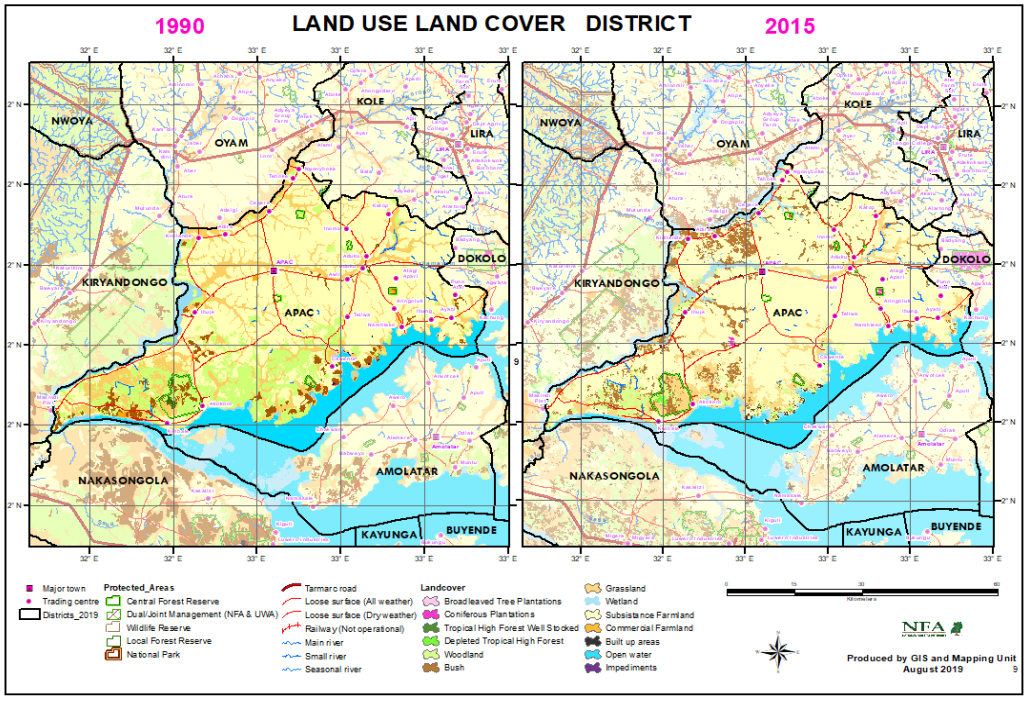


Figure 5.11: Land cover/ land use for Apac District

5.2.10 Land Physical Accounts for Arua District

Arua District land cover was 429,916 ha. Small scale farmlands occupied 51.3% of the land while woodlands occupied 32.2% of all District's land cover. The forest plantations, bushlands, wetlands, commercial farmlands, built up areas, open water and impediments made up the rest. Between 1990 and 2015, small scale farmlands increased by only 7,448 ha. However, woodlands decreased by 79,534 ha while bushlands increased by 90,171 ha (Table 5.10).

Table 5.10: Land cover/ land use for Arua District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High Forests	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	1215	395	-	138,404	27,058	30,019	8,061	220,400	116	478	3,738	33
Additions	32	6	-	21,075	99,350	10,202	4,562	52,742	-	192	795	-
Reductions	1,078	51	-	100,609	9,179	28,308	2,101	45,295	116	287	1,902	33
Closing stock	168	350	-	58,870	117,229	11,914	10,522	227,847	-	384	2,632	-
Net gains/reductions	(1,046)	(45)	-	(79,534)	90,171	(18,106)	2,461	7,448	(116)	(94)	(1,107)	(33)

The land cover changes in Arua showed that agriculture production was the leading land use in the District. The woodlands likely lost due to harvest for woody biomass. Bushlands were the major beneficiaries from the woodland conversion (Figure 5.12).

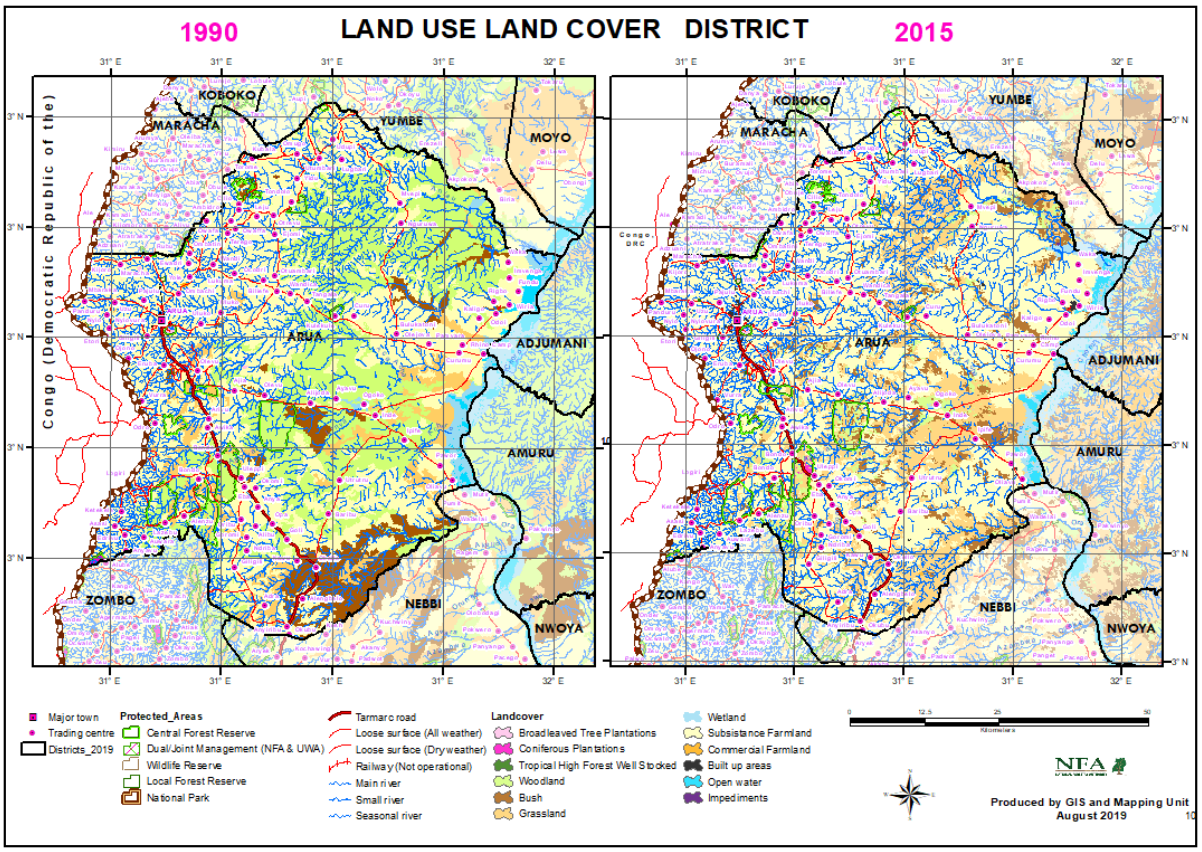


Figure 5.12: Land cover/ land use for Arua District

5.2.11 Land Physical Accounts for Budaka District

Budaka District land cover was 41,060.4 ha, and 90% of the cover was under small scale farmlands. Between 1990 and 2015, the small scale farmlands increased by 1,636 ha and in 2015, equivalent to 94% of the land cover (Table 5.11). The other land covers in the District are wetlands, commercial farmlands, grasslands and woodlands. The woodland gained 8 ha, bushlands lost 223 ha from 411 ha in 1990 while wetlands lost 1,736 ha from 3,157 ha in 1990. There was an increase in commercial farmland by 210 from 442 ha in 1990.

Small scale farmlands are very dominant. The District has to rely on the neighbouring Districts for access to woody biomass, and open water ecosystem services, among others.

Table 5.11: Land cover/ land use for Budaka District (in hectares)

1990 to 2015	Forest plantation	Tropical High Forests	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	-	-	-	411	-	3,157	37,000	442	50	-	-
Additions	-	-	8	106	114	409	2,498	451	23	-	-
Reductions	-	-	-	329	-	2,145	861	241	32	-	-
Closing stock	-	-	8	188	114	1,421	38,636	653	41	-	-
Net gains/reductions	-	-	8	(223)	114	(1,736)	1,636	210	(9)	-	-

The land cover situation in Budaka is the increased dominance of small scale farmlands (Figure 5.13). The District does not have a clear balance of ecosystem services, and would not be self-sufficient in woody biomass and water ecosystem services among others.

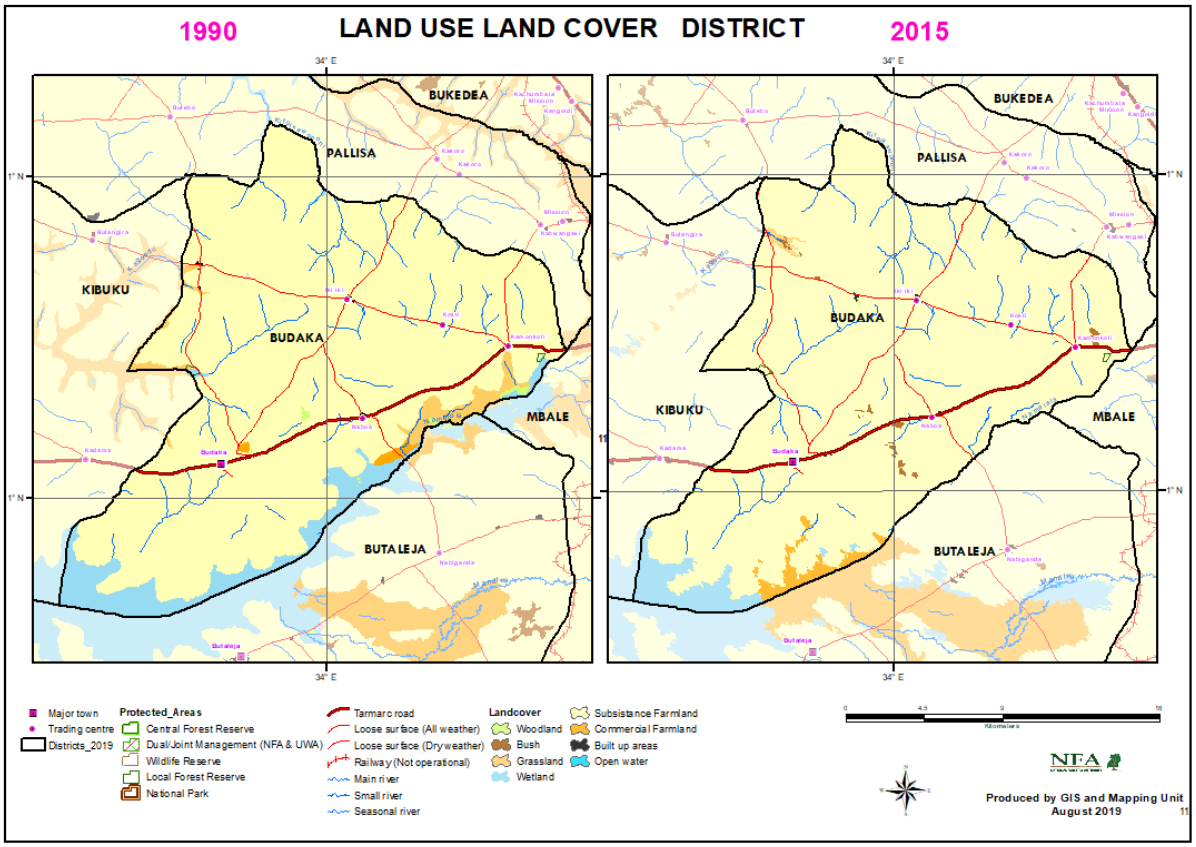


Figure 5.13: Land cover/ land use for Budaka District

5.2.12 Land Physical Accounts for Bududa District

Bududa District had a land cover of 27,390.1 ha. The District had a fair balance of land covers including forest plantations, tropical high forests, woodlands, bushlands, grasslands, small scale farmlands and built up area (Table 5.12). However, the District does not have coniferous forests, wetlands and commercial farmlands. The largest land cover in 1990 was woodlands at 5,989 ha but by 2015 the woodlands had been reduced to just 398 ha a loss of 5591 ha equivalent to 93.6% of the woodlands cover of the District. Small scale farmlands were the largest land cover with 52% of the land cover in 1990 which increased to 54% of the land cover between 1990 and 2015 (Table 5.12). THF well stocked and THF well stocked were important components of the land cover in the District due to the location of the District in the Mt. Elgon National Park landscape.

Table 5.12: Land cover/ land use for Bududa District

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	91	-	1,353	3,464	5,989	584	1,667	-	14,232	-	10	-	-
Additions	64	-	7,367	116	108	432	513	-	896	-	6	-	-
Reductions	90	-	81	3,032	5,699	173	153	-	265	-	10	-	-
Closing stock	66	-	8,638	549	398	842	2027	-	14,863	-	6	-	-
Net gains/reduction	(26)	-	7,285	(2,915)	(5,591)	258	360	-	631	-	(3)	-	-

The two major transitions in Bududa District was the six-fold expansion of THF well stocked by 7,285 ha and the loss of 5,591 ha of woodlands (Figure 5.14). THF low stocked reduced by 2,950 but this was likely due to expansion of the forest canopy and transition into THF well stocked.

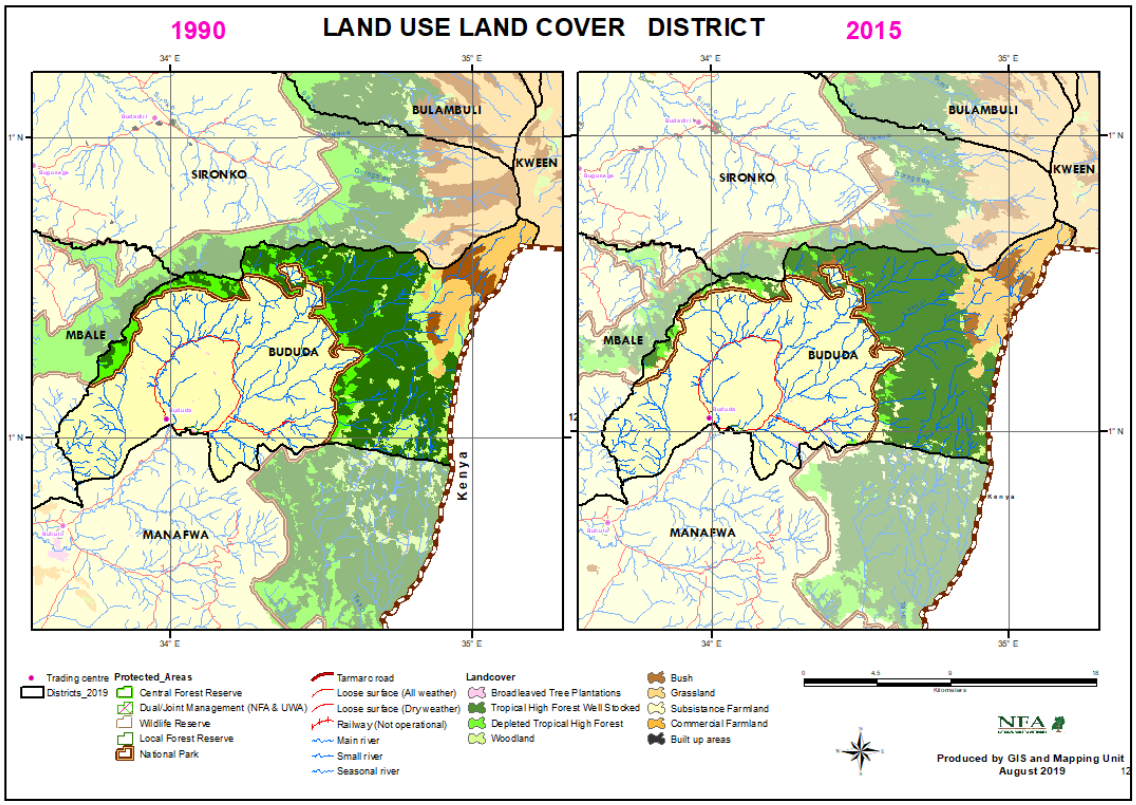


Figure 5.14: Land cover/ land use for Bududa District 1990 and 2015

5.2.13 Land Physical Accounts for Bugiri District

For Bugiri District the total land cover was 105,076.1 ha of which 79,181 ha (75.4%) was under small scale farmlands in 1990. The small scale farmlands expanded between 1990 and 2015 by gaining an additional 5,831 ha (Table 5.13). All of Bugiri District's 7,718 ha woodlands in 1990 were lost and the 1,473 ha of THF low stocked and 997 ha of THF well stocked was also lost. There was total natural forest deforestation in Bugiri. The forest plantations increased particularly broadleaved plantations from just 5 ha in 1990 to 2,822 ha and 312 ha of conifers between 1990 and 2015. Bushlands increased by 9 ha while wetlands increased by 1,225 ha. Commercial farmlands increased by 402 ha while built up areas expanded by 662 ha and the area of open water also increased by 463 ha.

Table 5.13: Land cover/ land use for Bugiri District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Wood-land	Bush-land	Grass-land	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	5	-	997	1,473	7,718	2,885	1,989	7,169	79,181	1,181	196	2,214	68
Additions	2,827	312	0	0	0	2,670	518	3016	10,765	515	748	592	-
Reductions	5	-	997	1,473	7,718	2,661	1,989	1791	4,934	112	87	129	68
Closing stock	2,827	312	-	-	-	2,895	518	8394	85,012	1,584	858	2,677	-
Net gains/reduction	2,822	312	(997)	(1,473)	(7,718)	9	(1,471)	1,225	5,831	402	662	463	(68)

The major transition for Bugiri District was the complete loss of natural forest cover. There was a large increase in broad leaved plantations by 2,822 ha (Figure 5.15). However, wetlands increased by 1,225 ha.

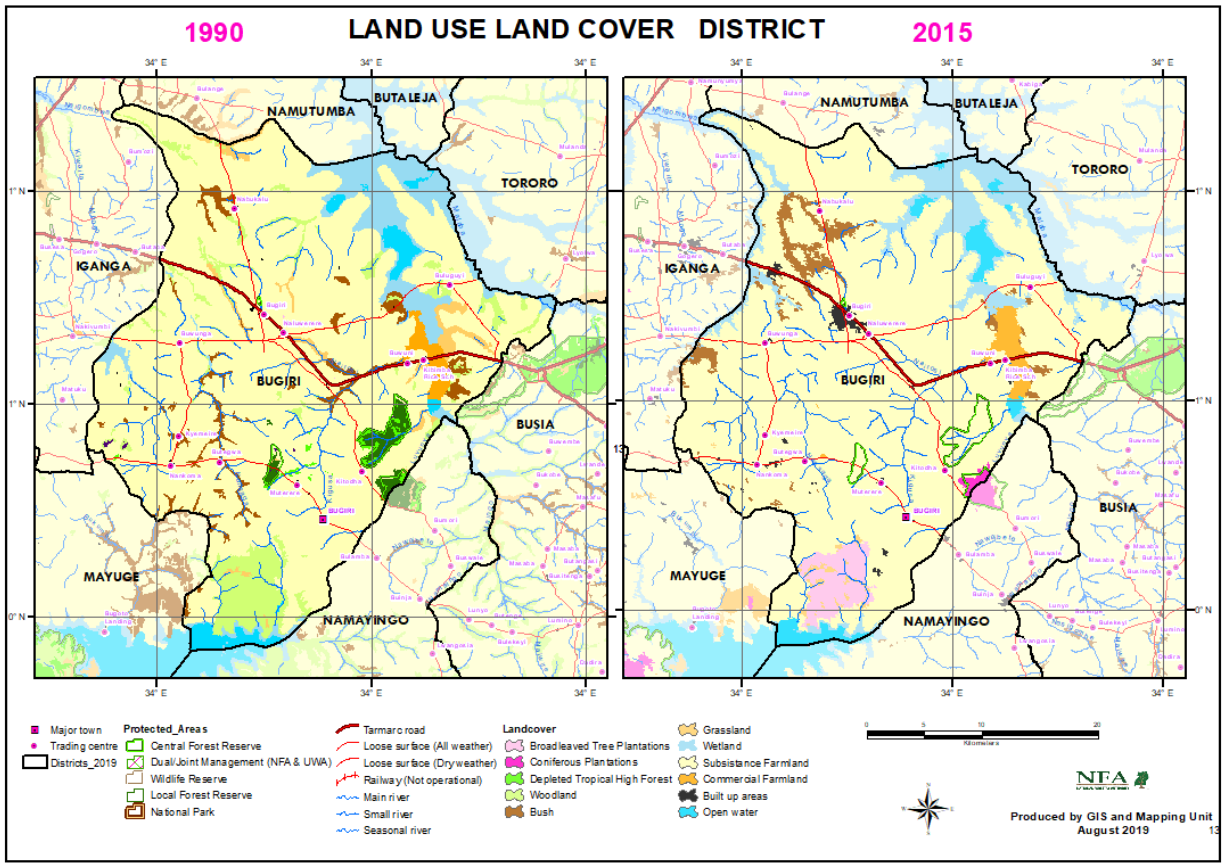


Figure 5.15: Land cover/ land use for Bugiri District

5.2.14 Land Physical Accounts for Buhweju District

Buhweju District total land cover was 67,195.7 ha of which 67.9% was small scale farmlands in 1990. By 2015, the small scale farmland had reduced to 26,993 ha as the area under grasslands expanded by 17,902 ha. Tropical high forests were an important component of the District's land cover. THF low stocked expanded by 658 ha while THF well stocked reduced by 1,082 ha from 1,023 ha and 14,756 ha, respectively (Table 5.14). Broad leaved plantations cover in Buhweju expanded by 112 ha but there were no coniferous plantations.

Table 5.14: Land cover/ land use for Buhweju District

1990 - 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Wood-land	Bush-land	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	95	-	14,756	1,023	596	85	4,502	494	45,618	25	2	-	-
Additions	201	-	444	935	492	1,587	20,091	10	2,368	-	6	-	-
Reductions	89	-	1,526	277	488	80	2,171	484	20,992	25	2	-	-
Closing stock	206	-	13,674	1,681	601	1,591	22,422	20	26,993	-	6	-	-
Net gains/reductions	112	-	(1,082)	658	4	1,507	17,920	(474)	(18,624)	(25)	4	-	-

The major land cover transition for Buhweju District was the reduction in small scale farmlands and THF well stocked as well as and the expansion of grasslands, bushlands and THF low stocked. Parts of the natural tropical high forest cover include Kasyoha-Kitomi central forest reserve and the grasslands are part of Kyambura Game Reserve (Figure 5.16).

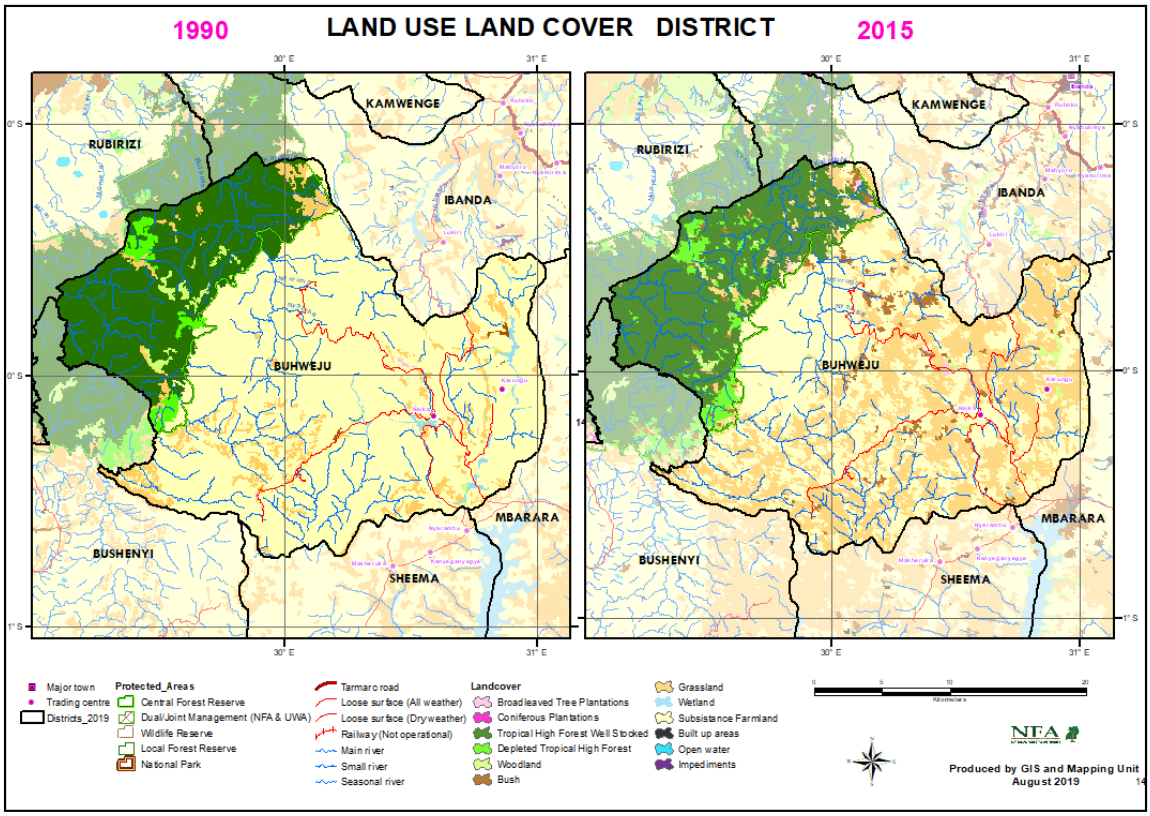


Figure 5.16: Land cover/ land use for Buhweju District

5.2.15 Land Physical Accounts for Bukedea District

Bukedea District had a cover of 105,466.1 ha. The District cover is dominated farmlands with 60,116 ha followed by grasslands with 34,042 ha (Table 5.15). between 1990 and 2015, small scale farmlands, wetlands and bushlands gained an additional 16,731 ha, 5,357 ha and 3,405 ha, respectively. The large gains for small scale farmlands showed an increased dominance of small holder farmlands. All the commercial farmlands in 1990 had been converted by 2015.

Table 5.15: Land cover/ land use for Bukedea District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Wood-land	Bush-land	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	-	-	-	-	4,407	4,522	34,042	2,032	60,116	205	92	50	-
Additions	-	68	-	-	712	7,773	2,910	6,351	19,834	0	123	35	-
Reductions	-	-	-	-	3,765	4,367	25,271	995	3,103	205	77	22	-
Closing stock	-	68	-	-	1,354	7,927	11,682	7,388	76,847	0	138	62	-
Net gains/reduction	-	68	-	-	(3,054)	3,405	(22,360)	5,357	16,731	205	46	(13	-

In Bukedea District, small scale farmlands continued to be the dominant land cover/ land use. Even though bushlands and wetlands increased their increases were outweighed by the increase in the small scale farmlands (Figure 5.17). The wetland expansion was quite large as it represented a threefold increase in wetland cover of the District. Woodlands lost 3,054 ha out of an area of 4,407 ha. The remaining woodland cover was only 1,354 ha.

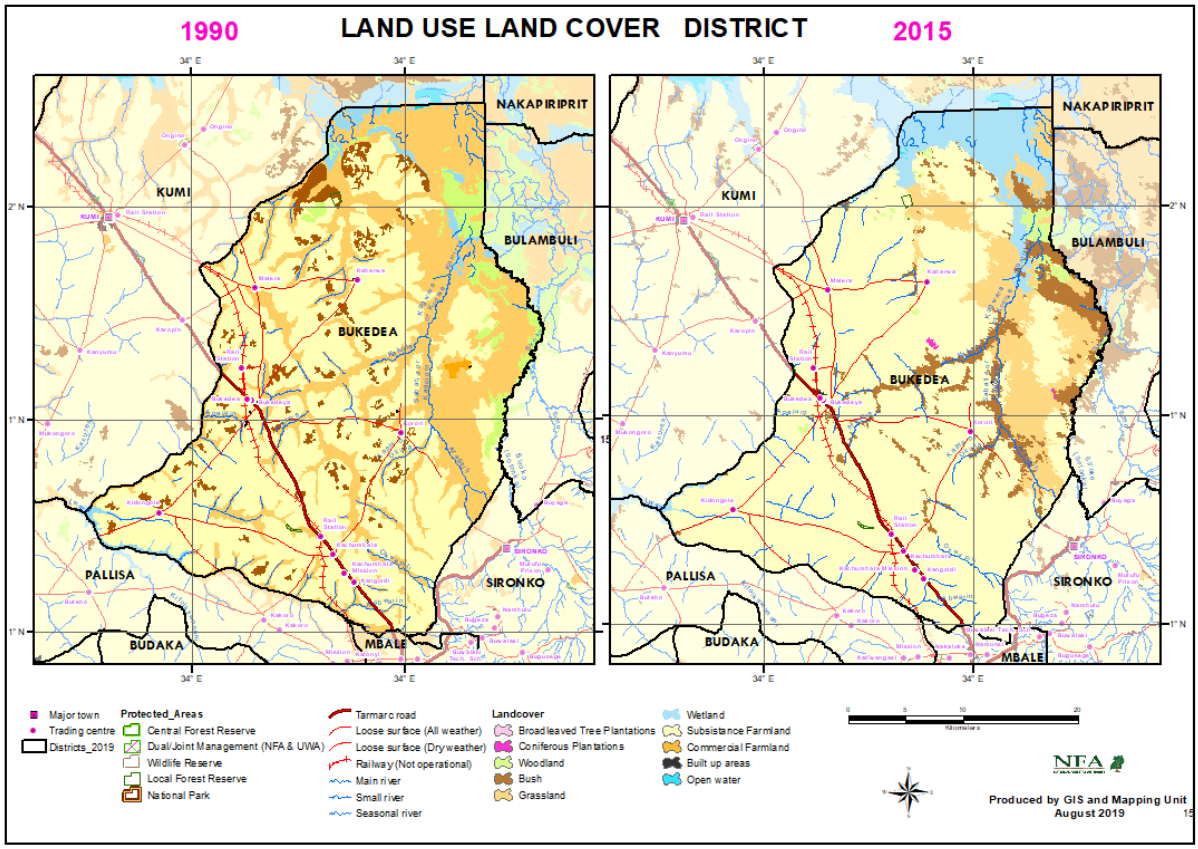


Figure 5.17: Land cover/ land use for Bukedea District

5.2.16 Land Physical Accounts for Bukomansimbi District

Bukomansimbi District had a land cover of 60,208.9 ha, 75.3% of which was small scale farmlands in 1990. The small scale farmlands to 51,703 ha by 2015. While woodlands which were 2,312 ha reduced by 56% to 1,007 ha. Wetlands, bushlands and built up areas increased by 3,317 ha, 915 ha and 28 ha respectively. The broadleaved forest plantations reduced from 124 ha in 1990 to 90 ha between 1990 and 2015. There were no tropical high forests, commercial farmlands, impediments and coniferous forest plantations in the District.

Table 5.16: Land cover/ land use for Bukomansimbi District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	124	-	-	-	2,312	54	11,140	1,163	45,377	-	39	-	-
Additions	34	-	-	-	159	969	805	3,394	7,401	-	62	-	-
Reductions	124	-	-	-	1,166	54	10,293	77	1,075	-	34	-	-
Closing stock	34	-	-	-	1,305	969	1,651	4,480	51,703	-	67	-	-
Net gains/reductions	(90)	-	-	-	(1,007)	915	(9,488)	3,317	6,326	-	28	-	-

The major transition in Bukomansimbi District was the increased dominance of farmlands, the three-fold increase in wetland area and the 19-fold increase in bushlands. The expansion of agricultural land was likely the major driver of the land cover change observed (Figure 5.18). There was an increase in bushlands suggesting that some of the woodland and broad leaved forest was not specifically used for economic production purposes.

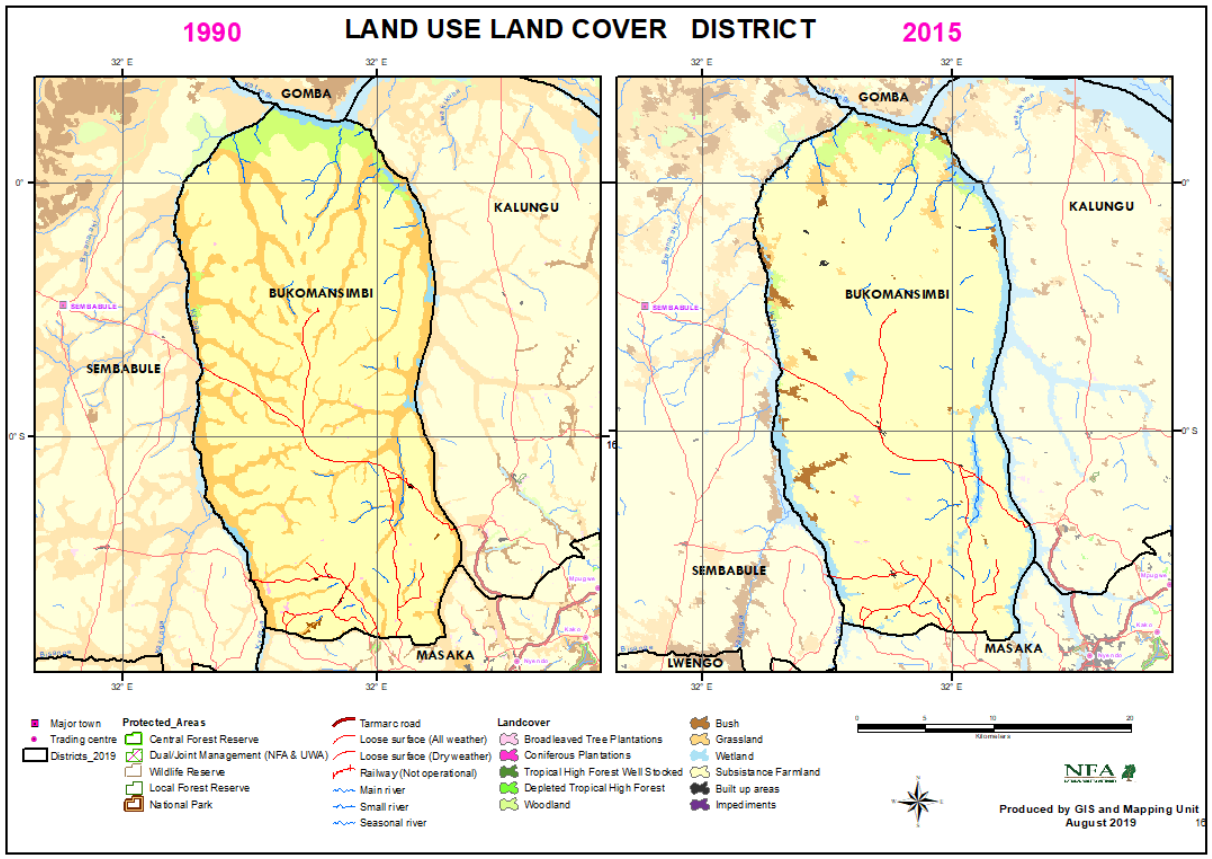


Figure 5.18: Land cover/ land use for Bukomansimbi District

5.2.17 Land Physical Accounts for Bukwo District

Bukwo District had a land cover of 52,556.9 ha most of was distributed between tropical high forests (14,179 ha), grasslands (12,392 ha), small scale farmlands (12,323 ha) and woodlands (10,788 ha). Between 1990 and 2015, there were gains for THF well stocked (7,030 ha), bushlands (5,302 ha) small scale farmlands (4,503 ha), commercial farmlands (1,266 ha) and forest plantations. Conversely, the woodlands lost 8,000 ha, THF low stocked lost 4,250 ha while grasslands lost 6,705 ha (Table 5.17).

Table 5.17: Land cover/ land use for Bukwo District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Wood-land	Bushland	Grass-land	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	-	716	7,475	6,704	10,788	1,637	12,392	-	12,323	523	-	-	-
Additions	111	192	8,064	813	1,046	6,686	1,466	-	6,050	1,289	29	-	-
Reductions	-	107	1,034	5,063	9,046	1,384	7,541	-	1,547	24	-	-	-
Closing stock	111	801	14,506	2,454	2,788	6,939	6,317	-	16,825	1,789	29	-	-
Net gains/reduction	111	85	7,030	(4,250)	(8,000)	5,302	(6,075)	-	4,503	1,266	29	-	-

The major transition in land cover was the loss of woodlands, grasslands and THF low stocked at the expense of THF well stocked, bushlands, small scale farmlands and commercial farmlands. There was a general increase in tropical forest cover and plantations which replaced woodlands and grasslands areas (Figure 5.19).

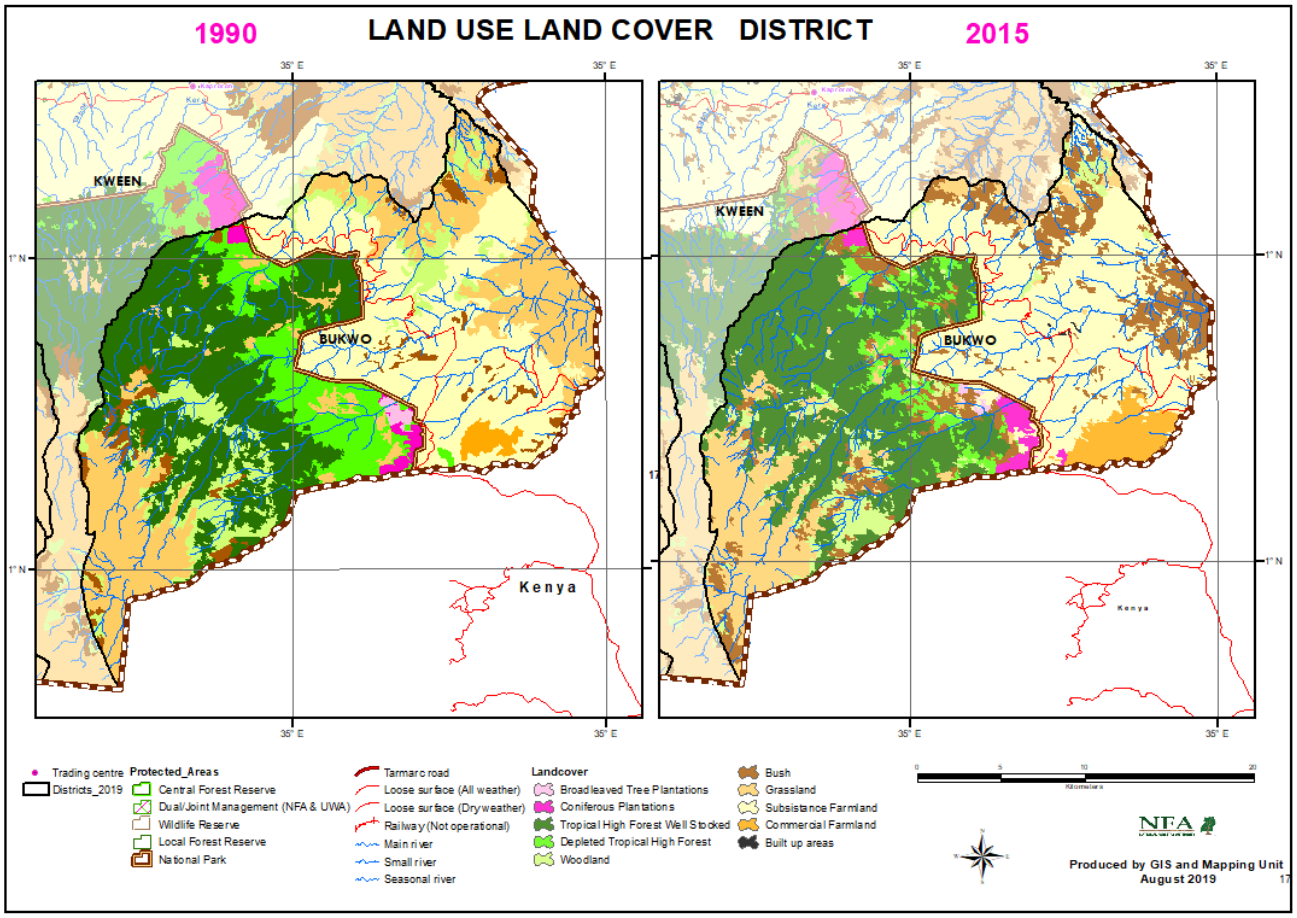


Figure 5.19 Land cover/ land use for Bukwo District

5.2.18 Land Physical Accounts for Bulambuli District

Bulambuli District land cover was 65,263 ha. One-third (33.5%) of which was grasslands and 30.5% was small scale farmlands and woodlands occupied 21.4% of the District's land cover. By 2015, the bushlands had increased by 7,881 ha, THF well stocked by 4,686 ha and small scale farmlands by 1,161 ha. In contrast, woodlands lost 10,588 ha, wetlands lost 2,064 ha (Table 5.18). Commercial farmlands reduced from 156 ha to only 8 ha while broad leaved plantations were completely lost. The built up area doubled to 124 ha.

Table 5.18: Land cover/ land use for Bulambuli District

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Wood-land	Bush-land	Grass-land	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	36	-	1,071	3,183	13,995	2,190	21,884	3,009	19,677	156	62	-	-
Additions	-	-	4,862	258	1,100	9,401	5,953	852	3,117	8	112	-	-
Reductions	36	-	176	1,193	11,688	1,520	5,972	2,917	1,955	156	50	-	-
Closing stock	-	-	5,757	2,248	3,407	10,072	21,864	945	20,838	8	124	-	-
Net gains/reductions	(36)	-	4,686	(935)	(10,588)	7,881	(20)	(2,064)	1,161	(148)	62	-	-

The loss of 76.6% of the woodland cover was the major transition in land cover for Bulambuli District between 1990 and 2015 (Figure 5.20). Another major transition was the expansion of bushlands. The small scale farmlands increased by only 6%; however, there was a major four-fold increase in THF well stocked. The increase in tropical high forest may be associated with improved management of the forest area under the Mt. Elgon National Park.

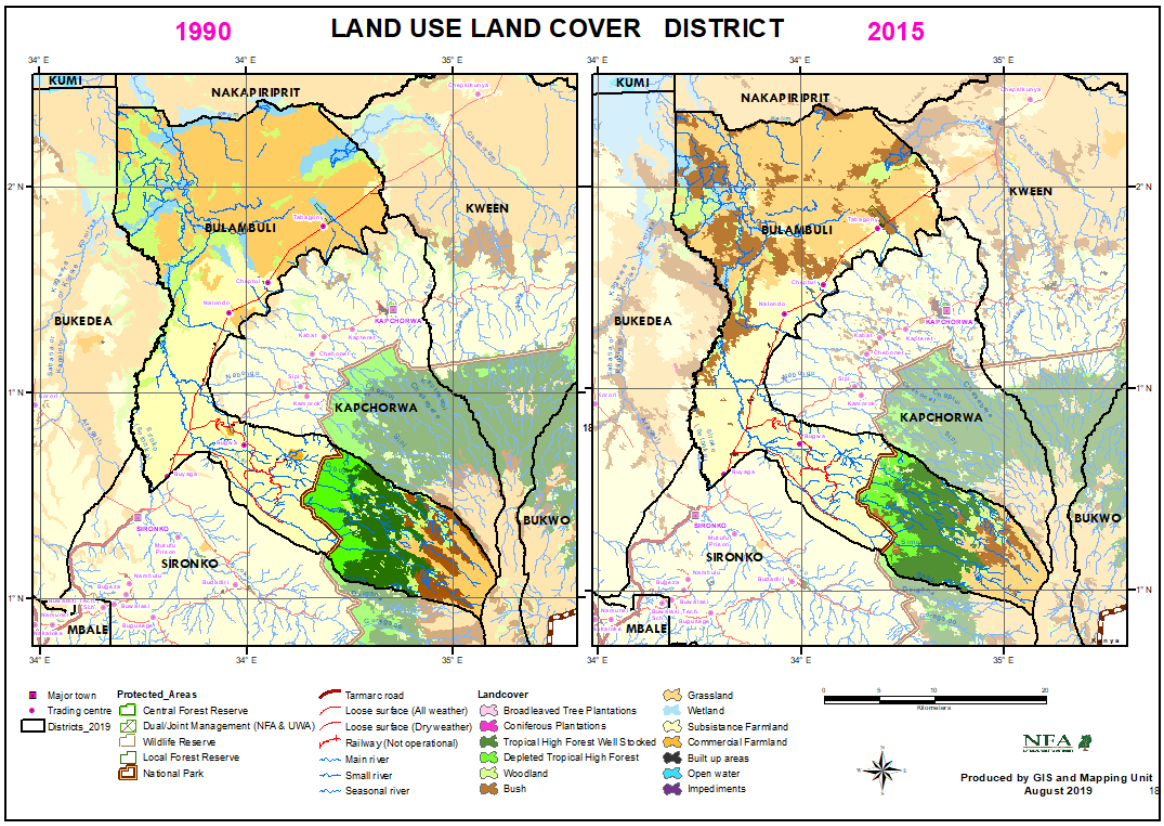


Figure 5.20: Land cover/ land use for Bulambuli District

5.2.19 Land Physical Accounts for Buliisa District

Buliisa District had a total cover of 287,975.7 ha. Woodlands, open water and grasslands were the three largest covers at 26.5%, 26.4% and 22.1% of the District cover. THF well stocked (11%) and small scale farmlands (5.7%) were the other leading land covers (Table 5.19). Between 1990 and 2015, Buliisa District lost 32,102 ha of its woodland cover but gained additional cover under tropical high forests, grasslands, wetlands and small scale farmlands.

Table 5.19: Land cover/ land use for Buliisa District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Wood-land	Bush-land	Grass-land	Wet-land	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	2		31,445	117	76,129	17,279	63,541	7,002	16,374		72	76,016	
Additions	-	-	1,658	1,176	18,567	27,454	46,477	3,407	7,071	25	110	1,440	51
Reductions	2	-	1,608	117	50,669	14,653	33,521	2,522	3,505	-	60	777	-
Closing stock			31,495	1,176	44,027	30,079	76,496	7,886	19,939	25	123	76,679	51
Net gains/reduction	(2)	-	50	1,059	(32,102)	12,800	12,955	884	3,566	25	51	663	51

The major transition for Buliisa District was the loss of 42% of the woodland cover between 1990 and 2015. Whereas the small scale farmlands increased by 22%, the 3,566 ha increase was small in magnitude when compared to the loss in woodland cover and the increase in bushland and grassland cover (Figure 5.21). Buliisa District occupies sections of Lake Albert and parts of Murchison Falls Protected Area (MFPA) where grasslands and bushlands are also important wildlife habitats. Therefore, alongside community livelihoods the land cover/land use is influenced by the areas under the protected areas, and the Lake Albert dependent livelihoods of fishing. Nonetheless, the woodland conversion was largely community exploitation of woodlands on private land.

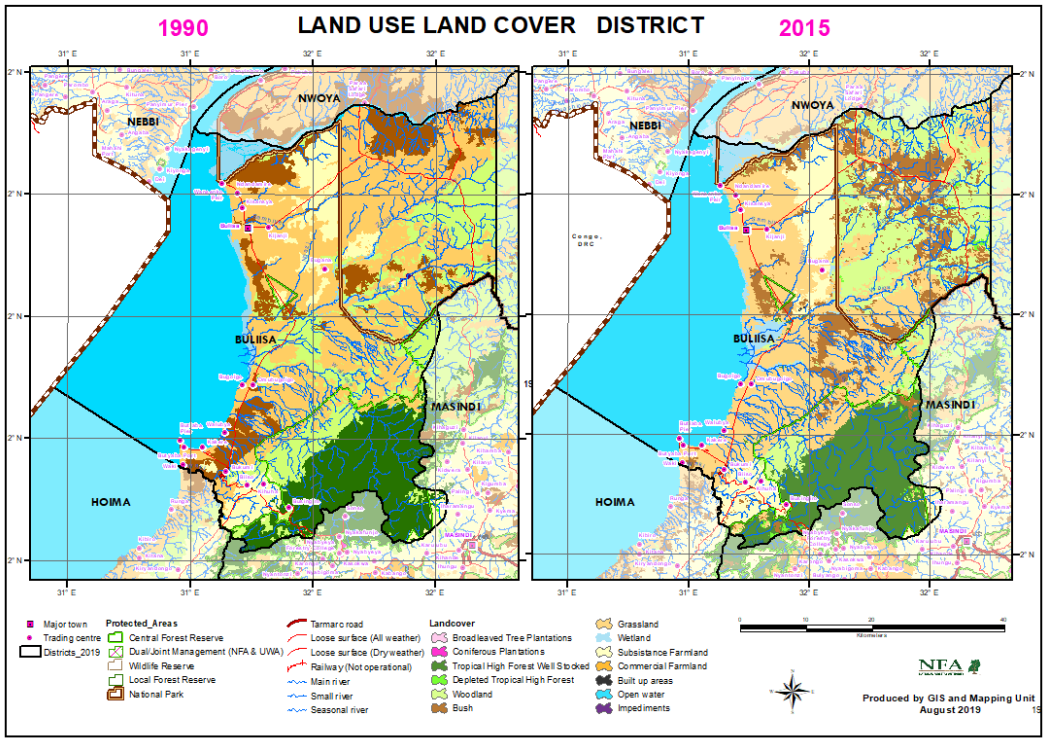


Figure 5.21: Land cover/ land use for Buliisa District

5.2.20 Land Physical Accounts for Bundibugyo District

The total land cover for Bundibugyo District was 85,677.4 ha. In 1990, the District's land cover was dominated by THF well stocked and small scale farmlands with 43.5% and 37.4% of the land cover. The woodlands, and grasslands covered just 9% and 6% of the District's land cover. The District had no plantations in 1990 but by 2015 had 65 ha of coniferous plantations. THF well stocked increased by 1,024 while THF low stocked decreased by 429 ha between 1990 and 2015. The largest increase in land cover was for small scale farmlands at 2,317 which is relatively small at 2.7% of the total land cover of the District (Table 5.20).

Table 5.20: Land cover/ land use for Bundibugyo District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Wood-land	Bush-land	Grass-land	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	-	-	37,250	1,913	8,050	801	5,373	8	32,048	-	38	196	-
Additions	-	67	6,317	1,342	3,279	1,658	2,344	-	4,490	-	532	97	-
Reductions	-	-	5,293	1,771	6,422	361	3,925	8	2,173	-	5	168	-
Closing stock	-	67	38,275	1,484	4,908	2,098	3,791	-	34,365	-	565	124	-
Net gains/reduction	-	67	1,024	(429)	(3,143)	1,297	(1,581)	8	2,317	-	527	(71)	-

Between 1990 and 2015, there were small increases in land cover for small scale farmlands and THF well stocked as well as a 262% increase in the area of bushlands from a small base of 801 ha. However, the general changes within the land covers were relatively small. In both 1990 and in 2015, tropical high forests and small scale farmlands represented the major land covers/ land uses (Figure 5.22).

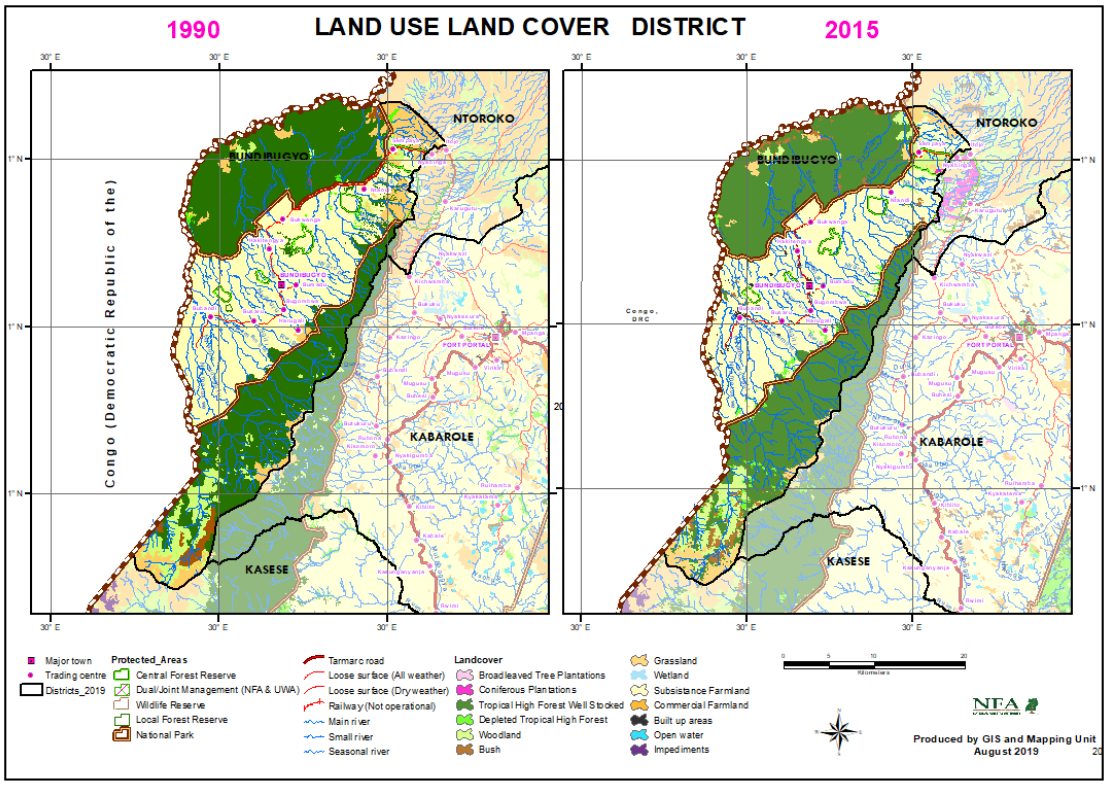


Figure 5.22: Land cover/ land use for Bundibugyo District

5.2.21 Land Physical Accounts for Bushenyi District

For the Bushenyi, the District land cover was 86,867.7, 61.6% of which was small scale farmlands. THF well stocked occupied 22.1% of the land cover while grasslands cover was 10.2%. There was a diverse distribution of land covers in the District that included all the 13 land cover classes (Table 5.21). The largest increases between 1990 and 2015 were the 82 ha increase in coniferous forest plantations, woodlands increased by seven-times from 304 ha to 2,248 ha and broadleaved plantations increased three-fold from 378 ha to 1,178 ha while commercial farmlands doubled in area. The land cover for small scale farmlands decreased by 16.2%, wetlands also decreased by 37%.

Table 5.21: Land cover/ land use for Bushenyi District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Wood-land	Bush-land	Grass-land	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	378	1	19,159	1,106	304	771	8,859	1,682	53,318	954	321	12	3
Additions	1,151	83	763	1,050	2,105	1,524	10,797	416	6,987	1,821	170	140	14
Reductions	352	1	854	544	160	753	7,055	1,040	15,632	375	250	3	3
Closing stock	1,178	83	19,068	1,612	2,248	1,542	12,601	1,058	44,672	2,401	241	149	14
Net gains/reduction	799	82	(91)	506	1,945	771	3,742	(624)	(8,645)	1,446	(80)	137	11

The major transition in land cover for 1990 to 2015 was the reduction in small scale farmland area and gains in grasslands, commercial farmlands, woodlands, forest plantations. There seemed to be a trend towards increased land use diversification enhancing grasslands and woody biomass areas (Figure 5.23).

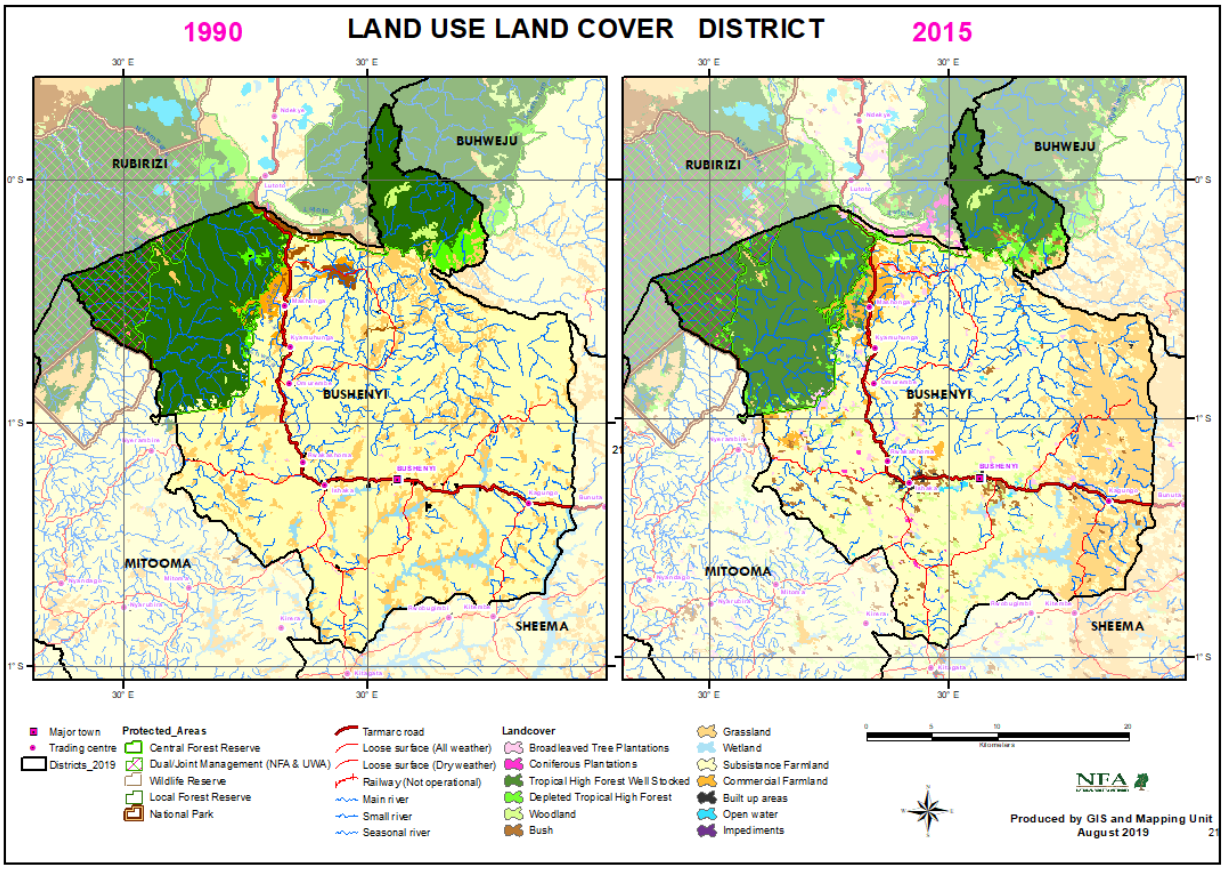


Figure 5.23: Land cover/ land use for Bushenyi District

5.2.22 Land Physical Accounts for Busia District

The Busia District cover was 75,940.3 ha, 70% of which was small scale farmlands. Woodlands were the second largest with 10% of the District's land cover. Whereas small scale farmlands expanded to 84%, the woodlands only reduced by 78 ha and remained at 10% of the land cover. Wetlands increased by 1,746 ha from 3.8% to 6.2% of the District land cover (Table 5.22).

Table 5.22: Land cover/ land use for Busia District

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Wood-land	Bush-land	Grass-land	Wet-land	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	8	16	431	1,861	7,606	4,484	2,449	2,908	52,836	159	326	2,852	5
Additions	53	23	0	1,028	57	963	61	2,559	12,749	0	219	86	-
Reductions	8	16	431	299	7,586	4,189	2,350	813	1,647	159	250	47	5
Closing stock	53	23	0	2,590	78	1,258	160	4,654	63,938	0	295	2,891	-
Net gains/reductions	45	7	(431)	729	(7,528)	(3,226)	(2,289)	1,746	11,102	(158)	(31)	39	(5)

The major transition was increased concentration of land cover into small scale farmlands, wetlands and maintenance of woodlands and increase in THF low stocked (Figure 5.24). Bushlands and grasslands whereas significant were generally small in area the District was increasingly an agriculture based livelihood.

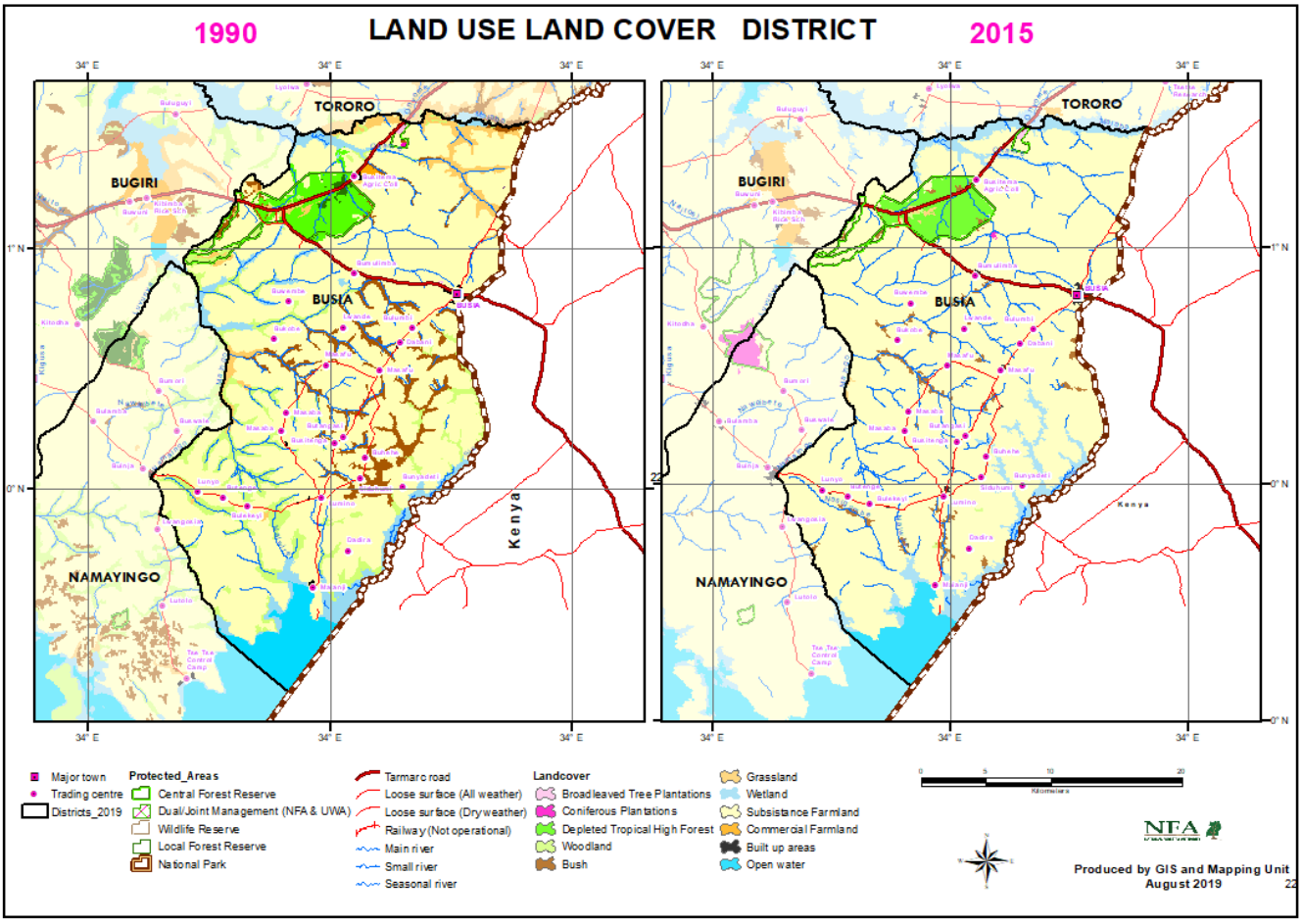


Figure 5.24: Land cover/ land use for Busia District

5.2.23 Land Physical Accounts for Butaleja District

Butaleja District had a land cover of 65,545 ha, of which 72% was under small scale farmlands. Between 1990 and 2015, commercial farmlands nearly doubled from 3,297 ha to 6,411 ha. However, small scale farmlands reduced by 478 ha. All grasslands, woodlands and tropical high forests were lost between 1990 and 2015 (Table 5.23)

Table 5.23: Land cover/ land use for Butaleja District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Wood-land	Bush-land	Grass-land	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	12	-	-	44	1,267	379	178	13,206	47,010	3,297	152	-	-
Additions	-	2	-	-	-	20	-	2,241	2,691	3,773	114	25	-
Reductions	12	-	-	44	1,267	379	178	3,046	3,170	659	112	-	-
Closing stock	-	2	-	-	-	20	-	12,402	46,532	6,411	154	25	-
Net gains/reductions	(12)	2	-	(44)	(1,267)	(359)	(178)	(805)	(478)	3,114	2	25	-

Between 1990 and 2015, the land cover in Butaleja changed from a more diverse land cover to complete loss of woodlands, tropical high forests and grasslands. The land cover in 2015 was concentrated in small scale farmlands, wetlands, and commercial farmlands (Figure 5.25).

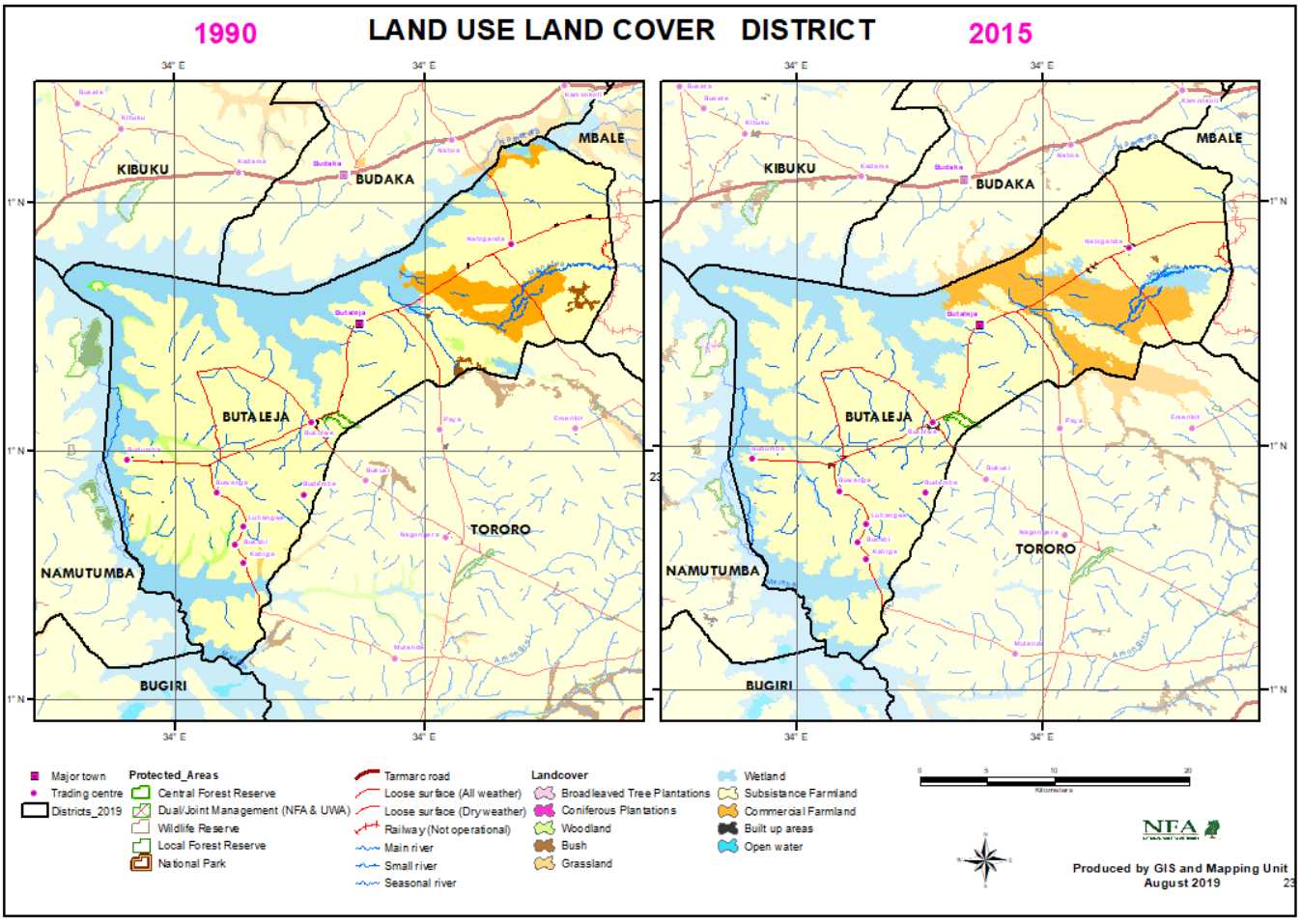


Figure 5.25: Land cover/ land use for Butaleja District

5.2.24 Land Physical Accounts for Butambala District

Butambala District in central Uganda had land cover of 40,484.8 ha. Small scale farmlands occupied 62.4% of the District's land cover while tropical high forest cover was 18.8% of the District cover (Table 5.24). Grasslands, woodlands, wetlands and bushlands were the other major land covers. Between 1990 and 2015, wetlands had the largest expansion of 3,200 ha followed by bushlands at 1,266 ha and 1,131 ha. Built up areas expanded by 544 ha while broadleaved and coniferous plantations increased by 274 and 56 ha.

Table 5.24: Land cover/ land use for Butambala District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Wood-land	Bush-land	Grass-land	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	14	-	4,260	3,359	1,847	629	4,160	923	25,247	-	46	-	-
Additions	283	56	47	1,503	1,017	1,867	2,123	3,297	4,652	-	571	-	31
Reductions	9	-	3,487	2,241	1,800	601	3,664	97	3,521	-	27	-	-
Closing stock	288	56	819	2,621	1,064	1,894	2,619	4,124	26,379	-	590	-	31
Net gains/reductions	274	56	(3,440)	(738)	(783)	1,266	(1,541)	3,200	1,131	-	544	-	31

The major transition for Butambala District was the three-fold expansion in the area of wetlands. There was an increase in farmlands and bushlands (Figure 5.26). The expansions in cover were at the expense of loss of tropical high forests and woodlands. There was an expansion of forest plantations and built up areas.

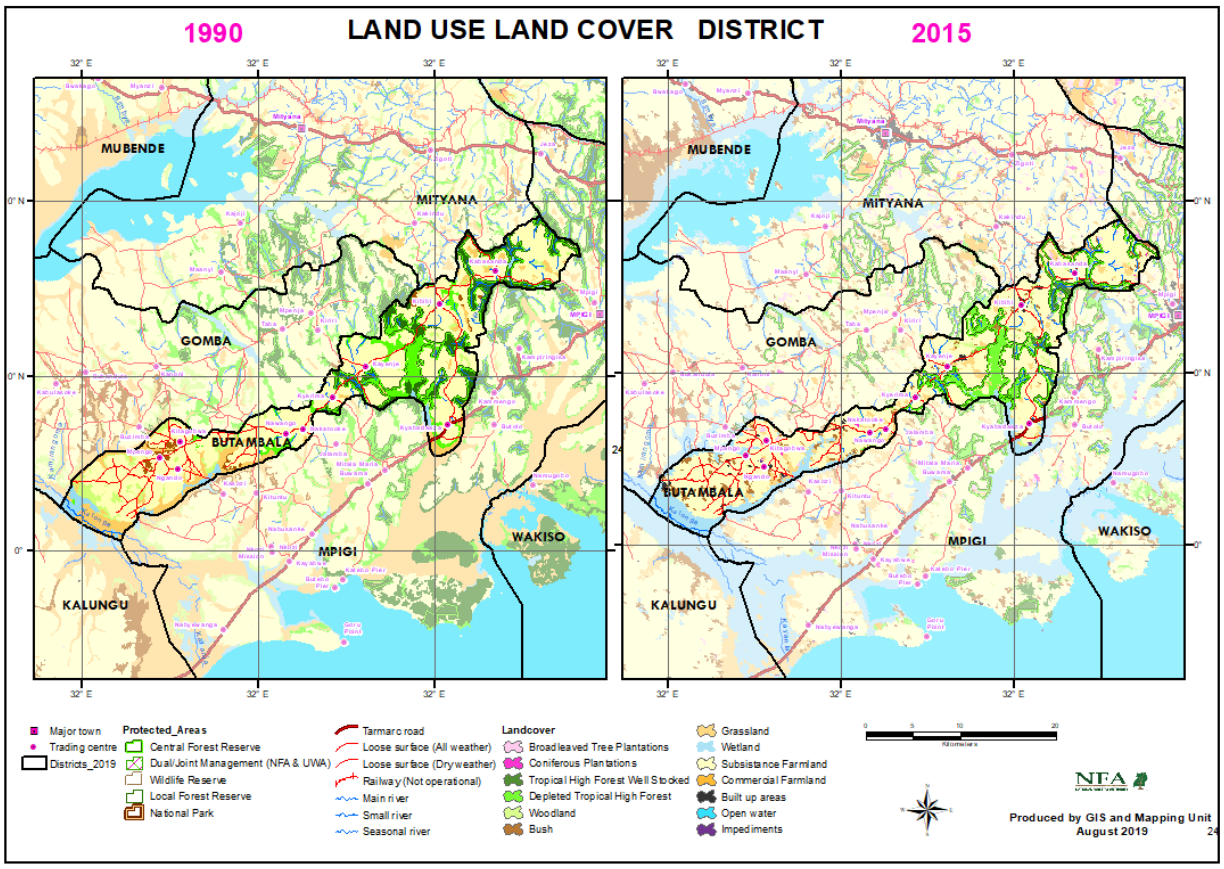


Figure 5.26: Land cover/ land use for Butambala District

5.2.25 Land Physical Accounts for Buvuma District

Buvuma District had a land cover of 838,832.4 ha, 96% of which was open water. The largest land area in 1990 was tropical high forest with 11,917 ha and 7,468 ha of THF well stocked and THF low stocked, respectively. However, by 2015, all THF well stocked had been lost and the THF low stocked had reduced to just 28% of its cover in 1990. The lost tropical high forest area was generally replaced small scale farmland, woodlands, bushlands and built up areas (Table 5.25).

Table 5.25: Land cover/ land use for Buvuma District

1990 to 2015	Forest plantation	THF well stocked	THF low stocked	Wood-land	Bush-land	Grass-land	Wet-land	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	-	11,917	7,468	67	7	6,272	1,277	2,780	-	3	809,034	7
Additions	-	-	1,263	4,230	714	1,755	311	13,679	-	119	1,867	23
Reductions	-	11,917	6,611	67	7	2,300	843	1,282	-	3	925	7
Closing stock	-	-	2,120	4,230	714	5,727	745	15,177	-	119	809,977	23
Net gains/reductions	-	(11,917)	(5,348)	4,163	707	(545)	(532)	12,397	-	116	942	16

The major transition in Buvuma District was the conversion of tropical high forests to small scale farmlands, woodlands, bushlands and built up areas (Figure 5.27). There were no forest plantations or commercial farmlands reported by 2015.

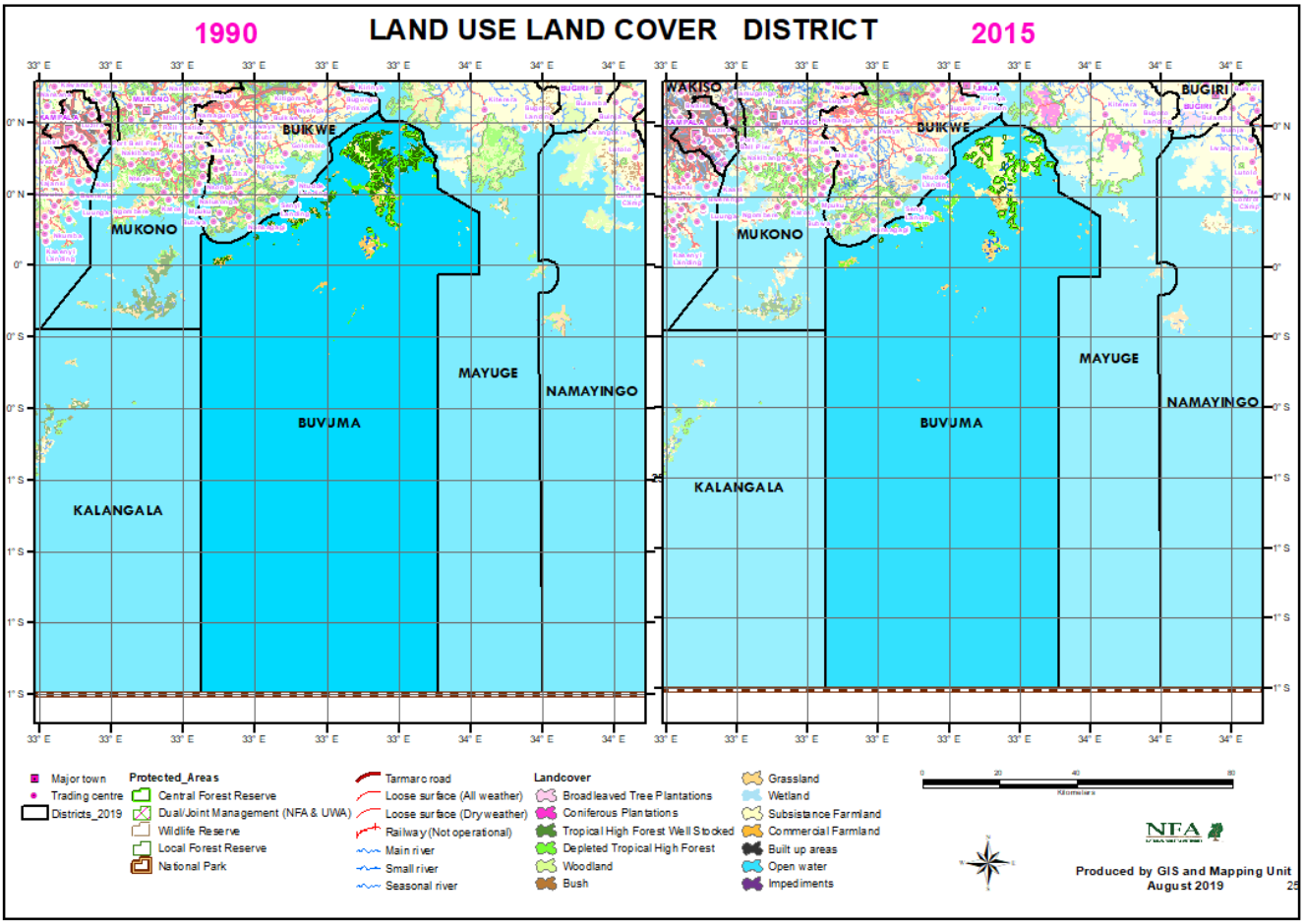


Figure 5.27: Land cover/ land use for Buvuma District

5.2.26 Land Physical Accounts for Buikwe District

Buikwe District had a land cover of 145,473.7 ha. The District had a diverse land cover comprising forest plantations, farmlands, natural forest areas, built up areas and impediments. The three leading land covers were small scale farmland, tropical high forests and open water 37.5%, 26.8% and 15.8% (Table 5.26). Grasslands and commercial farmlands also had land covers in excess of 10,000 ha.

Table 5.26: Land cover/ land use for Buikwe District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Wood-land	Bush-land	Grass-land	Wet-land	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	73	197	17,569	21,484	1,567	2,600	11,604	2,215	54,515	10,096	575	22,977	2
Additions	339	353	6,302	3,724	2,035	2,604	3,001	836	17,682	6,861	1,614	382	17
Reductions	69	197	6,354	16,535	1,548	2,525	6,249	1,045	9,467	1,170	262	326	2
Closing stock	343	353	17,518	8,673	2,054	2,679	8,355	2,005	62,730	15,788	1,927	23,033	17
Net gains/reduction	270	156	(52)	(12,811)	487	79	(3,248)	(209)	8,215	5,691	1,352	56	15

Buikwe District had continued to expand small scale farmlands. The commercial farmlands also expanded by more than 50%. Tropical high forests declined by 12,863 ha. Contrastingly, the woodlands increased by 487 ha. Bushlands and forest plantations increased while grasslands reduced by one-third (Figure 5.28).

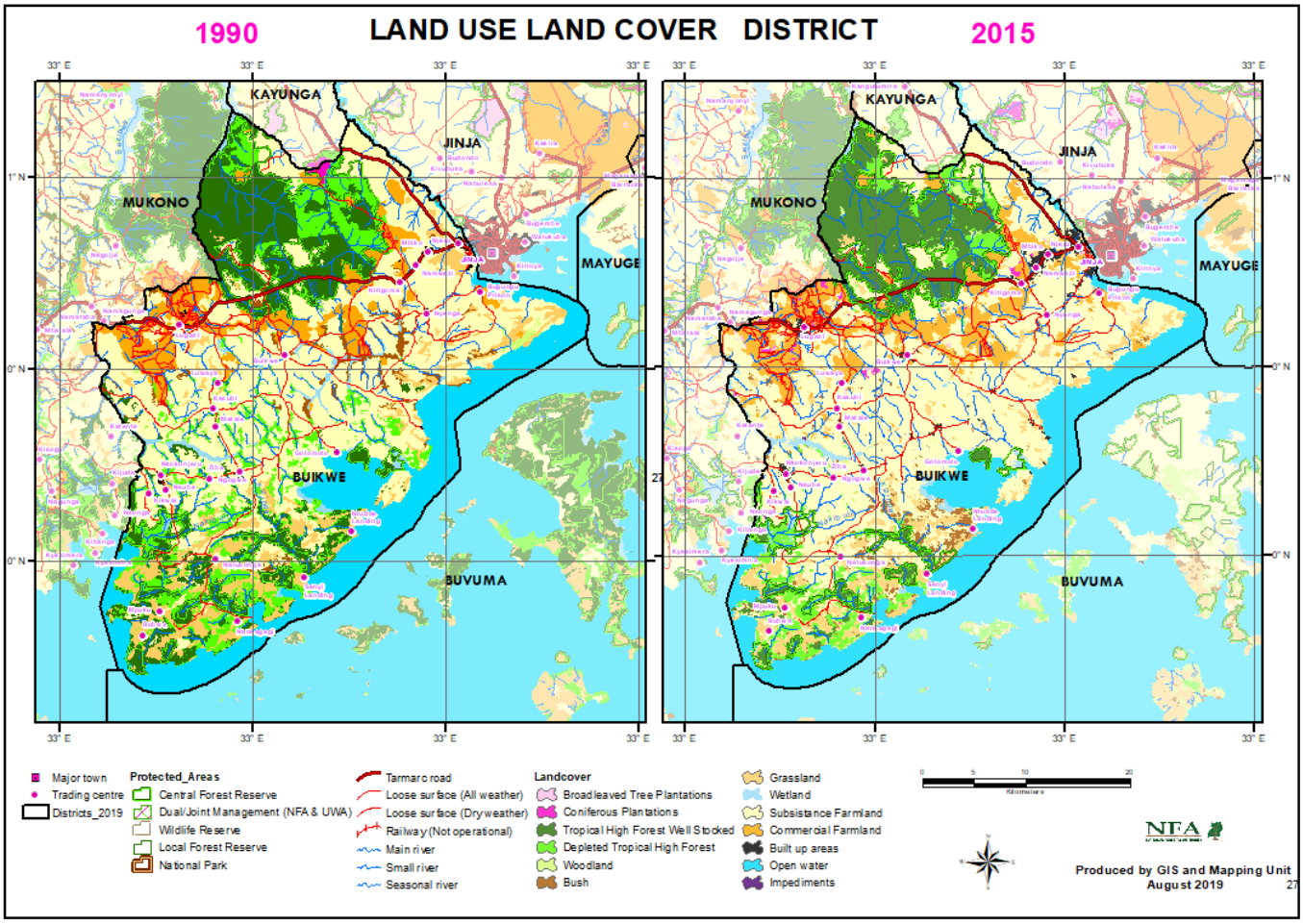


Figure 5.28: Land cover/ land use for Buikwe District

5.2.27 Land Physical Accounts for Buyende District

Buyende District had a land cover of 187,808.2 ha of which 42% was small scale farmlands and 29% was open water. The other leading land covers were wetlands, grasslands and woodlands. The District lies along Lake Kyoga and fisheries are a major livelihood. However, the District did not have tropical high forest or commercial farmlands. The plantations were small and by 2015, the broadleaved plantations had been removed while the coniferous plantations reduced from 21 ha to just 6 ha.

Table 5.27: Land cover/ land use for Buyende District

1990 to 2015	Broad eaved plantation	Coniferous plantation	Tropical High Forests	Wood-land	Bush-land	Grass-and	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	8	21	-	15,967	4,343	17,046	18,262	79,105	-	65	52,908	84
Additions	8	6	-	256	7,082	840	2,009	31,900	-	243	5021	-
Reductions	8	21	-	15,629	4,019	16,380	6,916	3,962	-	52	294	84
Closing stock	8	6	-	595	7,405	1,506	13,355	107,043	-	255	57,635	-
Net gains/reductions	-	(16)	-	(15,373)	3,063	(15,540)	(4,907)	27,938	-	190	4,727	(84)

The major land cover transition in Buyende District was the expansion of small scale farmlands (Figure 5.29). The farmlands covered an additional 27,938 ha. Small scale farmland cover was 57% of the District land cover in 2015 from 42% in 1990. The wetlands declined by one-quarter while bushlands expanded. From a land cover of 15,967 ha the woodlands had been decreased to just 595 ha.

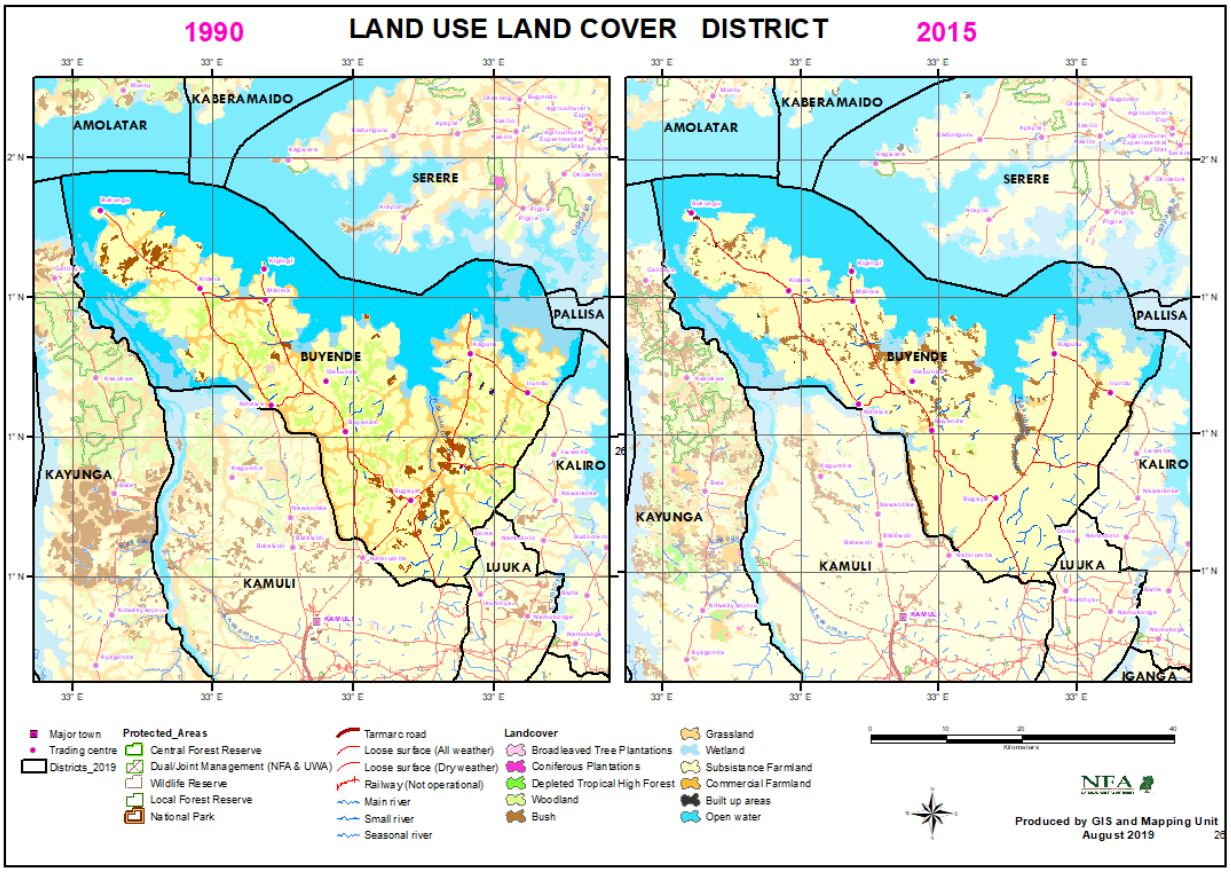


Figure 5.29: Land cover/ land use for Buyende District

5.2.28 Land Physical Accounts for Dokolo District

The land cover of Dokolo District was 108,731.5 ha. Much of the land was under small scale farmlands (67.5%). Grasslands cover 15% of the land cover while all the other remaining land covers were under 10,000 ha. The District did not have tropical high forests but the area of coniferous forest plantations increased 10-fold from 296 ha in 1990 to 2930 ha in 2015. All the coniferous forest plantations were lost. Small scale farmlands expanded by 3,489 ha while wetlands and bushlands expanded by 5,446 ha and 7,701 ha, respectively (Table 5.28).

Table 5.28: Land cover/ land use for Dokolo District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High forests	Wood-land	Bush-land	Grass-land	Wet-land	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	38	296	-	9,801	243	15,365	1,743	73,420	-	42	7,784	-
Additions	-	2,650	-	315	7,923	490	6,907	7,838	-	253	1,986	-
Reductions	38	8	-	9,305	222	12,884	1,461	4,350	-	24	71	-
Closing stock	-	2938	-	811	7,944	2,971	7,189	76,908	-	271	9,699	-
Net gains/reductions	(38)	2,642	-	(8,991)	7,701	(12,394)	5,446	3,489	-	230	1,915	-

The major land cover change between 1990 and 2015 was the over 90% loss of woodlands, the 81% loss in grassland covers and the expansion of mostly bushlands, wetlands, farmlands and coniferous forest plantations (Figure 5.30).

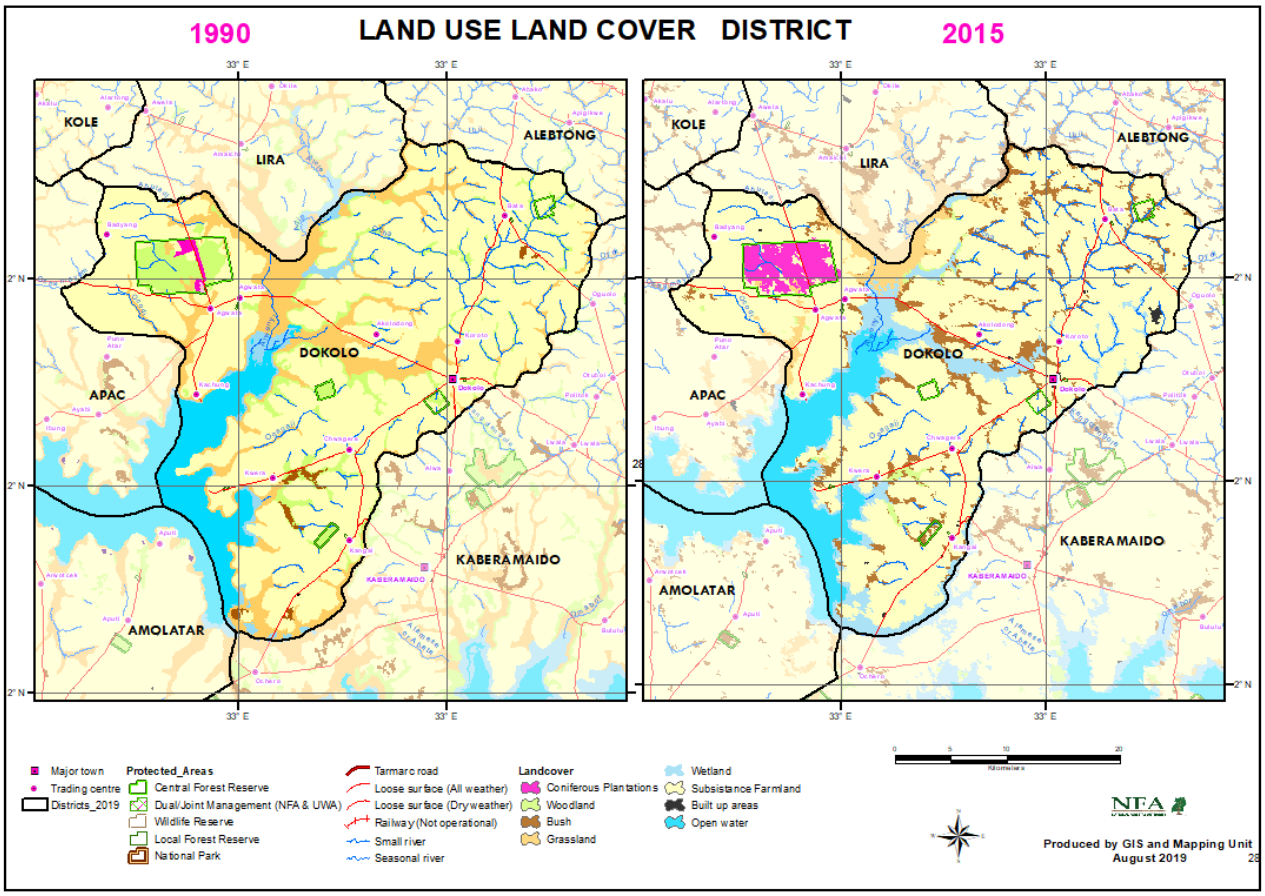


Figure 5.30: Land cover/ land use for Dokolo District

5.2.29 Land Physical Accounts for Gomba District

Gomba District had a land cover of 167,672.3 ha. The three leading land covers were small scale farmlands at 39.5%, grasslands at 31.5% and woodlands at 15.3% (Table 5.29). Between 1990 and 2015, the largest land cover change was the 24,258 ha reduction in grasslands and the 19,275 ha increase in bushlands followed by the 10,646 ha increase in the area of small scale farmland.

Table 5.29: Land cover/ land use for Gomba District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Wood-land	Bush-land	Grass-land	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	43	-	3,259	4,398	25,749	9,139	52,897	4,214	66,231	263	112	1,367	-
Additions	290	54	147	581	11,550	24,549	14,174	8,055	28,436	303	288	279	79
Reductions	43	-	3,147	4,221	18,847	5,254	38,432	834	17,790	159	57	1	-
Closing stock	291	54	259	758	18,452	28,434	28,639	11,435	76,877	407	344	1,645	79
Net gains/reduction	247	54	(3,000)	(3,640)	(7,297)	19,295	(24,258)	7,221	10,646	144	231	278	79

The increase in land area under small scale farmland was the major transition between 1990 and 2015 (Figure 5.31). The small scale farmland seems to have strengthened at the expense of grasslands. Bushlands also expanded as well as wetlands. The commercial farmlands, built up areas and forest plantations also expanded. There were severe losses for tropical high forests with a combined loss of 6,640 ha from a tropical high forest cover of 7,657 ha. The woodlands also lost 28% of their cover of the same timeline.

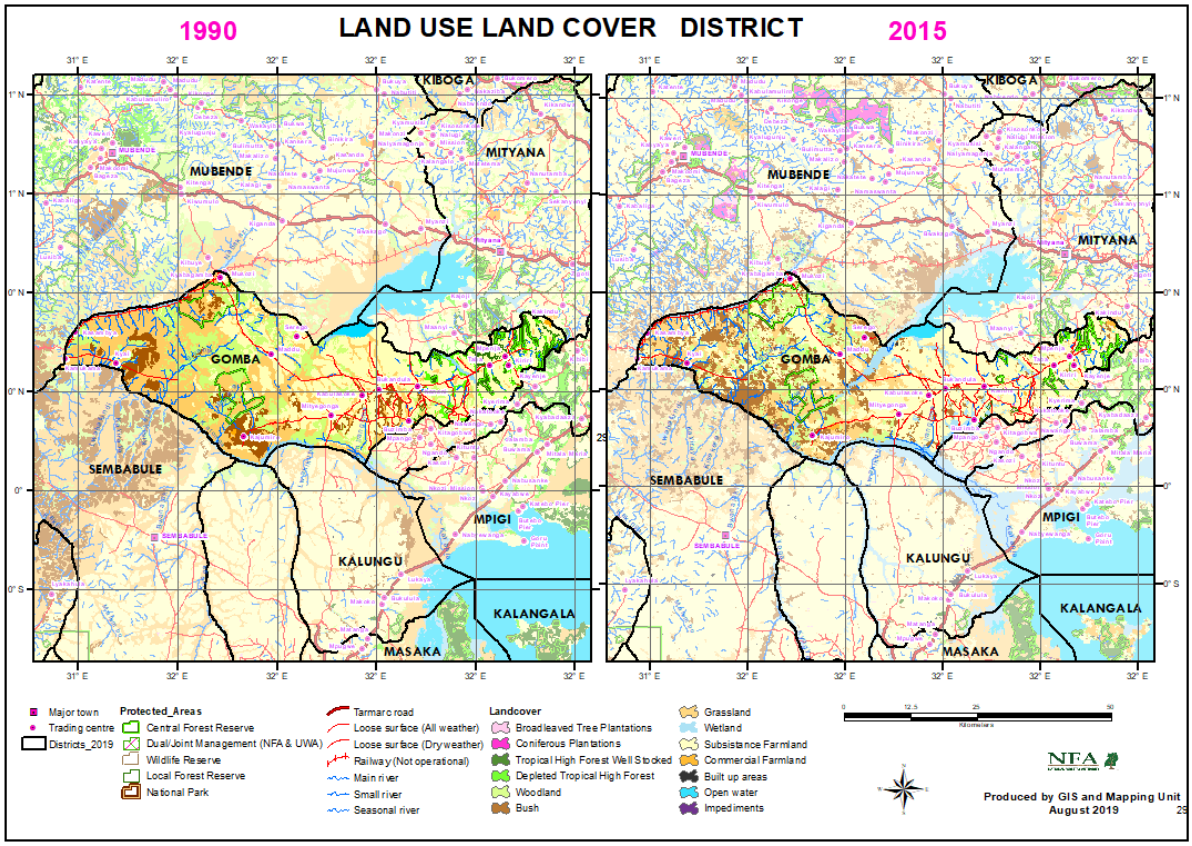


Figure 5.31: Land cover/ land use for Gomba District

5.2.30 Land Physical Accounts for Gulu District

The land cover of Gulu District was 328,861.5 ha, of which 72% was small scale farmlands. Woodland cover was 24.1% while all the other land covers were less than 10,000 ha (Table 5.30). However, the District land cover also included forest plantations, commercial farmlands and built up areas which increased over the assessment timeline. The built up areas increased by more than five times from occupying just 679 ha in 1990 to 3,606 ha in 2015. The small scale farmlands, grasslands, bushlands and wetlands increased between 2019 and 2015 while woodlands reduced.

Table 5.30: Land cover/ land use for Gulu District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High Forest	Wood-land	Bush-land	Grass-land	Wet-land	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	258	477	-	79,246	540	9,642	261	237,018	346	679	357	37
Additions	532	682	-	9,210	11,114	33,577	959	49,609	854	3,159	211	160
Reductions	256	458	-	68,273	401	6,889	121	33,053	171	232	174	37
Closing stock	534	701	-	20,183	11,253	36,330	1,099	253,575	1,028	3,606	394	160
Net gains/reduction	276	224	-	(59,063)	10,713	26,687	838	16,556	682	2,927	37	124

The major transition between 1990 and 2015 was the 75% loss of the woodland cover in the District. The 59,063 ha of woodland lost was larger than the expansion in small scale farmlands, grasslands and bushlands combined within the District. The District's built up area also expanded more than five times and the commercial farmlands tripled in size (Figure 5.32).

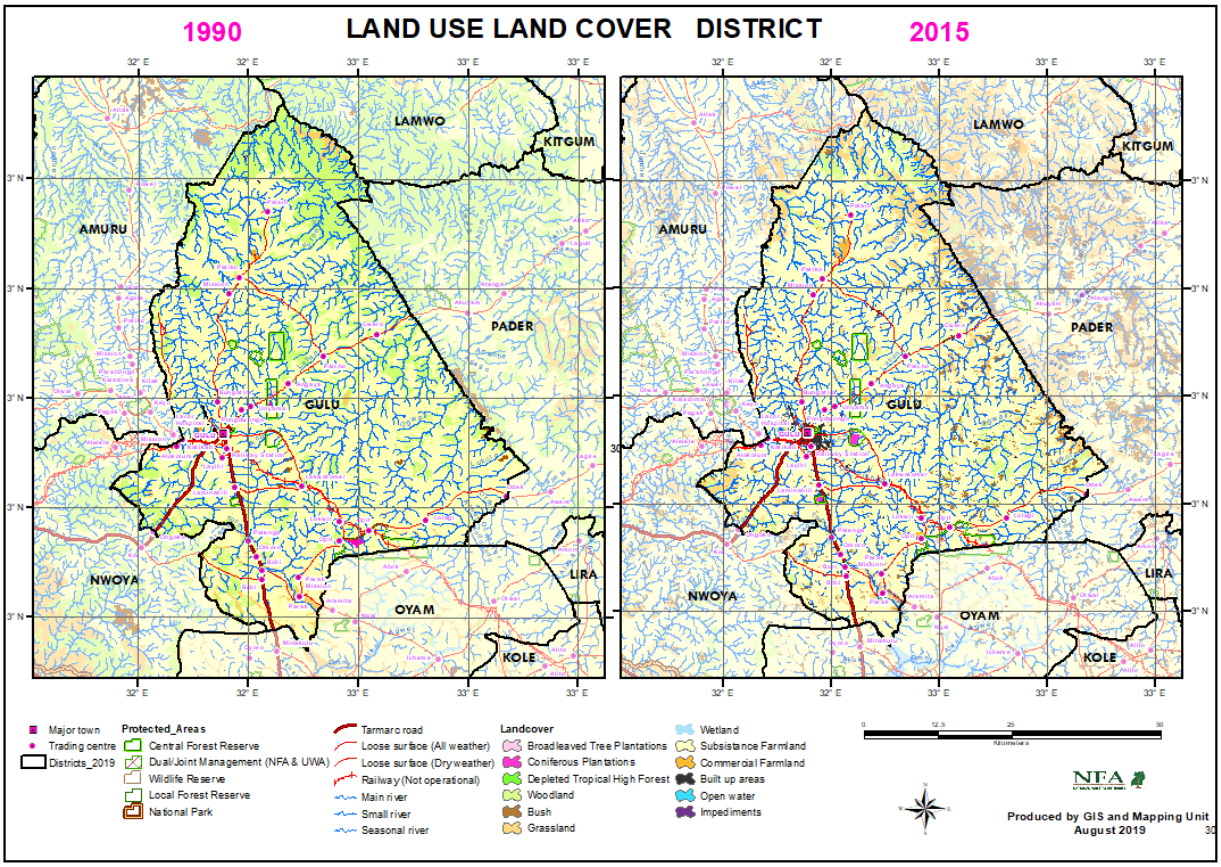


Figure 5.32: Land cover/ land use for Gulu District

5.2.31 Land Physical Accounts for Hoima District

Hoima District had a total area of 593,283.7 ha. The largest area (38%) was under open water followed by small scale farmlands (20%), woodlands (14%), tropical high forests (12.6%) and grasslands (12%). The major changes between 1990 and 2015 was the expansion of small scale farmlands from 118,326 ha to 215,008 ha. Commercial farmlands gained an additional 1,622 ha and bushlands gained over 40,000 ha. Conversely, there were major reductions for woodlands, tropical high forests, grasslands. Woodlands reduced by 82%, grasslands by 56% and tropical high forests by 42%. There was a five-fold increase in bushlands within the District as well.

Table 5.31: Land cover/ land use for Hoima District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Wood-land	Bush-land	Grass-land	Wet-land	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	47	432	48,440	26,704	84,890	8,558	71,564	5,817	118,326	1,290	345	226,871	-
Additions	1,002	387	6,362	4,139	8,672	44,106	10,026	2,083	110,616	2,094	874	950	80
Reductions	47	432	17,224	25,007	78,085	4,077	49,142	2,468	13,934	472	219	285	-
Closing stock	1,002	387	37,578	5,835	15,478	48,587	32,449	5,433	215,008	2,912	1,000	227,536	80
Net gains/reduction	955	(45)	(10,862)	(20,868)	(69,413)	40,029	(39,116)	(385)	96,682	1,622	655	665	80

There was an 82% increase in the area of small scale farmlands in Hoima District as well as a doubling in the area of commercial plantations and built up area (Figure 5.33). The expansions in land cover were achieved at the expense of woodlands, tropical high forests and grasslands. It would seem that the agriculture particularly crop production livelihoods were growing at the expense of other livelihoods.

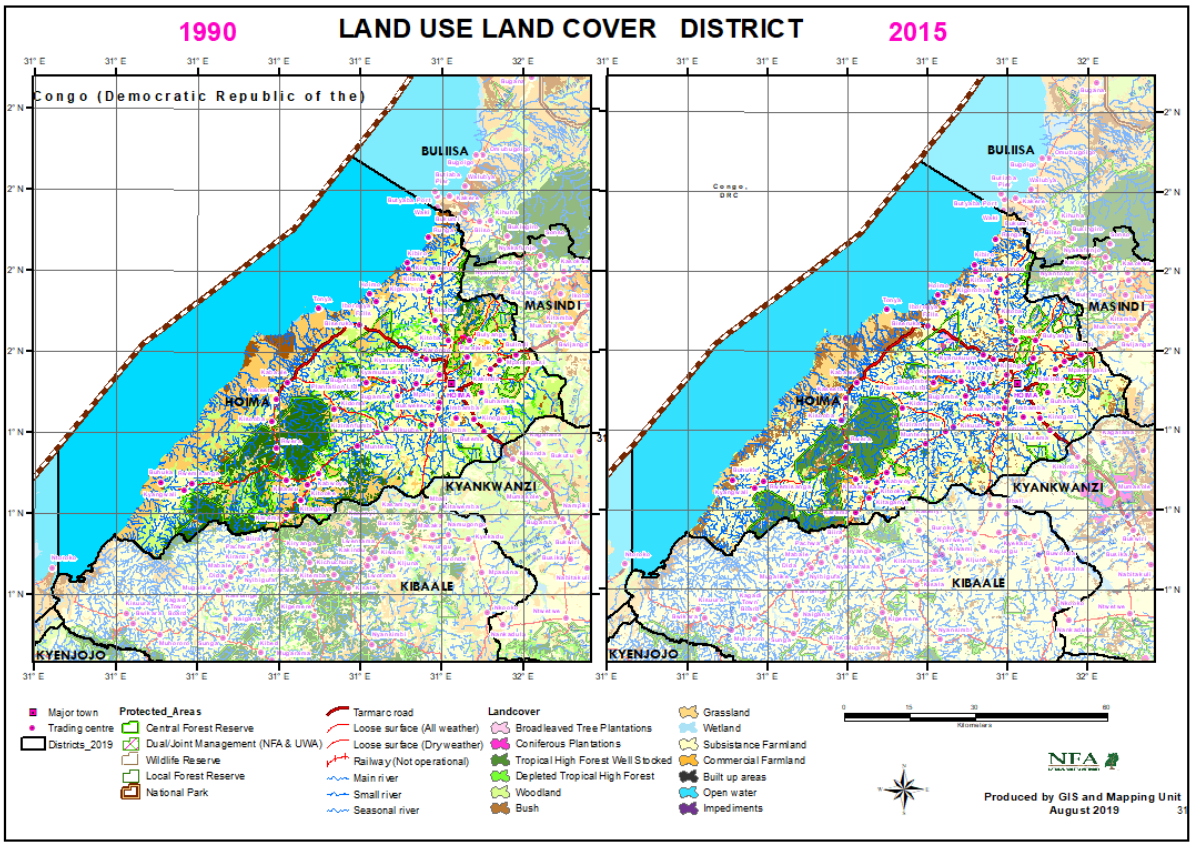


Figure 5.33: Land cover/ land use for Hoima District

5.2.32 Land Physical Accounts for Ibanda District

Ibanda District had a total land cover of 97,168.4 ha. In 1990, more than three-quarters of the land was under small scale farmlands while woodlands and tropical high forests occupied 2,901 and 3,871 ha, respectively (Table 5.32). Wetlands occupied 751 ha. By 2015, the major transformations were the loss of grassland and woodland cover and the large expansion of bushlands. The expansion of small scale farmlands was quite small at just 338 ha over the 25-year timeline. It would therefore seem that a lot of the land cover lost under grasslands and woodlands was converted to bushlands. There was an increase in the cover of forest plantations.

Table 5.32: Land cover/ land use for Ibanda District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Wood-land	Bush-land	Grass-land	Wet-land	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	75	-	3,700	171	2,901	31	16,144	751	72,977	229	115	2	73
Additions	312	44	315	424	917	4,688	8,358	54	12,673	51	602	72	47
Reductions	73	-	630	171	2,715	26	11,597	651	12,335	229	55	2	73
Closing stock	314	44	3,386	424	1,102	4,692	12,904	154	73,316	51	662	72	47
Net gains/reduction	239	44	(315)	253	(1,798)	4,662	(3,239)	(597)	338	(178)	547	70	(26)

The major land cover changes in Ibanda District were the loss of grasslands and woodlands and the large expansion in bushlands. The changes in land cover are generally associated with land use activities within minimal influence from protected area management restrictions (Figure 5.34).

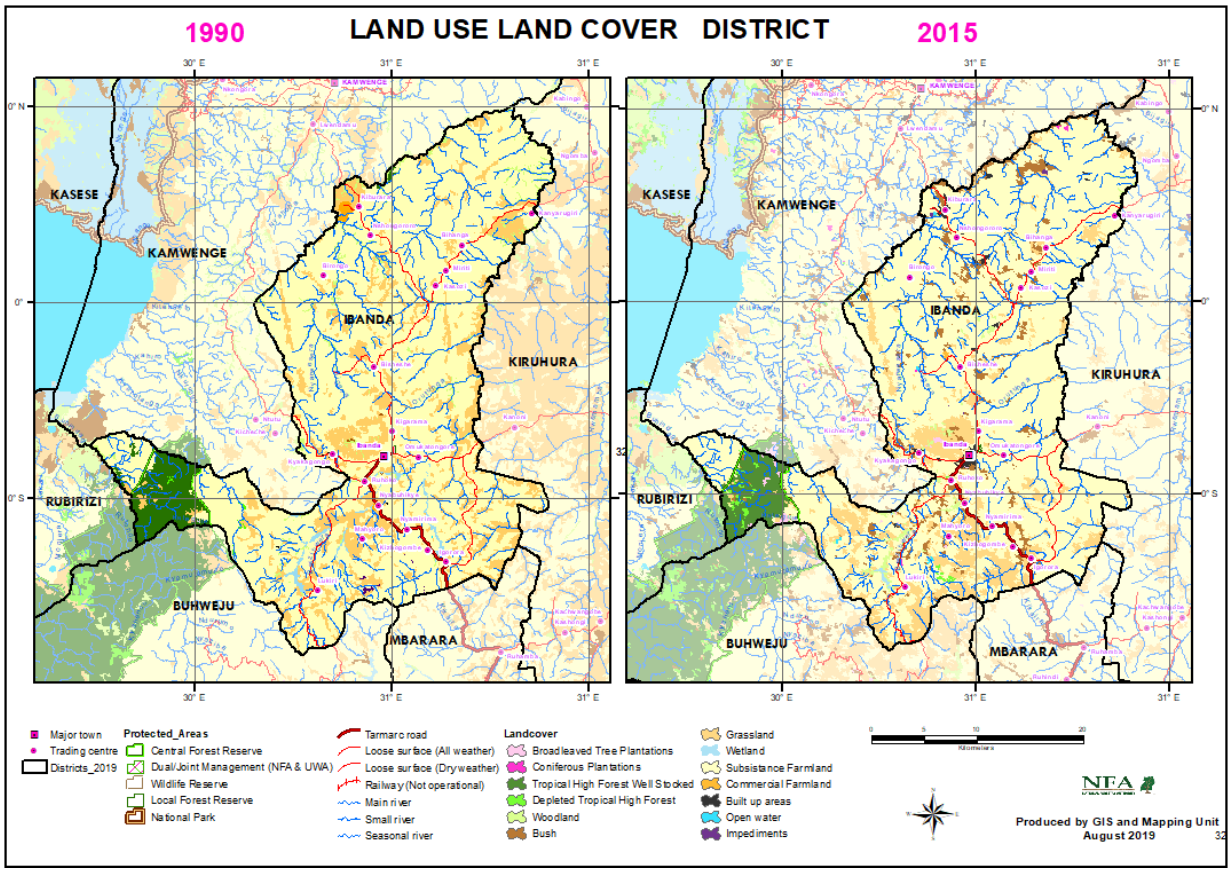


Figure 5.34: Land cover/ land use for Ibanda District

5.2.33 Land Physical Accounts for Iganga District

Out of the 101,925.5 ha of Iganga District's total land cover, 91% was under small scale farmlands in 1990. Wetlands, woodlands, grasslands and bushlands occupied 1,481, 2,706, 1,819 and 2,742 ha respectively. The major land cover change was the four-fold expansion of wetlands from 1,481 ha to 5,853 ha. Even though it was already the largest land cover the District, small scale farms expanded by418 ha between 1990 and 2015 (Table 5.33).

Table 5.33: Land cover/ land use for Iganga District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Wood-land	Bush-land	Grass-land	Wet-land	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	80	-	-	-	2,706	2,742	1,819	1,481	92,596	86	409	2	5
Additions	-	98	-	-	-	1,296	-	4,616	5,974	101	1,154	-	-
Reductions	80	-	-	-	2,706	2,542	1,819	244	5,556	86	198	2	5
Closing stock	-	98	-	-	-	1,496	-	5,853	93,013	101	1365	-	-
Net gains/reduction	(80)	98	-	-	(2,706)	(1,246)	(1,819)	4,372	418	15	956	(2)	(5)

The emerging synthesis from the land cover change for Iganga District between 1990 and 2015 was strengthening of land cover under small scale farmlands. The wetlands also expanded at the expense of woodlands, bushlands and grasslands (Figure 5.35). Indeed, all the woodlands in Iganga District were lost between 1990 and 2015, similarly coniferous plantations were lost. The built up area doubled in size.

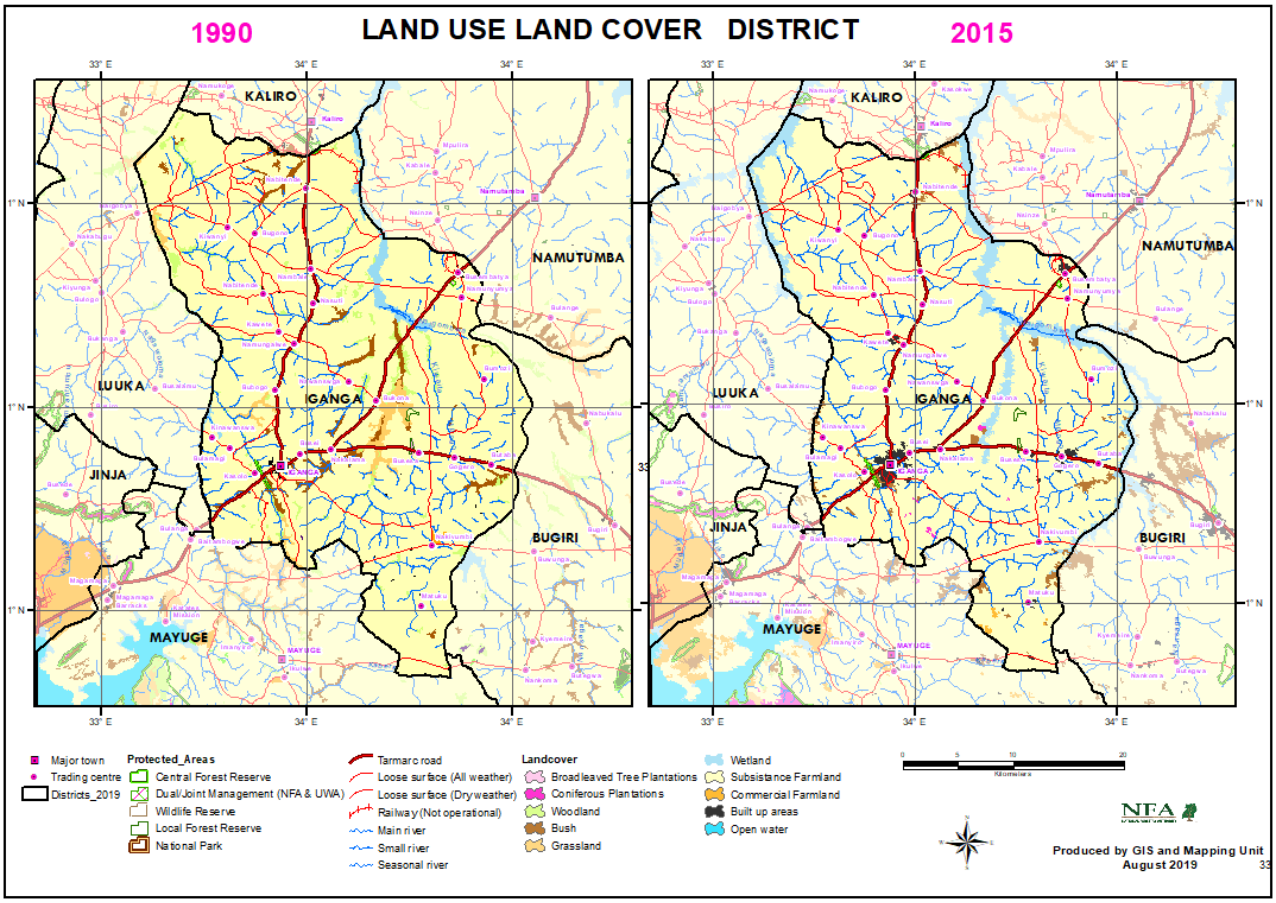


Figure 5.35: Land cover/ land use for Iganga District

5.2.34 Land Physical Accounts for Isingiro District

Isingiro District had a land cover of 265,090.3 ha. More than 55% of the land cover was composed of wetlands and 28% was small scale farmlands while bushlands occupied about 11% of the land cover in 1990. Between 1990 and 2015, the changes in land cover were general small. Small scale farmlands expanded by 8,598 ha while wetlands and grasslands also expanded (Table 5.34).

Table 5.34: Land cover/ land use for Isingiro District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Wood-land	Bush-land	Grass-land	Wet-land	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	115	-	-	-	3,816	30,187	146,030	6,973	74,040	56	40	3,833	-
Additions	75	798	-	-	986	14,438	43,197	2,998	33,680	-	99	791	3
Reductions	115	-	-	-	3,609	23,224	42,890	1,419	25,082	56	26	645	-
Closing stock	75	798	-	-	1,193	21,401	146,337	8,552	82,639	-	113	3,979	3
Net gains/reduction	(40)	798	-	-	(2,623)	(8,786)	307	1,579	8,598	(56)	73	146	3

There were minimal changes in land cover for Isingiro. Isingiro is a rangeland District with livestock and crop production as the major land uses (Figure 5.36). There are large areas of public land such as the refugee settlements the Nakivale Refugee settlement camp. The District had no tropical high forests and minimal impediments were reported.

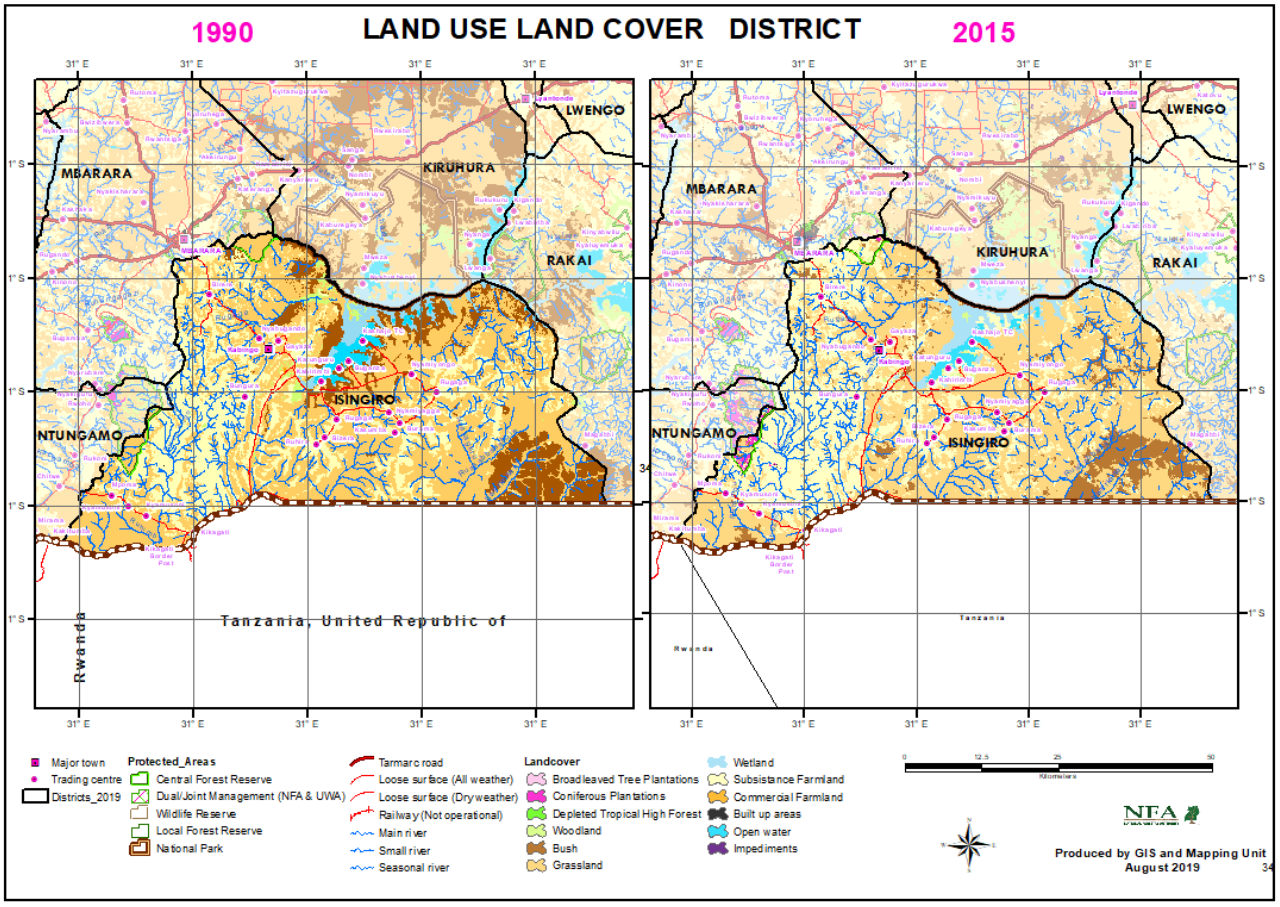


Figure 5.36: Land cover/ land use for Isingiro District

5.2.35 Land Physical Accounts for Jinja District

Jinja District had a land cover of 72,267.8 ha. Just over two-thirds of the land cover was under small scale farmlands. The other leading covers were commercial farmlands followed by open water and bushlands (Table 5.35). The farmlands in Jinja declined by 1,083 ha but there were gains in the commercial farmlands of 1,660 ha. The built up area also expanded as well as the coniferous forest plantations. However, 76% of the broadleaved forest plantations were lost.

Table 5.35: Land cover/ land use for Jinja District (in hectares)

1990 to 2015	Broad leaved plantations	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	3,256	186	34	255	264	2,502	442	1,215	49,122	8,193	1,825	4,974	-
Additions	240	2,202	-	232	20	229	551	186	3,302	2,042	1,716	277	-
Reductions	2,703	58	34	255	264	2,498	396	929	4,385	381	568	131	-
Closing stock	793	2,330		237	20	333	597	472	48,728	10,658	2,977	5,121	-
Net gains/reductions	(2,463)	2,145	(34)	(23)	(243)	(2,270)	155	(743)	(1,083)	1,660	1,149	146	-

The major land cover transition between 1990 and 2015 was the steady, albeit with a small decline, small scale farmland cover. The increase in the commercial farmlands, built up areas and the coniferous forest plantations. The woodlands are on the brink of being entirely lost with only 20 ha left by 2015, THF well stocked was lost but some THF low stocked (237 ha) still remained. Bushlands and wetlands increased while grasslands increased one third (Figure 5.37).

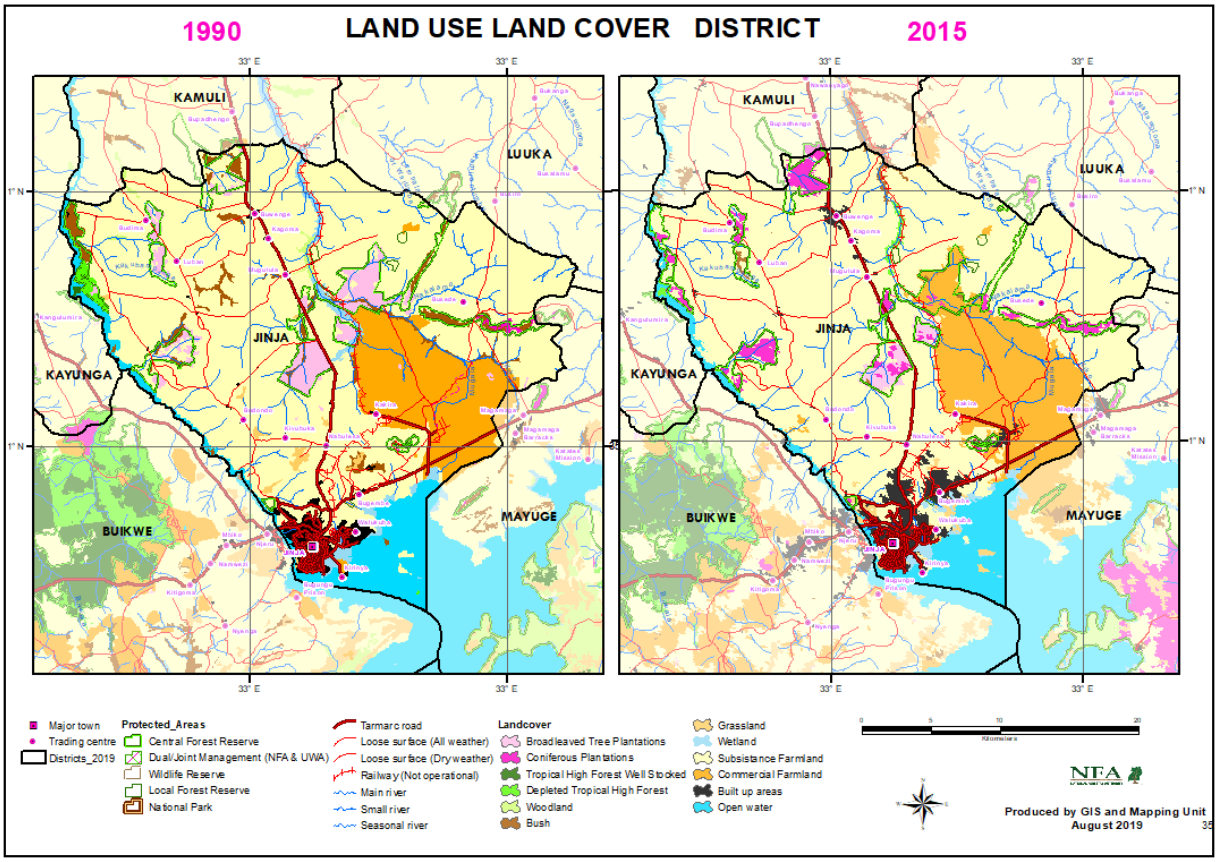


Figure 5.37: Land cover/ land use for Jinja District

5.2.36 Land Physical Accounts for Kaabong District

Kaabong District had a land cover of 726,373.3 ha most of which was under grassland (50%), bushlands (30%) and woodlands (11%) in 1990. By 2015, the grasslands had increased and covered 61% of the land cover at the expense of bushlands and woodlands which declined by 58,815 and 22,992 ha respectively. Small scale farmlands also expanded by 5,094 ha (Table 5.36).

Table 5.36: Land cover/ land use for Kaabong District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High Forest	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	17	-	-	81,890	217,515	365,780	-	61,024	-	68	-	80
Additions	28	-	-	32,072	108,591	184,744	-	27,584	-	42	154	37
Reductions	17	-	-	55,064	167,406	108,128	-	22,490	-	67	-	80
Closing stock	28	-	-	58,898	158,701	442,395	-	66,119	-	42	154	37
Net gains/reductions	11	-	-	(22,992)	(58,815)	76,616	-	5,094	-	(26)	154	(43)

The major transition in Kaabong District was the expansion of grasslands and the increase in small scale farmlands mostly at the expense of bushlands and woodlands (Figure 5.38). Part of the grassland of Kaabong is a section of the Kidepo Valley National Park and the expansion of the grasslands is an indication of the success in conservation of the National Park. However, expansion of small scale farmlands is an indication of increasing livelihood diversification away from a predominantly pastoral livelihood in the District.

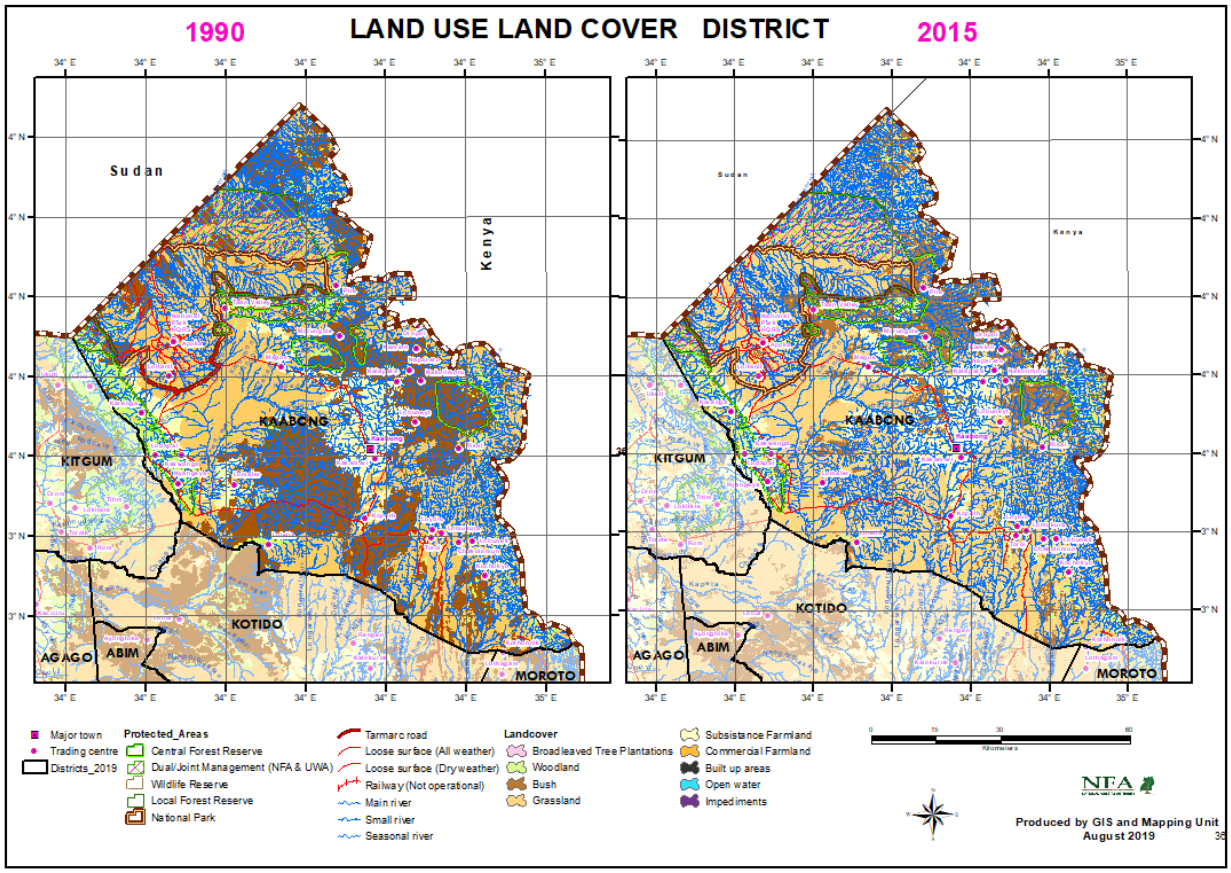


Figure 5.38: Land cover/ land use for Kaabong District

5.2.37 Land Physical Accounts for Kabale District

Kabale District had a land cover of 172,968.1 ha and 79% of the land cover was under small scale farmlands in 1990 (Table 5.37). THF well stocked and open water were the other leading covers with 8,138 and 5,061 ha, respectively. Kabale District had a diverse land cover which would ensure that there would be a diverse distribution of ecosystem services. Moreover, between 1990 and 2015, the land cover for woodlands, THF well stocked, coniferous plantations and wetlands increased. The land covers for broadleaved plantations, THF low stocked, grasslands and small scale farmlands increased. Conversely, the commercial farmlands increased.

Table 5.37: Land cover/ land use for Kabale District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	1,809	1,868	8,138	340	466	557	16,447	1,501	136,183	19	580	5,061	-
Additions	1,437	942	733	2	5,150	9,162	4,746	1,723	10,516	1,874	110	1,229	-
Reductions	1,701	286	217	224	81	504	10,989	904	21,798	19	413	488	-
Closing stock	1,545	2,524	8,654	118	5,535	9,214	10,204	2,320	124,901	1,874	277	5,801	-
Net gains/reductions	(264)	656	516	(222)	5,069	8,658	(6,243)	819	(11,282)	1,855	(303)	741	-

Kabale District land cover transitions showed a general strengthening of forest land management with expansion of coniferous forests, THF plantations and woodlands (Figure 5.39). Bushlands also expanded as well as wetlands. The expansion of commercial farmlands may be the most critical land cover change as change was from 19 ha in 1990 to 1,874 ha in 2015.

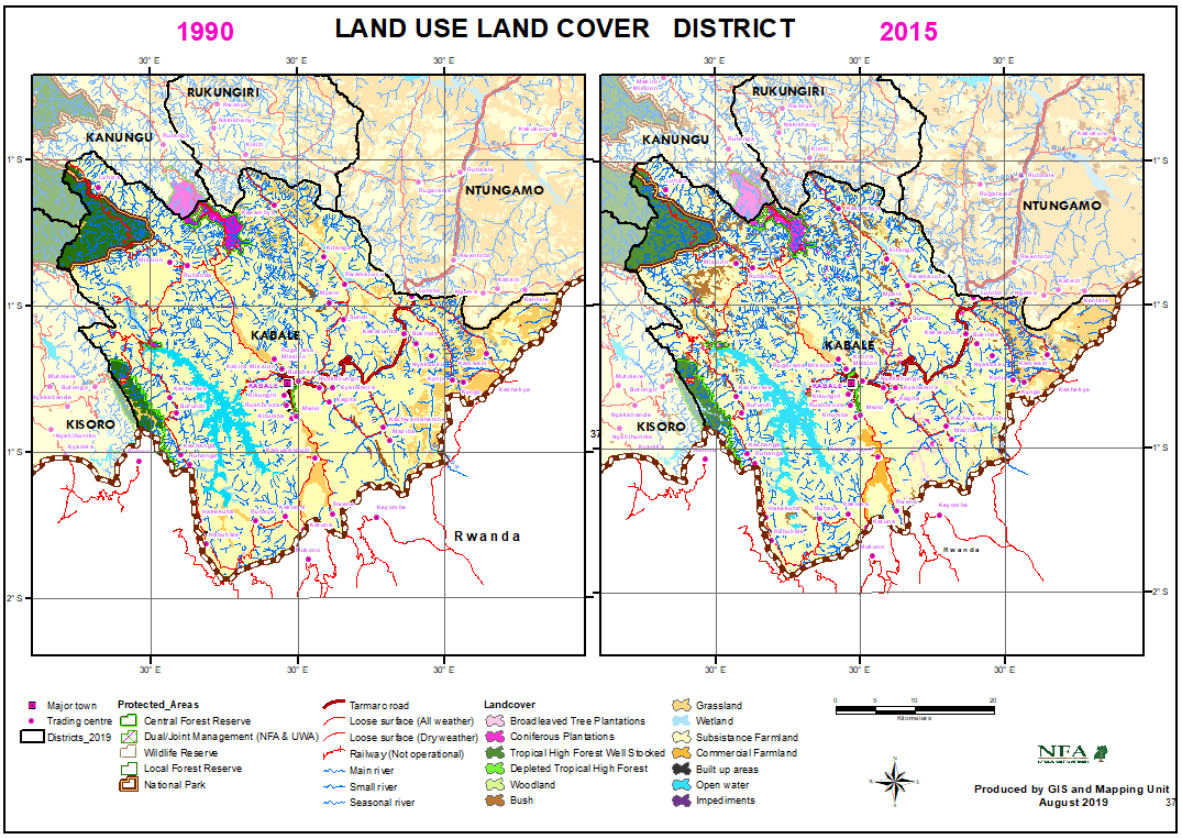


Figure 5.39: Land cover/ land use for Kabale District

5.2.38 Land Physical Accounts for Kabarole District

Kabarole District had a land cover of 182,445.7 ha. With 53% under small scale farmlands in 1990 and 22% under tropical high forests as the two leading land covers alongside the 21,509 ha under grasslands and 14,225 ha under woodlands (Table 5.38). By 1990, the small scale farmlands had expanded with an additional 4,223 ha. However, the THF well stocked expanded by 7,627 ha to 40,760 even though the THF low stocked declined over the same timeline.

Table 5.38: Land cover/ land use for Kabarole District

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	805	782	33,134	6,478	14,225	279	21,509	2,175	96,339	5,274	632	813	-
Additions	1,067	63	10,117	5,281	3,870	3,602	4,610	1,084	17,410	4,871	371	290	58
Reductions	704	782	2,490	6,154	11,550	277	14,256	1,532	13,187	1,352	298	112	-
Closing stock	1,169	63	40,760	5,605	6,546	3,604	11,863	1,727	100,563	8,793	705	991	58
Net gains/reduction	363	(719)	7,627	(873)	(7,680)	3,325	(9,646)	(448)	4,223	3,519	73	178	58

The major transition in Kabarole District was the strengthening of area under small scale farmlands and THF well stocked and the expansion commercial farmlands. The woodlands covered halves while bushlands increased over 14-fold (Figure 5.40).

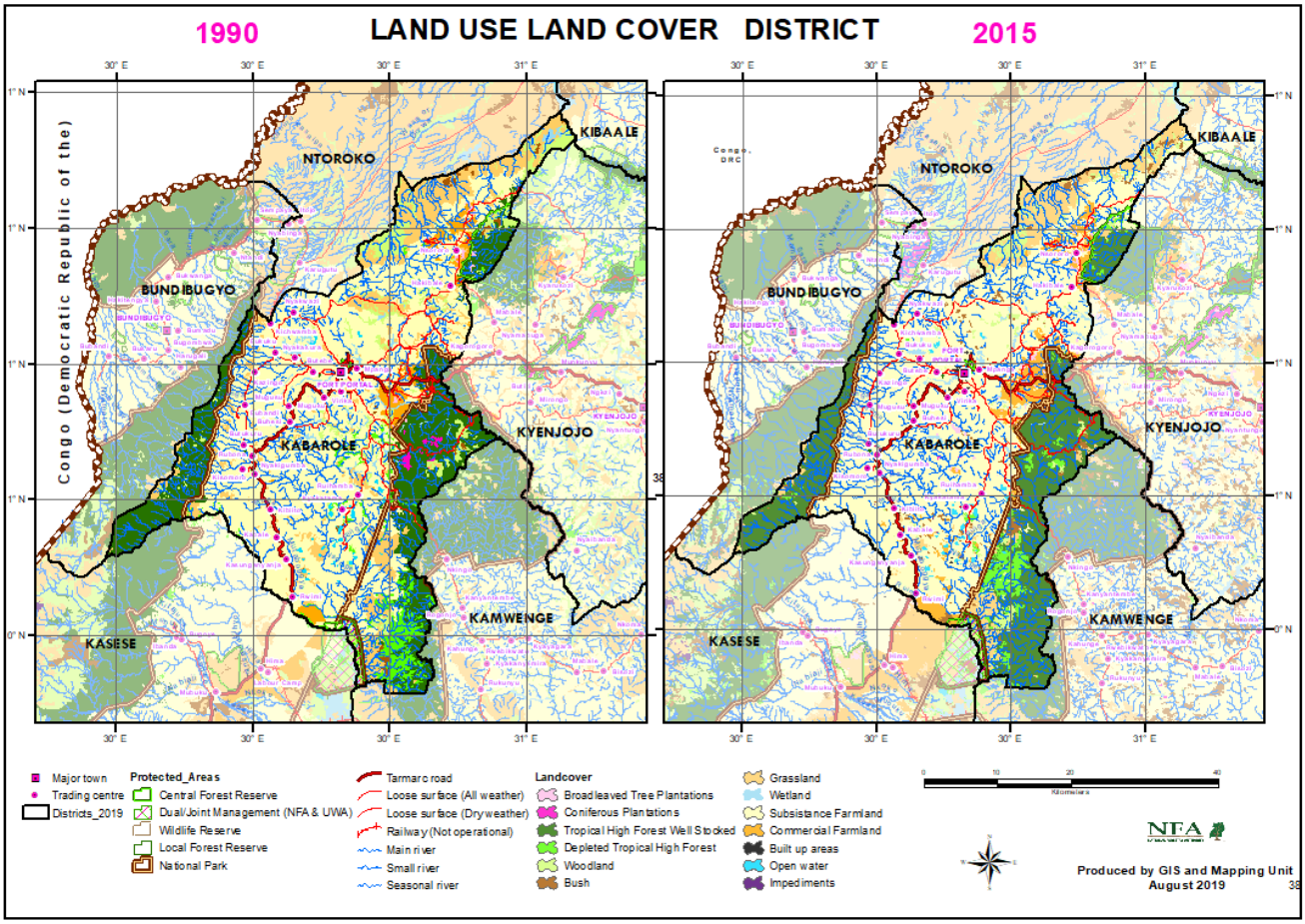


Figure 5.40: Land cover/ land use for Kabarole District

5.2.39 Land Physical Accounts for Kaberamaido District

Kaberamaido District had a land cover of 162,397 ha. More than half (55%) of the land cover was under small scale farmlands. The District had 17% of its cover under open water. Grasslands and woodlands were the other leading land covers with 19,579 and 17,546 ha, respectively (Table 5.39).

Table 5.39: Land cover/ land use for Kaberamaido District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	-	-	-	-	17,546	2,255	19,579	6,155	89,865	-	52	26,945	-
Additions	18	11	168	-	1,092	5,553	1,567	9,549	24,069	-	588	3,857	-
Reductions	-	-	-	-	16,403	2,062	19,212	4,077	4,637	-	25	56	-
Closing stock	18	11	168	-	2,235	5,746	1,935	11,627	109,296	-	616	30,746	-
Net gains/reductions	18	11	168	-	(15,311)	3,491	(17,644)	5,472	19,431	-	563	3,801	-

The major transition in land cover between 1990 and 2015 were the expansion of small scale farmlands to 67% of the District's total cover. With open water at 30,746 ha, the land expansion was at the expense of woodlands where 70% of the woodland cover of the District was lost while 90% of the grassland area were also lost (Figure 5.41). the built up area expanded by 10-times.

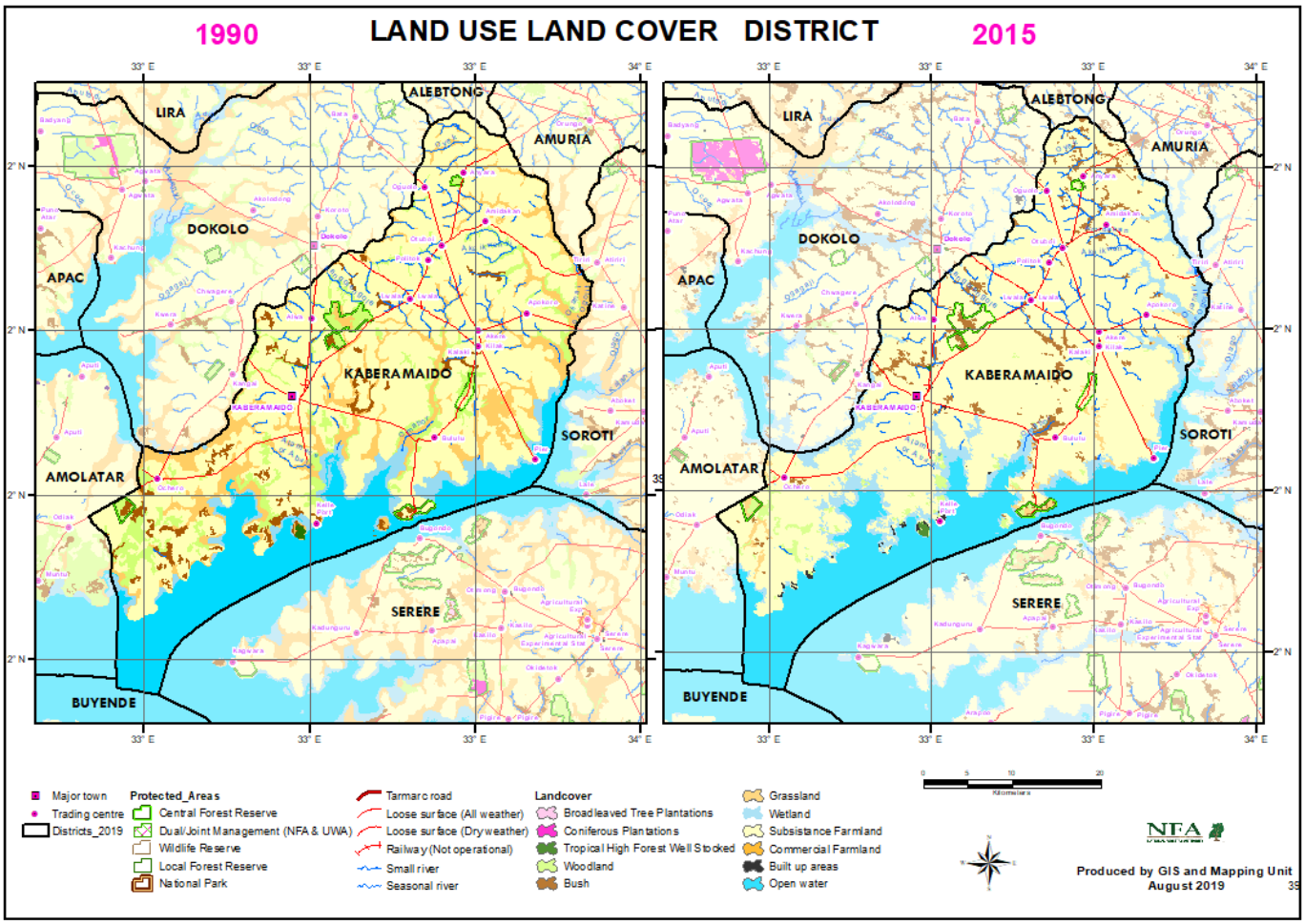


Figure 5.41: Land cover/ land use for Kaberamaido District

5.2.40 Land Physical Accounts for Kalangala District

Kalangala District had total cover of 906,864 ha. Nearly 95% of the total cover is open water. The remaining 5% of the District's land cover comprised 21,972 ha of THF well stocked, 11,469 ha of grasslands and 8,227 ha of small scale farmlands in 1990. By 2015, the small scale farmlands had reduced by 1,995 ha but the commercial farmlands emerged and expanded to cover an area of 8,175 ha. The commercial farmlands are attributed to commercial oil palm production which started in 2008. THF well stocked reduced by more than 50% while the THF low stocked expanded by 4,041 ha. The grasslands cover halved while the wetland cover increased by a further 2,344 ha (Table 5.40).

Table 5.40: Land cover/ land use for Kalangala District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	-	-	21,972	55	4,756	867	11,469	26	8,227	-	13	859,479	-
Additions	-	-	2,942	4,087	4,953	896	1,608	2,366	3,246	8,175	290	4,381	36
Reductions	-	-	14,857	46	3,660	849	7,460	22	5,241	-	13	834	-
Closing stock	-	-	10,058	4,096	6,050	915	5,617	2,370	6,232	8,175	291	863,027	36
Net gains/reduction	-	-	(11,915)	4,041	1,293	47	(5,852)	2,344	(1,995)	8,175	277	3,547	36

The major land cover transformation for Kalangala District was the emergence and expansion of commercial farmlands (Figure 5.42). The commercial farmlands are for oil palm production.

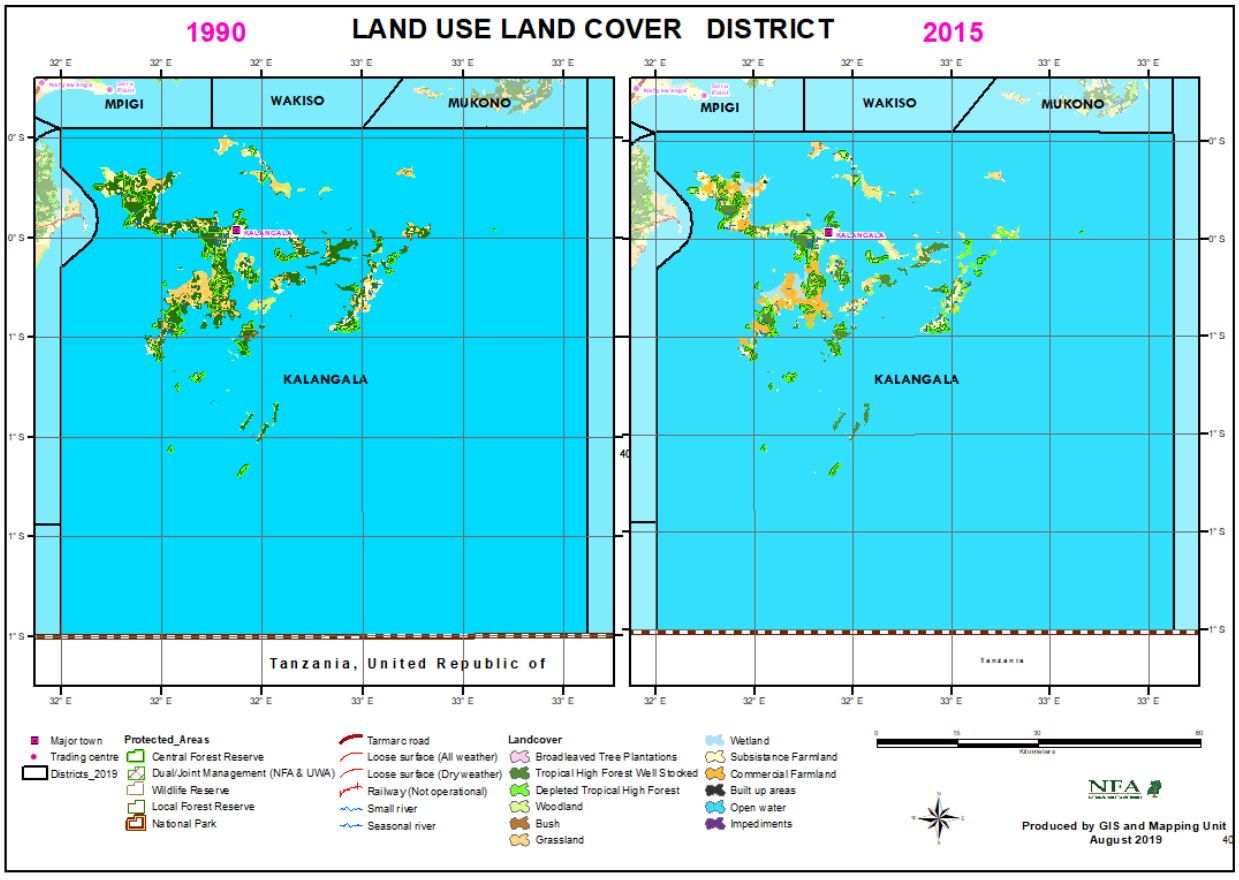


Figure 5.42: Land cover/ land use for Kalangala District

5.2.41 Land Physical Accounts for Kaliro District

Kaliro District had a land cover of 86,852.9 ha. Small scale farmlands cover 68% of the District while wetlands and open water made up 16% and 9%, respectively in 1990 (Table 5.41). Kaliro had no tropical high forest, impediments or commercial farmlands. The broadleaved forest plantations and woodlands that were available in 1990 had been lost by 2015. The bushlands, grasslands and wetlands all reduced in cover. The only increases in land cover were for small scale farmlands, built up area and open water. The open water likely increased due to increased surface retention from the degraded flood plains of grasslands and wetlands.

Table 5.41: Land cover/ land use for Kaliro District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High Forest	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	99	-	-	3,169	422	2,267	14,311	58,686	-	193	7,706	-
Additions	-	-	-	-	344	242	1,757	6,625	-	170	1,522	-
Reductions	99	-	-	3,169	422	2,267	3,093	1,432	-	120	58	-
Closing stock	-	-	-	-	344	242	12,975	63,878	-	243	9,171	-
Net gains/ reductions	(99)	-	-	(3,169)	(78)	(2,025)	(1,336)	5,193	-	50	1,465	-

The main transition for Kaliro District was the complete loss of forest cover including forest plantations, tropical high forests and woodlands. Bushlands, grasslands and wetlands also reduced. The District land cover is gradually consolidating into small scale farmlands and open water (Figure 5.43).

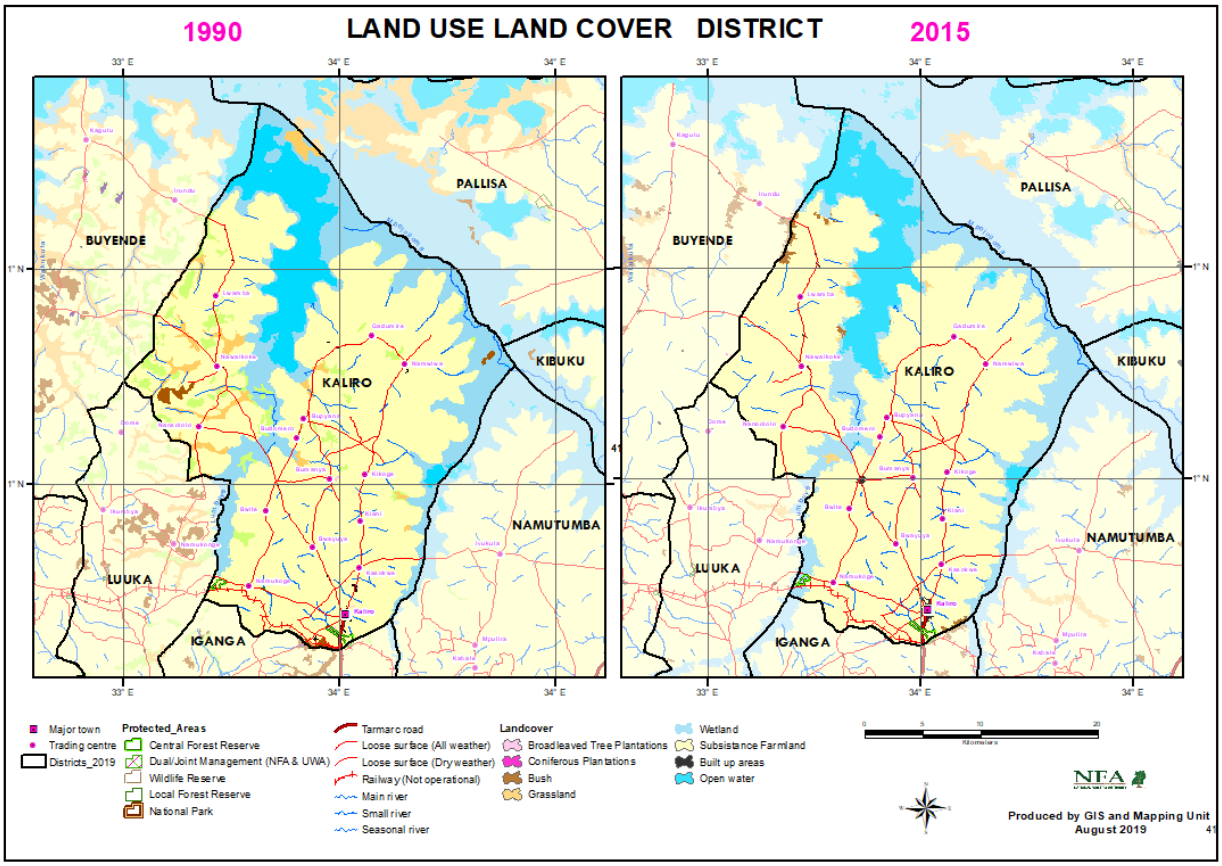


Figure 5.43: Land cover/ land use for Kaliro District

5.2.42 Land Physical Accounts for Kalungu District

The total land cover for Kalungu District was 83,628 ha of mostly small scale farmlands (61%) and grasslands (24.5%). The other important land covers were bushlands, wetlands, broadleaved plantations, open water and built up areas. Between 1990 and 2015, the small scale farmlands expanded by 3,039 ha. However, the largest expansion was for wetlands which increased six-fold from 2,402 ha to 12,551 ha (Table 5.42).

Table 5.42: Land cover/ land use for Kalungu District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	242	-	-	-	1,642	3,031	20,498	2,402	51,314	-	213	4,285	-
Additions	335	-	-	20	196	2,183	2,389	10,674	7,122	18	788	137	8
Reductions	235	-	-	-	1,426	2,775	14,545	525	4,027	-	133	206	-
Closing stock	343	-	-	20	413	2,440	8,342	12,551	54,409	18	868	4,217	8
Net gains/reductions	*100*	-	-	*20*	*(1,230)*	*(592)*	*(12,156)*	*10,149*	*3,095*	*18*	*655*	*(69)*	*8*

The major transition in Kalungu District was large expansion of wetlands and reduction of woodlands and grasslands. The grasslands as flood plains may have converted into wetlands. The small scale farmlands strengthened with gain of 3,095 ha of additional land. The built up areas expanded four fold from 213 ha to 868 ha (Figure 5.44).

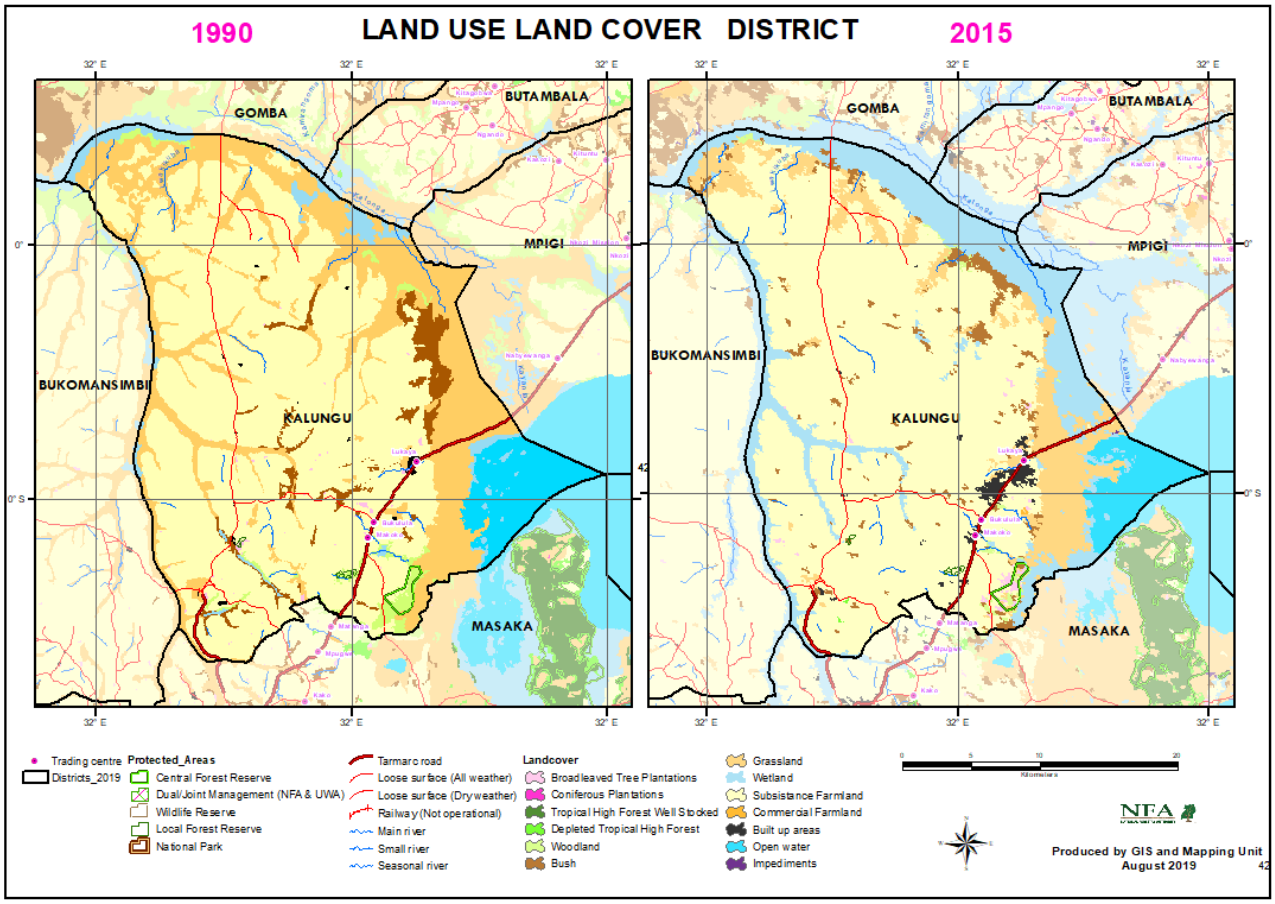


Figure 5.44: Land cover/ land use for Kalungu District

5.2.43 Land Physical Accounts for Kampala City

Kampala City had the small land cover in the country with 19,700.2 ha. For Kampala City, 43% was built up area and 35% was small scale farmland while 9% and 7% were open water and wetlands, respectively in 1990. By 2015, the built up area had expanded to 79% of the City's land cover. Small scale farmlands reduced by 91%. The tropical high forest cover was lost by 2015 while for plantations only 17 ha of broadleaved plantations remained.

Table 5.43: Land cover/ land use for Kampala City

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	31	-	-	491	30	736	80	1,452	6,904	123	8,150	1,685	19
Additions	16	-	-	-	88	238	465	169	596	-	7,716	119	18
Reductions	30	-	-	491	30	718	54	916	6,727	123	284	36	19
Closing stock	17	-	-	-	88	257	491	706	773	-	15,582	1,768	18
Net gains/reductions	*(14)*	-	-	*(491)*	*(58)*	*(480)*	*411*	*(747)*	*(6,131)*	*(123)*	*7,432*	*83*	*(1)*

The main transition was the expansion of the built up area to cover nearly 80% of the City. The City may be running out of space for expansion to accommodate both built up expansion and co-existence of other land covers (Figure 5.45).

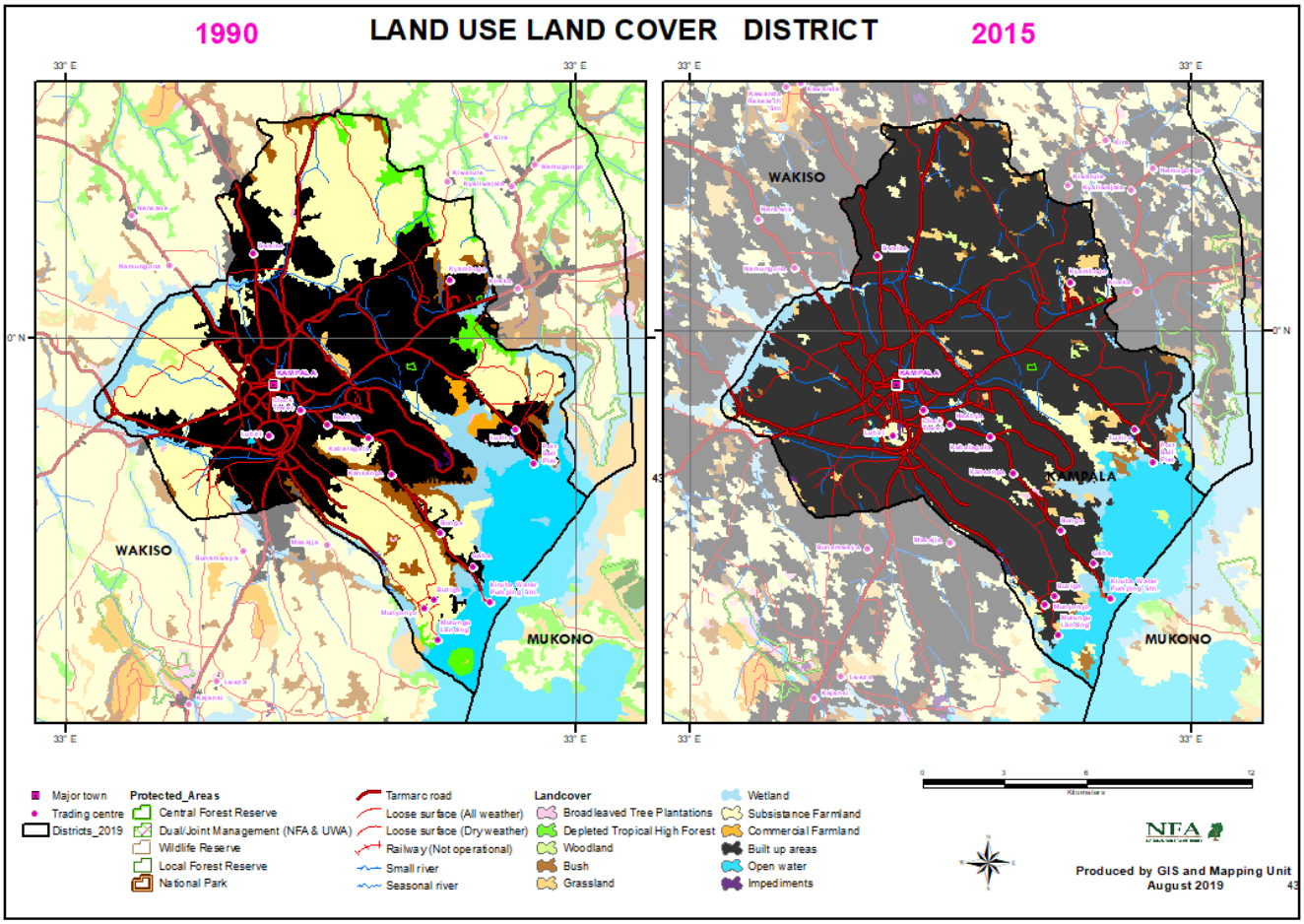


Figure 5.45: Land cover/ land use for Kampala City

5.2.44 Land Physical Accounts for Kamuli District

Kamuli District had a land cover of 155,495.9 ha. Nearly three-quarters (74%) of the land cover was small scale farmlands in 1990. Grasslands, woodlands, wetlands, bushlands and open water were the other major covers of the District (Table 5.44). Between 1990 and 2015, the small scale farmlands expanded to over 86% of the District's land cover at the expense of woodlands which reduced by 7,513 ha, grasslands that reduced by 11,926 ha and wetlands reduced by 1,732 ha.

Table 5.44: Land cover/ land use for Kamuli District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High Forest	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	180	-	-	8,465	5,678	14,470	7,109	114,702	242	329	4,303	18
Additions	-	125	-	595	5,614	1,269	1,440	23,502	163	669	1,253	-
Reductions	180	-	-	8,108	5,533	13,195	3,172	3,863	242	205	116	18
Closing stock	-	125	-	952	5,759	2,544	5,377	134,341	163	793	5,441	-
Net gains/ reductions	*(180)*	*125*	-	*(7,513)*	*81*	*(11,926)*	*(1,732)*	*19,639*	*(78)*	*464*	*1,137*	*(18)*

Small scale farmlands continued to expand in Kamuli District largely at the expense of woodlands, grasslands and wetlands. There were no tropical high forests while the broadleaved was completely lost by 2015 and coniferous plantations emerged with 125 ha (Figure 5.46).

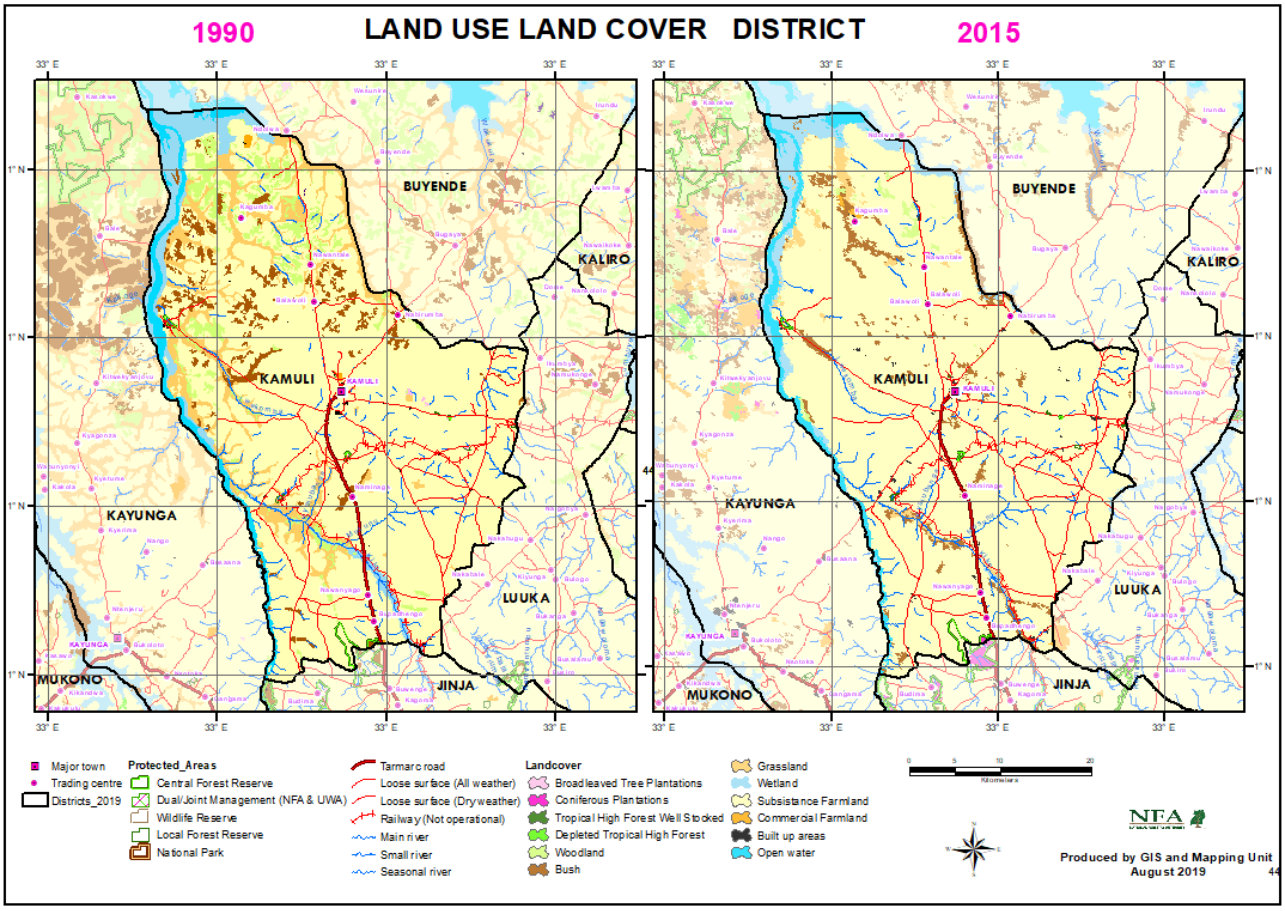


Figure 5.46: Land cover/ land use for Kamuli District

5.2.45 Land Physical Accounts for Kamwenge District

Kamwenge District had a land cover of 243,944.1 ha. Half of the land cover was under small scale farmlands, 22% under grasslands, 11% under woodlands and 10% under tropical high forests in 1990 (Table 5.45). by 2015, the area under small scale farmlands had increased to 61% of land cover. The other major increase was for bushlands which increased by 15,516 ha. Conversely, grasslands reduced by 32,522 ha, woodlands by 16,496 ha.

Table 5.45: Land cover/ land use for Kamwenge District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	38	-	24,387	1,026	27,123	3,986	53,375	7,517	119,933	73	70	6,414	2
Additions	1,045	252	2,864	3,161	9,023	19,202	8,857	2,521	47,920	65	635	244	104
Reductions	37	-	2,107	824	25,519	3,686	41,379	2,978	19,188	73	46	54	2
Closing stock	1,046	252	25,143	3,363	10,627	19,502	20,854	7,060	148,664	65	660	6,604	104
Net gains/reductions	*1,008*	*252*	*757*	*2,337*	*(16,496)*	*15,516*	*(32,522)*	*(457)*	*28,732*	*(8)*	*589*	*190*	*102*

The major transition in Kamwenge District land cover was the expansion of small scale farmlands at the expense of grasslands and woodlands. The bushlands also expanded suggesting that some of the land lost under from conversion of woodlands and grasslands was not under current livelihood uses (Figure 5.47).

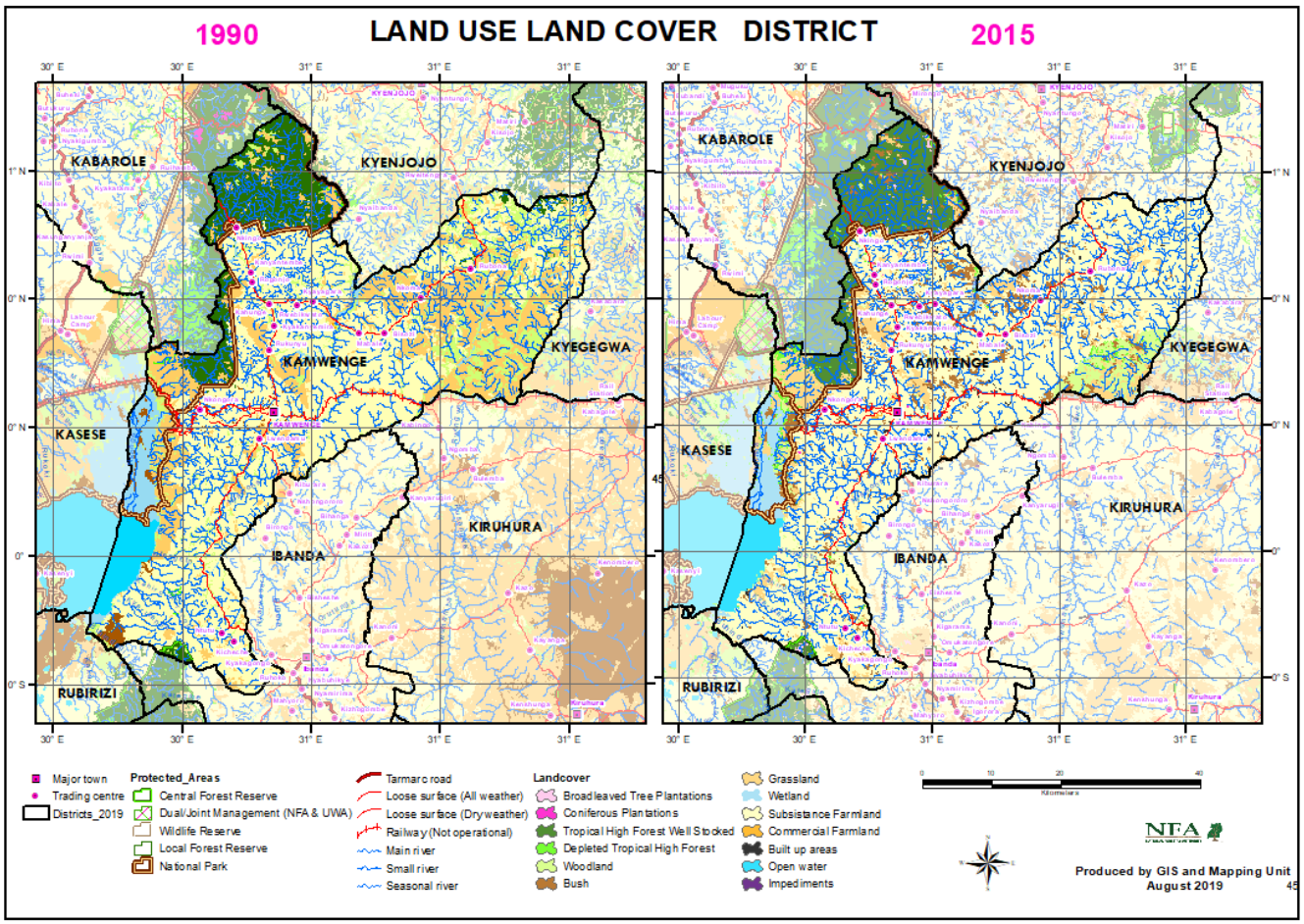


Figure 5.47: Land cover/ land use for Kamwenge District

5.2.46 Land Physical Accounts for Kanungu District

Kanungu District had a land cover of 129,214.2 ha, 60% of which was under small scale farmlands in 1990. Tropical high forests, woodlands and grasslands second, third and fourth largest land cover classes occupied 15%, 11% and 9% of the total land cover of the District. Between 1990 and 2015, the grasslands increased by 5,455 ha, bushlands increased (3,994 ha) and forest plantations as well as tropical high forests. The largest decline was for woodlands which reduced by 75% which small scale farmlands were lower by 1,315 ha. There were small increases in the area of commercial farmlands and built up areas as well (Table 5.46).

Table 5.46: Land cover/ land use for Kanungu District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	215	1,485	19,001	326	14,120	2,680	11,515	741	76,923	299	103	1,806	-
Additions	1,332	798	1,351	529	1,522	5,300	10,890	57	8,198	270	82	129	-
Reductions	177	38	534	326	12,118	1,306	5,435	690	9,513	240	74	7	-
Closing stock	1,370	2,245	19,819	529	3,524	6,674	16,970	109	75,608	329	110	1,929	-
Net gains/reductions	*1,155*	*760*	*817*	*203*	*(10,596)*	*3,994*	*5,455*	*(633)*	*(1,315)*	*30*	*8*	*122*	-

The major transition for Kanungu District was the stability of the small scale farmlands and the loss of more three-quarters of the woodland cover in the District (Figure 5.48). The expansion of bushlands and grasslands was largely at the expense of the woodlands. Kanungu District hosts large sections of Bwindi Impenetrable National park (BINP) and this may account for the stability and expansion of the tropical high forests as well as the grasslands.

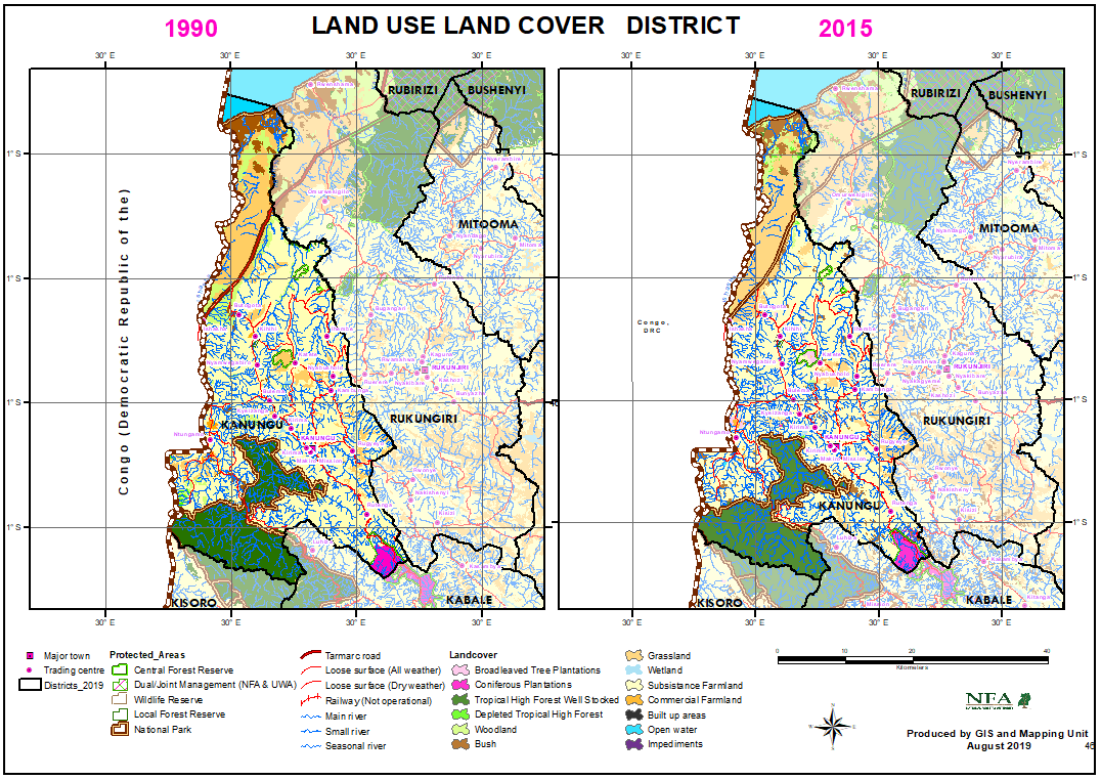


Figure 5.48: Land cover/ land use for Kanungu District

5.2.47 Land Physical Accounts for Kapchorwa District

Kapchorwa District had a land cover of 38,345.2 ha. Small scale farmlands occupy 45% of the District's land cover followed by tropical high forests, woodlands and grasslands at 25%, 16% and 10%, respectively, in 1990 (Table 5.47). Between 1990 and 2015, the small scale farmlands increased by 3,076 ha as did the THF well stocked. Conversely, the THF low stocked, woodlands and grasslands all decreased. THF low stocked reduced by 74%, woodlands reduced by 80% while grasslands reduced by 31%.

Table 5.47: Land cover/ land use for Kapchorwa District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	10	1	5,583	4,123	6,309	974	3,895	-	17,220	18	111	-	-
Additions	-	-	5,300	108	658	1,902	582	-	4,762	-	254	-	10
Reductions	10	1	529	3,145	5,682	687	1,784	-	1,686	18	34	-	-
Closing stock	-	-	10,355	1,087	1,285	2,189	2,693	-	20,297	-	330	-	10
Net gains/reductions	(10)	(1)	4,771	(3,037)	(5,024)	1,215	(1,202)	-	3,076	(18)	220	-	10

The main transition in land cover for Kapchorwa District was the expansion in small scale farmlands, the 85% increase THF well stocked and the loss of 80% of the woodland cover (Figure 5.49). Kapchorwa is one of the landscape Districts for the Mt. Elgon and shares a section the Mt. Elgon National Park which may account for the stability and increase in tropical high forests.

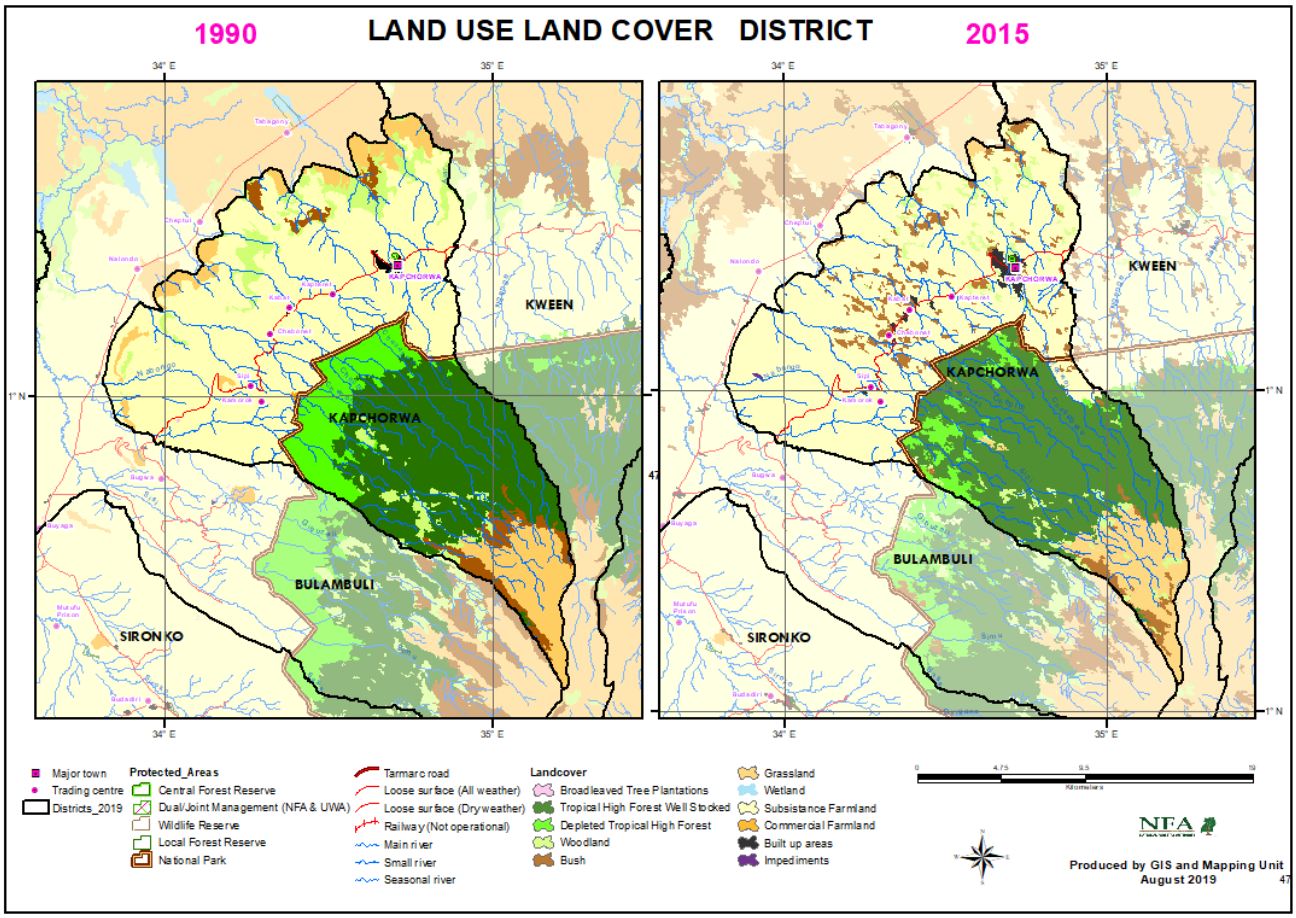


Figure 5.49: Land cover/ land use for Kapchorwa District

5.2.48 Land Physical Accounts for Kasese District

Kasese District had a land cover of 338,965.8 ha. Thirty percent of the land cover of Kasese District was under small scale farmlands, 20% under woodlands, 12.3% under tropical high forests, 12% open water and 5% bushlands in 1990 (Table 5.48). By 2015, grasslands, wetlands, commercial farmlands and THF low stocked had increased while woodland, bushlands and small scale farmlands decreased.

Table 5.48: Land cover/ land use for Kasese District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	196	1	39,438	2,254	66,869	18,362	55,307	6,578	103,016	4,253	1,231	40,971	489
Additions	363	39	5,926	5,525	9,222	9,244	42,720	9,935	8,285	17,357	1,182	1,556	2,696
Reductions	184	1	7,203	2,012	42,766	15,456	14,745	3,772	25,759	522	701	477	451
Closing stock	375	39	38,160	5,768	33,325	12,150	83,282	12,742	85,542	21,087	1,712	42,049	2,734
Net gains/ reductions	179	38	(1,277)	3,513	(33,544)	(6,212)	27,975	6,163	(17,474)	16,835	481	1,079	2,245

The transition in Kasese District was the reduction in small scale farmlands by 17%, woodlands by 50% and bushlands by 33% (Figure 5.50). In contrast, the expansion of grasslands by 50%, wetlands by 94%, commercial farmlands 396% and built up areas by 39%. The transformation reflected the importance of the protected areas in the District including sections of Queen Elizabeth National Park (QENP) and Rwenzori Mt. National Park (RMMNP), among others and the growing economic importance of agricultural industrialization and urban growth within the District.

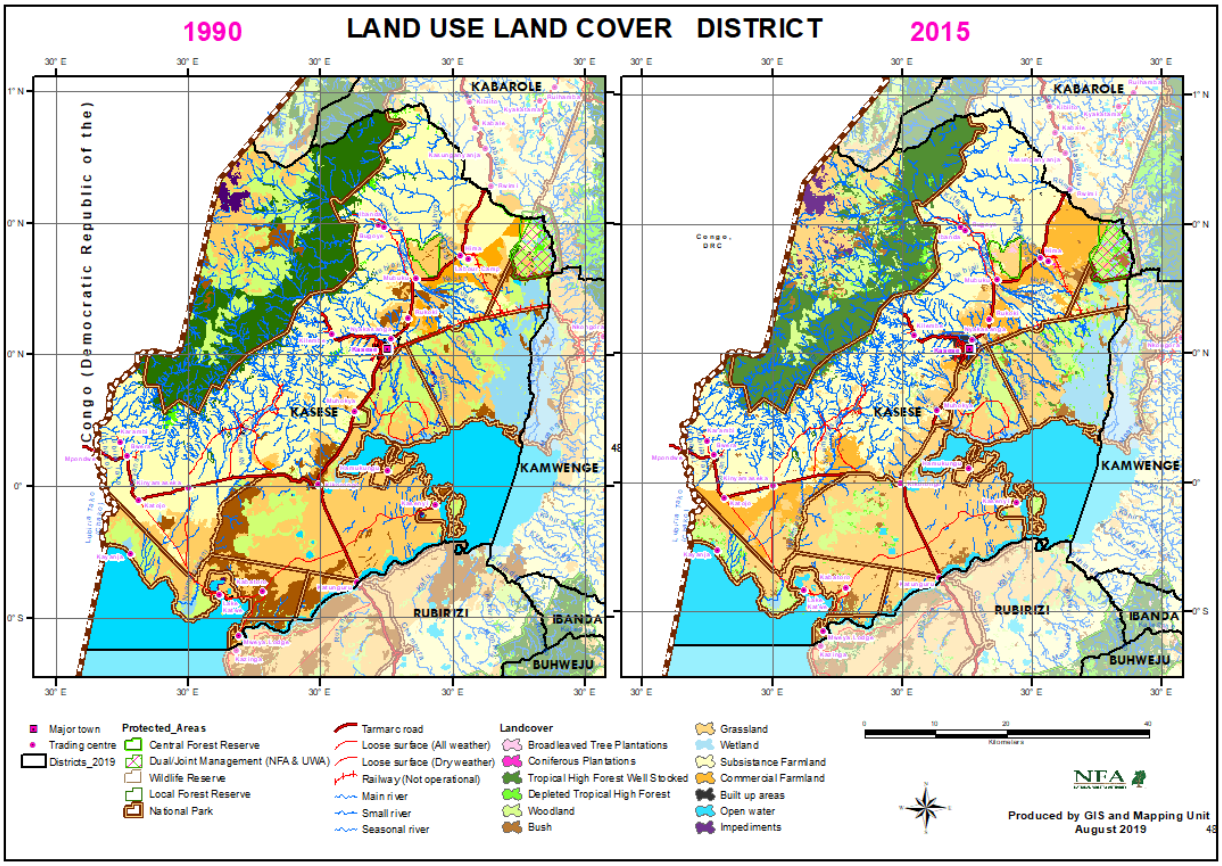


Figure 5.50: Land cover/ land use for Kasese District

5.2.49 Land Physical Accounts for Katakwi District

Katakwi District covered 243,151.6 ha and grasslands the largest land cover occupied 53% of the District followed by small scale farmlands with 38% of the District cover in 1990 (Table 5.51). The District had only 4 ha of forest plantation in 1990 but by 2015 there was no forest plantation. Tropical high forests were not found in Katakwi District.

Table 5.49: Land cover/ land use for Katakwi District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High Forest	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	4	-	-	12,117	-	129,482	5,407	86,947	-	176	8,986	33
Additions	-	-	-	165	32,066	16,994	24102	22,144	66	707	1,473	-
Reductions	4	-	-	11,805	-	64,375	899	19,306	-	123	1,171	33
Closing stock	-	-	-	478	32,066	82,101	28,609	89,785	66	760	9,287	-
Net gains/ reductions	(4)	-	-	(11,639)	32,066	(47,381)	23,203	2,838	66	584	301	(33)

The main transition in Katakwi was the expansion of wetlands, and strengthening of small scale farmland. The small scale land cover expanded by an additional 2,838 ha while the wetlands increased fivefold from 5,407 ha to 28,609 ha (Figure 5.51). The woodlands in Katakwi were close to being completely converted only 478 ha out of an original 12,117 ha in 1990 was left by 2015.

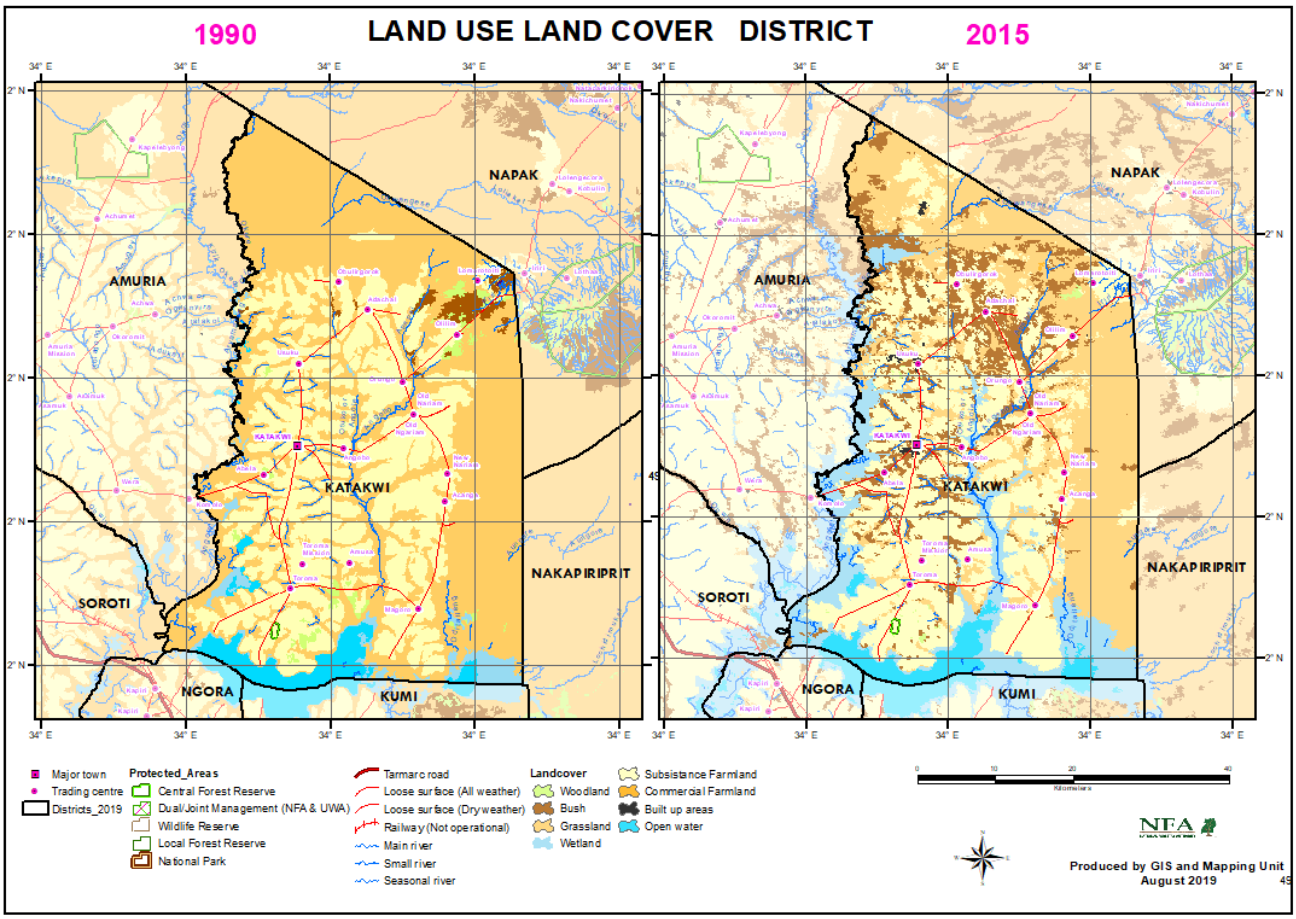


Figure 5.51: Land cover/ land use for Katakwi District

5.2.50 Land Physical Accounts for Kayunga District

Kayunga District covered 170,239.4 ha comprising 49% small scale farmlands, 17% grasslands, 10% wetlands, 8% woodlands and 8% bushlands, among other covers in 1990. By 2015, the small scale farmlands had increased to 57% of District lane cover while commercial farmlands increased 10-fold and built up areas increased fivefold (Table 5.50).

Table 5.50: Land cover/ land use for Kayunga District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	593	142	61	433	13,916	13,579	28,150	18,407	82,898	326	280	11,454	-
Additions	5	197	95	2,040	5,259	12,494	6,476	2,642	24,342	3,417	1,209	1,327	-
Reductions	593	142	61	362	11,149	11,747	21,344	3,263	10,312	246	135	148	-
Closing stock	5	197	95	2,111	8,026	14,326	13,281	17,787	96,928	3,497	1,355	12,632	-
Net gains/reductions	(588)	55	34	1,678	(5,890)	747	(14,868)	(621)	14,030	3,171	1,074	1,179	-

The major transition for Kayunga District was the continued expansion of small scale farmlands, expansion of commercial farmlands. The expanded farmlands were likely at the expense of woodlands, grasslands and wetlands. The built up area expansion and increase in area of tropical high forests were also important land cover changes (Figure 5.52).

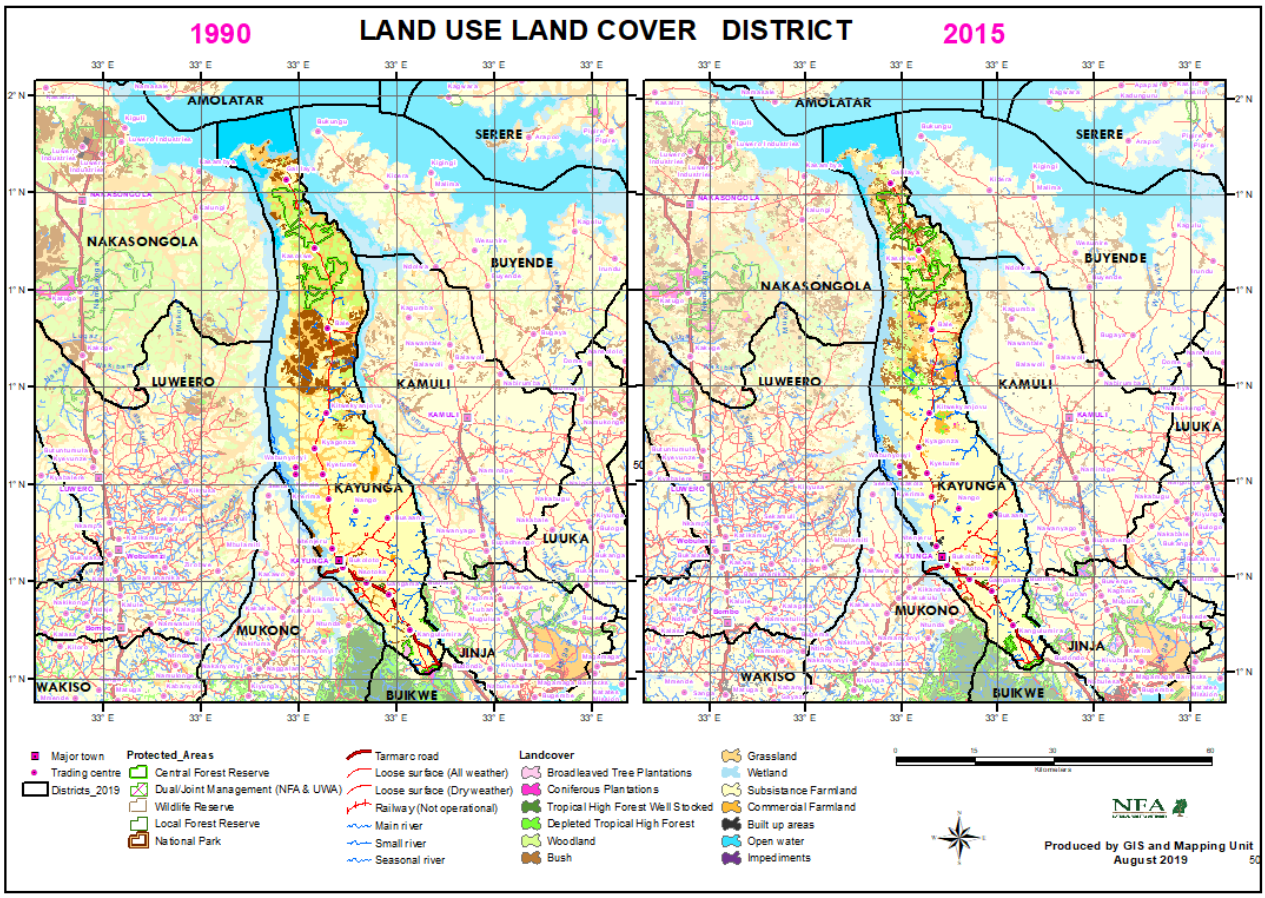


Figure 5.52: Land cover/ land use for Kayunga District

5.2.51 Land Physical Accounts for Kibale District

Kibale's District land cover of 424,609.1 ha comprised leading lane covers of 40% small scale farmlands, 27% tropical high forests, 17% woodlands and 12% grasslands in 1990. There was a doubling in small scale farmland cover between 1990 and 2015 with land cover increasing from 171,874 ha to 345,173 ha (Table 5.51). The expansion in bushlands was followed by a 10-fold increase in bushland cover. The expansion in small scale farmlands and bushlands was at the expense of tropical high forests which lost 94,172 ha, woodlands which lost 61,801 ha while grassland lost 47,263 ha.

Table 5.51: Land cover/ land use for Kibale District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Wood-land	Bushland	Grass-land	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	31	-	79,672	34,431	72,911	2,434	52,107	10,547	171,874	-	274	26	303
Additions	71	46	2,526	4,053	8,956	26,802	1,205	5,758	186,641	1,198	1,336	192	876
Reductions	31	-	67,329	33,422	70,757	2,093	48,468	3,766	13,342	-	161	4	287
Closing stock	71	46	14,869	5,062	11,110	27,143	4,843	12,539	345,173	1,198	1,449	214	892
Net gains/ reductions	40	46	(64,803)	(29,369)	(61,801)	24,709	(47,263)	1,992	173,299	1,198	1,175	188	589

The major transition of Kibale District was the doubling of small scale farmlands, the largest expansion of farmlands observed for any District. The expansion of farmlands was at the expense of tropical high forest, woodlands and grasslands (Figure 5.53).

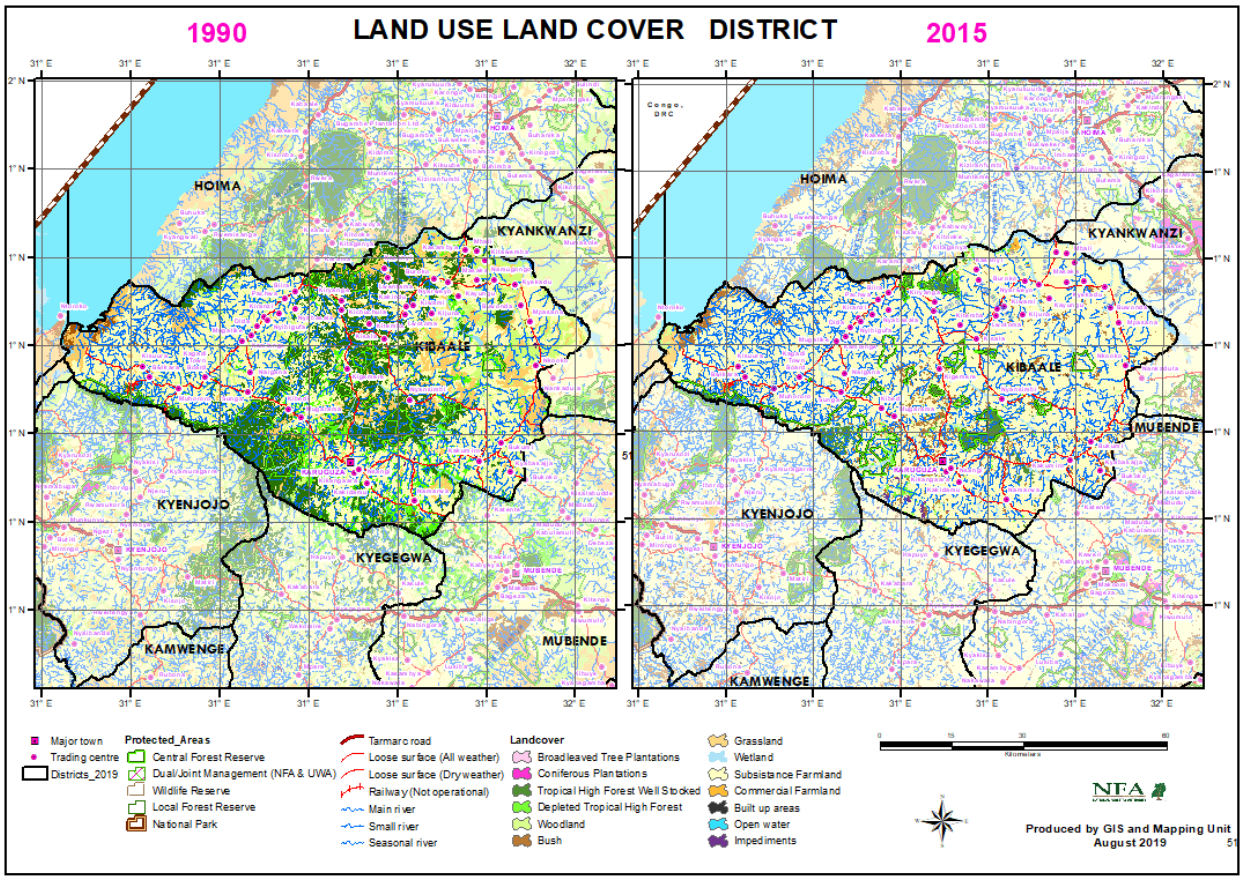


Figure 5.53: Land cover/ land use for Kibale District

5.2.52 Land Physical Accounts for Kiboga District

Kiboga District covered an area of 153,530.7 ha. One third of the land cover was under small scale farmlands, 30% under woodlands and 26% under grasslands as the three largest land covers (Table 5.52). Between 1990 and 2015, the largest increase in land cover was for Bushlands which increased by 2.5-times while wetlands and farmlands increased by 45% and 21%. Woodlands and grasslands reduced by 65% and 18%, respectively.

Table 5.52: Land cover/ land use for Kiboga District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	1	343	-	-	45,832	8,678	39,769	7,438	51,255	111	84	20	-
Additions	43	501	-	83	5,802	27,995	16,686	3,803	23,499	26	714	52	-
Reductions	1	165	-	-	35,741	6,190	23,912	478	12,557	111	33	15	-
Closing stock	43	679	-	83	15,892	30,483	32,543	10,763	62,197	26	765	57	-
Net gains/reductions	42	336	-	83	(29,939)	21,805	(7,226)	3,325	10,942	(85)	681	37	-

For Kiboga District the land cover change between 1990 and 2015 was the transition that included increased small scale farmlands, bushlands and wetlands. The land cover change occurred through the conversion of woodlands and grasslands (Figure 5.54).

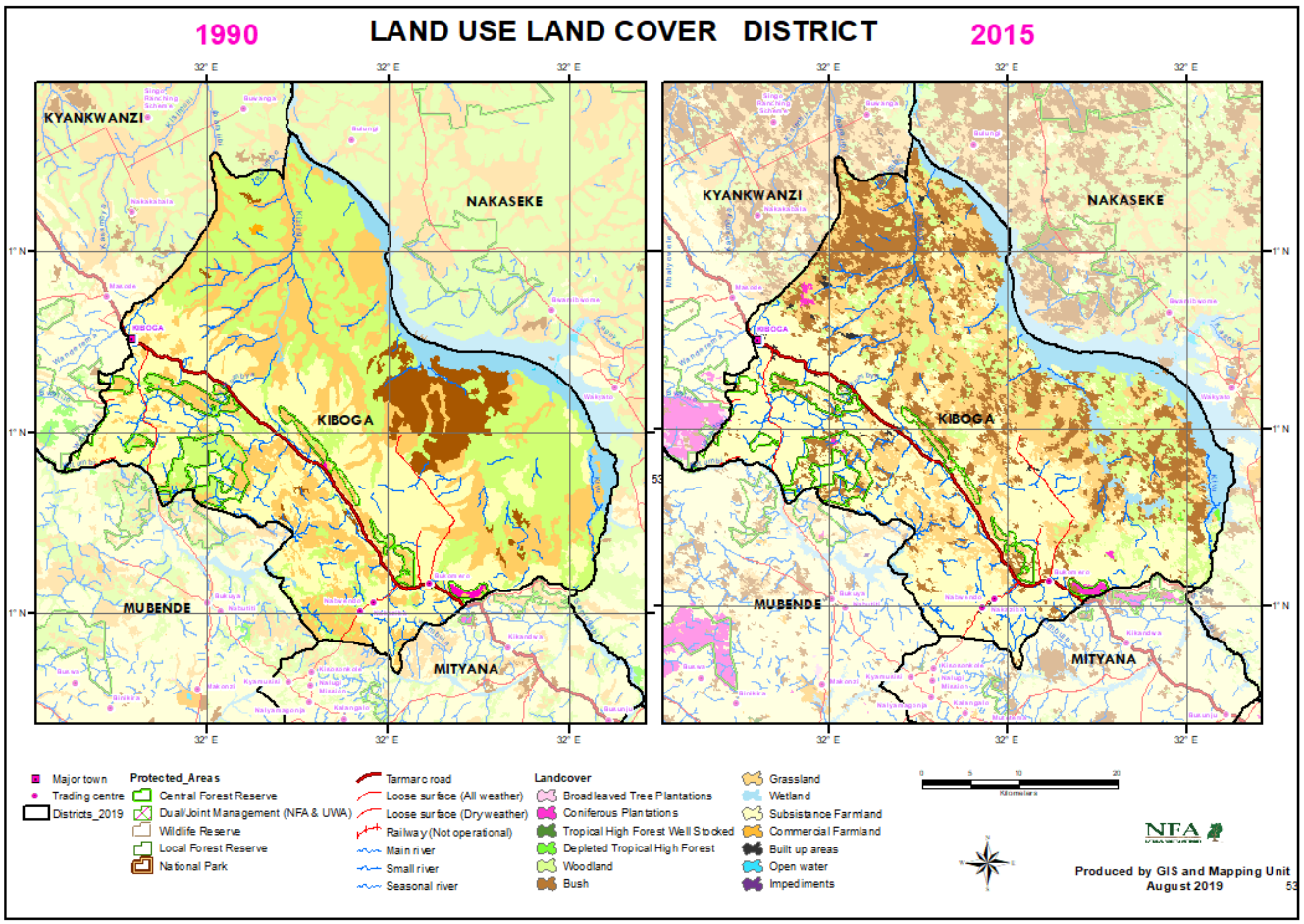


Figure 5.54: Land cover/ land use for Kiboga District

5.2.53 Land Physical Accounts for Kibuku District

Kibuku District had a land cover of 49,000.6ha. Small scale farmlands occupied 73% of the District's land cover followed by the 19% land cover under wetlands, grasslands occupy 6% of the land cover in 1990. Between 1990 and 2015, the small scale land cover increased by 2,084 ha while the grassland cover decreased by 2,415 ha an indication of conversion of grasslands into farmlands. The built up areas and bushlands also increased by 91 ha and 397 ha, respectively.

Table 5.53: Land cover/ land use for Kibuku District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	2	-	-	-	148	28	2,717	9,422	36,001	-	24	659	-
Additions	-	-	-	-	-	424	110	945	3,188	-	104	60	-
Reductions	2	-	-	-	148	28	2,525	835	1,105	-	13	176	-
Closing stock	-	-	-	-	-	424	302	9532	38,084	-	115	543	-
Net gains/ reductions	(2)	-	-	-	(148)	397	(2,415)	110	2,084	-	91	(116)	-

The major land use changes for Kibuku District was the continued expansion of small scale farmlands (Figure 5.55). The bushlands also increased largely because of the converted land that was fallowed or left unused. The woodland cover of 148 ha in 1990 was completely lost by 2015.

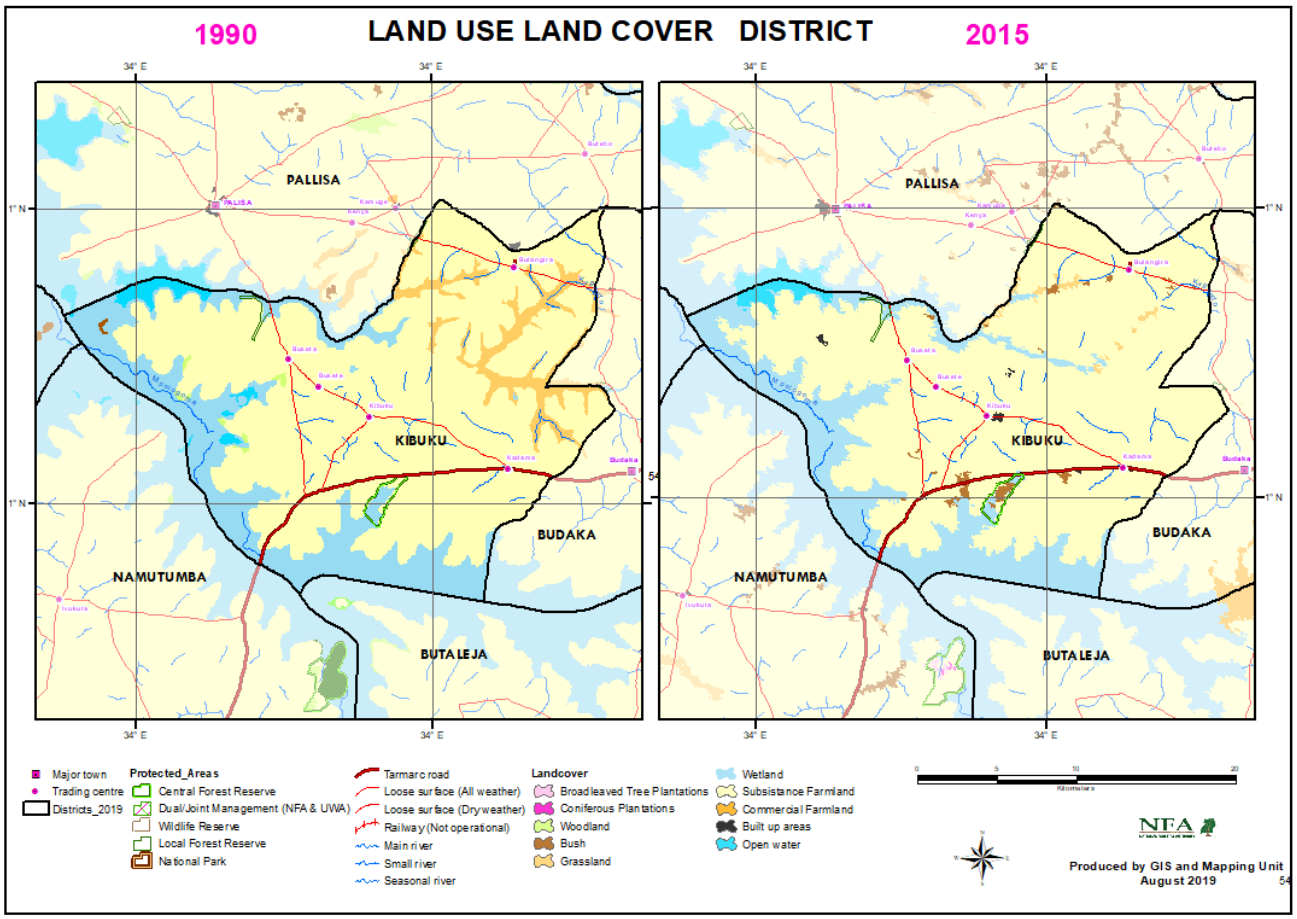


Figure 5.55: Land cover/ land use for Kibuku District

5.2.54 Land Physical Accounts for Kiruhura District

Kiruhura District covered 460,266.2 ha comprising grasslands (53%), bushlands (30%), and small scale farmlands (13%) as the largest covers in 1990. By 2015, the land cover transformation was that small scale farmlands had expanded by 125,595 ha to 184,876 ha (40% of District cover). The small scale farmlands increased by 212%. Grasslands and bushlands reduced by 22,362 ha and 111,426 ha, respectively. Woodlands increased by 4,275 ha. There was an increase in the forest plantation area while the area of THF well stocked was lost (Table 5.54).

Table 5.54: Land cover/ land use for Kiruhura District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	5	-	-	-	10,585	138,041	242,342	5,860	59,281	-	62	4,010	80
Additions	334	23	-	6	12,748	15,525	102,946	3,901	140,187	-	411	994	152
Reductions	5	-	-	-	8,473	126,951	125,308	1,409	14,592	-	57	352	80
Closing stock	334	23	-	6	14,860	26,616	219,980	8,352	184,876	-	416	4,652	152
Net gains/reductions	329)	23	-	6	4,275	(111,426)	(22,362)	2,492	125,595	-	354	642	72

The major transition in Kiruhura District was the expansion of small scale farmlands at the expense of bushlands (Figure 5.56). The areas that were largely not used for economic activity are increasingly being converted into small scale farmlands. The grassland area only reduced by about 10%. Lake Mburo National Park is hosted in Kiruhura District and the stability of grasslands and remaining area under bushlands may be attributed to the protected area activities.

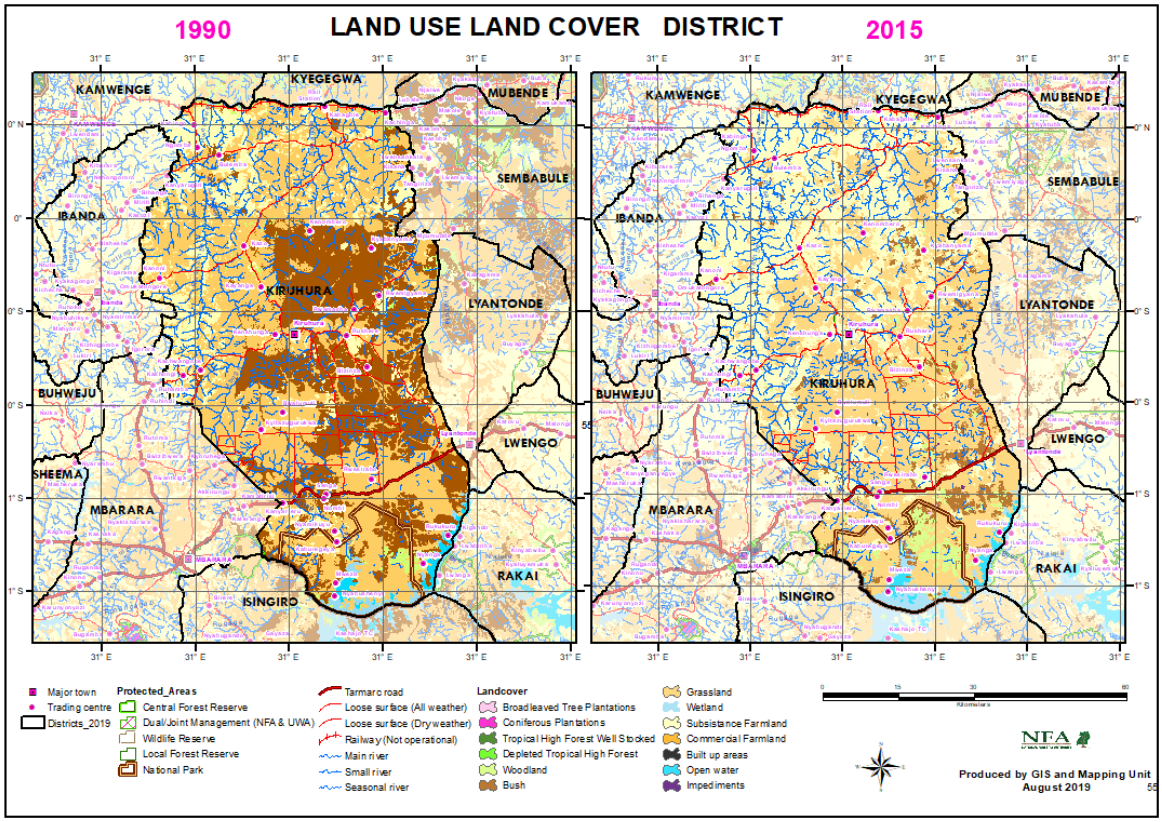


Figure 5.56: Land cover/ land use for Kiruhura District

5.2.55 Land Physical Accounts for Kiryandongo District

Kiryandongo District had a land cover of 362,805.9 ha. In 1990, the largest land covers in the District were woodlands (51%), grasslands (26%), and small scale farmlands (19%). By 2015, the land cover had transformed but woodlands were still leading with 34% followed by small scale farmlands with 27% and grasslands with 22%. Kiryandongo District was able to maintain a large area of woodlands because it overlaps with the Murchison Falls Protected Area (MFPA).

Table 5.55: Land cover/ land use for Kiryandongo District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	5	-	-	-	184,323	5,578	93,278	5,041	69,784	953	109	3,735	-
Additions	-	35	597	2,551	25,757	38,118	22,779	1,193	40,972	5,110	832	611	4
Reductions	5	-	-	-	84,952	3,864	35,746	1,250	11,747	603	78	315	-
Closing stock	-	35	597	2,551	125,128	39,833	80,310	4,985	99,009	5,460	863	4,032	4
Net gains/reductions	(5)	35	597	2,551	(59,195)	34,254	(12,967)	(57)	29,225	4,507	754	296	4

The main transition of land cover in Kiryandongo District was the increasing area of small scale farmlands. Nonetheless, woodlands were still the leading land cover in the District largely due to the presence of the National Park (Figure 5.57). The protected area was also responsible for the increase in the tropical high forest as observed between 1990 and 2015.

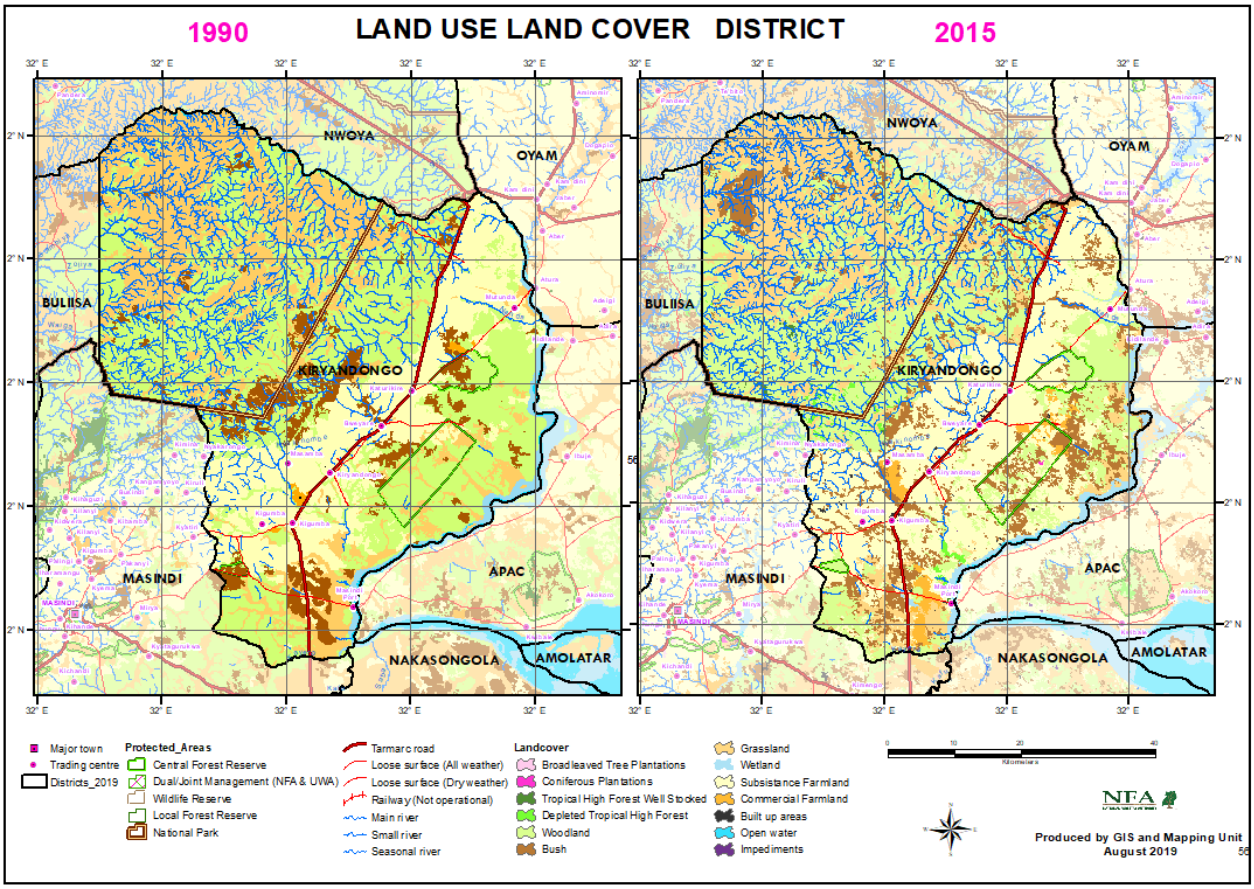


Figure 5.57: Land cover/ land use for Kiryandongo District

5.2.56 Land Physical Accounts for Kisoro District

Kisoro District land cover was 72,969.1 ha. The two largest land covers were small scale farmlands and tropical high forests and they covered 76% and 14% respectively in 1990 (Table 5.56). The land covers I Kisoro District were fairly stable across the 12 land cover classes available in the District. However, there was addition of woodland and commercial farmlands of cover of 754 ha and 213 ha. Bushlands increased and small scale farmlands increased by1,527 ha and 470 ha, respectively.

Table 5.56: Land cover/ land use for Kisoro District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	202	3	10,287	290	-	87	2,831	980	55,250	-	214	2,825	-
Additions	116	74	502	9	754	1,614	365	235	2,997	213	59	314	-
Reductions	202	3	833	93	-	87	2,472	817	2,527	-	149	69	-
Closing stock	116	74	9,956	206	754	1,614	724	398	55,719	213	124	3,071	-
Net gains/reductions	(86)	71	(331)	(84)	754	1,527	(2,107)	(582)	470	21)	(90)	245	-

The major land cover trends for Kisoro District was the generally stable land cover. However, there were increases in bushlands and small scale farmlands as well as additions of woodlands and commercial farmlands between 1990 and 2015 (Figure 5.58).

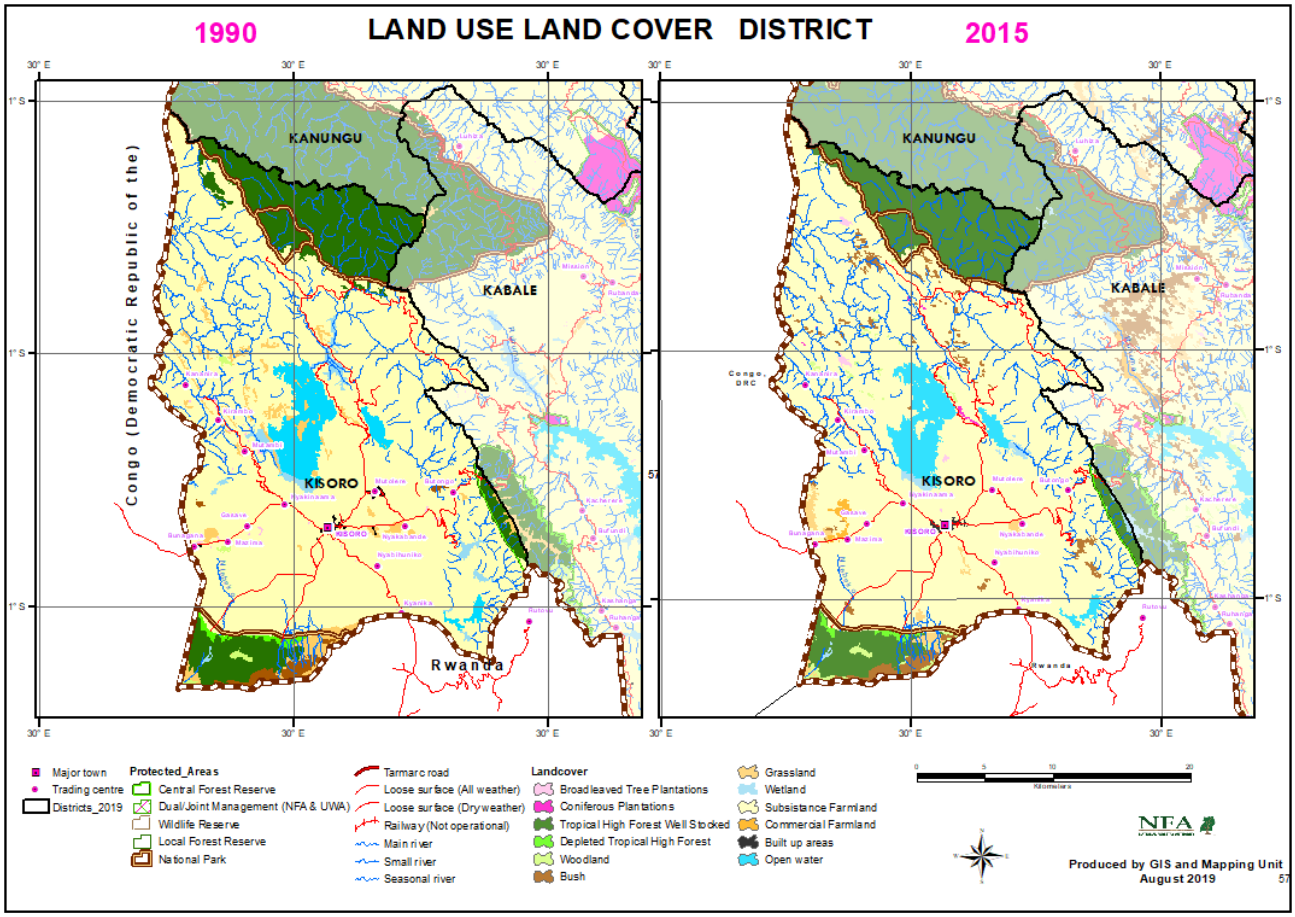


Figure 5.58: Land cover/ land use for Kisoro District

5.2.57 Land Physical Accounts for Kitgum District

Kitgum District had a land cover of 411,392.3 ha. Woodlands (43%), small scale farmlands (37%), grasslands (13%) and bushlands (7%) were the largest land covers in 1990 (Table 5.57). By 2015, the land cover had transformed grasslands had increased by 123,293 ha while woodlands had reduced by 142,486 ha. Woodlands had lost 81% of their cover while grasslands had gained 228% additional cover. Alongside the grasslands small scale farmlands and bushlands increased by 13,212 and 3,727 ha.

Table 5.57: Land cover/ land use for Kitgum District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	-	-	-	-	176,725	27,572	54,155	-	152,602	-	316	1	21
Additions	5	-	-	-	6,902	29,934	136,867	-	47,538	-	2,331	7	-
Reductions	-	-	-	-	149,389	26,206	13,574	-	34,326	-	67	1	21
Closing stock	5	-	-	-	34,239	31,300	177,448	-	165,814	-	2,580	7	-
Net gains/ reductions	5	-	-	-	(142,486)	3,727	123,293	-	13,212	-	2,264	6	(21)

The major transition in land cover for Kitgum District was the transformation of the woodland cover into grass land, small scale farmlands and bushland covers, among others (Figure 5.59). In addition, the built up area increased eight fold from 316 ha to 2,580 ha.

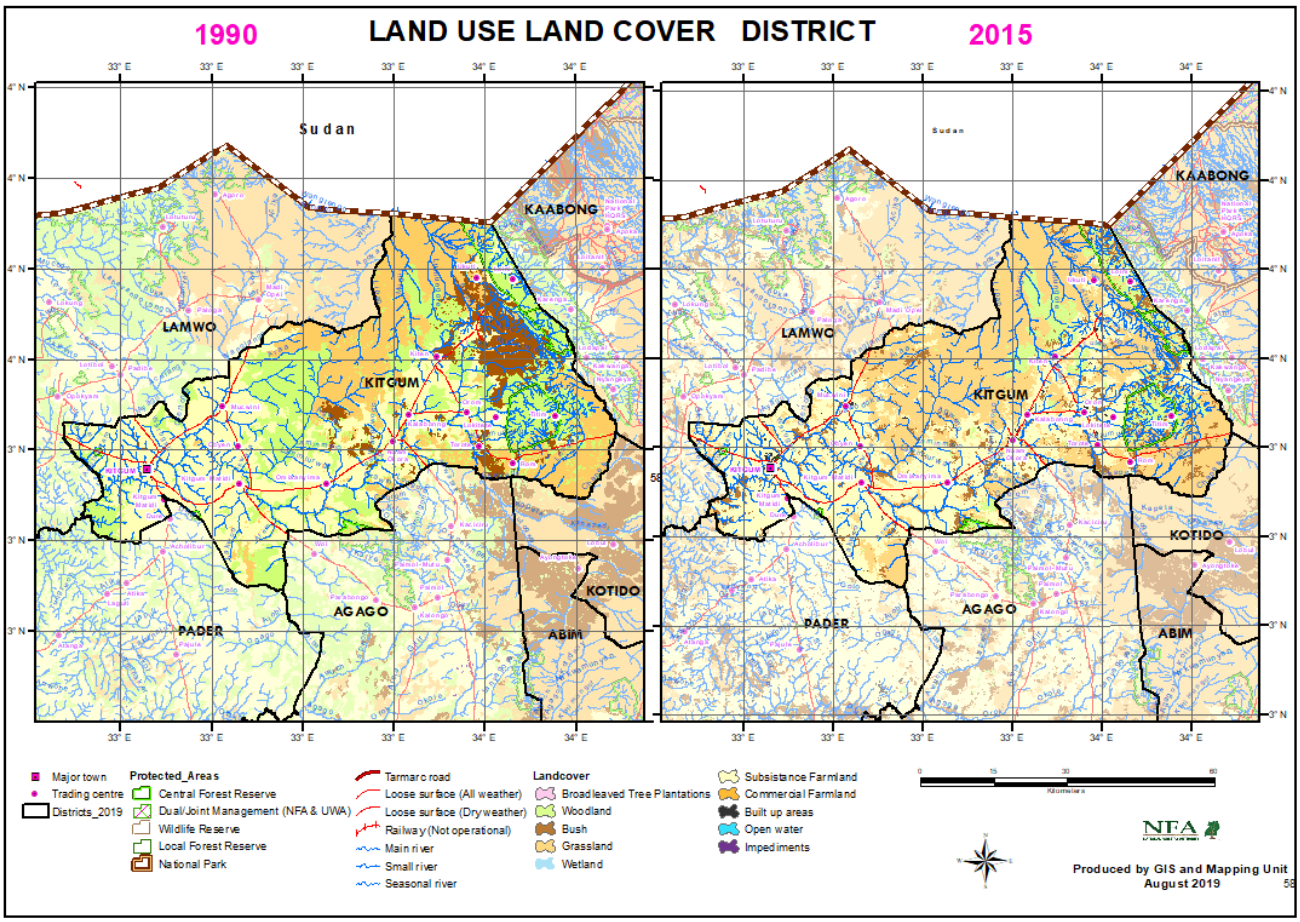


Figure 5.59: Land cover/ land use for Kitgum District

5.2.58 Land Physical Accounts for Koboko District

Koboko District had a land cover of 75,622.7 ha. The two leading land covers in 1990 were woodlands and small scale farmlands with 38,581 ha and 32,741 ha, respectively. However, by 2015, the small scale farmlands had gained an additional 26,206 ha of land while the woodlands had lost 32,330 ha (Table 5.58).

Table 5.58: Land cover/ land use for Koboko District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High Forest	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	139	-	-	38,581	51	4,039	0	32,741	-	42	-	29
Additions	397	40	-	1,833	3927	4,404	14	29,348	11	1,096	-	44
Reductions	139	-	-	34,163	51	3,592	0	3,142	-	14	-	13
Closing stock	397	40	-	6,251	3,927	4,851	14	58,947	11	1124	-	60
Net gains/ reduction	258	40	-	(32,330)	3,877	812	14	26,206	11	1,082	-	31

The major transition in land cover for Koboko District was the conversion of much of the woodland cover into small scale farmlands, bushlands and grasslands, among others (Figure 5.60). There was a 25-times increase in the built up area from just 42 ha to 1,082 ha. In Koboko, like in most of Northern Uganda, the end of armed insurgency had allowed the built up areas to expand in all the Districts.

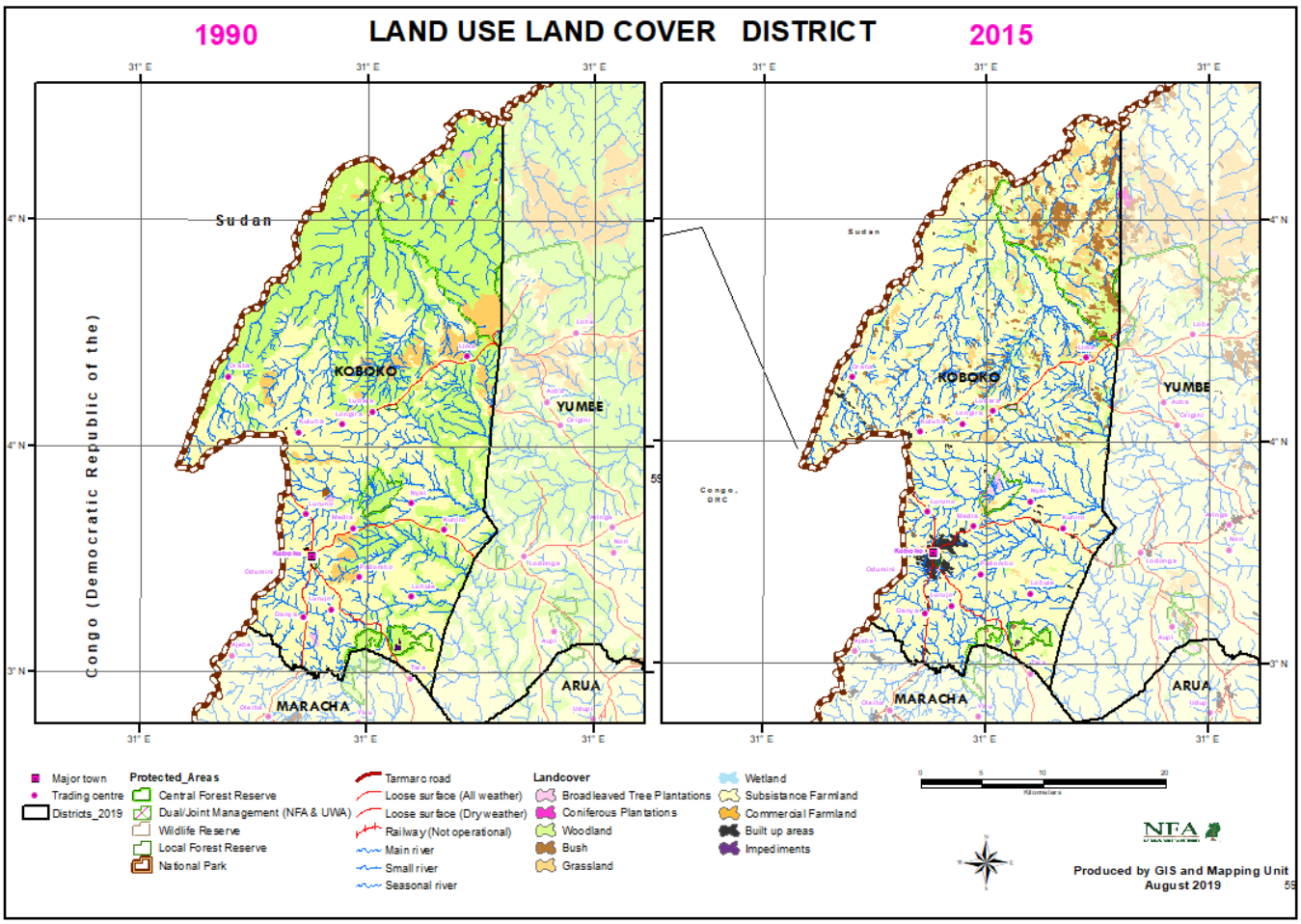


Figure 5.60: Land cover/ land use for Koboko District

5.2.59 Land Physical Accounts for Kole District

Kole District had a land cover of 105,045.4 ha. The largest land covers for the District were small scale farmlands followed by grassland and woodlands with 83,478 ha, 18,146 ha and 2,313 ha, respectively, in 1990. However, between 1990 and 2015, the land cover changed (Table 5.59). The bushland cover increased by 13,340 ha largely as a result of the loss of grassland cover by 15,224 ha. There was an increase in small scale farmlands, wetlands and built up areas alongside the increase in bushlands.

Table 5.59: Land cover/ land use for Kole District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High Forest	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	119	-	-	2,313	451	18,146	329	83,478	88	91	-	31
Additions	9	-	-	618	13,709	275	1,304	7,994	-	228	26	19
Reductions	113	-	-	,2154	369	15,498	313	5,538	88	78	-	29
Closing stock	15	-	-	777	13,790	2,923	1,320	85,933	-	241	26	21
Net gains/ reductions	(104)	-	-	(1,536)	13,340	(15,224)	991	2,455	(88)	150	26	(10)

The major transition of land cover for Kole District was the conversion of more than 84% and 66% of the grassland and woodland cover into bushlands, small scale farmlands, wetlands and built up area (Figure 5.61). There was a large reduction in the broadleaved plantation cover with 104 ha out of a total 119 ha plantation area in 1990 converted.

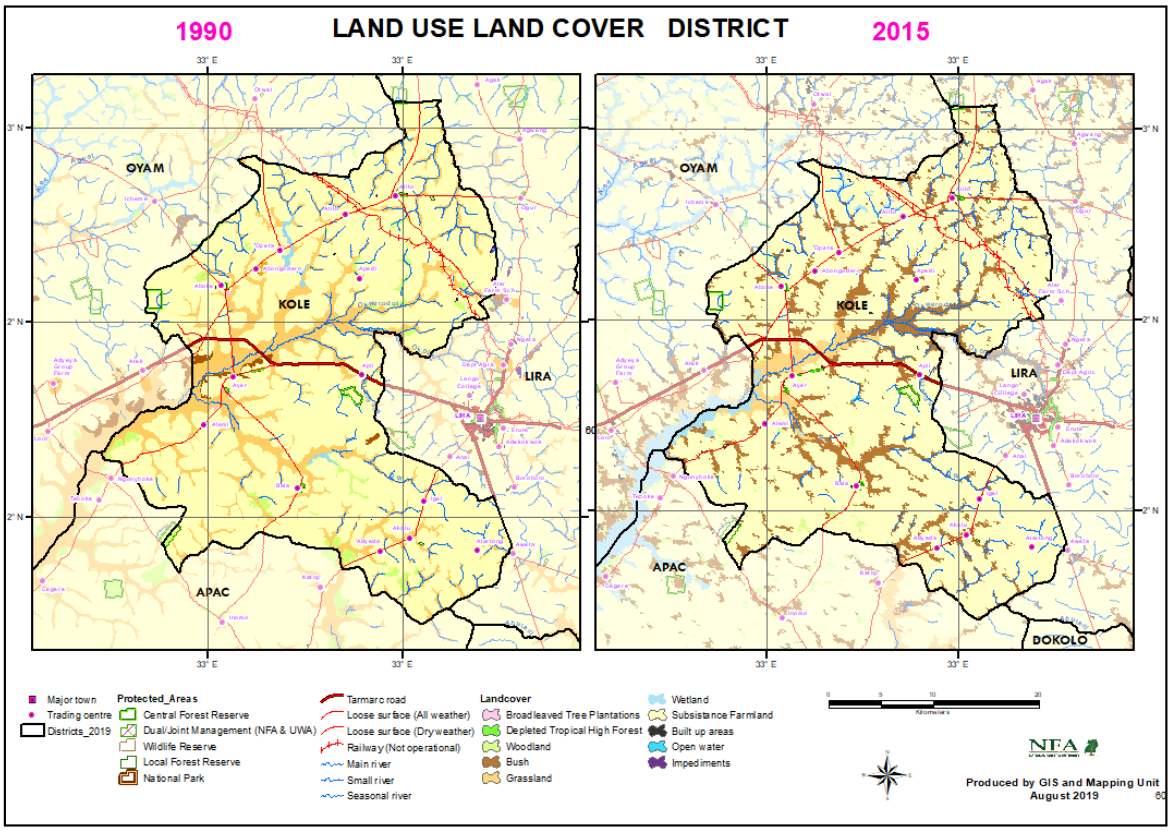


Figure 5.61: Land cover/ land use for Kole District

5.2.60 Land Physical Accounts for Kotido District

The total land cover for Kotido District was 362,892.5 ha. In 1990, the 61% of the District cover was grasslands, 18% was grasslands,12.5% was woodlands while 9% was small scale farmlands as the four leading land covers (Table 5.60). By 2015, grasslands had increased to 64% while small scale farmlands had also increased by 30,364 ha. In contrast, woodlands and bushlands had reduced. Woodlands had reduced considerably with 82% of their cover converted while bushlands had only lost 6% of their original cover from 1990.

Table 5.60: Land cover/ land use for Kotido District (in hectares)

1990 to 2015	Forest plantations	Tropical High Forests	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	-	-	45,444	65,772	222,697	-	28,836	-	38	6	99
Additions	-	-	3,704	49,230	67,135	-	36,734	-	-	7	24
Reductions	-	-	40,974	53,593	56,030	-	6,100	-	38	1	99
Closing stock	-	-	8,175	61,409	233,802	-	59,469	-	-	12	24
Net gains/ reductions	-	-	(37,270)	(4,363)	11,105	-	30,634	-	(38)	6	(75)

The major transition in land cover for Kotido District was the strengthening and expansion of grassland cover as well as increase in the small scale farmlands at the general expense of woodlands (Figure 5.62). The built up area which existed in 1990 was not observed in 2015.

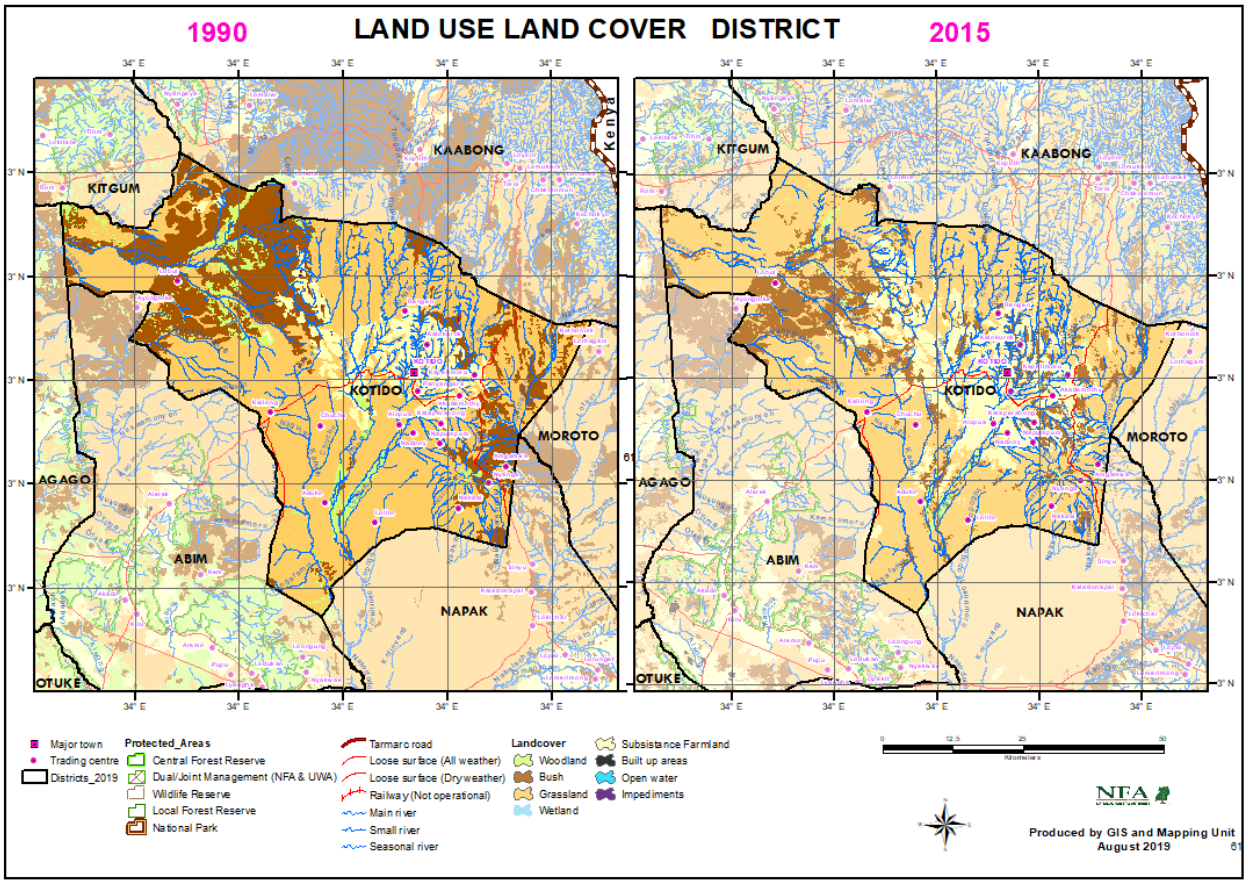


Figure 5.62: Land cover/ land use for Kotido District

5.2.61 Land Physical Accounts for Kumi District

Kumi District had a land cover of 107,325.2 ha. The dominant land cover in 1990 was small scale farmlands followed by grasslands, wetlands and open water (Table 5.61). Between 1990 and 2015, wetlands, small scale farmlands and woodlands expanded by 8,517 ha, 6,908 ha and 484 ha, respectively. The grasslands, bushlands, commercial farmlands and built up area reduced by 15,794, 283, 132 and 85 ha respectively.

Table 5.61: Land cover/ land use for Kumi District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High Forest	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	102	-	-	249	4,790	18,506	5,509	72,855	132	199	4,973	10
Additions	69	-	-	733	3,600	1,362	9,065	9,365	-	69	624	-
Reductions	102	-	-	249	3,883	17,155	548	2,456	132	154	197	10
Closing stock	69	-	-	733	4,507	2,713	14,026	79,764	-	114	5,400	-
Net gains/ reductions	(32)	-	-	484	(283)	(15,794)	8,517	6,908	(132)	(85)	427	(10)

The land cover change in Kumi District was characterized by the expansion of small scale farmlands and wetlands at the expense of grasslands (Figure 5.63). The woodlands in Kumi District expanded while the bushlands reduced. The expansion in woodlands may be related to a mature canopy of woodland regeneration likely from area previously categorized as bushland.

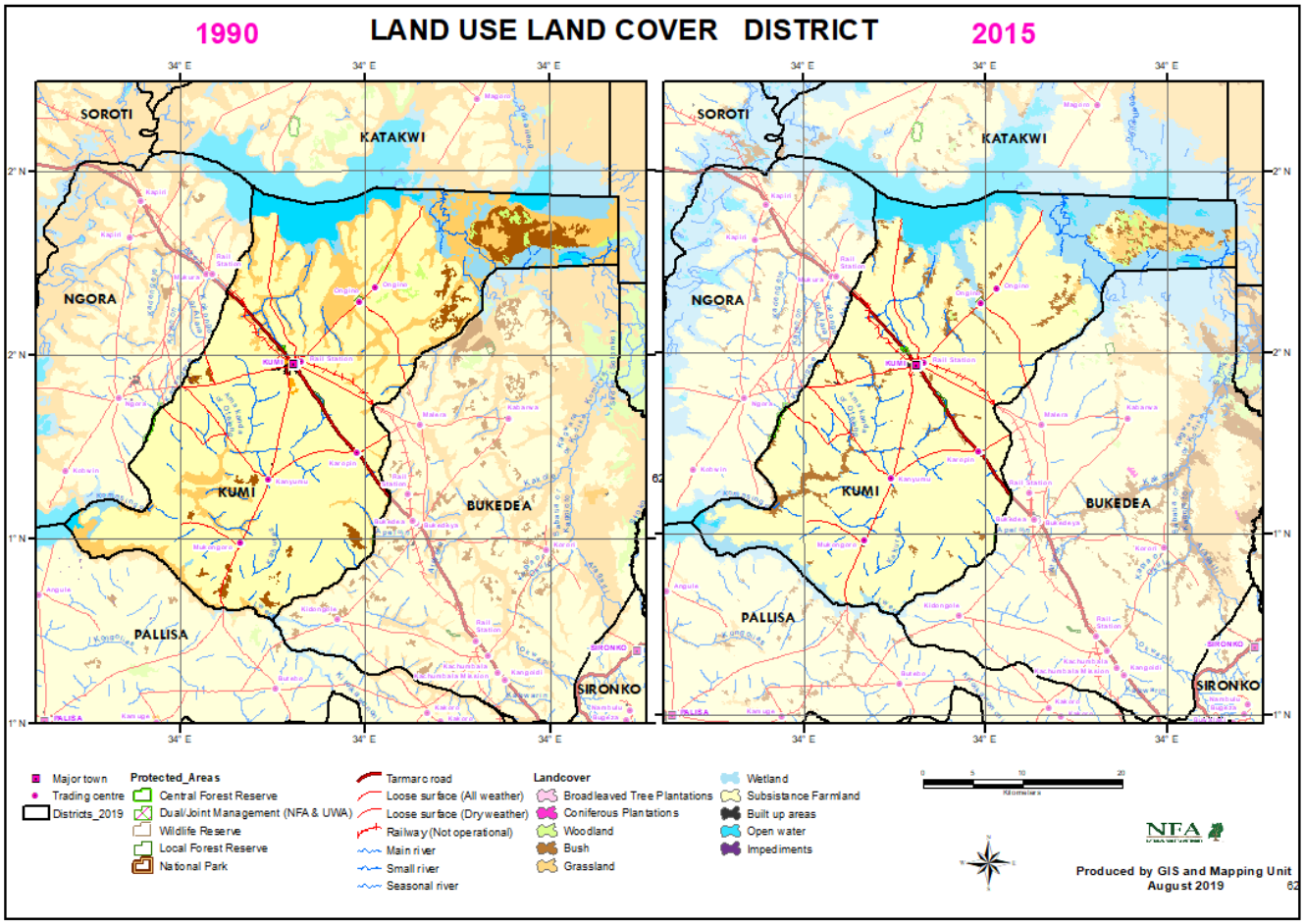


Figure 5.63: Land cover/ land use for Kumi District

5.2.62 Land Physical Accounts for Kween District

Kween District had a land cover of 82,371.1 ha. In 1990, the largest land covers grasslands, small scale farmlands, woodlands and tropical high forests were 51%, 18%, 13%, and 12% of the District land cover (Table 5.62). By 2015, the bushlands, small scale farmlands, commercial farmlands and built up areas had increased while tropical high forests, woodlands, bushlands and grasslands reduced.

Table 5.62: Land cover/ land use for Kween District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Wood-land	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	4	776	6,314	3,160	10,634	3,766	42,160	1,042	14,480	-	27	-	9
Additions	11	218	649	186	1,151	10,026	5,263	156	7,892	1,474	140	-	-
Reductions	4	139	1,454	2,804	9,619	2,516	7,895	1,042	1,658	-	27	-	9
Closing stock	11	855	5,508	542	2,165	11,276	39,527	157	20,715	1,474	140	-	-
Net gains/reductions	7	79	(805)	(2,618)	(8,468)	7,510	(2,633)	(886)	6,235	1,474	113	-	(9)

The land cover change for Kween District resulted into an increase for small scale farmlands and bushlands at the expense of tropical high forests, woodlands, bushlands and grasslands (Figure 5.64). Woodlands reduced by 80% while tropical high forests reduced by 36%. All the commercial farmland area was lost while the built up area increased four-fold.

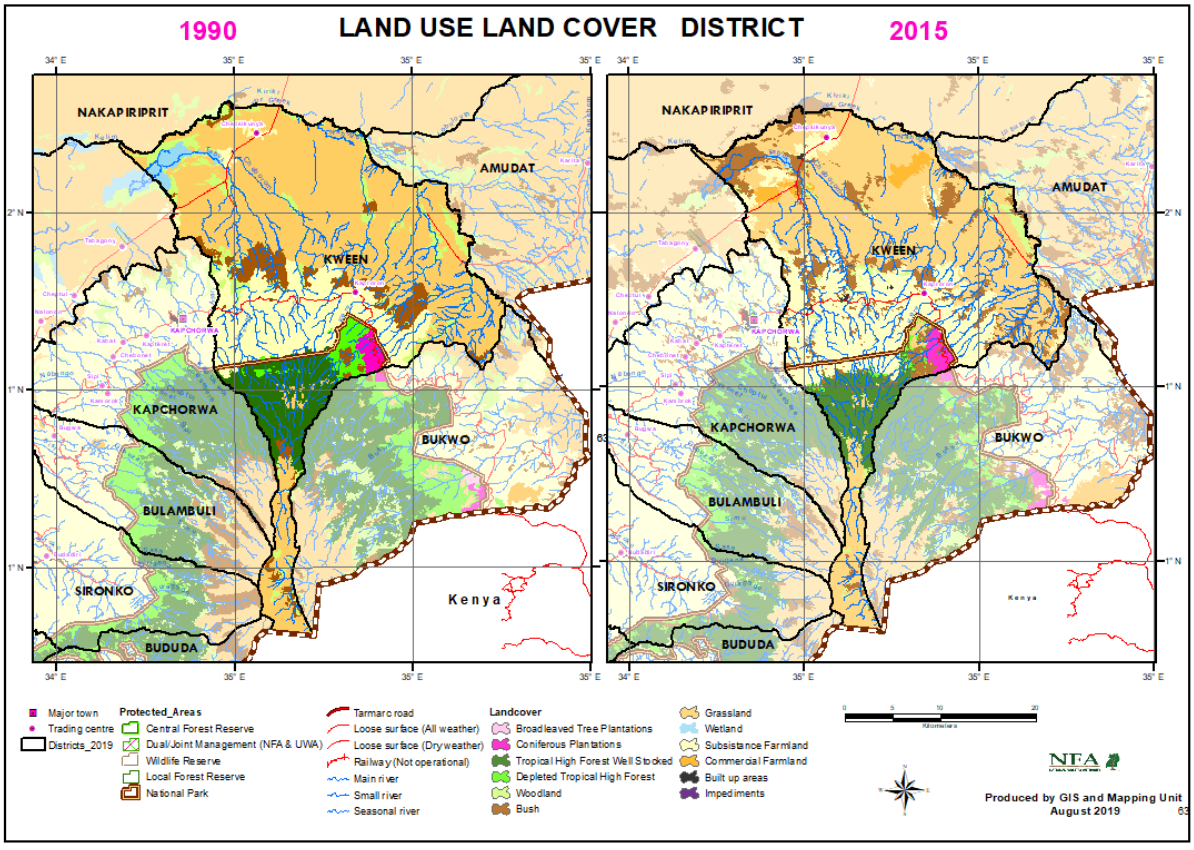


Figure 5.64: Land cover/ land use for Kween District

5.2.63 Land Physical Accounts for Kyankwanzi District

The total land cover of Kyankwanzi District was 251,021.2 ha. Woodlands, small scale farmlands and grasslands occupied 46%, 28% and 20%, respectively, in 1990 of the land cover of the District (Table 5.63). Between 1990 and 2015, woodlands, tropical high forests and grasslands reduced by 98,459, 6,810 and 9,490 ha while bushlands, small scale farmlands and wetlands increased by 63,222, 36,702 and 3,073 ha.

Table 5.63: Land cover/ land use for Kyankwanzi District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Wood-land	Bush-land	Grass-land	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	1	147	3,148	3,826	115,383	2,138	50,935	4,838	70,571	-	34	-	-
Additions	517	9,786	-	64	4,680	64,708	25,339	4,010	47,727	67	1,421	74	35
Reductions	1	19	3,148	3,826	103,139	1,486	34,829	937	11,025	-	18	-	-
Closing stock	517	9,914	-	64	16,924	65,360	41,444	7,911	107,273	67	1,437	74	35
Net gains/ reductions	*516*	*9,767*	*(3,148)*	*(3,762)*	*(98,459)*	*63,222*	*(9,490)*	*3,073*	*36,702*	*67*	*1,403*	*74*	*35*

Figure 5.65 shows the change in land cover from natural forest and grasslands to increased bushlands, small scale farmlands, forest plantations and built up areas. Tropical high forests were nearly depleted with only 64 ha of THF low stocked remaining. Similarly, 85% of the woodlands were depleted and replaced by bushlands and small scale farmlands.

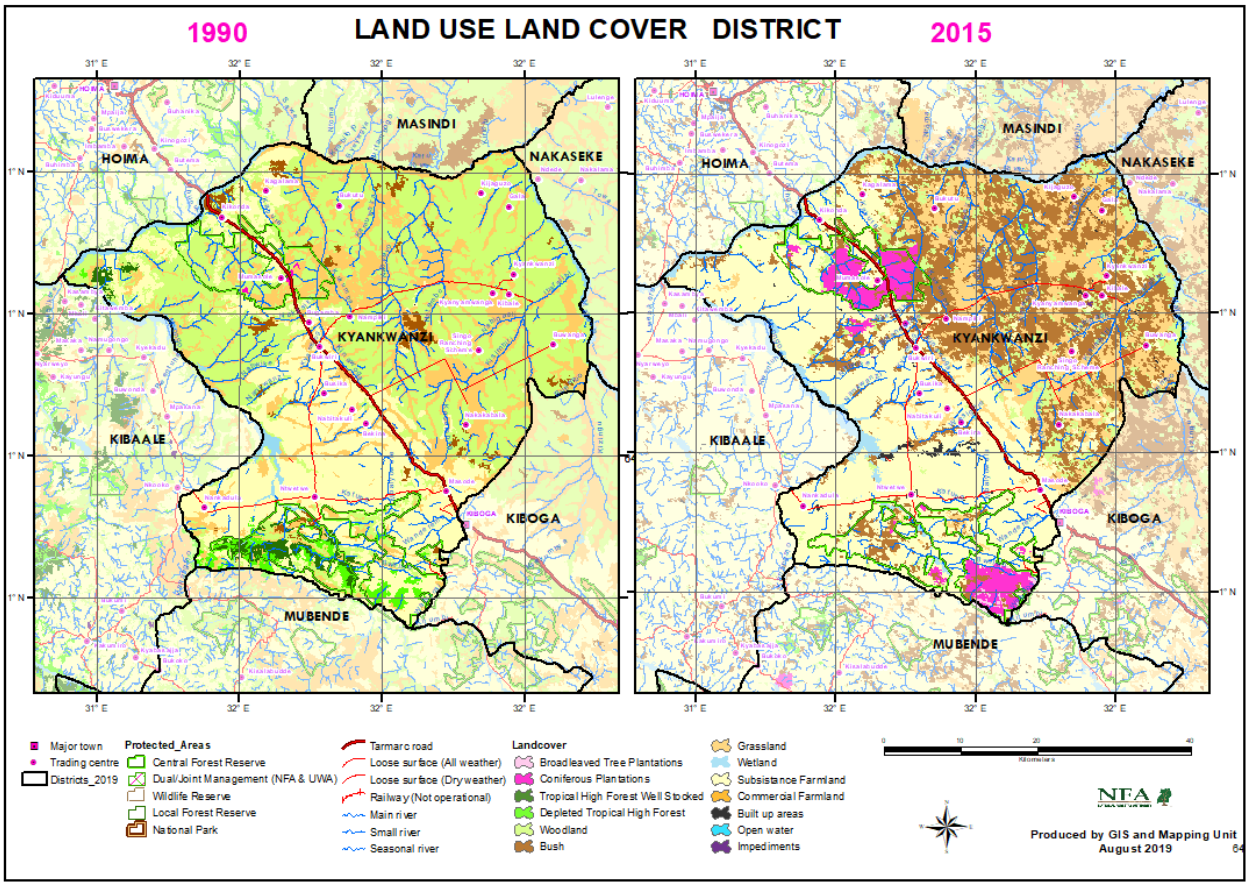


Figure 5.65: Land cover/ land use for Kyankwanzi District

5.2.64 Land Physical Accounts for Kyegegwa District

The total land cover was 174,725 ha which comprised of small scale farmlands (41%), grasslands (25%), woodlands (21%) and tropical high forests (10%) in 1990. By 2015, the land cover change included a 60,989 ha increase in small scale farmlands and 11,211 ha increase in bushlands. Broadleaved plantations and built up areas also increased by 3,945 and 179 ha. The increases occurred at the expense of reductions in woodland cover of 85%, grasslands by 80% and tropical high forest by 54% (Table 5.64).

Table 5.64: Land cover/ land use for Kyegegwa District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	11	-	10,266	7,197	35,903	1,622	43,270	4,260	71,557	118	26	5	489
Additions	3,953	-	1,213	4,641	4,764	12,747	1,155	1,156	68,874	-	202	51	130
Reductions	8	-	8,045	7,154	35,445	1,536	35,644	2,536	7,885	118	23	5	486
Closing stock	3,957	-	3,434	4,683	5,223	12,833	8,781	2,880	132,547	-	205	51	133
Net gains/ reductions	*3,945*	-	*(6,832)*	*(2,513)*	*(30,681)*	*11,211*	*(34,489)*	*(1,380)*	*60,989*	*(118)*	*179*	*46*	*(356)*

The land cover change consisted of an 85% increase in small scale farmlands, an eight-fold increase in bushland area. In contrast, woodlands, grasslands and wetlands decreased (Figure 5.66).

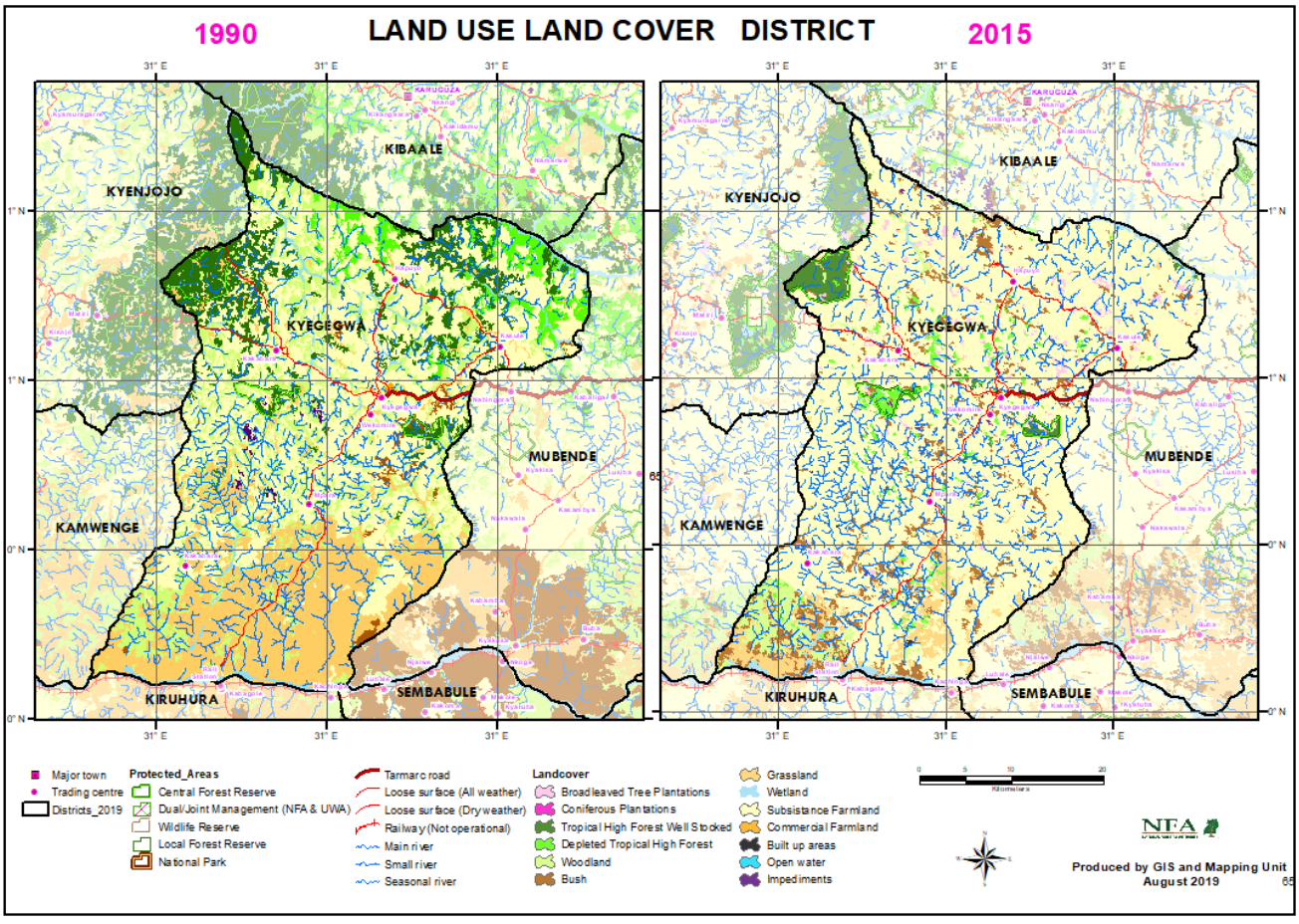


Figure 5.66: Land cover/ land use for Kyegegwa District

5.2.65 Land Physical Accounts for Kyenjojo District

Kyenjojo District had a land cover of 230,714.8 ha. Small scale farmlands occupied 48% while tropical woodlands, tropical high forests and grasslands covered 22%, 16% and 10% were the leading land covers (Table 5.65).

Table 5.65: Land cover/ land use for Kyenjojo District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	216	1,993	32,138	4,641	49,697	1,373	23,120	4,916	109,701	2,791	129	-	-
Additions	4,160	543	7,589	2,497	1,165	16,598	6,324	5,533	62,155	4,912	391	12	44
Reductions	129	850	15,393	4,409	48,818	1,196	18,736	2,768	18,301	1,208	115	-	-
Closing stock	4,247	1,685	24,334	2,730	2,044	16,776	10,708	7,680	153,556	6,494	405	12	44
Net gains/reductions	(4,031)	307	7,804	1,912	47,653	(15,402)	12,412	(2,765)	(43,854)	(3,704)	(276)	(12)	(44)

The land cover transition in Kyenjojo District comprised a 40% increase in the small scale farmlands largely at the expense of a 96% decline in the woodland cover in the District. The bushlands cover also increased by 12-times, commercial farmlands expanded by 132%. The tropical high forest cover reduced by one-quarter but remained quite land large within the District (Figure 5.67).

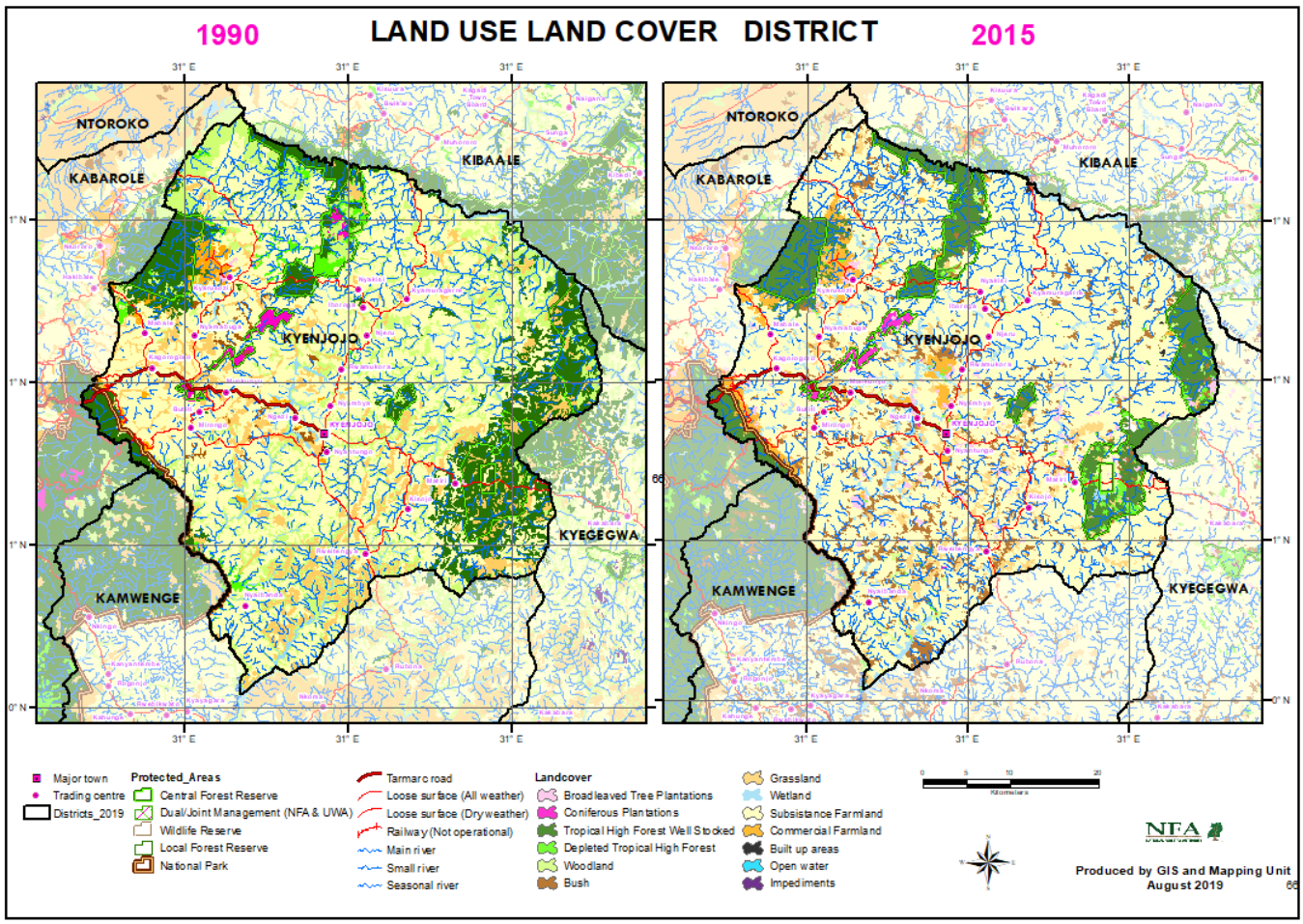


Figure 5.67: Land cover/ land use for Kyenjojo District

5.2.66 Land Physical Accounts for Lamwo District

Lamwo District had a land cover of 552,078.8 ha. In 1990, the largest land covers were woodlands (54%), small scale farmlands (23%) and grasslands (22%) and together they accounted for 99.7% of the Districts land cover. Between 1990 and 2015, the grasslands expanded by an additional 140,392 ha, bushlands gained 37,961 ha while woodlands lost 274,793 ha (92%) of their land cover in 1990 (Table 5.66). Small scale farmlands expanded by 57,950 ha and commercial farmlands emerged with an area of 36,672 ha. The built up area expanded over 100-times from the original area in 1990.

Table 5.66: Land cover/ land use for Lamwo District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	-	-	-	-	298,588	1,255	123,459	0	128,434	-	18	309	16
Additions	7	-	-	-	4,099	39,002	172,401	10	98,999	36,672	1,860	166	20
Reductions	-	-	-	-	278,892	1,042	32,008	0	41,050	-	4	224	16
Closing stock	7	-	-	-	23,794	39,216	263,852	10	186,384	36,672	1,874	251	20
Net gains/reductions	7	-	-	-	(274,793)	37,961	140,392	10	57,950	36,672	1,856	(58)	4

The main transition in land cover in Lamwo District was the near complete loss of woodland cover (Figure 5.68). The woodland cover was replaced with grasslands, small scale farmlands, bushlands and commercial farmlands. The emergence of a large area of commercial farmland was also an indication of external investment into land use change in the District.

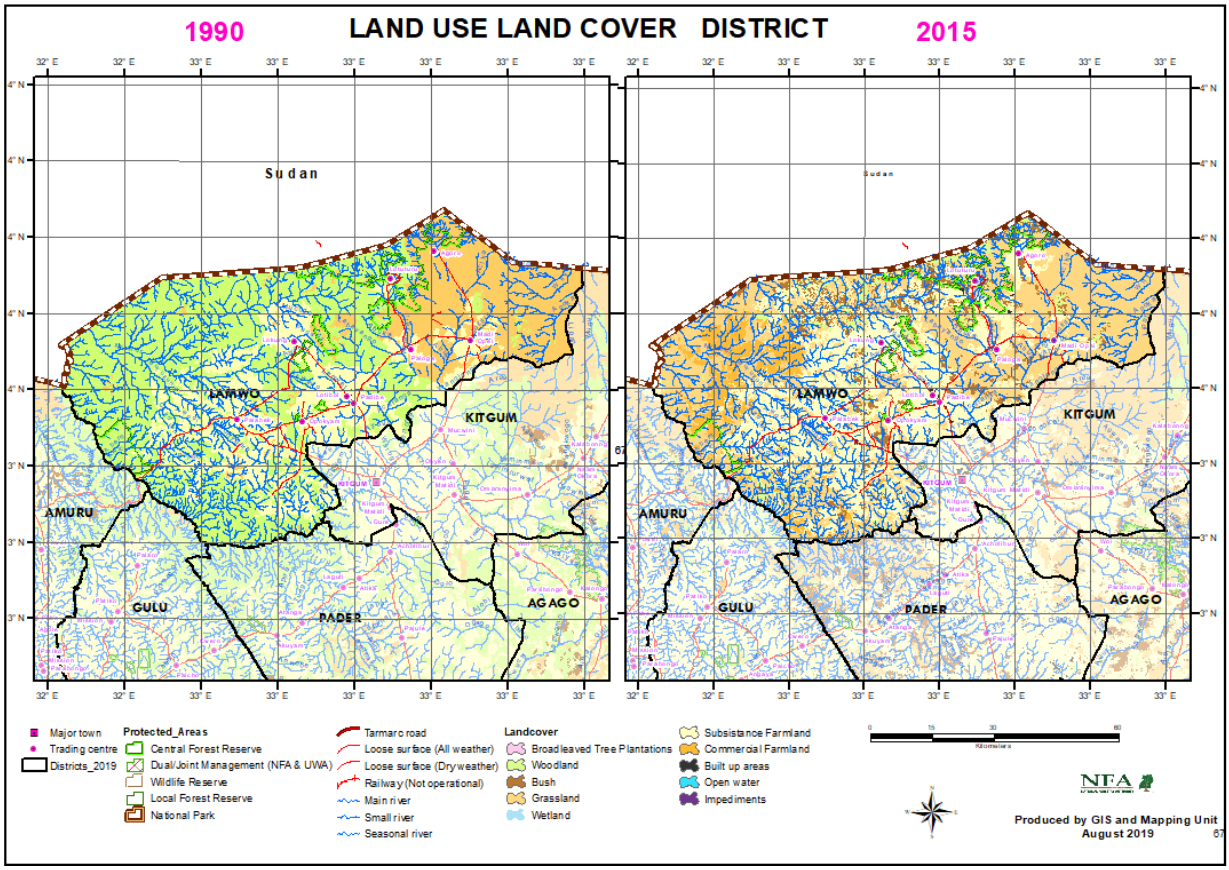


Figure 5.68: Land cover/ land use for Lamwo District

5.2.67 Land Physical Accounts for Lira District

The land cover for Lira District was 132,561 ha. In 1990, 81% of the District was occupied by small scale farmlands while grasslands occupied 12% of the land cover. The rest of the land cover was composed of woodlands, commercial farmlands, built up area, broad leaved plantations, open water and impediments (Table 5.67). By 2015, the land cover had generally stayed similar with the small increases in the small scale farmlands a large increase in the area of bushlands from 433 ha to 12,480 ha and an increase in the built up areas.

Table 5.67: Land cover/ land use for Lira District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High Forest	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	16	2	-	7087	433	15,515	523	107,934	309	647	5	89
Additions	212	-	-	548	12,455	1,125	40	13,478	-	866	288	25
Reductions	16	2	-	6,920	408	12,863	523	7,526	309	405	5	59
Closing stock	212	-	-	716	12,480	3,777	40	113,886	-	1,107	288	55
Net gains/ reduction	196	(2)	-	(6,372)	12,047	(11,738)	(483)	5,953	(309)	461	283	(34)

The major trend for land cover in Lira District was the strengthening and expansion of farmlands and the increase in bushland cover. The increase in farmland and bushland was at the expense of woodlands where nearly 90% of the woodland was lost and loss of one-fifth of the grasslands cover between 1990 and 2015 (Figure 5.69).

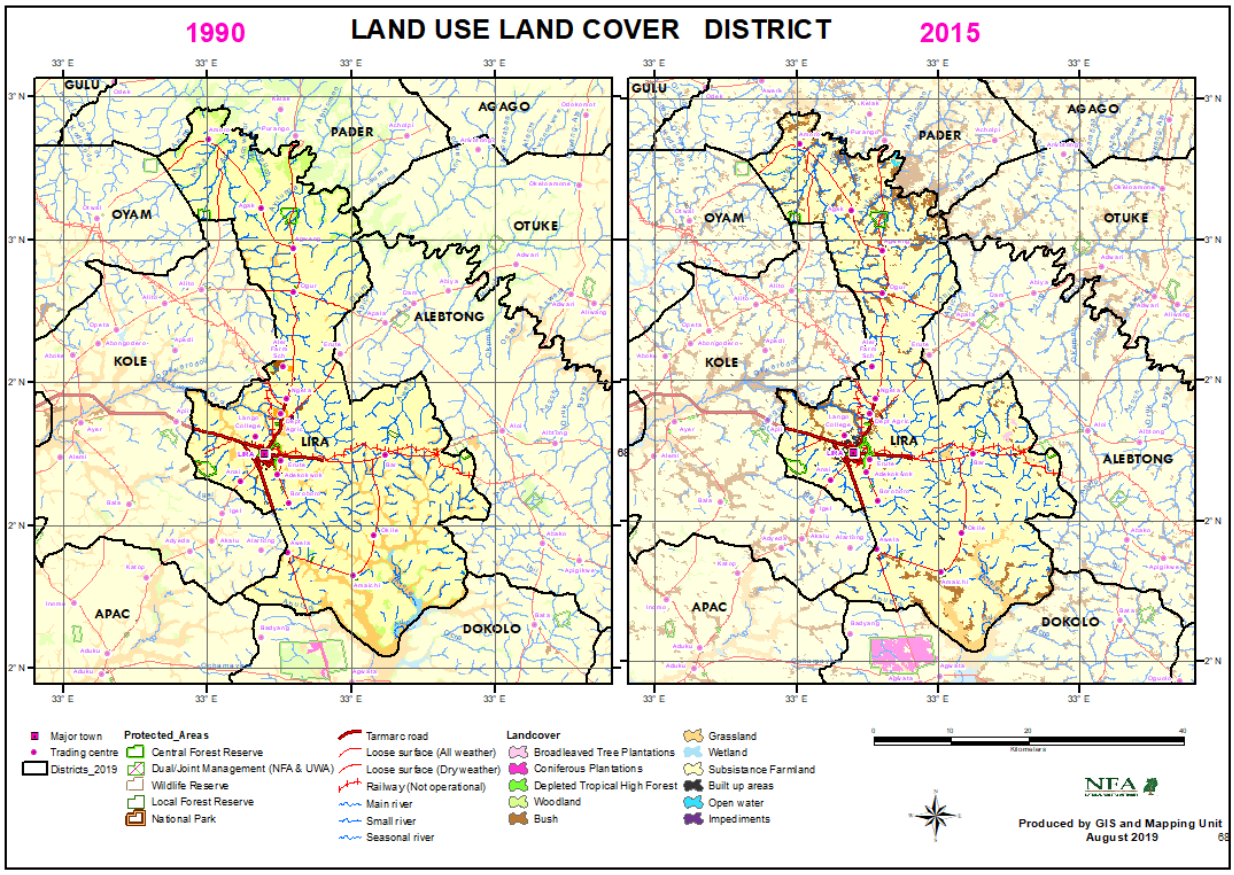


Figure 5.69: Land cover/ land use for Lira District

5.2.68 Land Physical Accounts for Luuka District

Luuka District had a land cover of 65,039.9 ha with 92% of the District's land cover under small scale farmlands. The other leading land covers were woodlands, bushlands and grasslands which together had a combined cover of 7% of the District. Between 1990 and 2015, small scale farmlands, wetlands, commercial farmlands all expanded while woodlands, bushlands, grasslands and broadleaved plantations reduced. All the broadleaved plantations and woodlands were lost and only 16% of the original bushlands area of 1990 was still available (Table 5.68).

Table 5.68: Land cover/ land use for Luuka District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High Forest	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	29	-	-	1,921	1,406	1,295	440	59,848	-	86	3	11
Additions	-	91	-	0	209	78	1,677	4,254	452	150	-	-
Reductions	29	-	-	1,921	1,395	1,177	224	2,077	-	72	3	11
Closing stock	-	91	-	0	219	197	1,893	62,024	452	163	-	-
Net gains/ reduction	(29)	91	-	(1,921)	(1,186)	(1099)	1,453	2,176	452	78	(3)	(11)

Luuka District already had constrained land cover that was dominated by small scale farmlands (Figure 5.70). The small scale farmlands continued to expand at the expense of woodlands, bushlands and grasslands. The expansion in wetlands also occurred and this might be related to loss of grassland and bushland flood plains which due to the constrained land cover in the District.

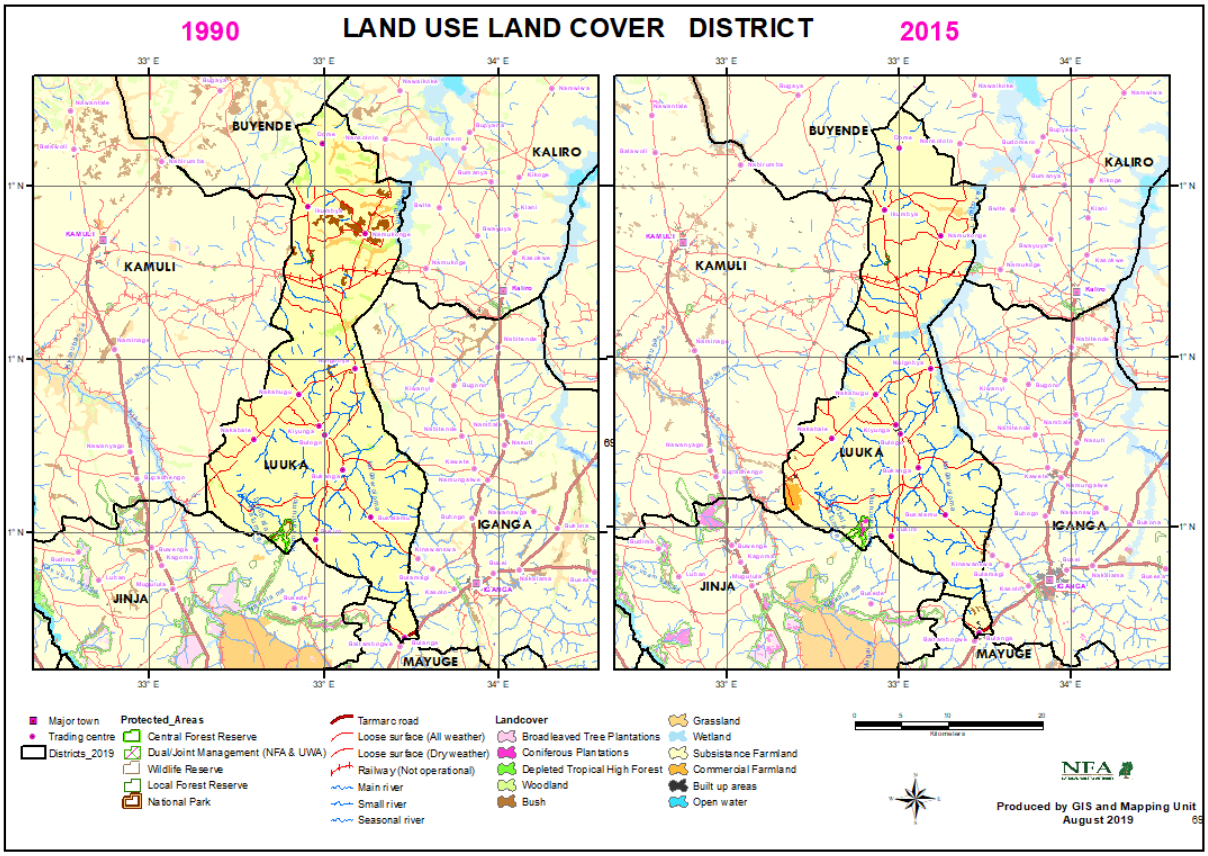


Figure 5.70: Land cover/ land use for Luuka District

5.2.69 Land Physical Accounts for Luwero District

Luwero District had a land cover of 222,170.3 ha dominated by small scale farmlands (53%), woodlands (21%), grasslands (18%) and wetlands (5%) in 1990. Small scale farmlands, bushlands, commercial farmlands and plantations increased. Tropical high forests generally declined even if the THF well stocked emerged over the timeline of 1990 to 2015 as the THF low stocked was close to depletion (Table 5.69).

Table 5.69: Land cover/ land use for Luwero District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	76	15	-	1,440	46,187	5,865	38,963	10,324	118,460	388	452	1	-
Additions	445	698	221	107	5,590	16,424	11,863	4,253	38,120	1,323	2,358	82	30
Reductions	76	-	-	1,440	32,655	4,960	23,460	2,032	16,381	379	131	1	-
Closing stock	445	713	221	107	19,122	17,329	27,366	12,545	140,199	1,332	2,678	82	30
Net gains/ reductions	369	698	221	(1,333)	(27,065)	11,464	(11,597)	2,221	21,739	944	2,227	81	30

The major land cover transition was the continued expansion of small scale farmlands with an additional 10% expansion to 63% of the District's land cover (Figure 5.71). The bushlands increased three-fold as indication that all the woodland areas and tropical forest converted was not immediately used for economic activity.

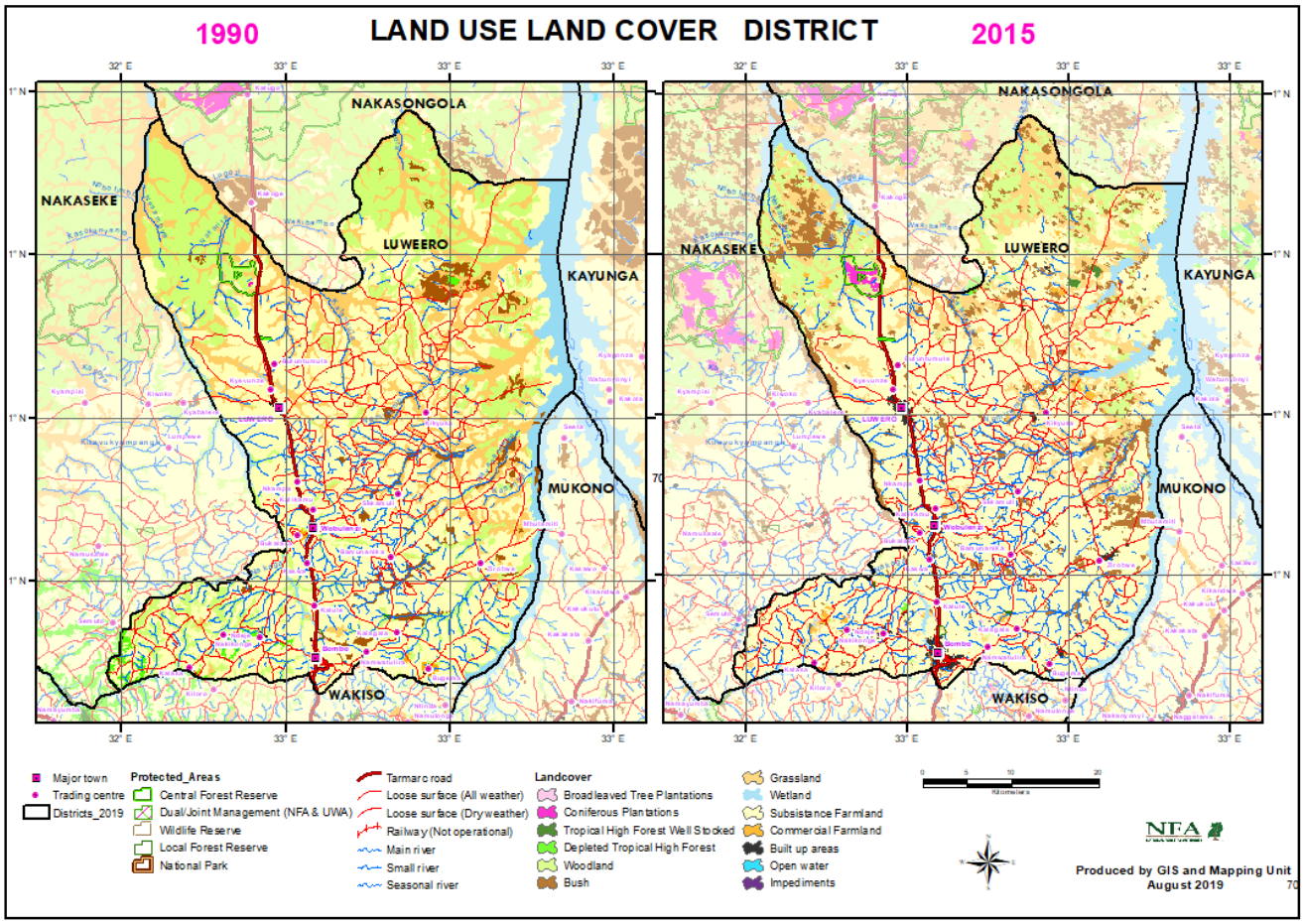


Figure 5.71: Land cover/ land use for Luwero District

5.2.70 Land Physical Accounts for Lwengo District

Lwengo District had a cover of 92,300.3 ha three-quarters of which were under small scale farmlands and 22% was under grasslands in 1990 (Table 5.70). The small scale farmlands expanded by 7,243 ha while grasslands reduced by 14,007 ha between 1990 and 2015 while woodlands, bushlands and wetlands all expanded.

Table 5.70: Land cover/ land use for Lwengo District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High forests	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	378	-	-	-	1,636	20,173	299	69,552	147	115	-	-
Additions	220	-	-	160	6,161	3,319	1,689	13,002	-	236	31	-
Reductions	376	-	-	-	1,053	17,326	117	5,759	147	40	-	-
Closing stock	221	-	-	160	6,744	6,166	1,871	76,795	-	312	31	-
Net gains/ reductions	(156)	-	-	160	5,108	(14,007)	1,572	7,243	(147)	196	31	-

The major transition in land cover for Lwengo District was the expansion of small scale farmlands, woodlands, bushlands and wetlands at the expense of grasslands (Figure 5.72). Additionally, commercial farmlands were completely lost while broadleaved plantations reduced by 156 ha.

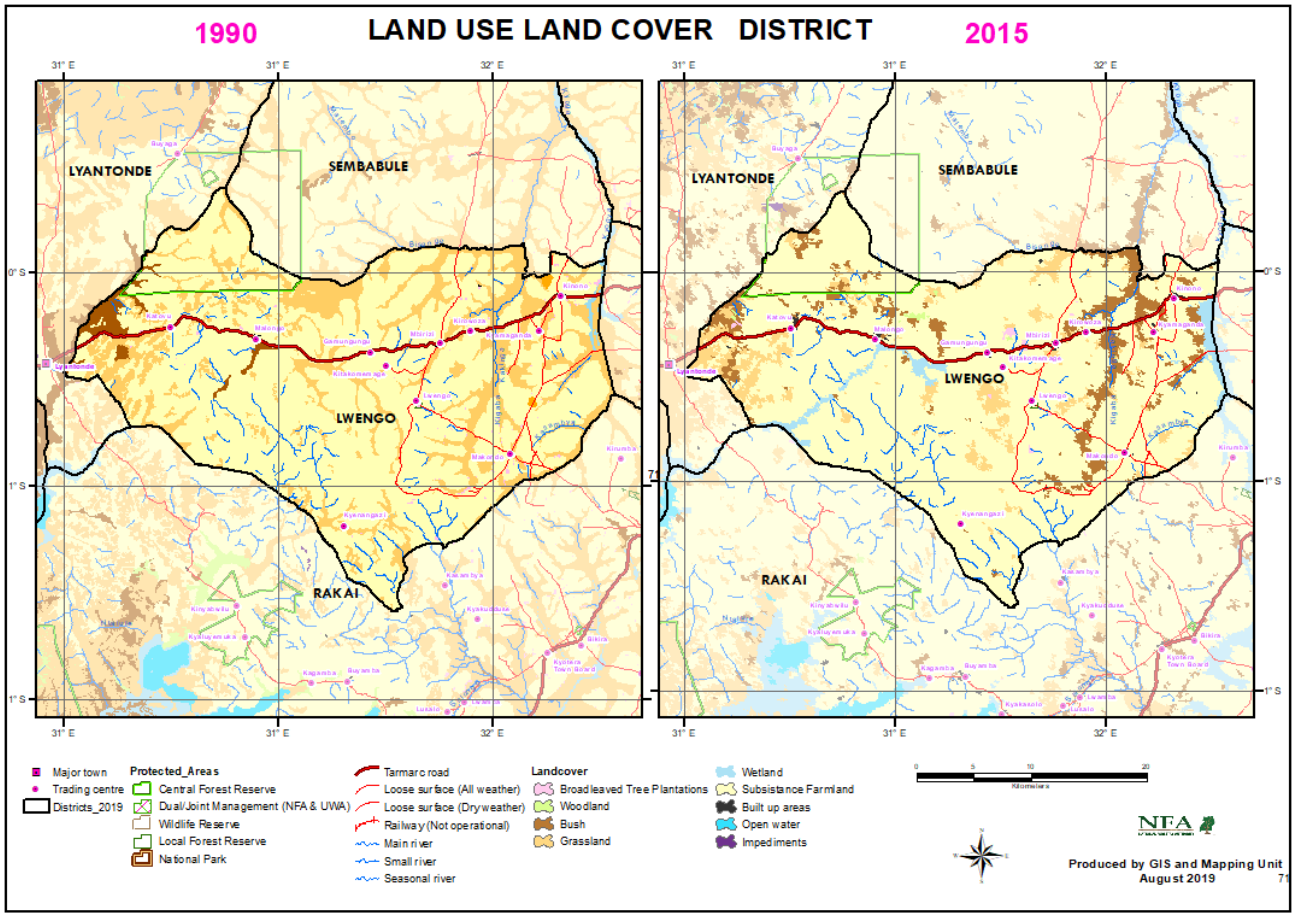


Figure 5.72: Land cover/ land use for Lwengo District

5.2.71 Land Physical Accounts for Lyantonde District

Lyantonde District had a land cover of 87,361.1 ha, which was largely spread between grasslands (53%), small scale farmlands (27%) and bushlands (16%) in 1990. The rest of land cover comprised broadleaved plantations, wetlands, commercial farmlands, built up areas and open water (Table 5.71). By 1990, the land small scale farmlands had expanded by 13,111 ha at the expense of a decrease in grasslands, bushlands and woodlands.

Table 5.71: Land cover/ land use for Lyantonde District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	18	-	-	-	3,129	14,053	46,550	318	23,212	71	7	3	-
Addition	-	-	-	58	1,656	10,007	16,536	131	22,464	-	141	54	110
Reductions	18	-	-	-	2,961	12,350	26,355	40	9,353	71	7	3	-
Closing stock	-	-	-	58	1,824	11,710	36,731	409	36,323	-	141	54	110
Net gains/ reductions	(18)	-	-	58	(1,305)	(2,343)	(9,819)	91	13,111	(71)	134	51	110

In Lyantonde District, the period between 1990 and 2015 was characterized by an increase in small scale farmlands as the cover of grasslands, bushlands and woodlands decreased (Figure 5.71). There was specific pattern of land use consolidation with the exception of increased small scale farmlands. Nonetheless, grasslands, bushlands and woodlands remained large and important land covers within the District (Figure 5.73).

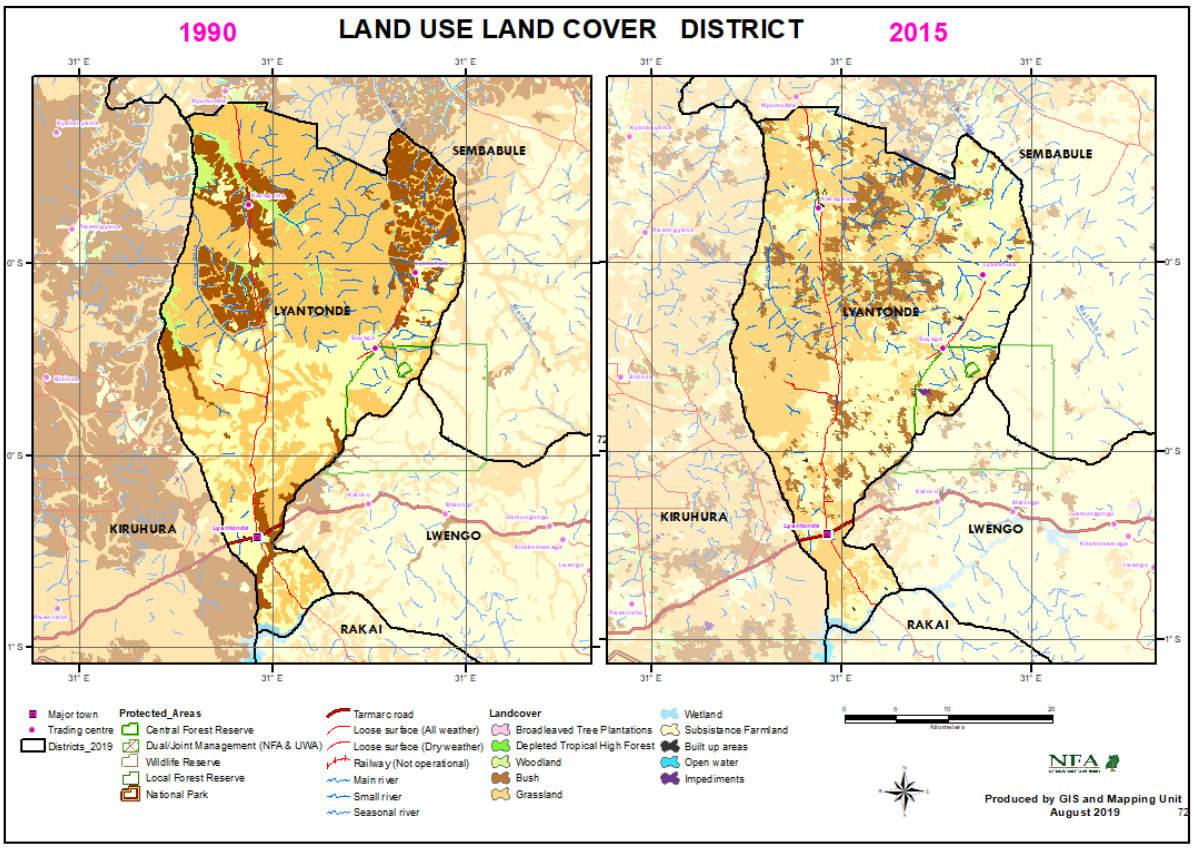


Figure 5.73: Land cover/ land use for Lyantonde District

5.2.72 Land Physical Accounts for Manafwa District

Manafwa District had a land cover of 58,076.9 ha of which 79% was under small scale farmlands in 1990 (Table 5.72). The other leading land covers in Manafwa District in 1990 were tropical high forests, woodlands and grasslands. Between 1990 and 2015, the largest increase in land cover for THF well stocked, which increased by 4,926 ha followed by the 2,312 ha increase in small scale farmlands. The largest decline was for woodlands which declined by 3,571 ha leaving only 306 ha of woodlands. THF low stocked area also declined even though that may be as result of conversion into THF well stocked.

Table 5.72: Land cover/ land use for Manafwa District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	175	-	3,060	3,798	3,877	215	1,231	-	45,696	-	25	-	-
Additions	-	-	5,264	258	74	490	13	-	2,442	-	126	-	-
Reductions	175	-	339	2,764	3,645	188	1,226	-	310	-	21	-	-
Closing stock	-	-	7,986	1,292	306	517	18	-	47,828	-	129	-	-
Net gains/reductions	(174)	-	4,926	(2,506)	(3,571)	302	(1,213)	-	2,132	-	105	-	-

The land cover transition in Manafwa District was the strengthening and expansion of THF well stocked and small scale farmlands at the expense of THF low stocked, and woodlands and grasslands respectively (Figure 5.74). Manafwa District also covers a section of Mt. Elgon National Park, which may account for the increase in the THF well stocked area.

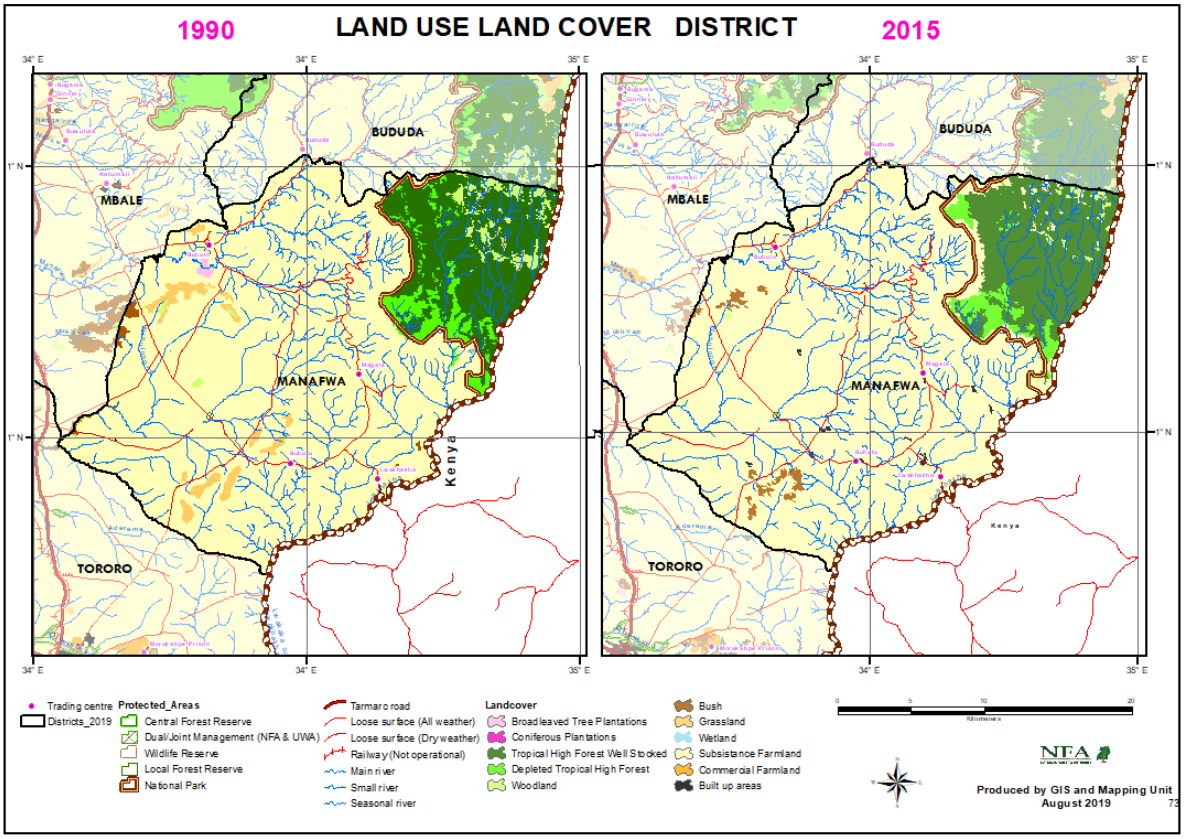


Figure 5.74: Land cover/ land use for Manafwa District

5.2.73 Land Physical Accounts for Maracha District

Maracha District had a land cover of 44,591.1 ha which was 97% under small scale farmlands (Table 5.73). Between 1990 and 2015, the small scale farmlands decreased by 1,075 ha alongside a decrease in the area of woodlands, and bushlands. The decreased land covers allowed for the expansion of built up area by 1,028 ha and grasslands by 159 ha.

Table 5.73: Land cover/ land use for Maracha District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High Forest	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	483	-	-	581	320	18	-	43,126	-	54	-	10
Additions	711	4	-	263	4	176	-	936	-	1,049	-	4
Reductions	326	-	-	441	320	17	-	2,011	-	21	-	10
Closing stock	868	4	-	403	4	177	-	42,050	-	1,082	-	4
Net gains/ reductions	385	4	-	(178)	(315)	159	-	(1,075)	-	1,028	-	(6)

In Maracha District, small scale farmlands were a very dominant land cover (Figure 5.75). In order to achieve an expansion of the built up area of the District some of the small scale farmland had to be lost. The broadleaved plantation area expanded by 385 ha and 4 ha of coniferous forest were recorded.

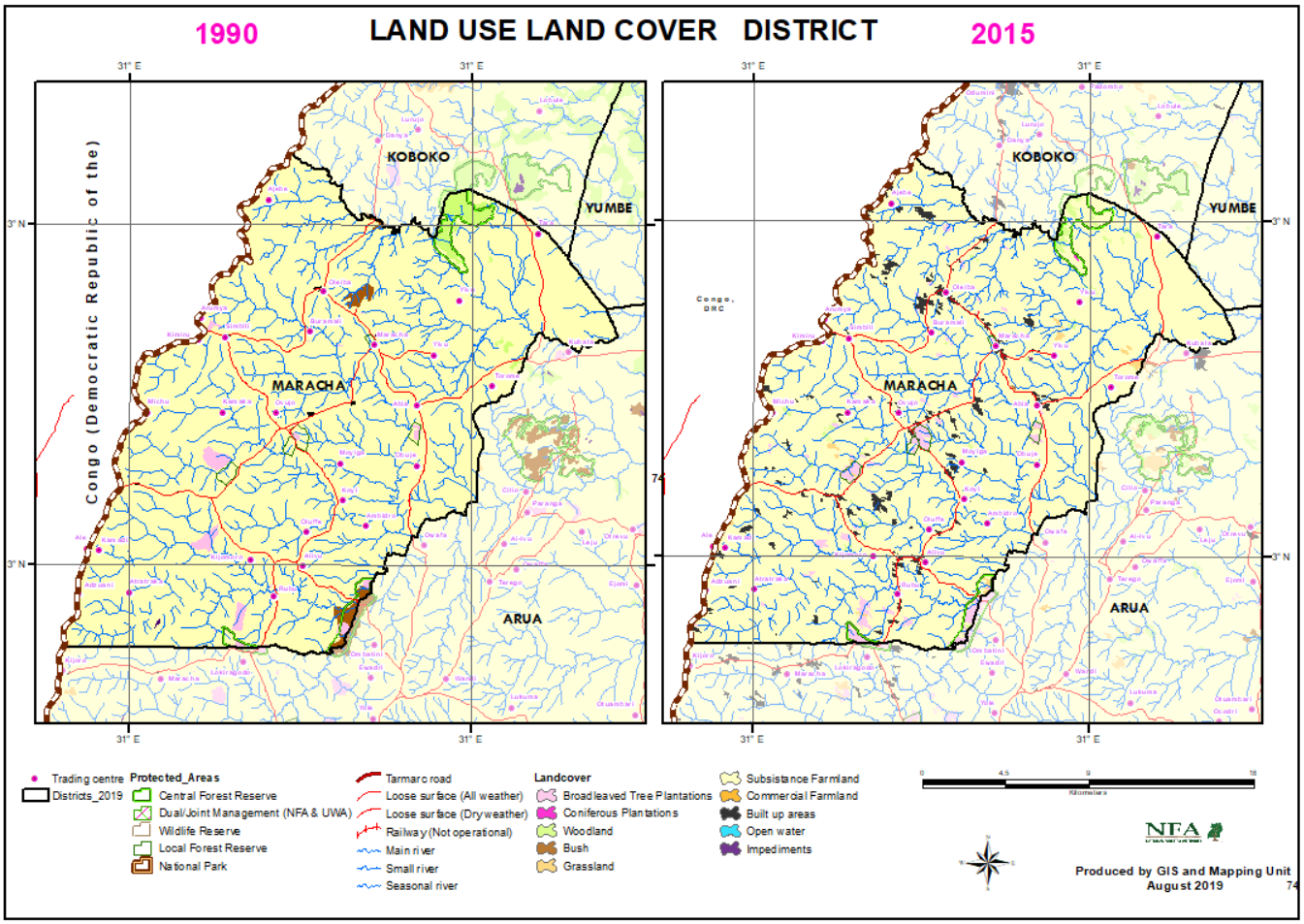


Figure 5.75: Land cover/ land use for Maracha District

5.2.74 Land Physical Accounts for Masaka District

Masaka District had a land cover of 233,035.7 ha. The open water of a section of Lake Victoria was the largest cover of the District (47%) followed by small scale farmlands (26%) and grasslands (16%). By 2015, grasslands had reduced by 76% while small scale farmlands increased by 15%. Woodlands, THF well stocked, bushlands and wetlands also increased in cover while commercial farmlands, forest plantations and THF low stocked declined (Table 5.74).

Table 5.74: Land cover/ land use for Masaka District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	509	6	6,013	9,599	1,166	4,318	38,024	4,467	59,452	222	578	108,683	-
Additions	449	-	5,806	1,984	1,261	4,811	7,732	6,192	15,202	15	759	795	290
Reductions	509	6	2,891	9,005	1,125	3,474	16,715	3,963	6,297	222	305	784	-
Closing stock	449	-	8,928	2,578	1,302	5,655	29,041	6,696	68,356	15	1,032	108,693	290
Net gains/reductions	(60)	(6)	2,915	(7,021)	136	1,337	(8,983)	2,229	8,905	(207)	454	11	290

The major land cover trend in Masaka District was the strengthening of small scale farmlands and the increase in wetlands and THF well stocked (Figure 5.76). The decreases occurred largely with THF low stocked and grasslands. Whereas some of the low stocked THF may have increased to THF well stocked some of it was likely converted into either woodlands, bushlands or small scale farmlands. The grasslands are likely to have been converted into either small scale farmlands or bushlands.

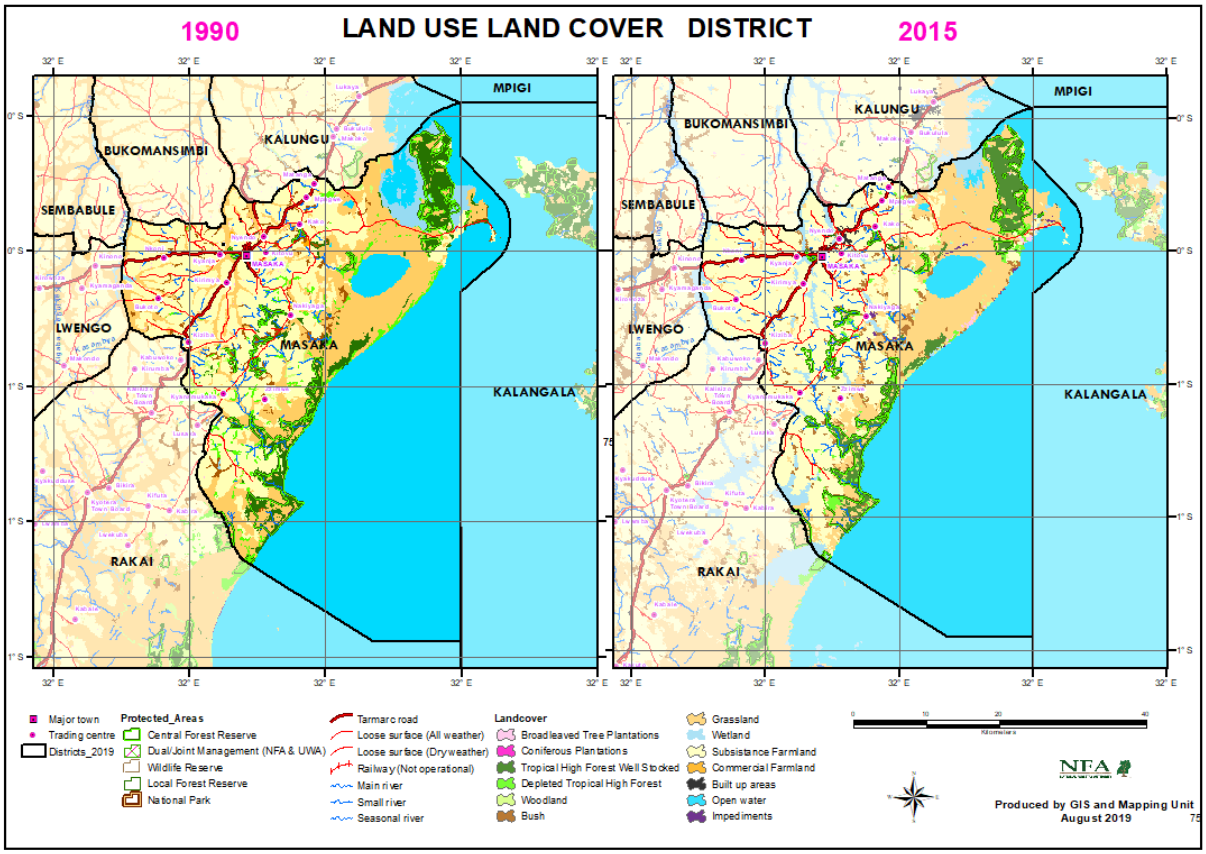


Figure 5.76: Land cover/ land use for Masaka District

5.2.75 Land Physical Accounts for Masindi District

The land cover for Masindi District was 293,531 ha of mostly woodlands (45%), small scale farmlands (27%), grasslands (15%) and tropical high forests (7%) in 1990. Between 1990 and 2015, the small scale farmlands, wetlands, commercial farmlands and bushlands expanded by 37,397, 6,384, 14,014 and 24,406 ha respectively. The land cover increases occurred at the expense of woodlands and grasslands which decreased by 77,663 and 2,844 ha, respectively (Table 5.75).

Table 5.75: Land cover/ land use for Masindi District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	275	112	19,521	1,863	132,967	3,876	44,644	1,000	78,355	9,939	761	206	12
Additions	255	149	1,714	2,857	7,727	27,760	23,889	7,033	49,708	15,972	853	54	19
Reductions	268	112	4,588	1,806	85,390	3,354	26,733	649	12,311	1,958	620	187	12
Closing stock	263	149	16,647	2,914	55,304	28,282	41,800	7,383	115,752	23,952	994	72	19
Net gains/ reductions	(13)	37	(2,874)	1,051	(77,663)	24,406	(2,844)	6,384	37,397	14,014	233	(133)	7

In Masindi District, the land cover trends showed that small scale farmlands, commercial farmlands, wetlands and bushlands were expanding at the expense of woodlands and grasslands (Figure 5.77). The loss of woodlands and grasslands may have affected nature conservation areas such as central forest reserves and local forest reserves, among others.

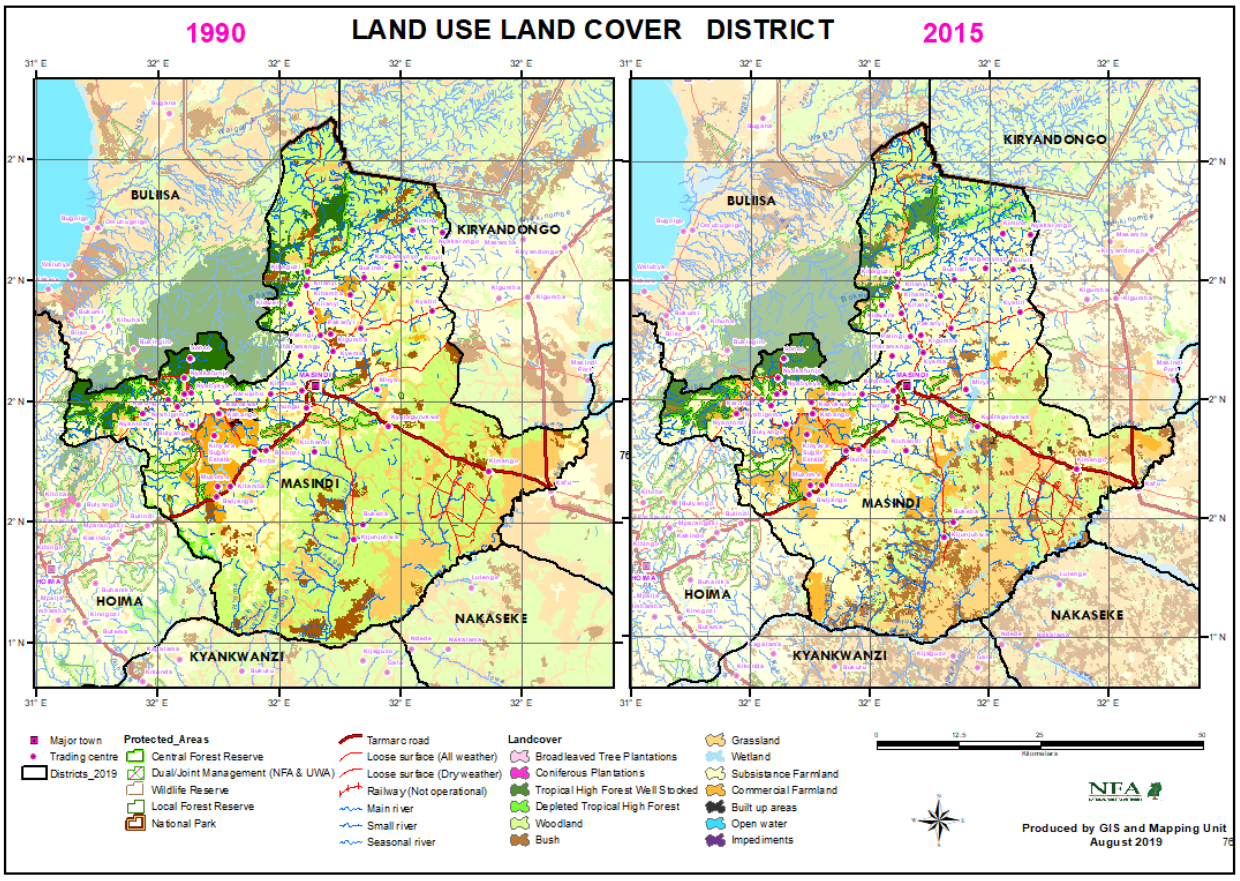


Figure 5.77: Land cover/ land use for Masindi District

5.2.76 Land Physical Accounts for Mayuge District

Mayuge District had a land cover of 463,858.8 ha, of which 77% is located under the open water of Lake Victoria. The leading land cover was small scale farmlands followed by tropical high forests, woodlands and grasslands. Between 1990 and 2015, the small scale and commercial farmlands expanded by 18,175 and 3,553 ha respectively (Table 5.76). Forest plantations expanded by 6773 ha combined for both broadleaved and coniferous plantations. Conversely, tropical high forests, bushlands, grasslands and wetlands all declined. Indeed, by 2015, the tropical high forests in the District were completely lost while the woodlands were reduced to just 11% of the original cover in 1990.

Table 5.76: Land cover/ land use for Mayuge District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	129	139	1,282	13,880	6,960	3,856	7,623	5,710	67,822	660	173	355,600	24
Additions	166	6,777	-	-	176	1,330	1,121	1,607	24,543	3,773	1125	2,101	-
Reductions	83	87	1,282	13,880	6,366	3,775	6,723	2,908	6,367	219	83	9,22	24
Closing stock	212	6,830	-	-	770	1,412	2021	4,409	85,998	4214	1216	356,779	-
Net gains/ reductions	83	6,690	(1,282)	(13,880)	(6,190)	(2,444)	(5,602)	(1,301)	18,175	3,553	1,043	1,179	(24)

The major transition in land cover for Mayuge District was the replacement of forests, woodlands, bushlands, grasslands and wetlands with small scale and commercial farmlands and forest plantations. The built up area also expanded seven-fold (Figure 5.78). The natural vegetation is increasingly being replaced with planted vegetation.

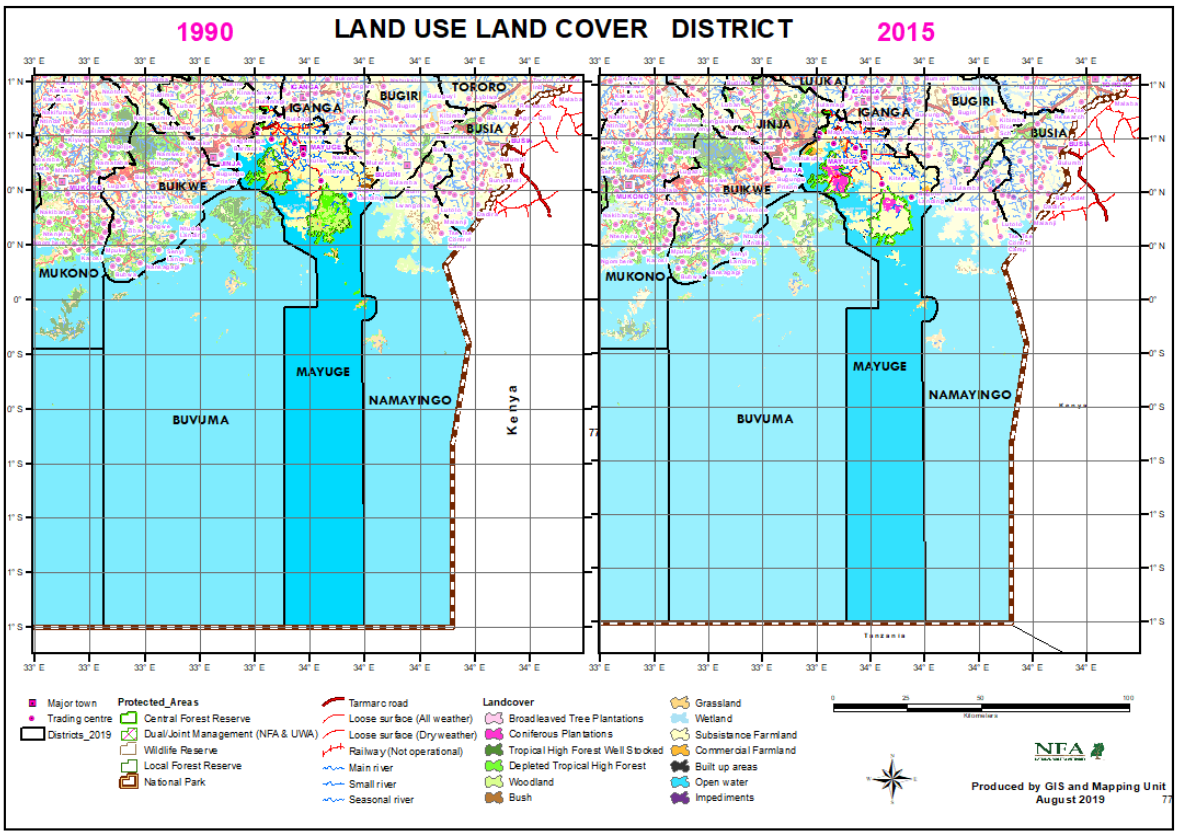


Figure 5.78: Land cover/ land use for Mayuge District

5.2.77 Land Physical Accounts for Mbale District

The land cover for Mbale District was 51,816.5 ha of mostly small scale farmlands (79%) alongside grasslands (8%) and tropical high forests (7%) as the major land covers (Table 5.77). Between 1990 and 2015, the area of small scale farmlands expanded to 90% of the District cover while grasslands, wetlands, bushlands and THF low stocked decreased.

Table 5.77: Land cover/ land use for Mbale District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	291	-	344	3,279	121	775	4,483	515	40,810	-	1,188	3	7
Additions	364	-	967	92	347	336	-	81	6,807	210	483	-	-
Reductions	81	-	123	2,238	120	646	4,449	515	929	-	576	3	7
Closing stock	575	-	1,188	1,132	348	465	34	81	46,688	210	1,096	-	-
Net gains/ reductions	284	-	844	(2,147)	226	(311)	(4,449)	(433)	5,878	210	(93)	(3)	(7)

The major transition in Mbale District was the continued expansion of farmlands largely at the expense of grasslands and bushlands (Figure 5.79). There was an increased utilization of land suggesting that the area available for expansion was decreasing. The commercial farmlands emerged as a 210 ha area and even the built up area decreased to accommodate the expansions. Woodlands, THF well stocked and forest plantations also increased.

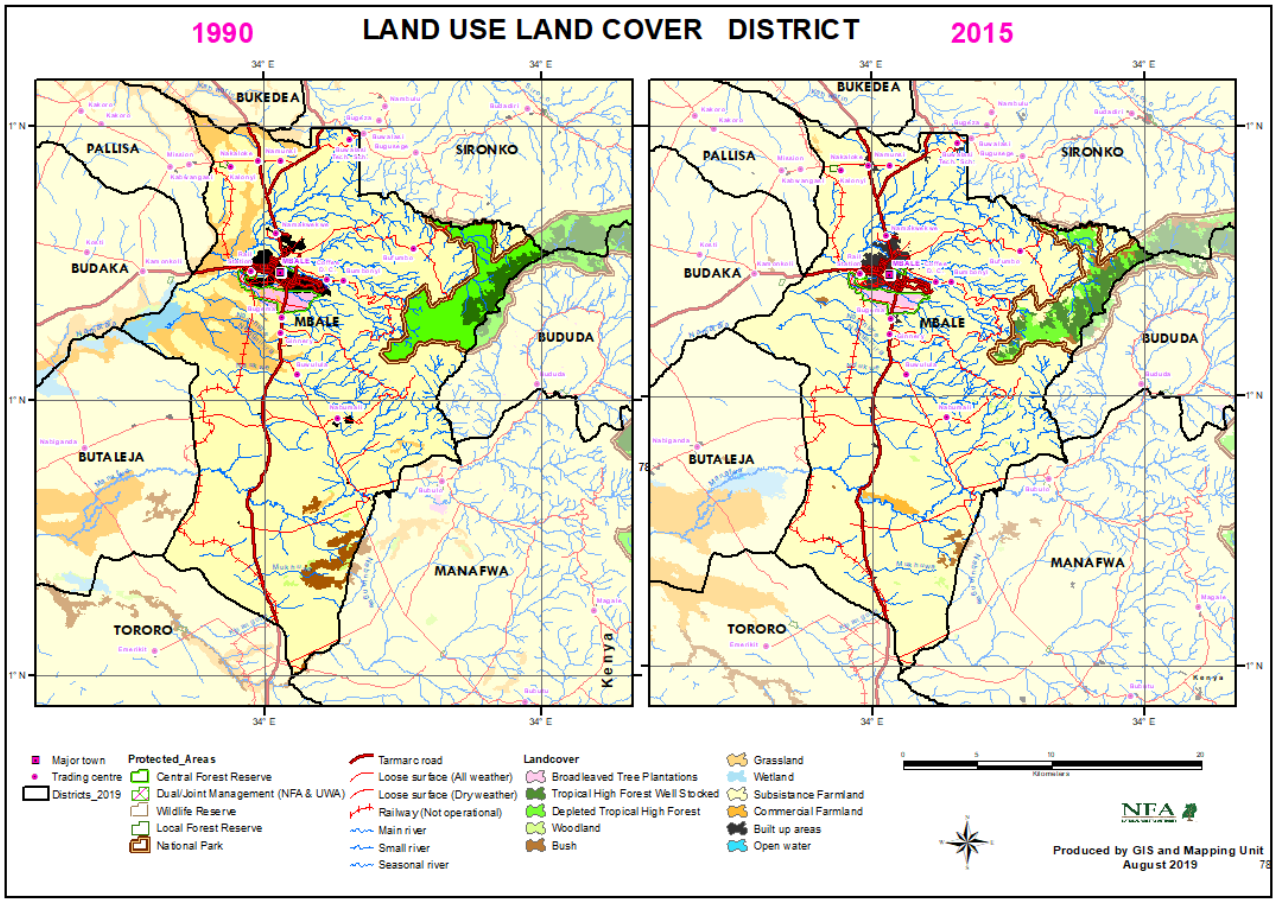


Figure 5.79: Land cover/ land use for Mbale District

5.2.78 Land Physical Accounts for Mbarara District

Mbarara District had a land cover of 179,394.8 ha of mostly grasslands (49%) and farmlands (44%) in 1990 (Table 5.78). The other land covers were forest plantations, woodlands, bushlands, grasslands wetlands and built up areas, among others. The area of small scale farmlands, bushlands, woodland and built up areas were the major expansions between 1990 and 2015 while the cover of grasslands and wetlands were the major decreases.

Table 5.78: Land cover/ land use for Mbarara District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	850	1,232	-	-	536	2,226	88,576	6,729	78,252	-	885	93	16
Additions	429	645	-	33	1,812	10,174	21,561	1,199	34,631	59	1,185	21	-
Reductions	824	518	-	-	502	1,786	40,650	2,717	24,321	-	377	36	16
Closing stock	454	1,359	-	33	1,845	10,613	69,486	5,212	88,562	59	1,692	78	-
Net gains/ reduction	(395)	127	-	33	1,310	8,388	(19,089)	(1,518)	10,310	59	808	(15)	(16)

The major trends in land cover for Mbarara District was the consolidation for small scale farmlands which decreased at the expense of grasslands which reduced (Figure 5.80). By 2015, small scale farmlands were the leading land cover while grasslands were in second place. There were increases for woodlands and bushlands, and the built up area doubled. The increase for bushlands suggests that there was likely additional expansion particularly for small scale farmlands in future.

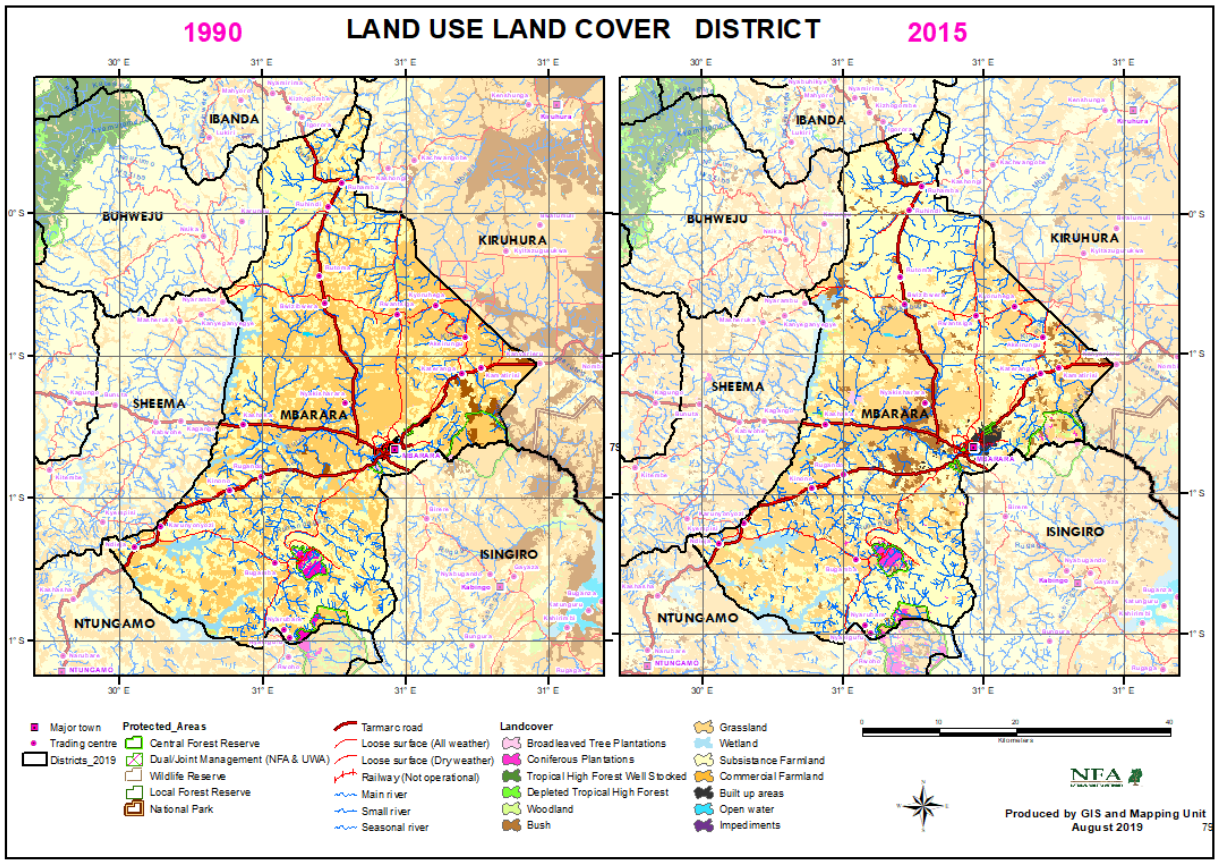


Figure 5.80: Land cover/ land use for Mbarara District

5.2.79 Land Physical Accounts for Mitooma District

The land cover for Mitooma District was 57,815.7 ha with 83% of the land under small scale farmlands. grasslands occupied 9% and tropical high forests 6% of the land cover (Table 5.79). Between 1990 and 2015, the land under small scale farmlands decreased by 626 ha while there were gains for forest plantations, woodlands, bushlands and commercial farmlands.

Table 5.79: Land cover/ land use for Mitooma District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	151	-	3,198	-	-	-	5,304	1,086	48,016	25	35	-	-
Additions	411	15	149	128	1,834	1,666	1,079	87	3,774	193	15	38	7
Reductions	141	-	519	-	-	-	3,435	870	4,400	1	32	-	-
Closing stock	421	15	2,828	128	1,834	1,666	2,948	303	47,391	218	18	38	7
Net gains/ reductions	270	15	(370)	128	1,834	1,666	(2,356)	(783)	(626)	192	(17)	38	7

The main transition in Mitooma District was the addition of woodlands and bushlands. In both cases at the expense of grasslands, wetlands and small scale farmlands (Figure 5.81). The expansions for commercial farmlands and forest plantations were important as well. Bushlands represent land allowed to fallow and/or unutilized while woodlands and forest plantations may have been added to address the demand for woody biomass within the District.

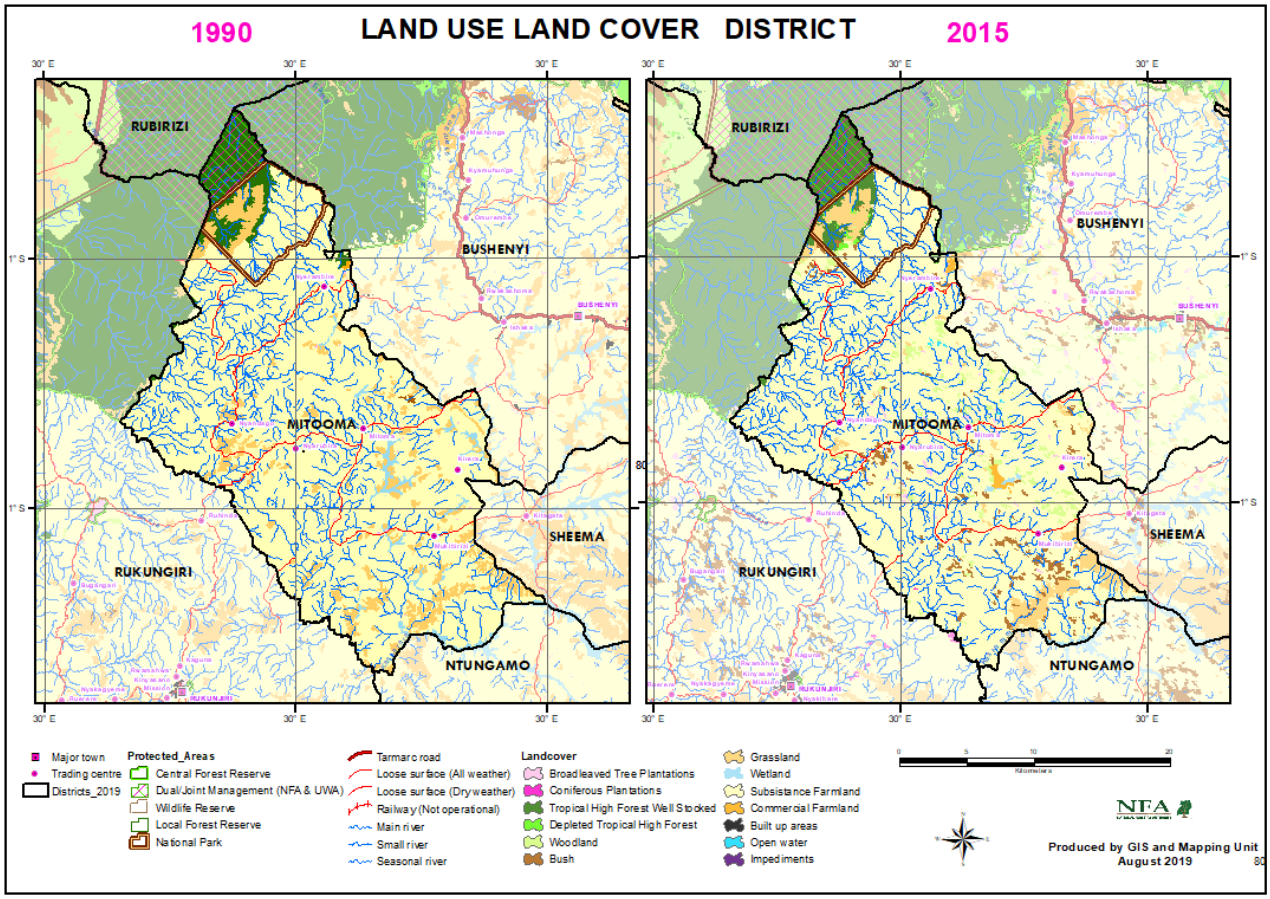


Figure 5.81: Land cover/ land use for Mitooma District

5.2.80 Land Physical Accounts for Mityana District

Mityana District had a land cover of 157,130.9 ha with two-thirds under small scale farmlands in 1990. The rest of the land cover was largely spread between tropical high forests, woodlands, grasslands and wetlands. Between 1990 and 2015, the small scale farmlands expanded by 13,136 ha and bushlands by 9,088 ha. There were also increases for wetlands, forest plantations, commercial farmlands and built up areas (Table 5.80).

Table 5.80: Land cover/ land use for Mityana District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	419	95	2,890	7,358	13,827	1,260	12,865	5,631	101,621	1,729	149	9,286	-
Additions	1,528	721	275	1,071	3,130	10,225	2,679	2,983	28,130	1,344	1,336	674	53
Reductions	305	95	2,652	7,027	13,073	1,137	12,551	1,625	14,994	539	66	87	-
Closing stock	1,643	721	514	1,402	3,883	10,348	2,994	6,989	114,757	2,535	1,420	9,873	53
Net gains/ reduction	1,223	626	(2,377)	(5,956)	(9,943)	9,088	(9,872)	1,358	13,136	805	1,270	587	53

The major transitions in Mityana District were the continued expansion of farmlands and bushlands at the expense of grasslands, woodlands and tropical high forests (Figure 5.82). Eight one percent of the tropical high forest was lost between 1990 and 2015 and 72% of the woodlands was also lost. The forest cover was likely targeted for both timber and wood fuel as well as agricultural land expansion.

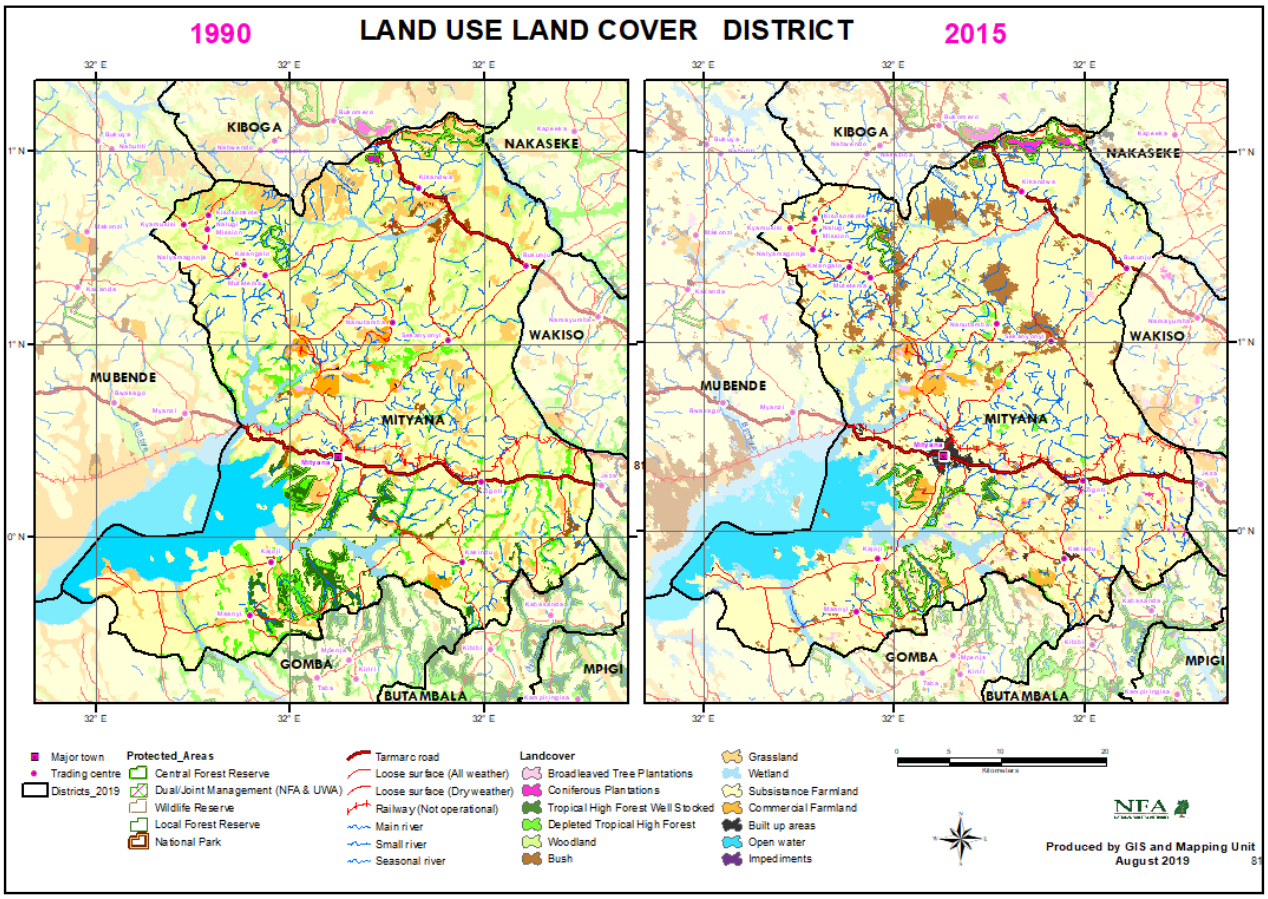


Figure 5.82: Land cover/ land use for Mityana District

5.2.81 Land Physical Accounts for Moroto District

Moroto District had a land cover of 353,836.3 ha. Bushlands (46%), grasslands (37%), woodlands 11% and small scale farmlands (5%) were the four largest land covers in the District in 1990. Between 1990 and 2015, the land cover for bushlands halved while that for woodlands, grasslands and small scale farmlands increased (Table 5.81).

Table 5.81: Land cover/ land use for Moroto District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High Forests	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	-	-	-	39,558	163,807	131,506	-	18,726	-	241	-	0
Additions	43	-	-	44814	31,440	79,343	-	25,880	-	392	36	144
Reductions	-	-	-	20,012	116,321	39,850	-	5,872	-	37	-	0
Closing stock	43	-	-	64,360	78,926	170,999	-	38,733	-	596	36	144
Net gains/ reduction	43	-	-	24,802	(84,881)	39,493	-	20,008	-	355	36	144

The major land cover trend for Moroto District was the halving of bushlands and the gains in grasslands, woodlands and small scale farmlands (Figure 5.83). Built up areas and broadleaved plantations also increased. In Moroto like most of the Karamoja region grasslands are important for livestock production and as habitats and forage for wildlife in the wildlife reserves for the Matheniko Game Reserve.

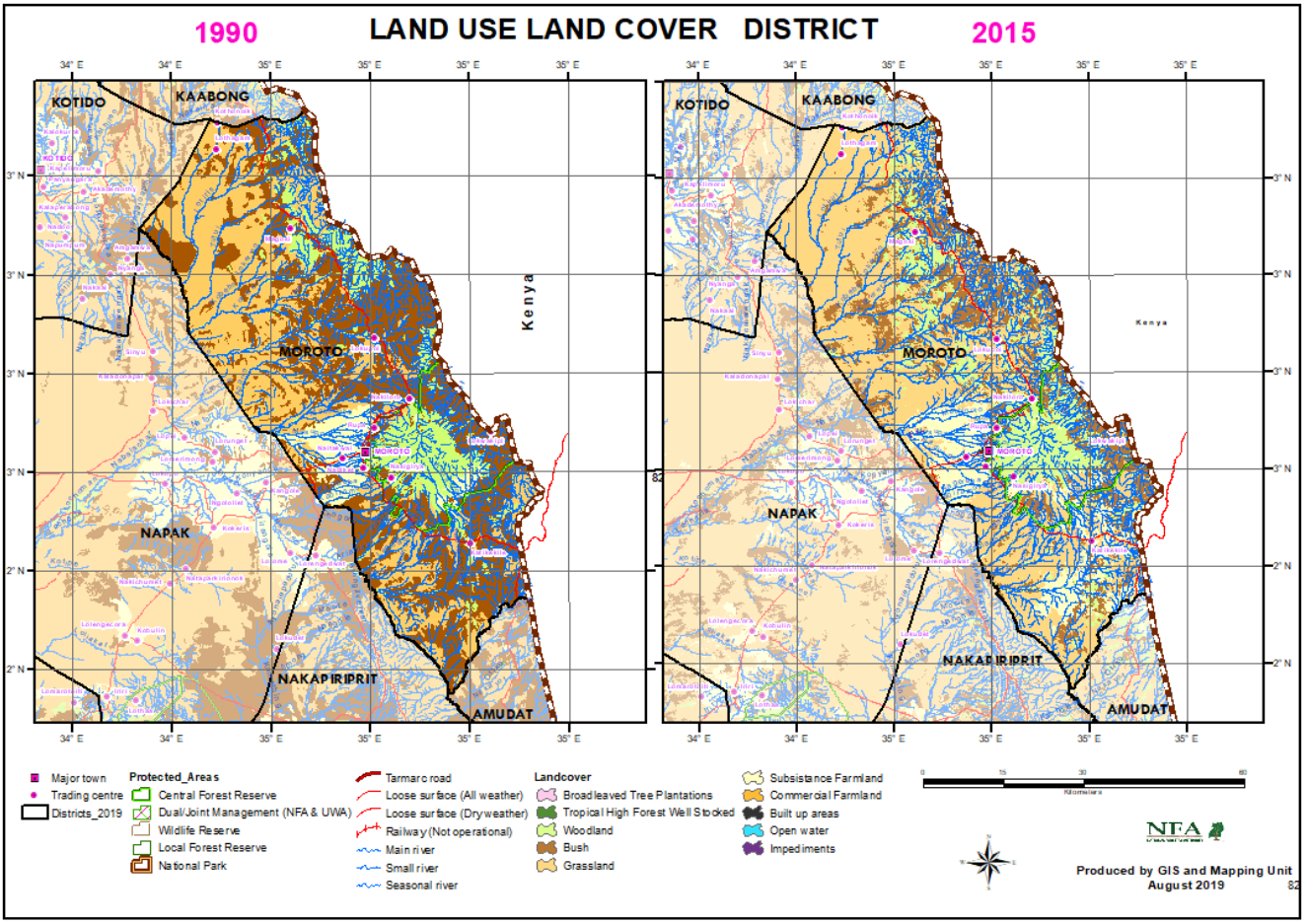


Figure 5.83: Land cover/ land use for Moroto District

5.2.82 Land Physical Accounts for Moyo District

Moyo District had a land cover of 189,072.6 ha. The woodlands (37%), grasslands (30%), small scale farmlands (20%) and wetlands (5%) were the four largest land covers in 1990 (Table 5.82). The woodlands reduced by 57%, grasslands by 32%, and wetlands by 20% while the small scale farmlands and bushlands increased by 53% and 800%, respectively between 1990 and 2015.

Table 5.82: Land cover/ land use for Moyo District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High Forests	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	18	2	-	70,693	4,710	56,652	10,226	37,565	0	205	8,996	1
Additions	4	-	-	7,438	41,567	17,884	2,049	28,997	85	287	2,771	131
Reductions	18	2	-	47,663	3,905	35,878	4,107	9,023	0	108	502	1
Closing stock	4	-	-	30,468	42,372	38,658	8,167	57,539	85	384	11,264	131
Net gains/reduction	(14)	(2)	-	(40,225)	37,662	(17,994)	(2,058)	19,973	85	179	2,269	130

The major trends of land cover change for Moyo District was the replacement loss woodland and grassland areas which were replaced by small scale farmlands and bushlands, among others. Built up areas and commercial farmlands increased while forest plantations decreased to near depletion (Figure 5.84).

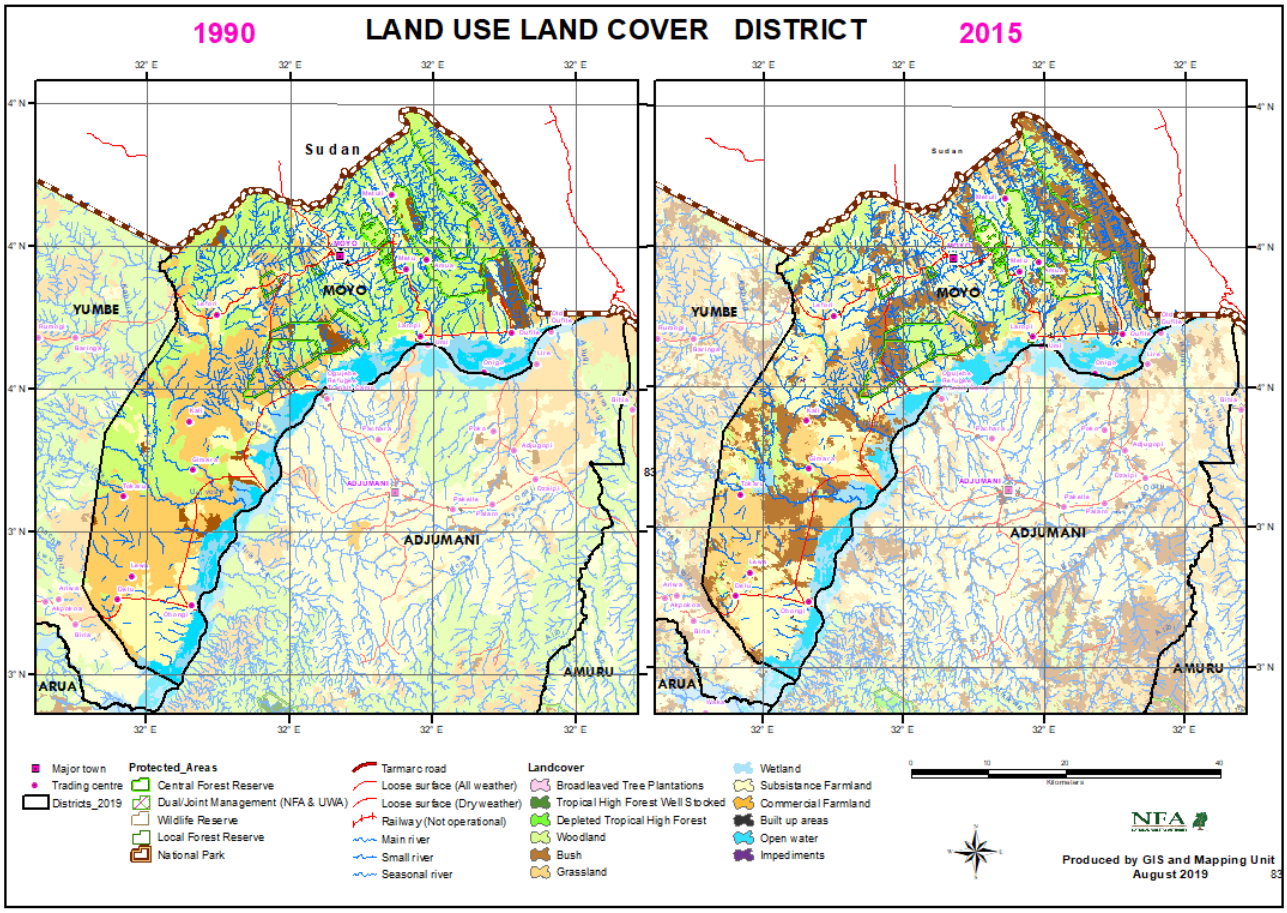


Figure 5.84: Land cover/ land use for Moyo District

5.2.83 Land Physical Accounts for Mpigi District

Mpigi District had a land cover of 152,404.5 ha one-third of which was under small scale farmlands in 1990. Grasslands were just under one-fifth of the District land cover while tropical high forests were 16% while woodlands and wetlands were 3,961 and 3,137 ha (Table 5.83). By 2015, the wetlands had the largest increase in land cover with 23,138 ha followed by small scale farmland (7,983 ha), bushland (3,548 ha) and forest plantations (2,609 ha). Built up areas and commercial farmlands also increased by 1,387 and 218 ha, respectively (Table 5.83).

Table 5.83: Land cover/ land use for Mpigi District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	36	-	13,320	11,705	3,961	1,000	26,409	3,137	59,386	794	225	32,434	-
Additions	2,110	533	117	1,572	2,906	4,446	7,332	23,931	18,027	714	1,477	196	44
Reductions	34	-	11,881	11,111	3,780	898	24,215	744	10,044	496	90	112	-
Closing stock	2,112	533	1,556	2,165	3,087	4,548	9,526	26,323	67,369	1,011	1,612	32,518	44
Net gains/reductions	2,076	533	(11,764)	(9,539)	(874)	3,548	(16,883)	23,187	7,983	218	1,387	84	44

The major trend observed was the expansion of wetland cover between 1990 and 2015. Many of the flood plains under grasslands and bushlands as tropical high forests were converted into wetlands. Alongside wetlands, small scale farmlands, commercial farmlands and built up areas also expanded (Figure 5.85).

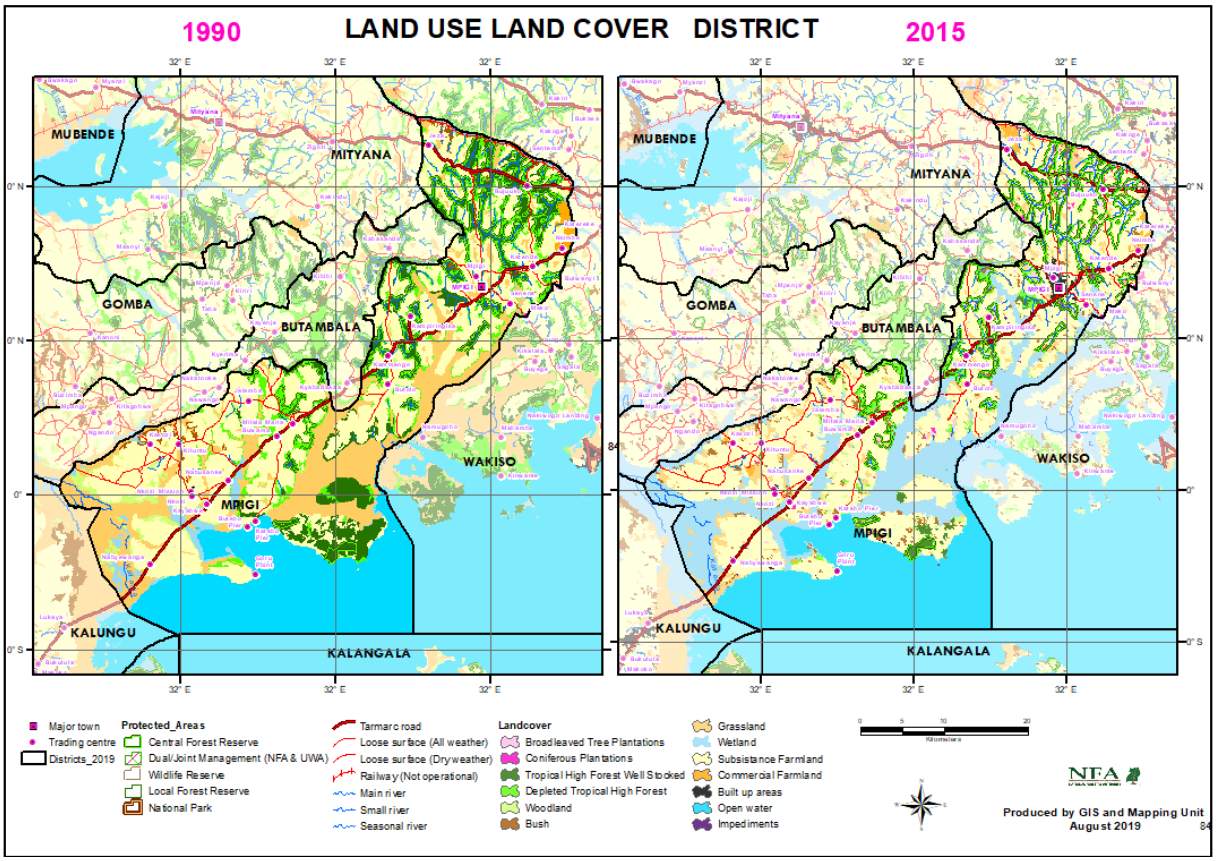


Figure 5.85: Land cover/ land use for Mpigi District

5.2.84 Land Physical Accounts for Mubende District

Mubende District had a land cover of 462,643.1 ha with 51% under small scale farmlands in 1990. Grasslands, woodlands, bushlands and tropical high forests were the other leading land covers with 86,244, 80,621, 24,787 and 18,619 ha, respectively. Between 1990 and 2015, the small scale farmlands expanded by 37% and the proportion of the total District land cover increased to 69%. The wetlands cover increased by 45%, the bushland area doubled while the forest plantation area increased by 41-times (Table 5.84).

Table 5.84: Land cover/ land use for Mubende District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	288	42	2,027	16,592	80,621	24,787	86,244	10,371	234,016	1,155	323	6,142	35
Additions	2,071	11,582	711	2,061	10,862	42,764	22,157	8,848	123,090	2,595	1,521	795	82
Reductions	272	27	1,960	16,460	77,666	19,972	71,273	4,207	35,999	700	157	413	35
Closing stock	2,088	11,597	778	2,193	13,817	47,579	37,128	15,012	321,107	3,050	1,688	6,523	82
Net gains/reduction	1,799	11,555	(1,249)	(14,399)	(66,804)	22,792	(49,116)	4,641	87,091	1,895	1,364	382	47

The major land cover trend for Mubende District was the expansion of small scale farmlands and forest plantations at the expense of woodlands and grasslands. The woodlands and grasslands lost 83% and 53% respectively of their land cover between 1990 and 2015. Commercial farmlands and built up areas expanded by 164% and 424%, respectively (Figure 5.86, Table 5.84).

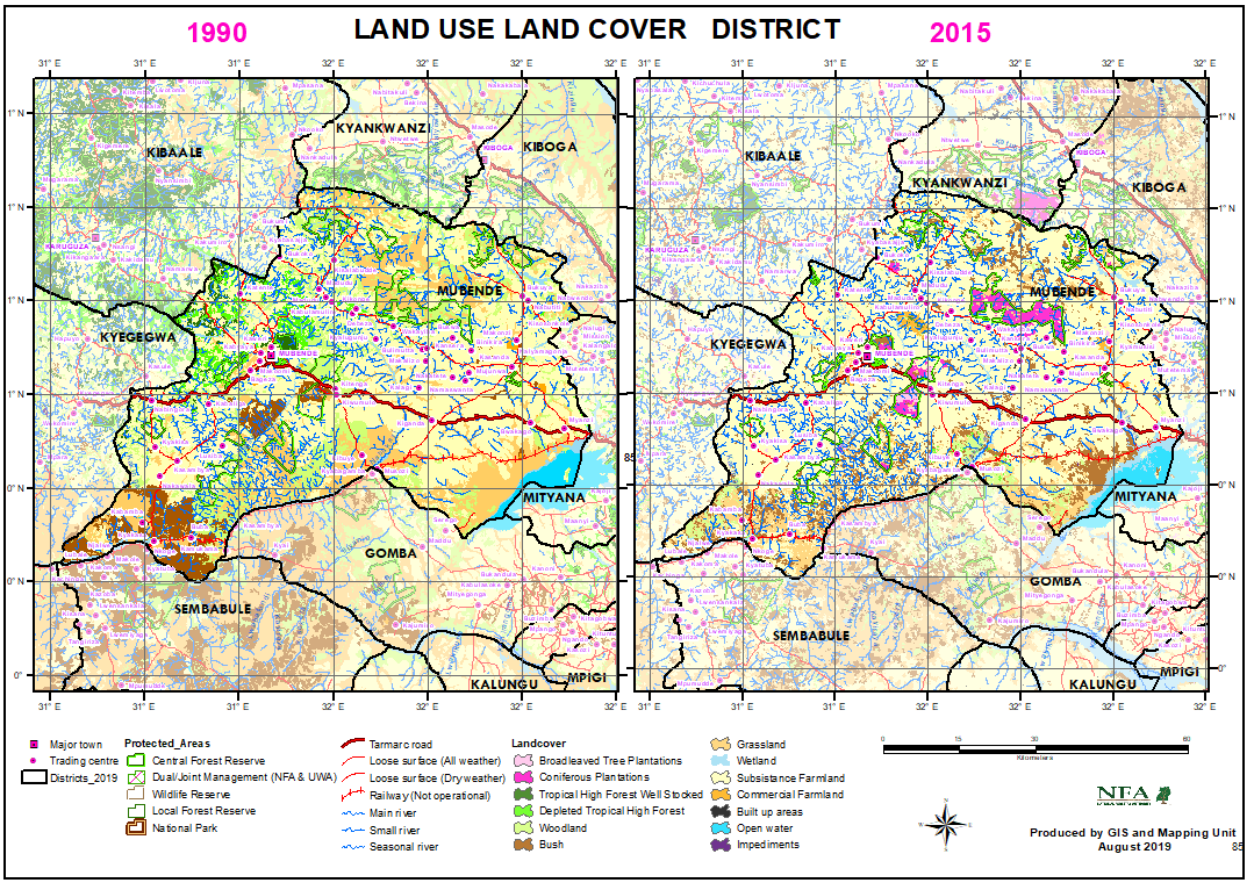


Figure 5.86: Land cover/ land use for Abim District

5.2.85 Land Physical Accounts for Mukono District

Mukono District had a land cover of 281,275.3 ha with 34%, 32% and 15% as open water, small scale farmlands and tropical high forests in 1990. Between 1990 and 2015, woodlands, small scale farmlands, wetlands, commercial farmlands and built up areas expanded by 12%, 14%, 45%, 96% and 839% respectively. Conversely, tropical high forests, bushlands and grasslands decreased by 59%, 30% and 41% respectively (Table 5.85).

Table 5.85: Land cover/ land use for Mukono District (in hectares)

1990 to 2005	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	424	18	26,143	16,045	5,007	10,313	14,244	13,741	92,535	5,041	863	96,826	75
Additions	1,989	342	529	4,208	5,519	5,428	5,223	9,219	29,937	6,544	7,493	1,374	160
Reductions	380	18	13,925	15,145	4,914	9,714	11,105	2,993	17,307	1,682	251	456	75
Closing stock	2,033	342	12,748	5,108	5,613	6,026	8,361	19,967	105,165	9,903	8,105	97,744	160
Net gains/reductions	1,609	324	(13,396)	(10,937)	605	(4,286)	(5,882)	6,226	12,630	4,862	7,242	918	85

The major transition in Mukono District land cover was the expansion of small scale farmlands, commercial farmlands, forest plantations and built up areas at the expense of tropical high forests, bushlands and grasslands. The land cover trends suggest increased economic use of the land and that the increasing land covers were considered to provide the best economic opportunity (Figure 5.87).

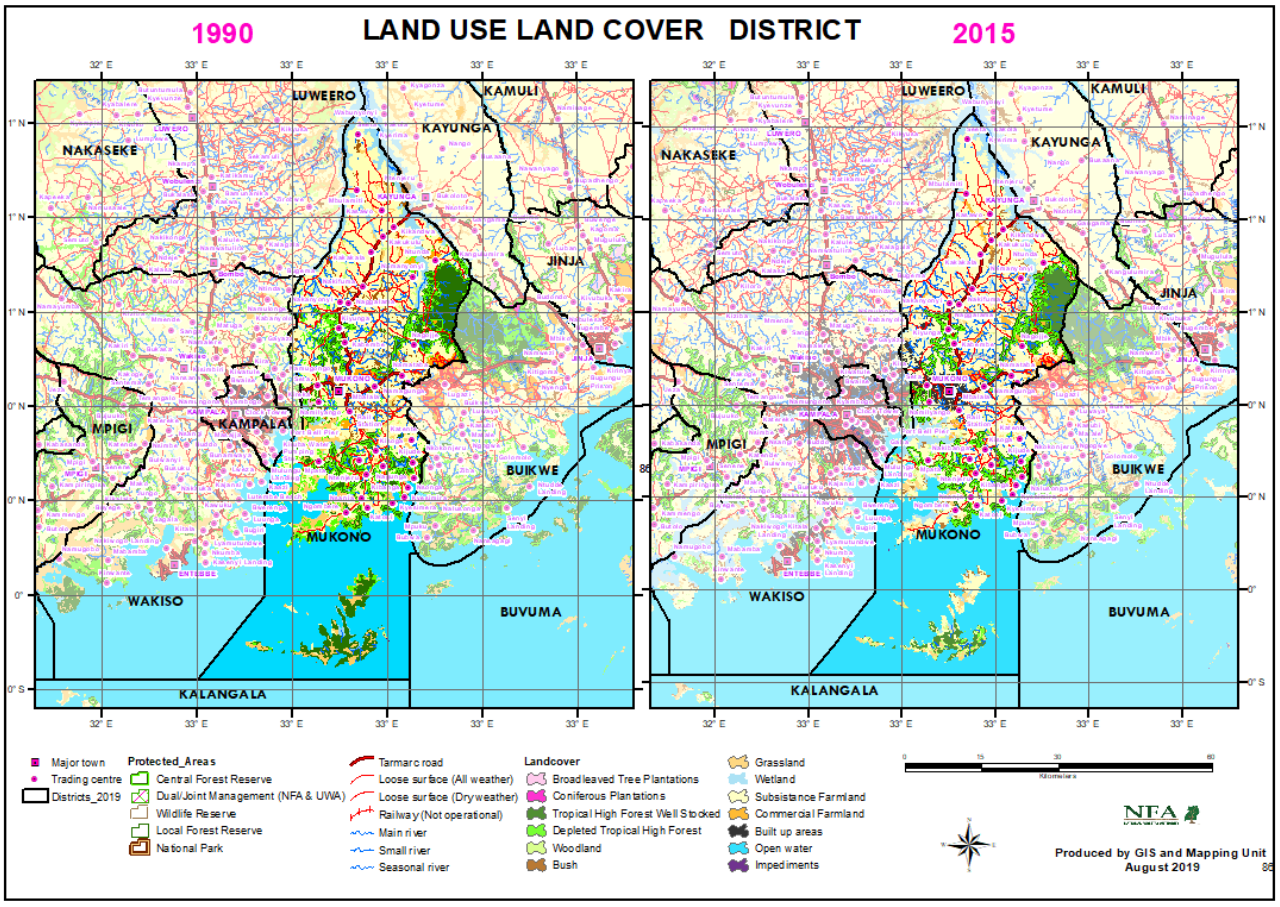


Figure 5.87: Land cover/ land use for Mukono District

5.2.86 Land Physical Accounts for Nakapiriprit District

Nakapiripirit District had a land cover of 419,544.9 ha of which 57% was under grasslands, 27% under bushlands, 9% under woodlands and 7% under small scale farmlands in 1990. The only increases in land cover observed were for small scale farmlands and grasslands with 16,574 and 39,445 ha, respectively. The land cover for woodlands, bushlands and wetlands decreased by 27%, 40% and 16%, respectively. Commercial farmlands and built up area also decreased by 9 and 25 ha, respectively (Table 5.86).

Table 5.86: Land cover/ land use for Nakapiripirit District (in hectares)

1990 to 2015	Forest Plantations	Tropical High Forests	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	-	-	37,733	112,635	237,844	1,417	29,647	83	48	-	138
Additions	-	-	12,923	35,173	85,223	871	28,476	74	23	-	0
Reductions	-	-	23,296	80,425	45,778	1,092	11,902	83	48	-	138
Closing stock	-	-	27,361	67,382	277,288	1,196	46,221	74	23	-	0
Net gains/ reduction	-	-	(10,372)	(45,252)	39,445	(221)	16,574	(9)	(25)	-	(138)

The major transition in Nakapiripirit District was the consolidation and increase of grasslands and small scale farmlands (Figure 5.88). The increased land cover highlights the economic importance of livestock production, protected area management (Pian Upe Game Reserve) and agricultural production.

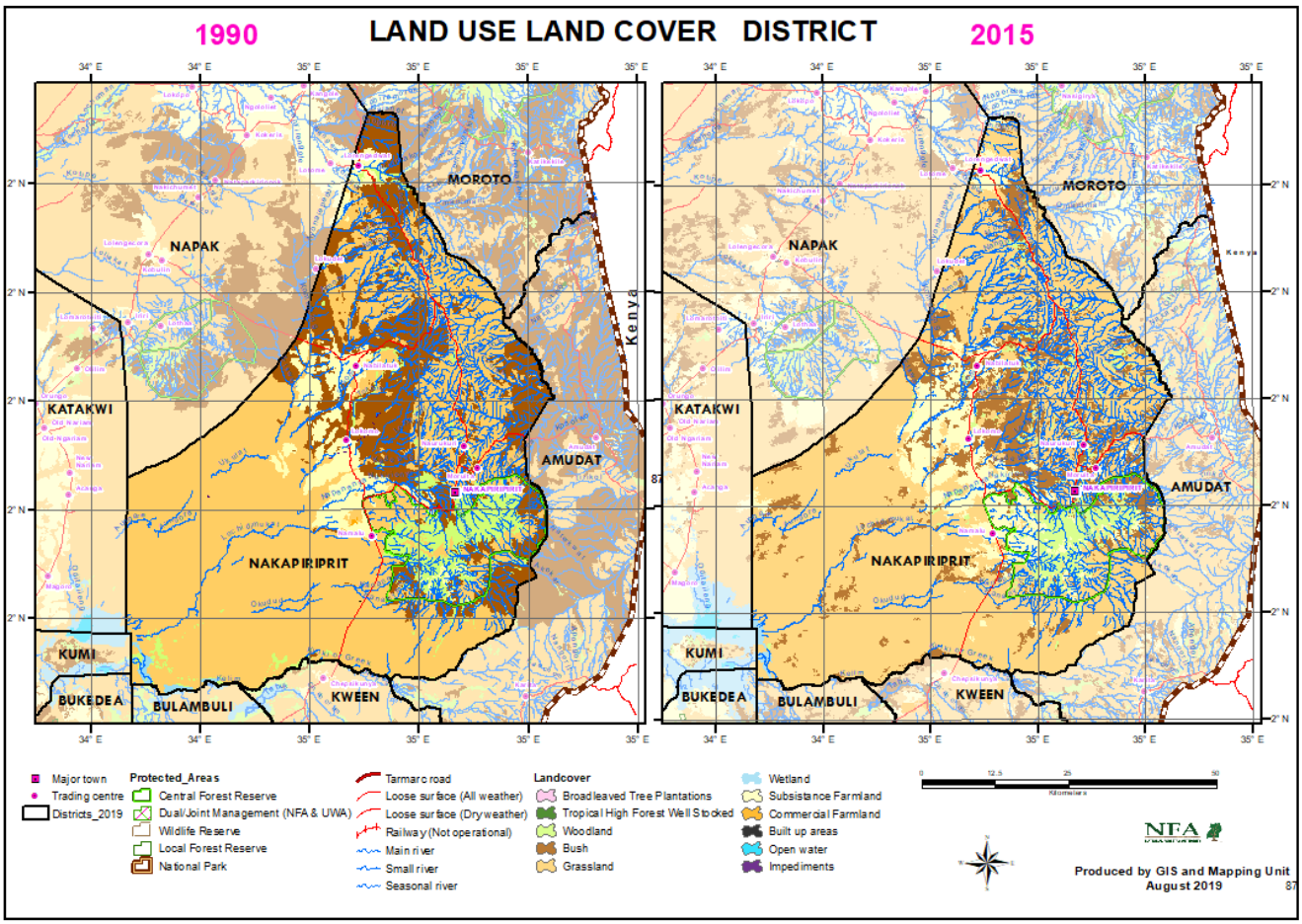


Figure 5.88: Land cover/ land use for Nakapiripirit District

5.2.87 Land Physical Accounts for Nakaseke District

Nakaseke District had a land cover of 347,224.9 ha composed mostly of woodlands (53%), grasslands (24%) and small scale farmlands (17%) in 1990 (Table 5.87). By 2015, the largest land cover increase had occurred for bushlands (82,996 ha) followed by small scale farmlands (26,859 ha) while the largest decrease was for woodlands (109,402 ha) followed by grasslands (8,599 ha).

Table 5.87: Land cover/ land use for Nakaseke District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	-	17	137	4,126	185,454	799	84,109	13,683	58,714	-	56	126	3
Additions	200	3,587	-	116	18,376	83,572	44,338	8,531	34,644	1,120	995	208	5
Reductions	-	16	137	4,126	127,778	576	52,937	2,273	7,785	-	31	31	3
Closing stock	200	3,588	-	116	76,052	83,795	75,510	19,941	85,574	1,120	1,020	303	5
Net gains/ reduction	200	3,571	(137)	(4,010)	(109,402)	82,996	(8,599)	6,258	26,859	1,120	964	177	2

The major transition for Nakaseke District was the loss of woodlands and tropical high forests, and the increase in forest plantations, bushlands and small scale farmlands (Figure 5.89). For woodland loss the indication was that wood fuel harvest was likely the major cause since most of the woodland was converted to bushland.

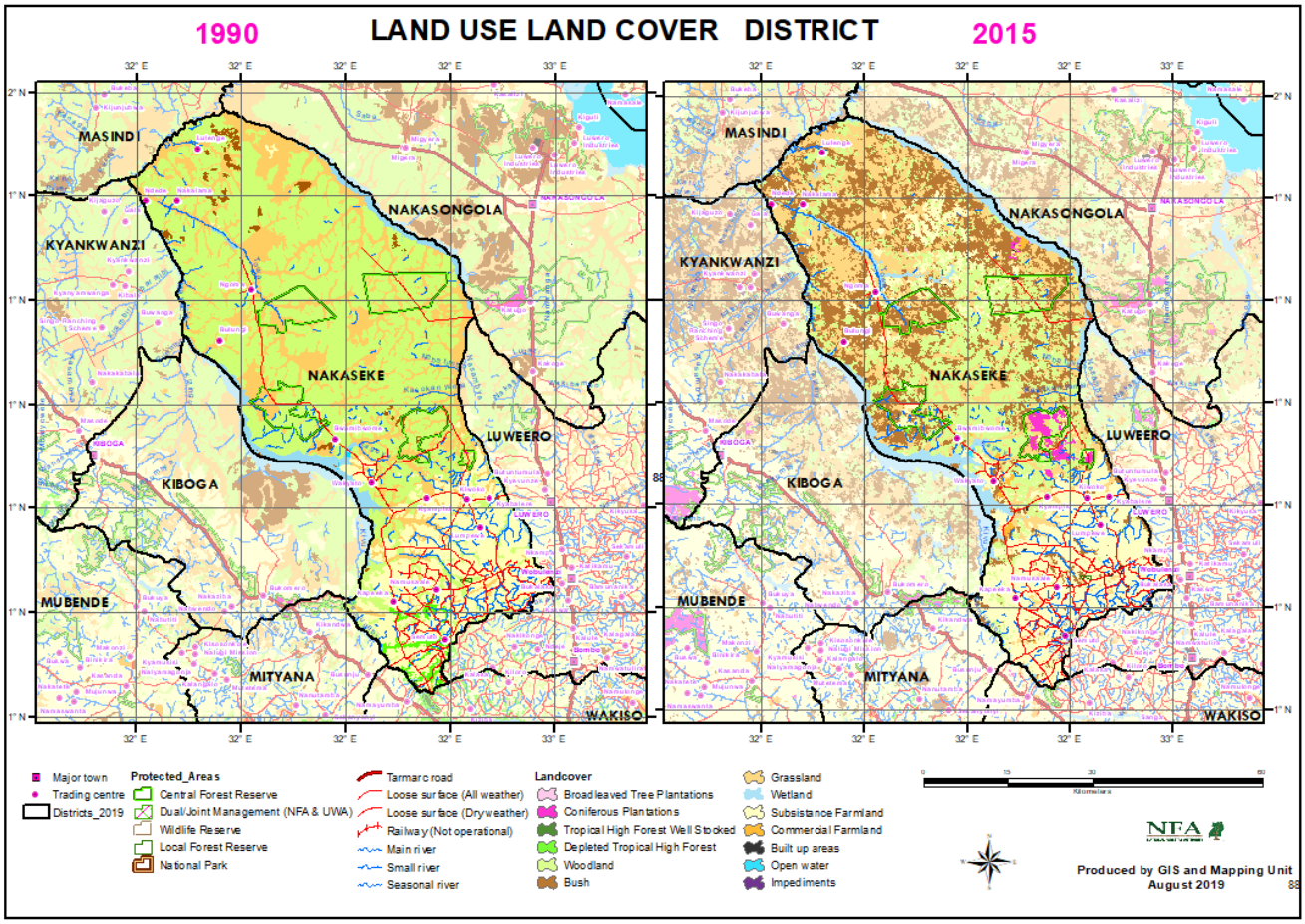


Figure 5.89: Land cover/ land use for Nakaseke District

5.2.88 Land Physical Accounts for Nakasongola District

The land cover of Nakasongola District was 350,999.7 ha composed mostly of woodlands (36%), grasslands (22%), small scale farmlands (16%), bushlands (14%) and open water (7%) in 1990. The District cover was also composed of forest plantations, THF low stocked, commercial farmlands and built up area (Table 5.88). Between 1990 and 2015, small scale farmlands, grasslands, wetlands, bushlands, coniferous forests, commercial farmlands and built up areas increased by 22,131, 21,661, 5,337, 4,474, 1,345, 948, 106 ha respectively.

Table 5.88: Land cover/ land use for Nakasongola District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	1	1,707	-	-	127,052	48,865	78,092	15,806	54,729	67	793	23,884	1
Additions	-	1,697	-	196	28,405	44,123	55,170	10,074	42,856	951	772	3,664	50
Reductions	1	352	-	-	86,960	39,649	33,509	4,737	20,725	3	666	1,355	1
Closing stock	-	3,053	-	196	68,497	53,340	99,753	21,142	76,860	1,015	899	26,194	50
Net gains/reductions	(1)	1,345	-	196	(58,555)	4,474	21,661	5,337	22,131	948	106	2,309	49

The main land cover transition was loss of 46% of woodland and gains in small scale and commercial farmland, bushlands, grasslands, coniferous plantations and THF well stocked (Figure 5.90). The District still had 54% of the woodlands available that could be conserved. The expansion in bushlands and grasslands suggests that some of the woodlands was largely targeted for wood fuel.

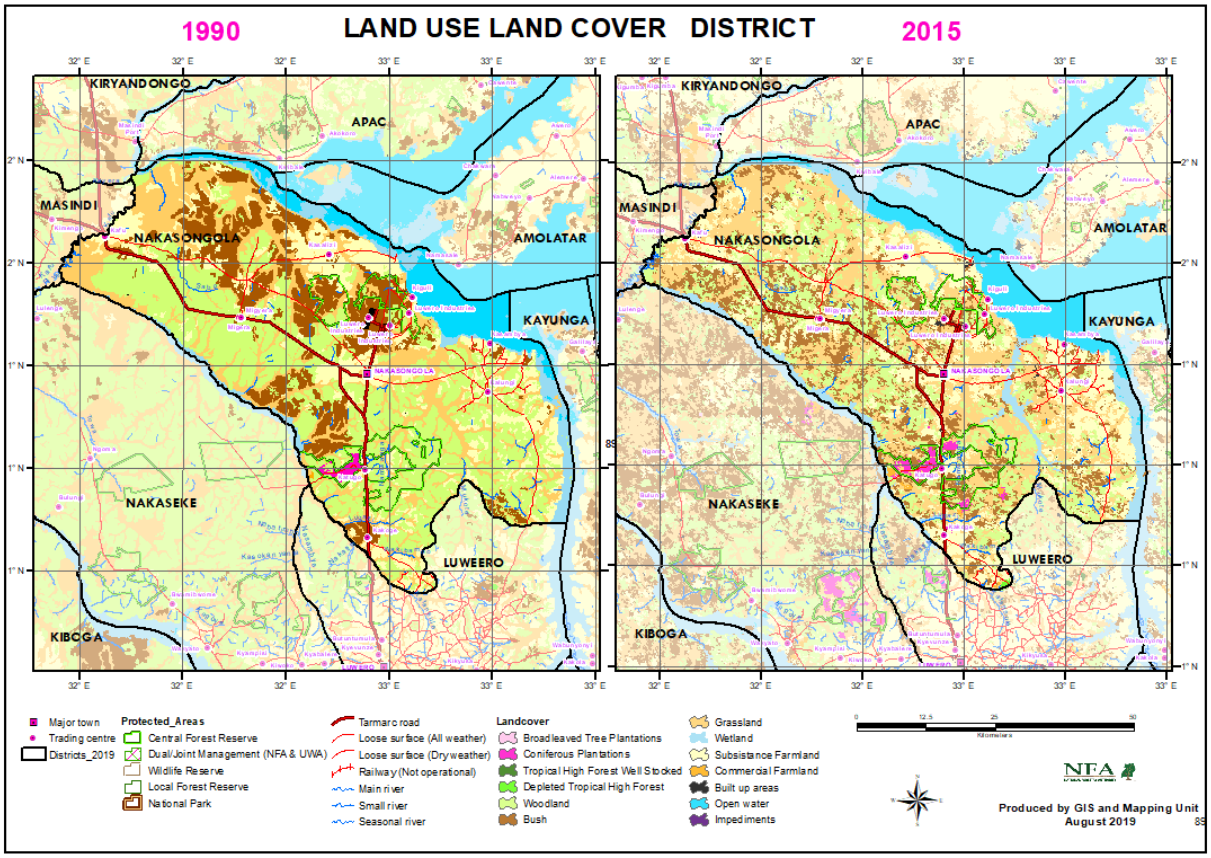


Figure 5.90: Land cover/ land use for Nakasongola District

5.2.89 Land Physical Accounts for Namayingo District

Namayingo District land cover of 462,021.4 ha. However, 88% of the District cover was under the open water of Lake Victoria. The second and third largest covers were small scale farmlands with 29,012 ha and woodlands with 15,372 ha. The District land cover also comprised tropical high forests coniferous plantations, bushlands, grasslands and built up area (Table 5.89). Between 1990 and 2015, small scale farmlands increased by 61% largely at the expense of woodlands, bushlands, wetlands, grasslands and tropical high forest. Coniferous forest plantations were additions to the District cover while the built up area expanded by 39 ha.

Table 5.89: Land cover/ land use for Namayingo District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	-	-	436	692	15,372	2,364	2,655	3,367	29,012	-	124	407,956	43
Additions	-	431	-	123	166	555	479	570	18,640	-	122	2,575	-
Reductions	-	-	436	692	15,370	2,363	1,456	1,734	802	-	83	681	43
Closing stock	-	431	-	123	168	556	1,677	2,203	46,850	-	164	409,850	-
Net gains/reductions	-	431	(436)	(569)	(15,203)	(1,808)	(978)	(1,164)	17,838	-	39	18,93	(43)

The major land cover trend for Namayingo District was the expansion of small scale farmlands and the decrease of woodlands, bushlands, wetlands and grasslands (Figure 5.91). There were also additions of conifers. Namayingo District livelihoods are largely dependent on capture fisheries and small scale farmlands, and the trends were indication of the importance of small scale farmlands above all other land cover/ land uses.

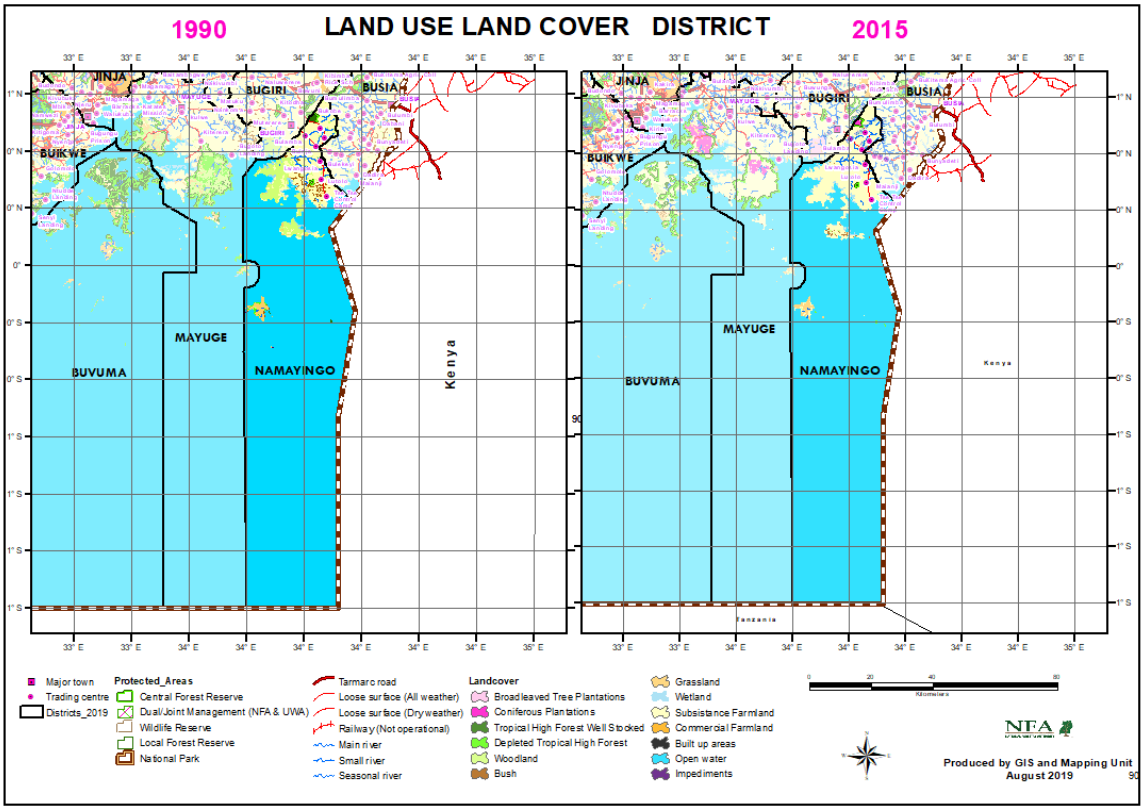


Figure 5.91: Land cover/ land use for Namayingo District

5.2.90 Land Physical Accounts for Namutumba District

Namutumba District had a land cover of 81,268.4 ha of which 82% was small scale farmlands followed by wetlands with 16% land cover as the two largest covers in 1990. The only increases in land cover were for wetlands (1,348 ha), bushlands (446 ha), built up area (194 ha) and forest plantations (46 ha). The increases occurred at the expense of a 1,220 ha reduction in small scale farmlands, a 575 ha decrease in THF well stocked, 210 ha reduction in woodlands and a 72 ha reduction in grasslands (Table 5.90).

Table 5.90: Land cover/ land use for Namutumba District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	46	-	575	-	210	524	592	12,697	66,312	-	51	261	-
Additions	75	17	-	-	0	954	519	2,027	2,143	-	227	182	-
Reductions	46	-	575	-	210	507	592	679	3,363	-	33	139	-
Closing stock	75	17	-	-	0	971	519	1,4045	65,092	-	245	304	-
Net gains/ reductions	29	17	(575)	-	(210)	446	(72)	1,348	(1,220)	-	194	43	-

The major transition for Namutumba District was the increase in wetland cover at the expense of small scale farmlands and tropical high forest (Figure 5.92). The expansion of wetlands may have occurred due to increase flooding and retentions in sections of small scale farmlands and tropical high forests. The increase in open water cover may also be an indication of overflow from surface water systems that led to expansion.

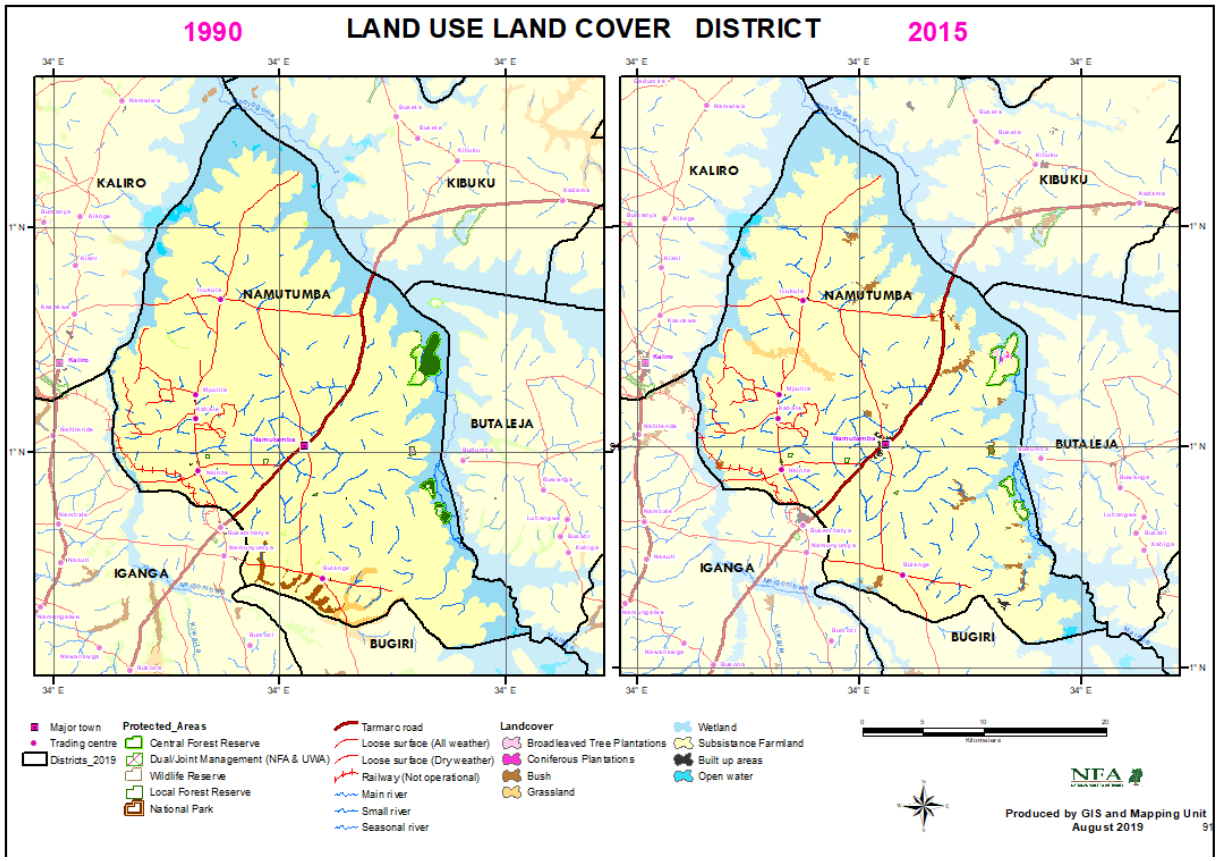


Figure 5.92: Land cover/ land use for Namutumba District

5.2.91 Land Physical Accounts for Napak District

Napak District had a land cover of 498,018 ha. Grasslands covered 65% while bushlands, small scale farmlands and woodlands covered 17%, 11% and 6%, respectively in 1990 (Table 5.91). Whereas the land cover was fairly stable between 1990 and 2015, the grasslands, small scale farmlands and built up areas increased by 29,529, 6,668 and 722 ha, respectively. Conversely, woodlands and bushlands decreased by 19,100 and 17,953 ha, respectively.

Table 5.91: Land cover/ land use for Napak District

1990 to 2015	Forest Plantations	Tropical High Forests	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	-	-	28,811	88,209	324,041	-	56,860	-	27	-	70
Additions	-	-	6,788	58,423	98,764	-	36,086	-	738	64	140
Reductions	-	-	25,888	76,377	69,235	-	29,418	-	16	-	70
Closing stock	-	-	9,711	70,255	353,570	-	63,529	-	749	64	140
Net gains/reductions	-	-	(19,100)	(17,953)	29,529	-	6,668	-	722	64	70

The major land cover trend for Napak District was the strengthening of grasslands and small scale farmlands at the expense of woodlands and bushlands. Woodlands which were already relatively small in cover when compared to grasslands, and small scale farmlands, reduced by two-thirds (Figure 5.93). The woodlands were likely converted to produce wood fuel given the relatively small increase in small scale farmlands.

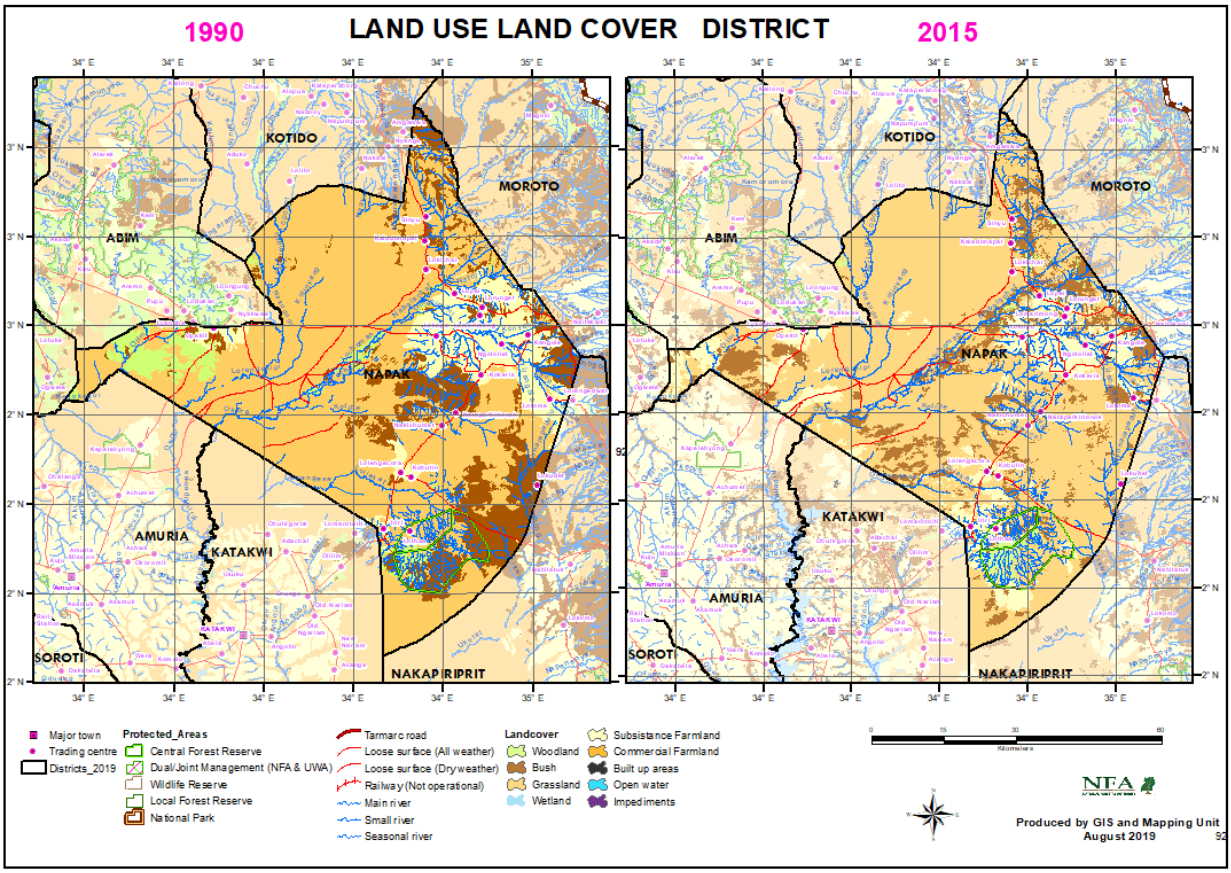


Figure 5.93: Land cover/ land use for Napak District

5.2.92 Land Physical Accounts for Nebbi District

Nebbi District had a land cover of 199,507 ha of which 50% was small scale farmlands and 27% was grasslands, 11% bushlands and 7% woodlands in 1990 (Table 5.92). Between 1990 and 2015, small scale farmlands increased by 18%, commercial farmland and built up area increased by 292 and 1,393 ha, respectively. The increases were at the expense of woodlands, grasslands, bushlands and wetlands. Woodlands, grasslands and bushlands reduced by 55%, 13% and 23%, respectively. Similarly, the THF well stocked was completely lost while broadleaved plantations reduced by 23 ha.

Table 5.92: Land cover/ land use for Nebbi District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	40	-	190	-	14,010	21,283	52,970	2,739	99,965	100	54	8,156	-
Additions	17	-	-	-	4,051	12,505	18,272	385	33,705	303	1,411	1,064	34
Reductions	40	-	190	-	11,810	17,418	24,966	1,424	15,765	12	18	106	-
Closing stock	17	-	-	-	6,252	16,371	46,275	1,700	117,906	392	1447	9,114	34
Net gains/reductions	(23)	-	(190)	-	(7,758)	(4,913)	(6,694)	(1,039)	17,941	292	1,393	958	34

The main land cover transition in Nebbi District was the expansion of small scale farmlands, built up area as well as commercial farmlands. The natural land covers of woodlands, bushlands, grasslands and wetlands were converted. The expansion of farmlands and built up areas is likely associated with increased economic activity skewed towards urban areas and agricultural production (Figure 5.94).

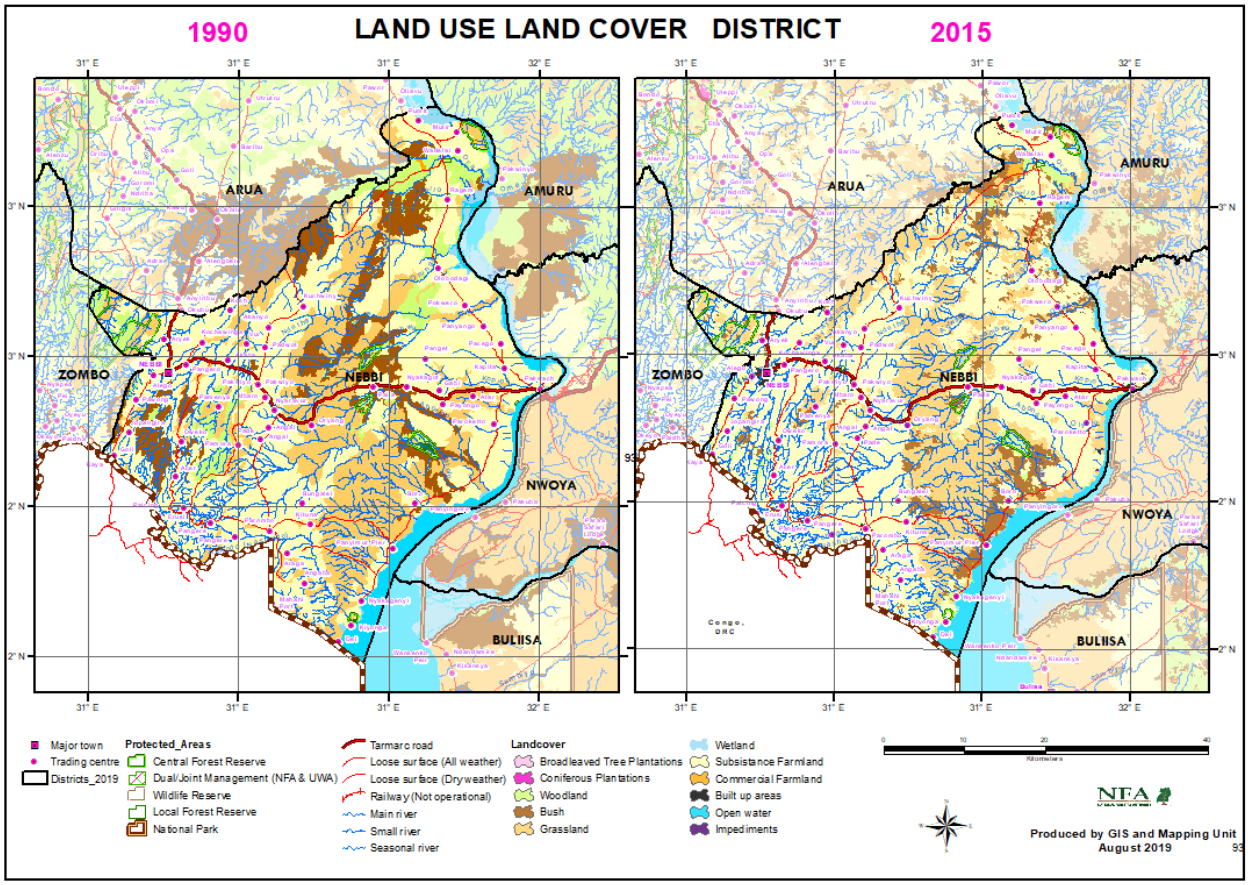


Figure 5.94: Land cover/ land use for Nebbi District

5.2.93 Land Physical Accounts for Ngora District

Ngora District had a land cover of 72,025.2 ha much of which was under small scale farmlands (47%) and grasslands (34) while open water occupied 9% in 1990. The rest of the District was composed of woodlands, bushlands, grasslands, commercial farmland and broadleaved plantations and built up area. Woodlands were nearly depleted with only 9 ha out of 3,399 ha remaining while broadleaved plantations were actually entirely depleted. Grasslands also decreased by 96%. Small scale farmlands already the largest land cover in the District increased by 18%, while wetlands and bushlands increased by 19,110 and 1,425 ha from 3,101 and 361 ha, respectively between 1990 and 2015 (Table 5.93).

Table 5.93: Land cover/ land use for Ngora District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High Forests	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	19	-	-	3,399	361	24,602	3,101	33,838	32	88	6,552	34
Additions	-	-	-	9	1,747	225	1,9975	7,335	-	20	2,024	3
Reductions	19	-	-	3,399	322	23,864	865	1,112	32	84	1,607	33
Closing stock	-	-	-	9	1,785	963	22,211	40,060	-	24	6,969	3
Net gains/reductions	(19)	-	-	(3,390)	1,425	(23,638)	19,110	6,222	(32)	(64)	417	(31)

The major land cover trend was the expansion of wetlands and small scale farmlands at the expense of grasslands and woodlands (Figure 5.95). The near depletion of woodlands and the actual depletion of broadleaved plantations in Ngora District. By 2015, Ngora District barely had any forests left within its landscape. The remaining 9 ha of woodland are unlikely to provide adequate biomass for wood fuel. The District's wood fuel energy demand will have to be through imports from the neighbouring Districts.

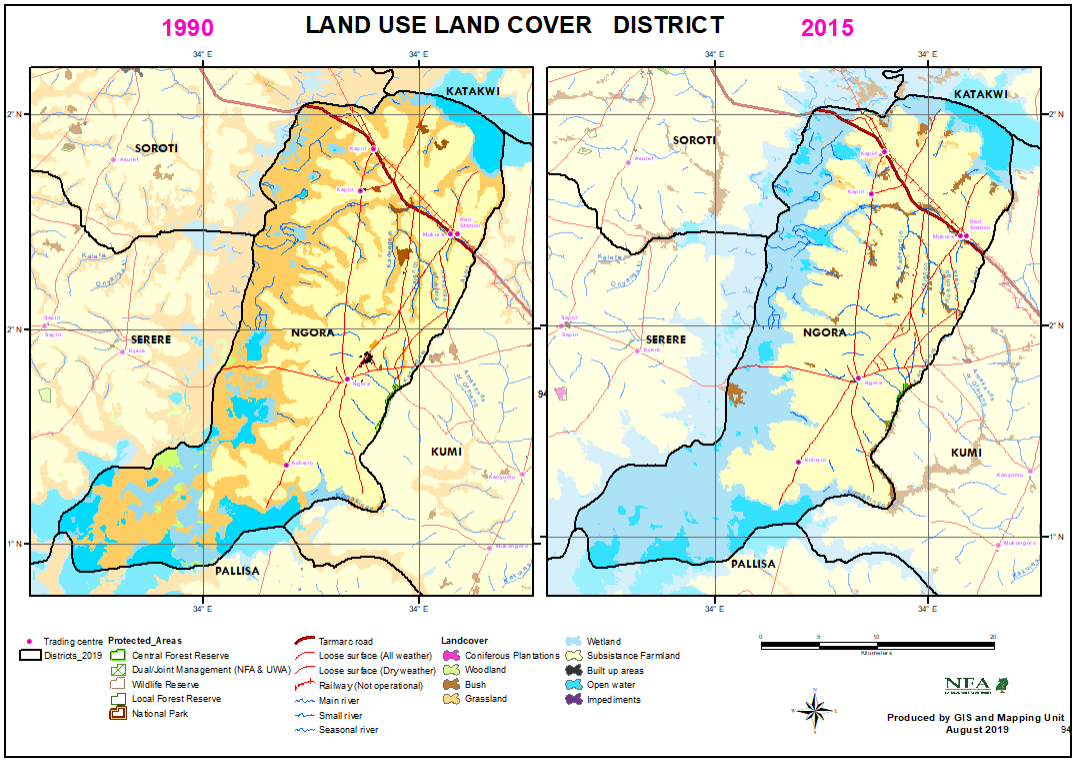


Figure 5.95: Land cover/ land use for Ngora District

5.2.94 Land Physical Accounts for Ntoroko District

Ntoroko District had a land cover of 140,492.3 ha. Grasslands (62%), open water (12%), woodlands (10%), wetlands (6%) and small scale farmlands (5%) in 1990 were the four largest land covers in the District. Between 1990 and 2015, woodlands and wetlands increased while grasslands, bushlands, small scale farmlands and built up areas decreased. Woodlands increased by 90% while wetlands increased by 20% (Table 5.94). small scale farmlands reduced by one-third, grasslands by 9% and bushlands by 63%. Coniferous plantations were depleted while THF well stocked increased by 28 ha.

Table 5.94: Land cover/ land use for Ntoroko District (in hectares)

	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock		1,243	208	-	14,020	3,888	87,599	8,600	6,767		288	17,880	
Additions	-	-	92	-	21,980	1,444	16,309	4,298	1,644	-	20	615	-
Reductions	-	1,243	10	-	9,417	3,888	24,323	2,616	3,942	-	288	674	-
Closing stock			290	-	26,583	1,444	79,584	10,282	4,469		20	17,820	
Net gains/reductions	-	(1,243)	82	-	12,562	(2,444)	(8,015)	1,682	(2,298)	-	(268)	(60)	-

Ntoroko District which includes sections of Toro-Semuliki Wildlife Reserve was dominated by grasslands. It was the reduction in grassland, small scale farmlands, bushlands and coniferous plantations that allowed for the expansion in woodlands, wetlands and THF well stocked. Despite the loss of 1,243 ha of coniferous plantations, there was increase in woody biomass area of tropical high forest and woodlands and the expansion of wetlands (Figure 5.96).

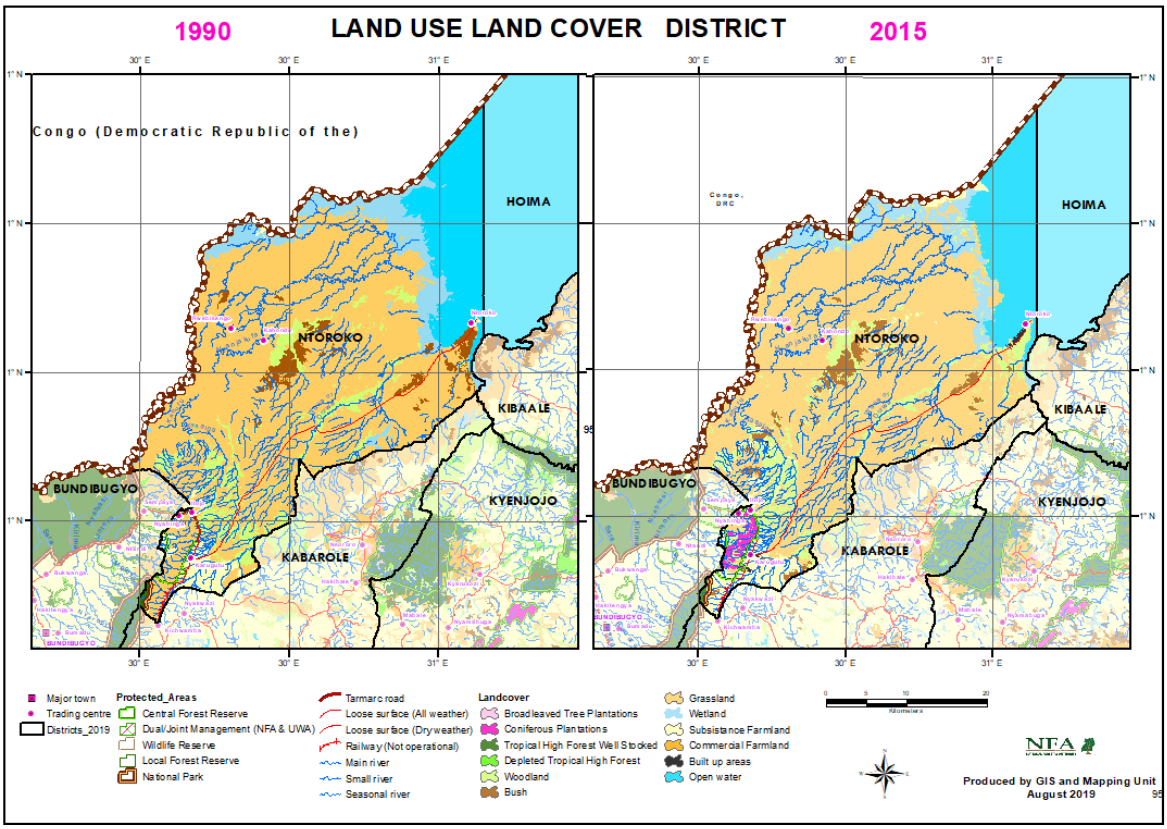


Figure 5.96: Land cover/ land use for Ntoroko District

5.2.95 Land Physical Accounts for Ntungamo District

Ntungamo District had a land cover of 205,550.8 ha. The land cover was dominated by small scale farmlands lands (48%) and grasslands (47%) in 1990 (Table 5.95). Small scale farmlands and woodlands decreased by 13,349 and 1,092 ha, respectively while bushlands, forest plantations and commercial farmlands increased by 12,656, 1496 and 773 ha. Built up areas also increased by 261 ha.

Table 5.95: Land cover/ land use for Ntungamo District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High Forests	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	295	333	-	1,927	313	97,108	6,997	98,034	-	128	415	-
Additions	298	1,632	-	630	12,911	28,185	2,696	22,062	773	366	136	10
Reductions	289	145	-	1,722	255	29,287	2,463	35,411	-	105	20	-
Closing stock	304	1,820	-	835	12,968	96,005	7,230	84,685	773	389	531	10
Net gains/reduction	9	1,487	-	(1,092)	12,656	(1,102)	233	(13,349)	773	261	116	10

The land cover transition of Ntungamo District was increase in forest plantations, bushlands and wetlands at the expense of small scale farmlands, woodlands and grasslands. There were reductions for small scale farmlands and grasslands which together with 57% reduction in woodlands were the major decreases. The expansion of bushlands was an indication of expanded land area which was abandoned with little or no economic activity (Figure 5.97).

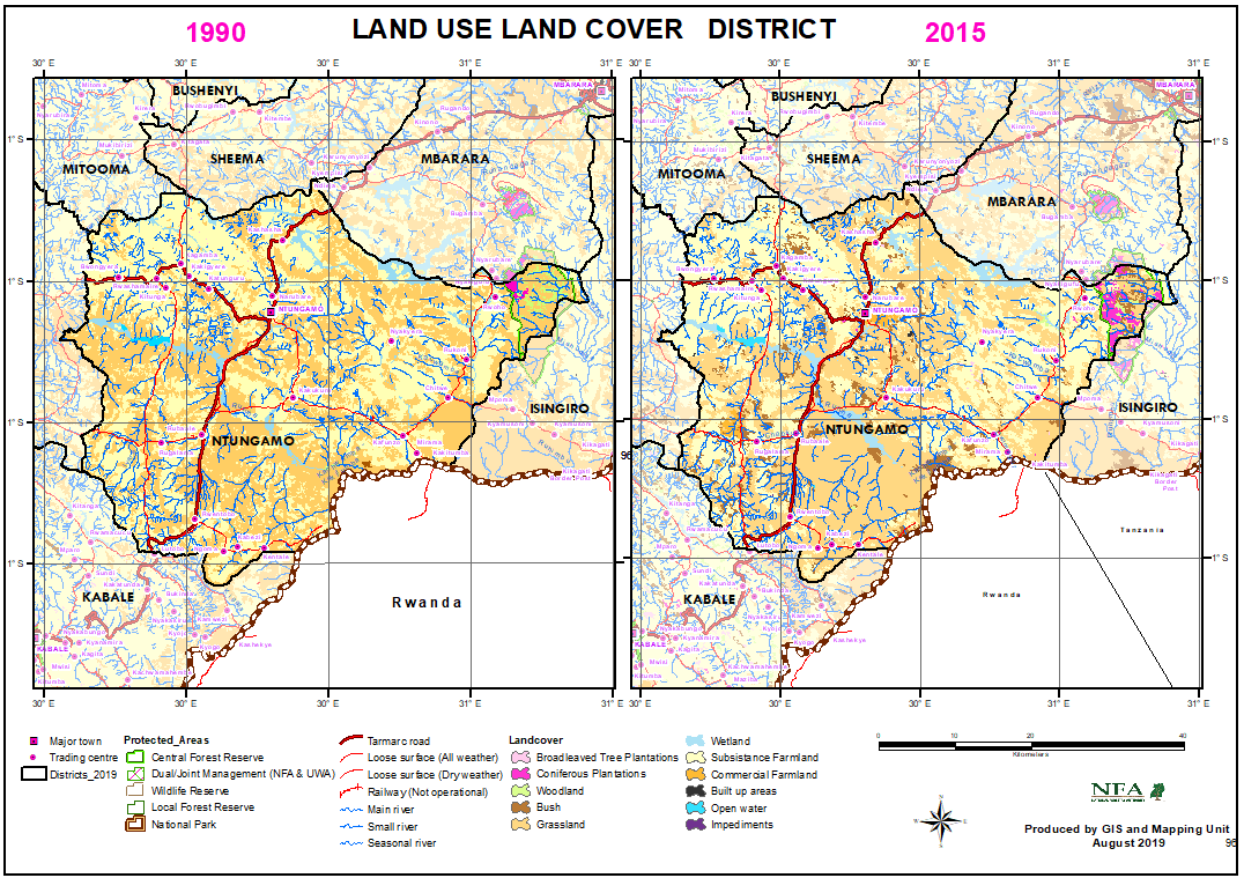


Figure 5.97: Land cover/ land use for Ntungamo District

5.2.96 Land Physical Accounts for Nwoya District

Nwoya District had a land cover of 408,569.8 ha which was generally under woodlands (34%), grasslands (29%) and small scale farmlands (29.4%) in 1990 (Table 5.96). By 2015, small scale farmlands, grasslands and bushlands expanded by 36%, 25% and 14.5% while woodlands and wetlands decreased by 68% and 28%. Broadleaved forest plantations were depleted. Commercial farmlands were introduced between 1990 and 2015 and they reached 17,787 ha by 2015.

Table 5.96: Land cover/ land use for Nwoya District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High Forests	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	-	-	-	139,671	20,049	120,065	2,794	119,145	-	24	6,821	-
Additions	38	-	-	18,014	19,946	72,155	677	65,909	17,787	888	1,364	250
Reductions	-	-	-	112,339	17,047	41,982	1,465	23,404	-	4	787	-
Closing stock	38	-	-	45,346	22,949	150,238	2,006	161,650	17,787	908	7,398	250
Net gains/reductions	38	-	-	(94,325)	2,899	30,174	(789)	42,505	17,787	884	577	250

The main land cover transition was the additional expansion of small scale farmland, commercial farmlands and grasslands at the general expense of woodlands. Whereas, woodlands were generally targeted for wood fuel, in the case of Nwoya District, the woodlands were replaced with small scale farmlands and grasslands. The expansion of grasslands might be related to the improvements in the state sections of Murchison Fall Protected Area which is located in Nwoya Districts. Expansion of small scale farmland and commercial farmlands was an indication of the increased importance of agriculture (Figure 5.98).

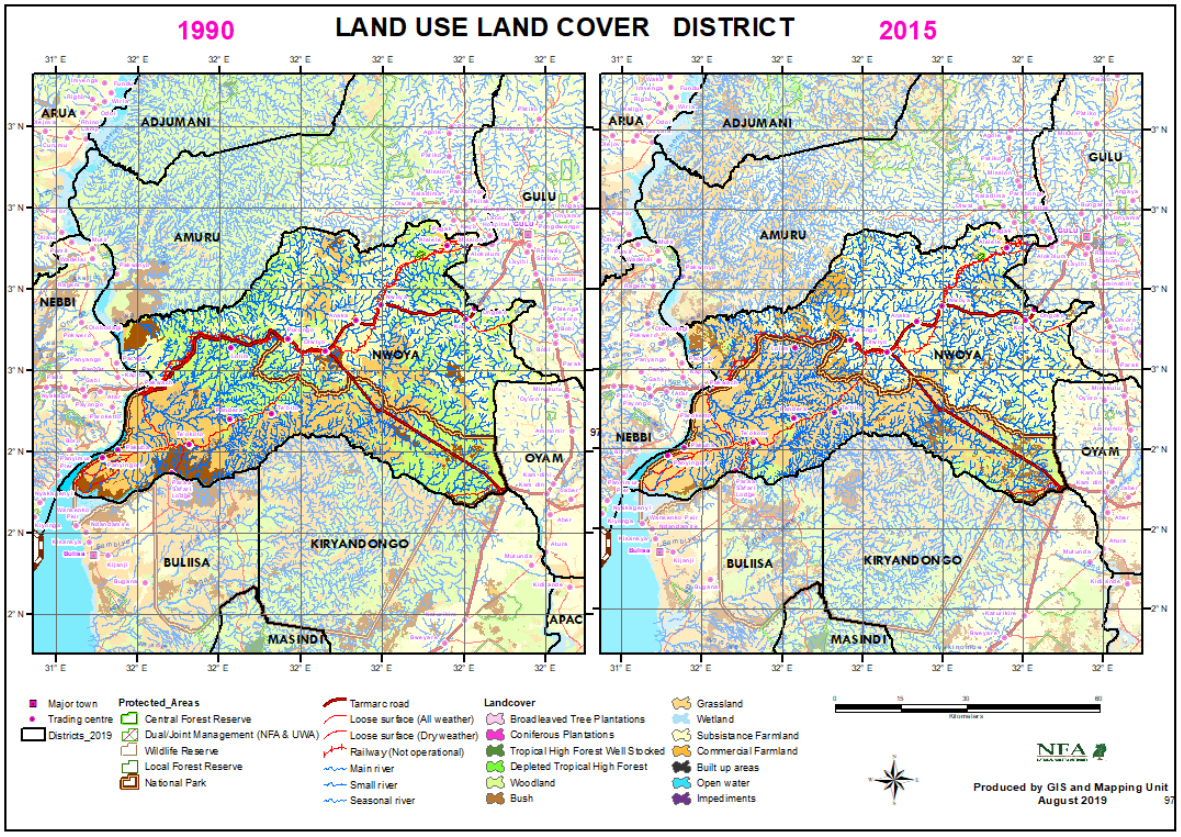


Figure 5.98: Land cover/ land use for Nwoya District

5.2.97 Land Physical Accounts for Otuke District

The land cover for Otuke District was 154,891 ha largely distributed between small scale farmlands (62%), woodlands (20%) and grasslands (18%) in 1990. By 2015, woodlands had been depleted of 28,258 ha and grasslands lost 5,179 ha which were converted into 23,249 ha of bushlands, 8,829 ha of small scale farmlands and 497 ha of wetlands (Table 5.97).

Table 5.97: Land cover/ land use for Otuke District (in hectares)

1990 to 2015	Forest Plantations	Tropical High Forests	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	-	-	31,038	150	27,226	-	96,447	-	31	-	-
Additions	-	-	1,960	2,3394	13,683	497	25,927	-	648	222	4
Reductions	-	-	30,217	145	18,859	-	17,098	-	17	-	-
Closing stock	-	-	2,780	23,399	22,050	497	105,276	-	662	222	4
Net gains/ reduction	-	-	(28,258)	23,249	(5,176)	497	8,829	-	632	222	4

The main transition in Otuke District was depletion of 91% of woodland cover which was generally converted into small scale farmlands and bushlands. The grasslands cover also decreased by 5,176 ha. The depletion of woodlands was likely for wood fuel production as most of the depleted woodland was converted into bushlands. The expansion of small scale farmlands may have been opportunistic expansion as the converted woodlands could easily be converted into farmlands (Figure 5.99).

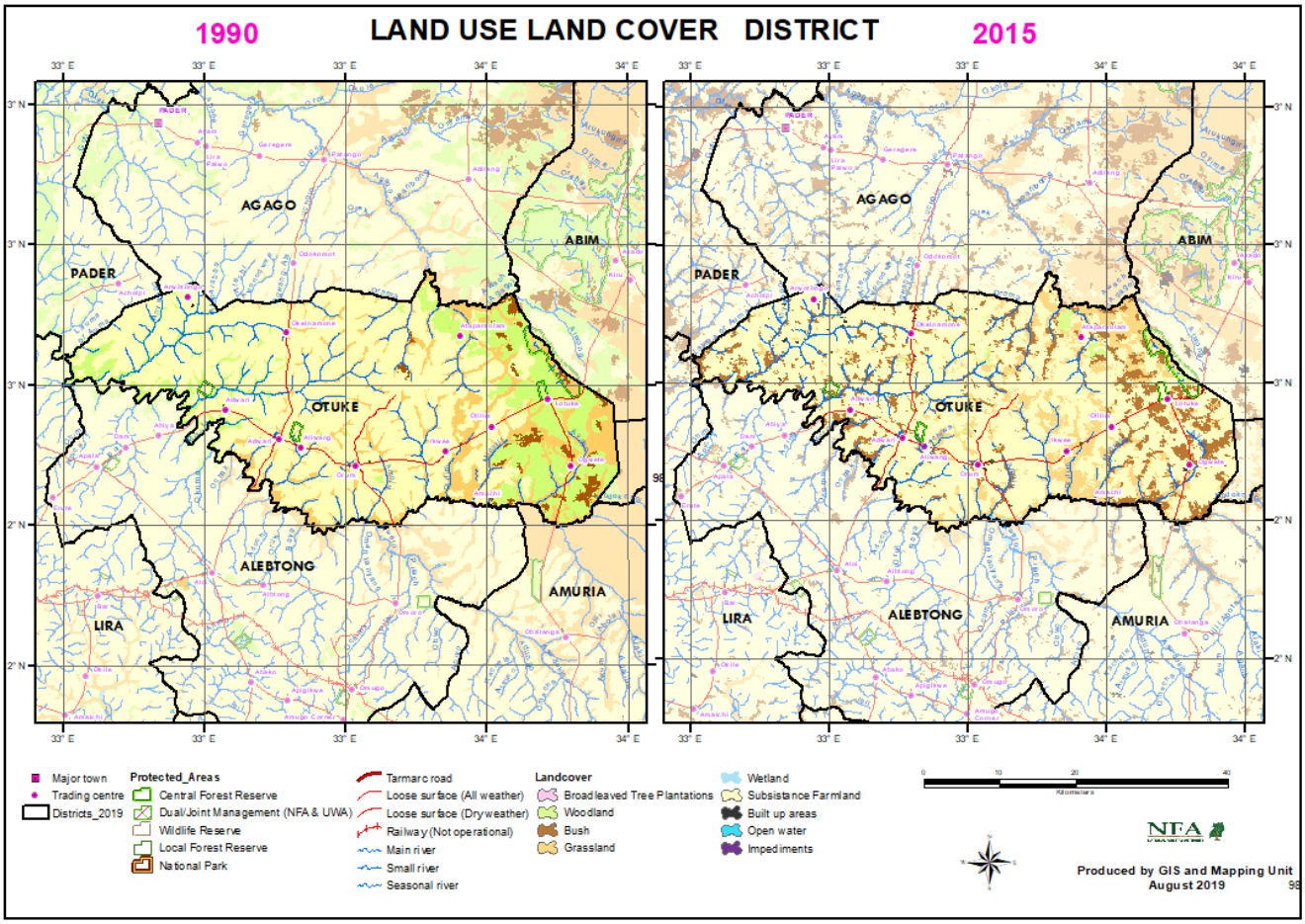


Figure 5.99: Land cover/ land use for Otuke District

5.2.98 Land Physical Accounts for Oyam District

Oyam District had a land cover of 220,586 ha largely composed of small scale farmlands (81.5%) and grasslands (14%) in 1990. Between 1990 and 2015, bushlands, wetlands and woodlands increased by 16,924, 14,645, and 1,980 ha at the expense of grasslands and small scale farmlands which decreased by 23,717 and 11,252 ha, respectively (Table 5.98).

Table 5.98: Land cover/ land use for Oyam District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	18	-	-	-	2,952	1,184	30,975	4,575	179,680	511	127	564	-
Additions	68	-	-	91	4,704	17,846	3,916	16,553	10,666	324	1,331	86	131
Reductions	12	-	-	-	2,724	922	27,634	1,908	21,919	426	92	80	-
Closing stock	74	-	-	91	4,931	18,109	7,258	19,220	168,427	409	1,365	570	131
Net gains/ reductions	56	-	-	91	1,980	16,924	(23,717)	14,645	(11,252)	(102)	1,239	6	131

Oyam District lies adjacent to the Murchison Falls Protected Area which may account for the large grassland area in 1990. However, small scale farmlands were the major livelihood and were still fairly stable despite a decline in cover of 6% (Figure 5.100). In contrast, grasslands reduced by 77% an indication of a higher willingness to convert grasslands. However, the grasslands being converted into bushlands was an indication of degradation in grasslands while conversion into grasslands was an indication of consolidation of woody biomass into a woodland canopy.

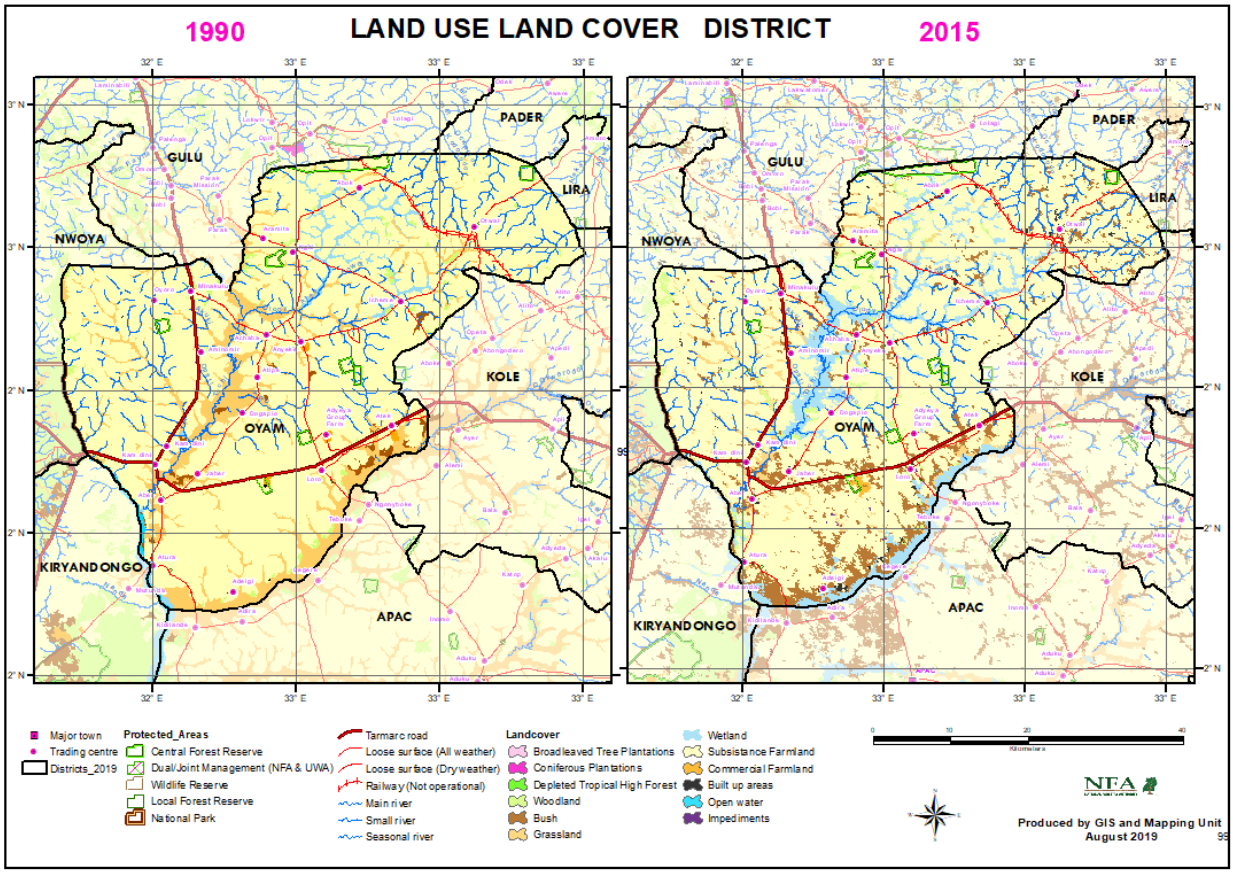


Figure 5.100: Land cover/ land use for Oyam District

5.2.99 Land Physical Accounts for Pader District

The land cover of Pader District was 342,689.8 ha largely composed of small scale farmlands (54%) and woodlands (40%) in 1990. Grasslands also had a relatively large area with 5% of the total District land cover in 1990. By 2015, the land cover had transformed. Bushlands, grasslands, small scale farmlands, built up areas and wetlands had expanded all at the expense of woodlands (Table 5.99).

Table 5.99: Land cover/ land use for Pader District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	3	2	-	-	138,294	1,153	18,885	-	183,657	-	119	578	-
Additions	18	-	-	-	2,707	48,518	61,561	168	74,591	208	1768	393	2
Reductions	3	2	-	-	135,659	1,075	16,699	-	35,987	-	43	465	-
Closing stock	18	-	-	-	5,341	48,596	63,747	168	222,261	208	1,844	505	2
Net gains/ reductions	15	2	-	-	(132,953)	47,443	44,862	168	38,604	208	1,725	(73)	2

The major transition for Pader District was the near depletion of woodlands (Figure 5.101). Woodlands decreased by 96% while bushlands expanded from just 1,153 to 48,596 ha. Grassland and small scale farmlands increased by 44,862 and 38,604 ha. Built up areas increased from only 119 ha to 1,844 ha. There were increases for commercial farmlands and broadleaved plantations. The small scale farmlands area strengthened at the expense of woodlands. However, a lot of the woodland area depleted remained as bushlands and woodlands an indication that the woodlands were largely targeted for wood fuel.

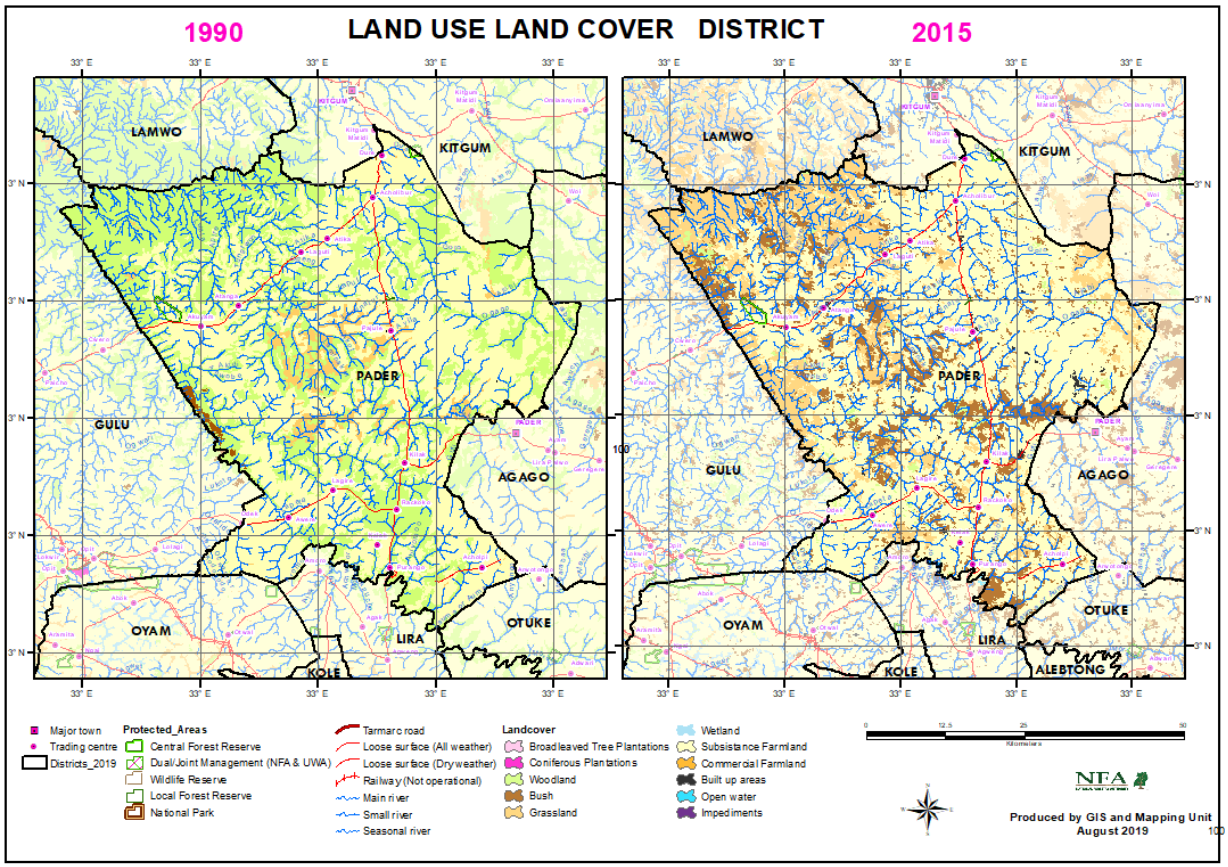


Figure 5.101: Land cover/ land use for Pader District

5.2.100 Land Physical Accounts for Pallisa District

Pallisa District had a land cover of 109,114 ha largely composed of small scale farmlands (67%), wetlands (17%) and grasslands (9%) in 1990 (Table 5.100). The land cover changes between 1990 and 2015 showed an increase in wetlands, small scale farmlands, bushlands at the expense of grasslands and woodlands.

Table 5.100: Land cover/ land use for Pallisa District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	27	-	-	-	594	402	9,744	18,880	73,258	29	185	5,969	26
Additions	-	-	-	-	0	1141	1,734	7,506	5,128	-	93	1,571	-
Reductions	27	-	-	-	594	396	8,966	2,416	3,655	29	143	921	26
Closing stock	-	-	-	-	0	1147	2,513	23,969	74,731	-	135	6,619	-
Net gains/reductions	(27)	-	-	-	(594)	746	(7,231)	5,090	1,473	(29)	(50)	650	(26)

The main transition was the depletion of woodlands and broadleaved plantations. Grasslands lost 74% of the land cover between 1990 and 2015 and they were converted into wetlands and small scale farmlands (Figure 5.102).

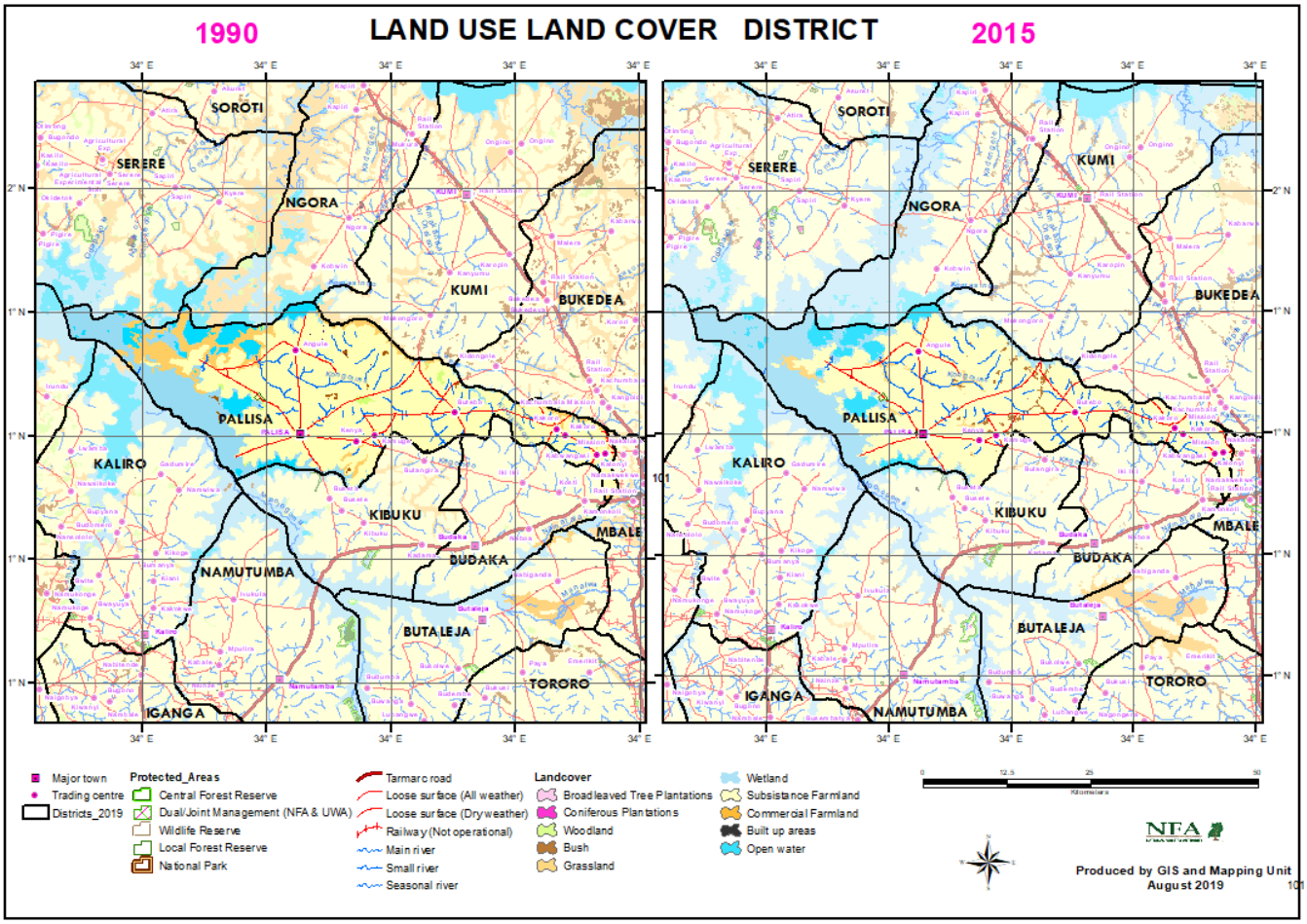


Figure 5.102: Land cover/ land use for Pallisa District

5.2.101 Land Physical Accounts for Rakai District

The land cover of Rakai District was 403,518.3 ha dominated by grasslands (36%), small scale farmlands (30%), and open water (19%) in 1990 (Table 5.101). By 2015, the largest increase in land cover was for small scale farmlands (32,749 ha) which replaced grasslands as the leading land cover in the District. Grasslands lost a cover of 29,871 ha. Wetlands also increased by 11,634 ha.

Table 5.101: Land cover/ land use for Rakai District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	686	-	18,293	3,206	10,974	16,498	146,293	8,542	122,973	161	258	75,514	122
Additions	409	26	1,668	649	646	11,931	32,553	14,635	55,079	580	572	1,207	16
Reductions	684	-	2,564	2,738	10,610	14,262	62,424	3,001	22,330	161	173	903	122
Closing stock	411	26	17,396	1,117	1,010	14,167	116,422	20,176	155,722	580	657	75,819	16
Net gains/reduction	(275)	26	(896)	(2,089)	(9,964)	(2,331)	(29,871)	11,634	32,749	419	399	304	(106)

The major transition in land cover was the expansion of small scale farmlands and wetlands at the expense of grasslands, woodlands and bushlands. Tropical high forests reduced, THF low stocked by 65% and THF well stocked by 5% while woodlands were depleted by 91% (Figure 5.103).

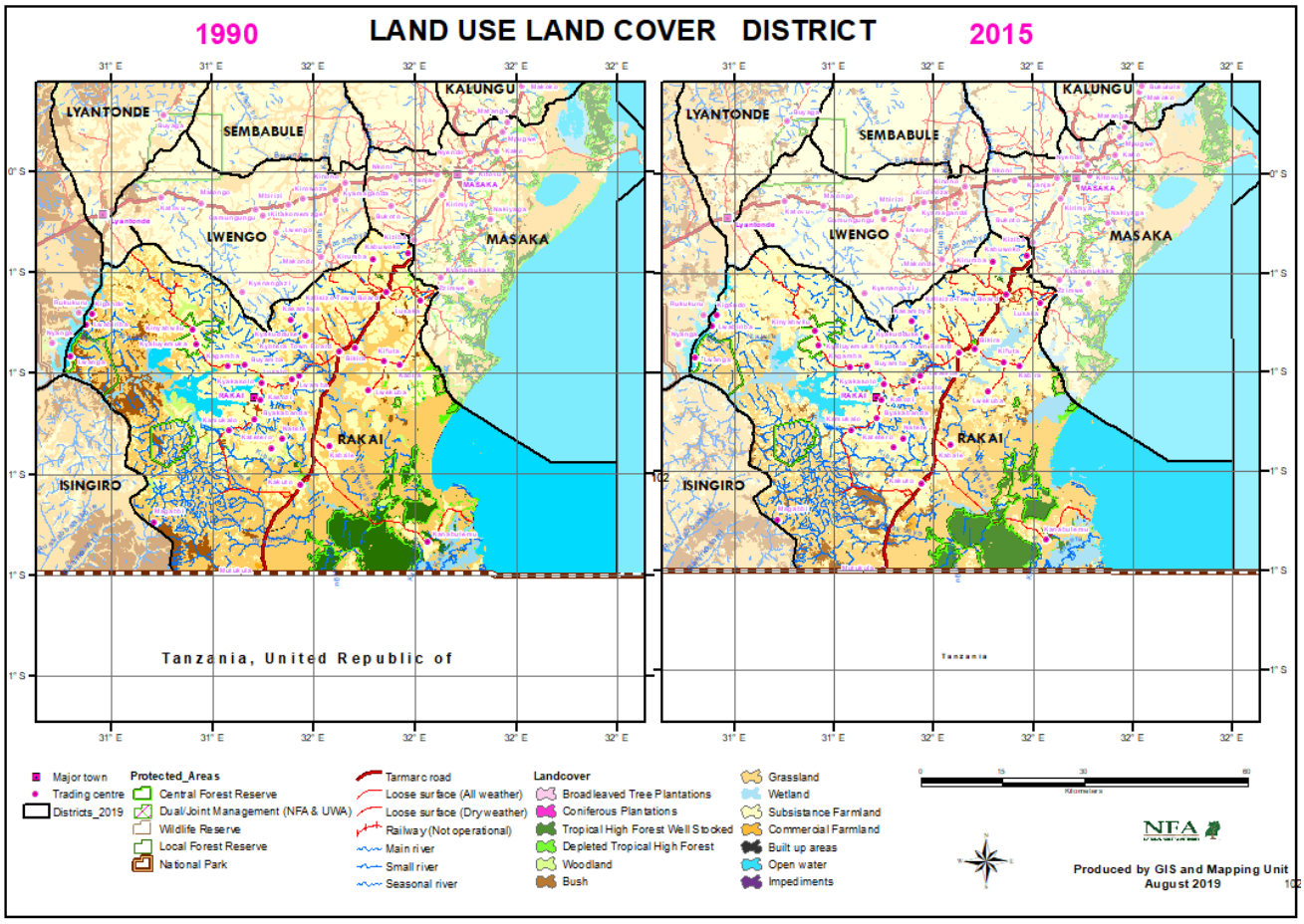


Figure 5.103: Land cover/ land use for Rakai District

5.2.102 Land Physical Accounts for Rubirizi District

Rubirizi District had a land cover of 147,084.3 ha. Of the total land cover of the District, open water, THF well stocked, grasslands, and small scale farmlands 25%, 21%, 17% and 15% were the four largest land covers in 1990. Woodlands and bushlands had land covers of 16,390 and 13,638 ha (Table 5.102).

Table 5.102: Land cover/ land use for Rubirizi District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	27	15	30,685	1,130	16,390	13,638	24,926	1,744	21,508	-	32	36,971	19
Additions	555	377	3,752	2,143	5,271	8,361	11,174	184	1,584	44	165	856	53
Reductions	25	12	1,792	224	8,561	9,280	9,383	1,140	3,755	-	27	303	19
Closing stock	556	381	32,645	3,049	13,101	12,719	26,716	788	19,337	44	171	37,524	53
Net gains/ reduction	530	365	1,960	1,919	(3,290)	(919)	1,791	(956)	(2,171)	44	138	553	34

The major transition was the increase in land cover for the forest plantation, tropical high forests and grasslands at the expense of woodlands, small scale farmlands and bushlands. Commercial farmlands and built up areas also increased. Whereas small scale farmlands and grasslands reduced by 2,171 and 1,791 ha they remained the largest land covers in the District (Figure 5.104). There were increase in forest plantations by 21-times and tropical high forests by 12% while the woodlands reduced by 20%.

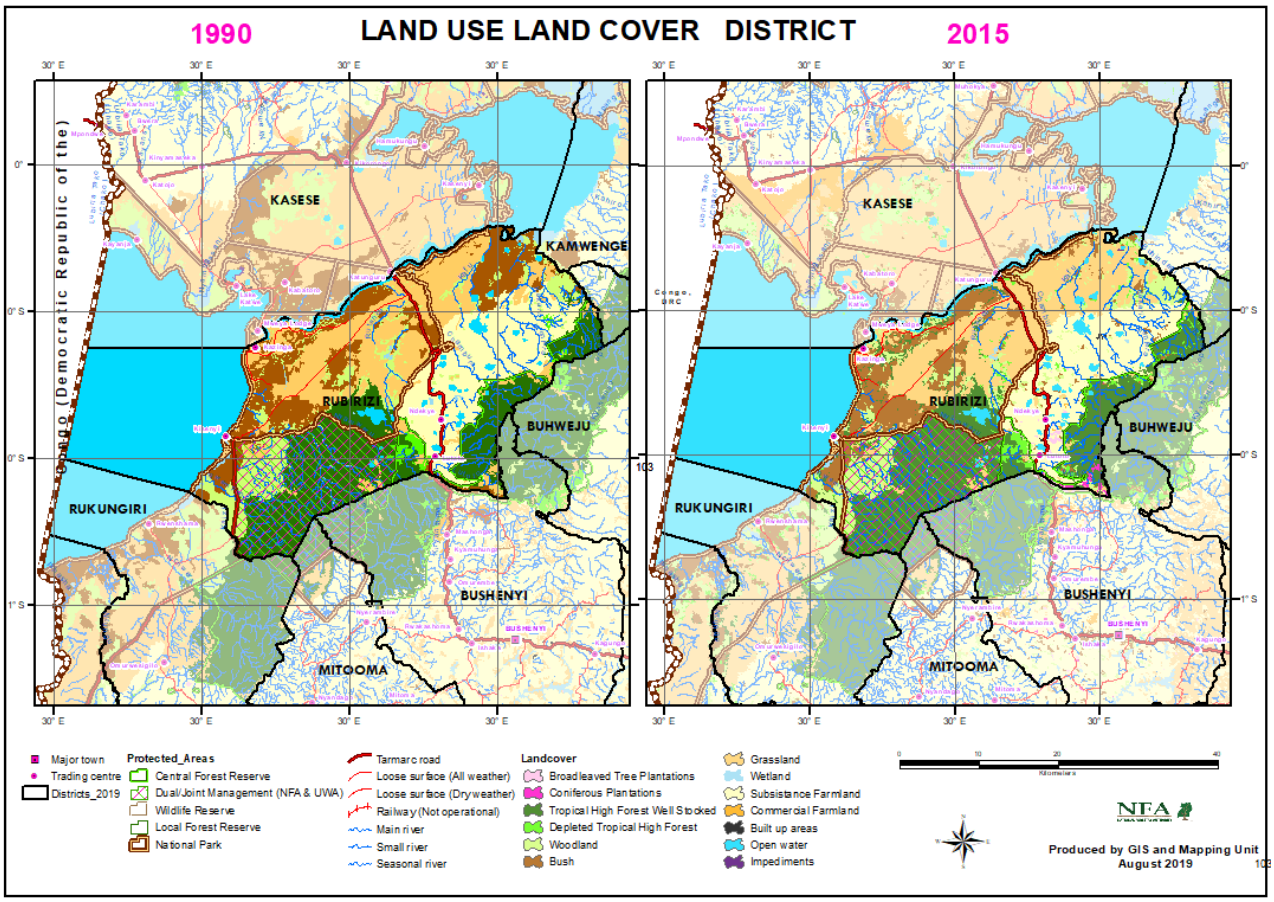


Figure 5.104: Land cover/ land use for Rubirizi District

5.2.103 Land Physical Accounts for Rukungiri District

Rukungiri District had a land cover of 156,677.9 ha dominated by small scale farmlands (51%), grasslands (21%), THF well stocked (11%) and open water (8%) in 1990 (Table 5.103). The forest plantation tropical high forests and built up area increased as well as bushlands at the expense of woodlands, grasslands, small scale farmlands and wetlands

Table 5.103: Land cover/ land use for Rukungiri District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	569	-	16,929		8,552	4,060	33,315	925	80,278	-	168	11,882	-
Additions	588	150	1,425	1,061	1,533	6,736	10,347	421	11,471	-	208	166	7
Reductions	551	-	599	-	4,495	1,428	13,214	576	13,159	-	69	21	-
Closing stock	606	150	17,755	1,061	5,589	9,368	30,447	770	78,591		307	12,027	7
Net gains/ reductions	37	150	826	1,061	(2,962)	5,308	(2,867)	(155)	(1,688)	-	139	145	7

The transition of land cover was the increase in forest cover for plantations and tropical high forests and the decrease of woodlands, farmlands and grasslands (Figure 5.105). The grassland and tropical high forest section of Rukungiri District covers Kigezi Game Reserve, which may account for the increase in tropical high forests observed.

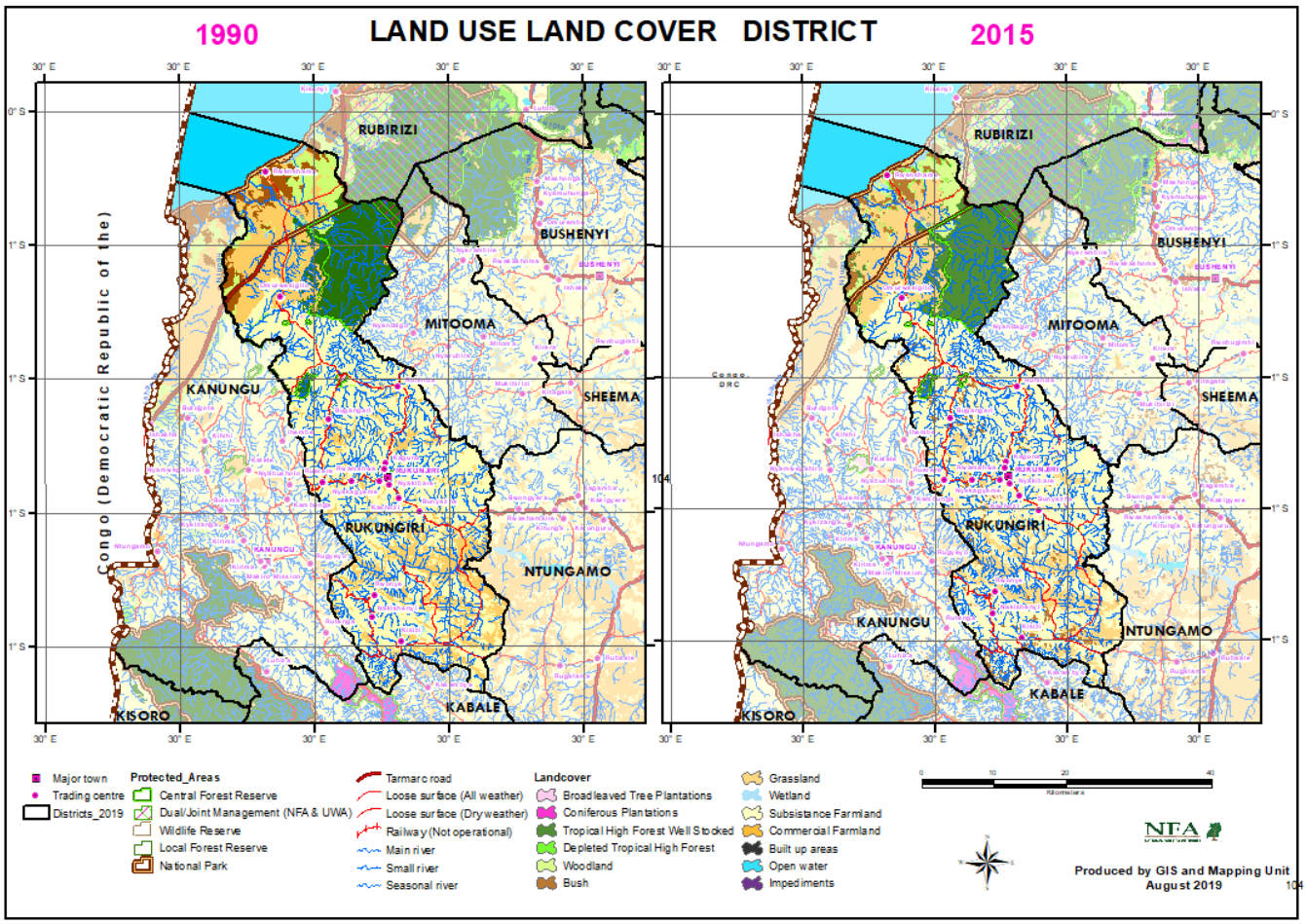


Figure 5.105: Land cover/ land use for Rukungiri District

5.2.104 Land Physical Accounts for Sembabule District

Sembabule District had a land cover of 231,916.9 ha composed mostly of grasslands (37%), small scale farmlands (31%), and bushlands (24%) in 1990 (Table 5.104). Between 1990 and 2015, there was an 80% increase in small scale farmlands largely at the expense of bushlands and grasslands, which decreased by 27,465 and 22,164 ha, respectively. Woodlands also decreased by two-thirds while wetlands, THF low stocked and built up areas increased by 847, 422 and 225 ha, respectively.

Table 5.104: Land cover/ land use for Sembabule District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	91	-	-	-	15,749	54,639	85,212	3,600	72,484	7	58	77	-
Additions	27	3	-	422	2,995	16,356	31,454	1,887	66,300	-	259	126	104
Reductions	91	-	-	-	13,294	43,821	53,618	1,040	8,006	7	34	24	-
Closing stock	27	3	-	422	5,451	27,174	63,049	4,448	130,778	-	282	179	104
Net gains/ reduction	(64)	3	-	422	(10,299)	(27,465)	(22,164)	847	58,29)	(7)	225	102	104

The major transition in Sembabule District was the increase of small scale farmlands at the expense of grasslands (Figure 5.106). Traditionally a livestock producing District, the increase of small scale farmlands was an indication of the increased crop production and/or smallholder farmers in the District. There was also a likelihood of increased settled farms replacing the herded grasslands that dominated the District in 1990.

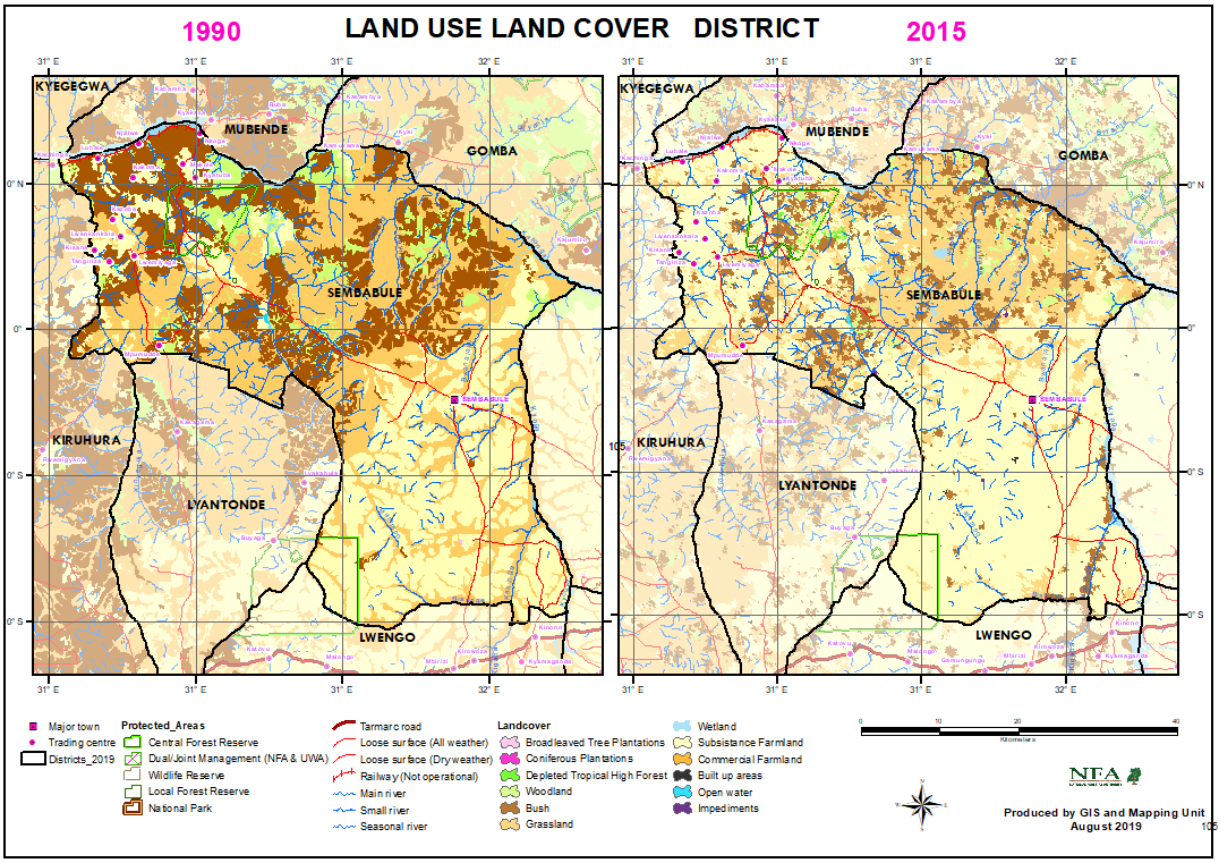


Figure 5.106: Land cover/ land use for Sembabule District

5.2.105 Land Physical Accounts for Serere District

The land cover for Serere District was 196,691.1 ha composed mostly of small scale farmlands (44%), open water (24%), grasslands (19%) and wetlands (9%) in 1990 (Table 5.105). Between 1990 and 2015, the area of small scale farmlands expanded by 26,253 ha while that of grasslands decreased by 34,291 ha. Alongside an increase in small scale farmlands were increases for wetlands (4,649 ha) and bushlands (2,746 ha) while bushlands were nearly depleted with an 84% reduction in their cover.

Table 5.105: Land cover/ land use for Serere District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High Forest	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	9	287	-	3,953	1,668	37,804	18,184	87,198	290	175	47,123	-
Additions	-	285	-	479	4,355	1,502	1,2766	29,329	126	280	5,340	-
Reductions	9	274	-	3,803	1,609	35,793	8,116	3,076	148	143	1,491	-
Closing stock	-	297	-	629	4,414	3,513	22,834	113,451	267	313	50,973	-
Net gains/ reduction	(9)	11	-	(3,324)	2,746	(34,291)	4,649	26,253	(22)	138	3,849	-

In Serere District, the small scale farmlands increased at the expense of grasslands and woodlands. The wetlands and bushlands also increased an indication of some slack in the areas converted (Figure 5.107). It is therefore, likely that woodland depletion was driven by wood fuel production demand as well as agricultural land expansion

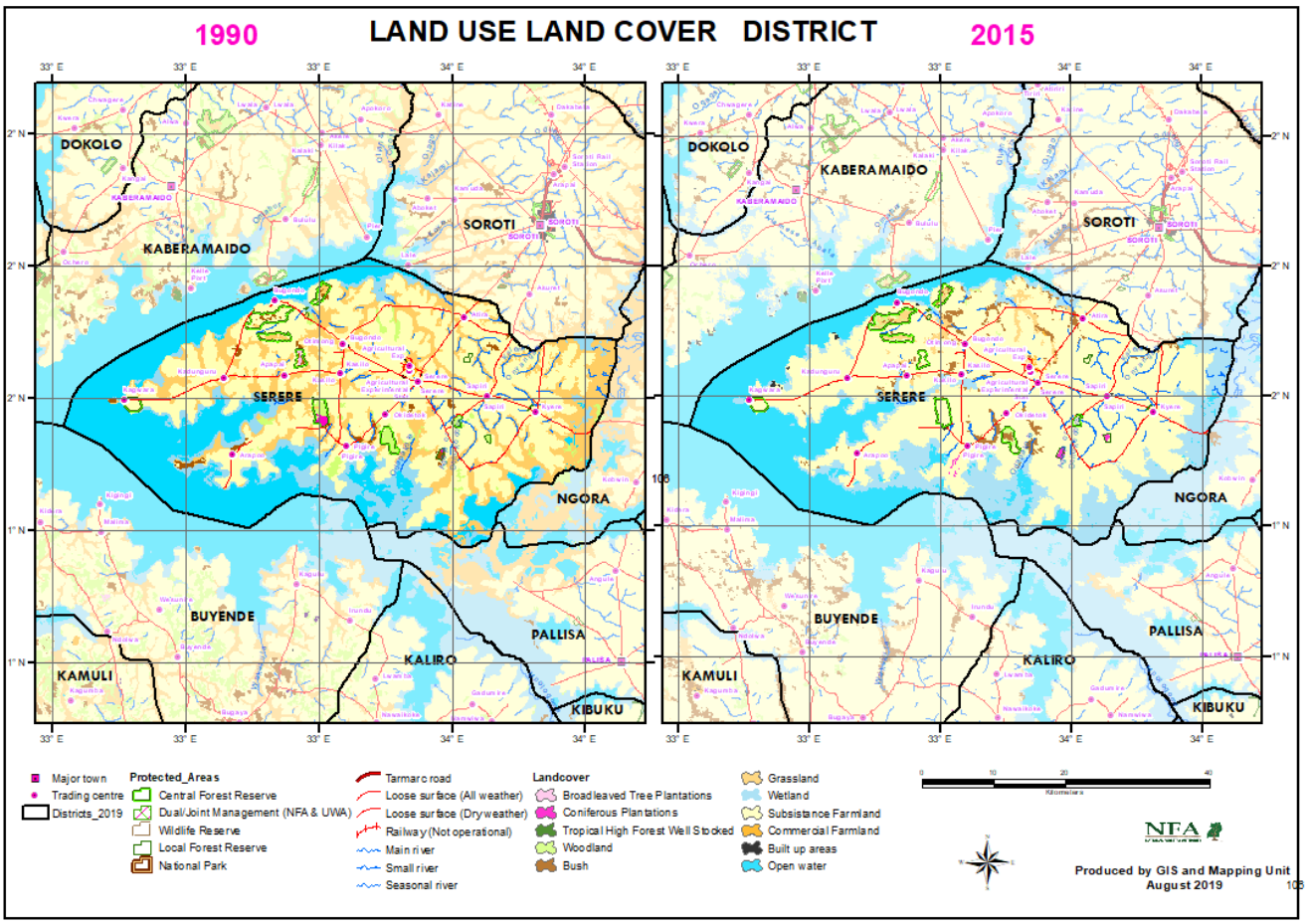


Figure 5.107: Land cover/ land use for Serere District

5.2.106 Land Physical Accounts for Sheema District

Sheema District had a land cover of 70,294 ha, 65% of which was small scale farmland and 28% was under grasslands. By 2015, the small scale farmlands had declined by 18,385 ha and instead grasslands, bushlands and woodlands increased by 16,983, 2,187 and 1,175 ha, respectively. The increase in grassland at the expense of small scale farmlands increased balance of land available for livestock production with that available for crop production. In 2015, grasslands occupied 52% of the land cover while small scale farmlands occupied 39%.

Table 5.106: Land cover/ land use for Sheema District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	416	-	-	-	10	14	19,618	4,192	45,928	-	112	-	4
Additions	291	77	-	-	1,179	2,201	23,332	525	5,881	-	148	-	5
Reductions	407	-	-	-	4	14	6,349	2,500	24,266	-	96	-	4
Closing stock	300	77	-	-	1,185	2,201	36,601	2,217	27,543	-	165	-	5
Net gains/ reduction	(116)	77	-	-	1,175	2,187	16,983	(1,975)	(18,385)	-	52	-	1

The major transition in land cover between 1990 and 2015 was the increase in area of grasslands at the expense of small scale farmlands (Figure 5.108). It would seem that land available for livestock production may have exceeded that for crop production.

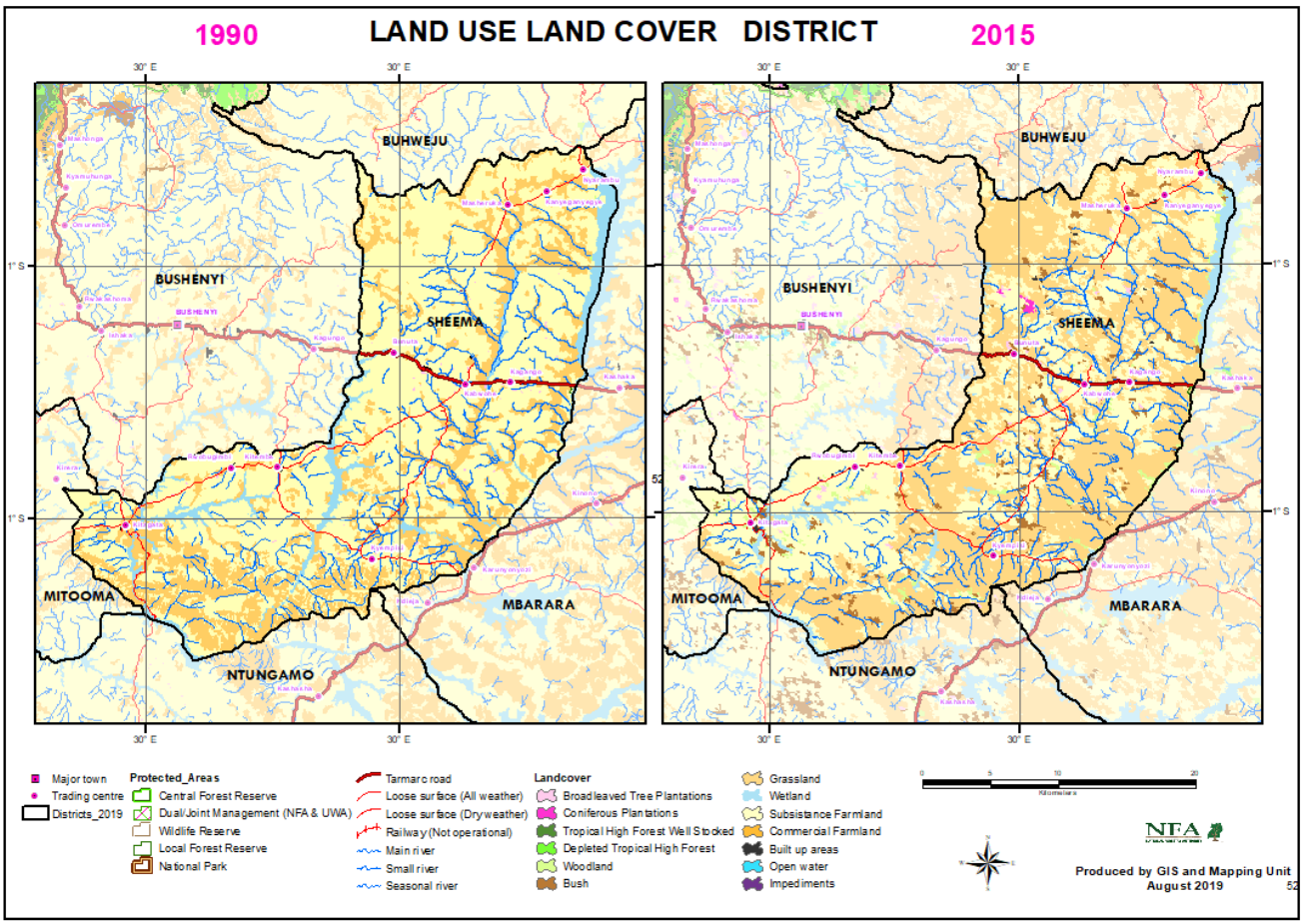


Figure 5.108: Land cover/ land use for Serere District

5.2.107 Land Physical Accounts for Sironko District

Sironko District occupied an area of 44,127.8 ha 74% of which was small scale farmlands in 1990 (Table 5.107). Between 1990 and 2015, small scale farmlands and THF well stocked increased by 1,337 and 3,499 ha, respectively. Conversely, THF low stocked, and woodlands decreased by 2,149 and 2,793 ha, respectively.

Table 5.107: Land cover/ land use for Sironko District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	25	-	1,029	2,909	3,180	1,266	3,060	-	32,472	72	115	-	-
Additions	-	-	3,754	145	149	928	1,141	-	1,747	7	258	-	-
Reductions	25	-	255	2,294	2,942	928	1,195	-	410	23	57	-	-
Closing stock	-	-	4,528	760	388	1,266	3,005	-	33,809	55	316	-	-
Net gains/reductions	(25)	-	3,499	(2,149)	(2,793)	-	(54)	-	1,337	(17)	201	-	-

The major transition for Sironko District land cover was the expansion of THF well stocked and the strengthening and expansion of small scale farmlands. The THF well stocked and farmlands likely expanded at the expense of THF low stocked and woodlands (Figure 5.109).

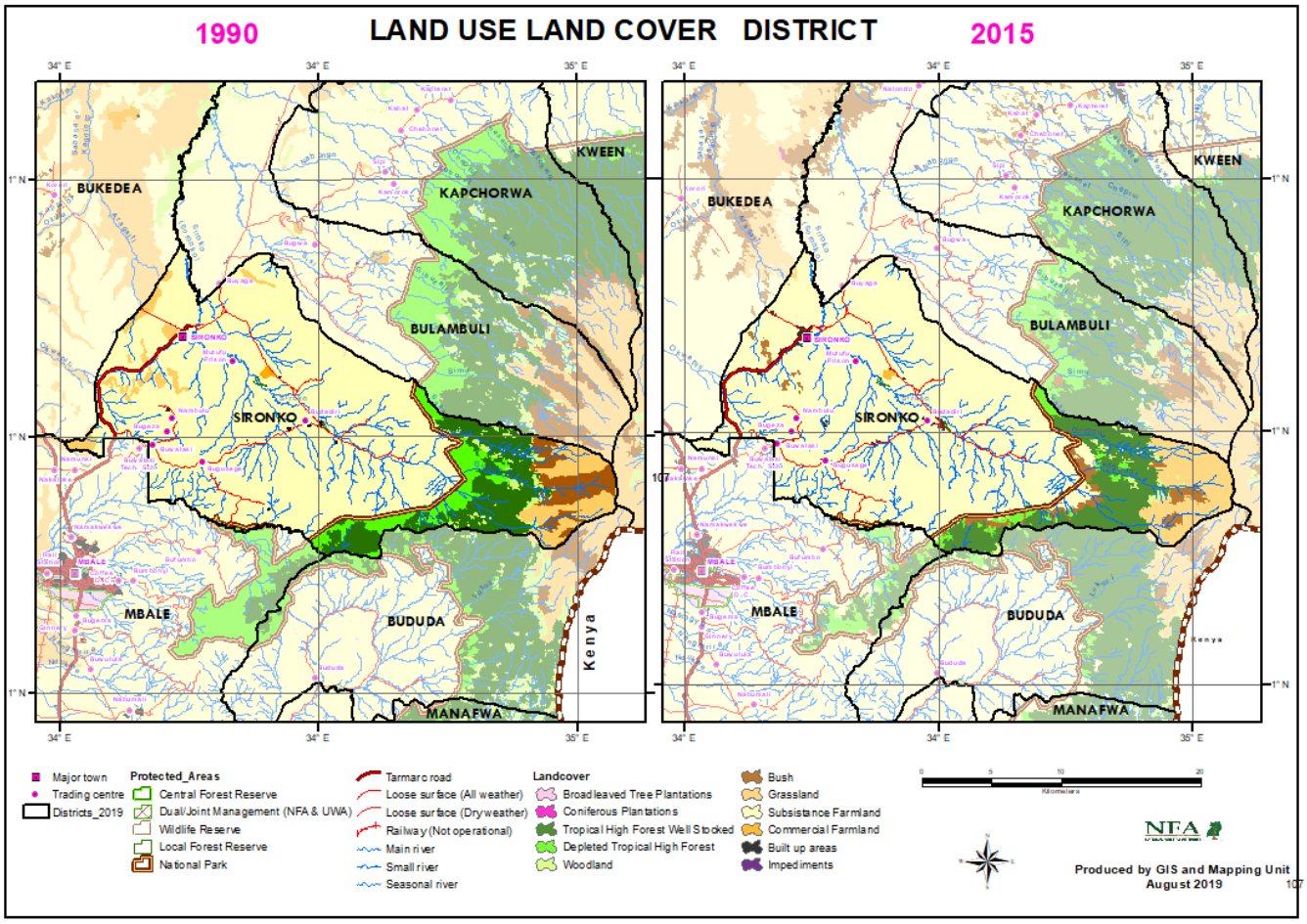


Figure 5.109: Land cover/ land use for Sironko District

5.2.108 Land Physical Accounts for Soroti District

Soroti District land cover was 141,078.7 ha two-thirds of which was small scale farmlands and one-quarter was grasslands in 1990 (Table 5.108). By 2015, small scale farmlands had increase in proportion to land cover to 81%. Wetlands and bushlands also increased by 8,813 and 4,754 ha, respectively at the expense of grasslands and woodlands. Indeed, woodlands and grasslands were nearly depleted. Woodlands were only 53 ha away from complete depletion while grasslands decreased by 96%.

Table 5.108: Land cover/ land use for Soroti District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	1	-	-	-	2,524	1,356	34,580	4,335	93,726	140	1,171	3,246	-
Additions	-	-	-	-	53	5,815	770	10,667	22,121	-	290	2,088	-
Reductions	1	-	-	-	2,524	1,062	33,861	1,855	1,420	140	710	233	-
Closing stock	-	-	-	-	53	6,110	1,490	13,148	114,428	-	751	5101	-
Net gains/reductions	(1)	-	-	-	(2,471)	4,754	(33,090)	8,813	20,701	(140)	(421)	1,854	-

For Soroti District, the small scale farmlands strengthen and increased by 22% in contrast, woodlands and grasslands decreased 98% and 96%, respectively. Wetlands increased three-fold while bushlands increased fourfold (Figure 5.110).

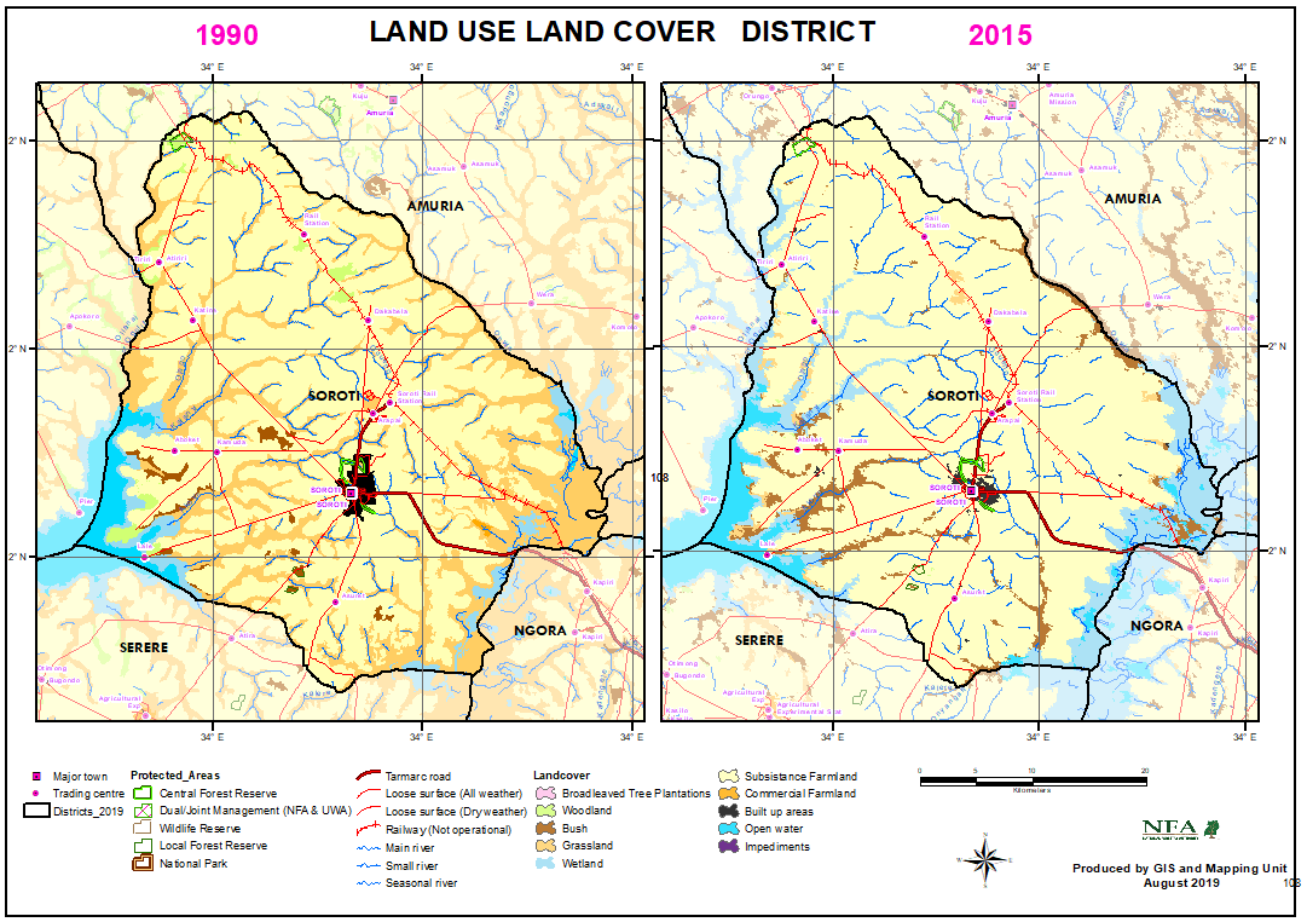


Figure 5.110: Land cover/ land use for Soroti District

5.2.109 Land Physical Accounts for Tororo District

Tororo District had a land cover of 119,383.2 ha. Eighty-six percent of the land cover was under small scale farmlands in 1990. However, the small scale farmlands still expanded by 4,790 ha between 1990 and 2015. Wetlands also increased by 1,710. The increases occurred at the expense of woodlands, bushlands and bushlands (Table 5.109).

Table 5.109: Land cover/ land use for Tororo District

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	195	-	1	-	1,586	3,384	5399	4,651	102,888	395	862	8	14
Additions	98	62	-	-	6	2,104	78	2,413	8,645	1,699	408	43	-
Reductions	166	-	1	-	1,586	3,060	5332	703	3,855	220	612	8	14
Closing stock	*127*	*62*	-	-	*6*	*2,429*	*146*	*6,362*	*107,679*	*,1874*	*657*	*43*	-
Net gains/ reductions	(68)	62	(1)	-	(1,580)	(956)	(5,254)	1,710	4,790	1,479	(204)	35	(14)

For Tororo, woodlands and grasslands which already occupied only 1.3% and 4.5% of the District in 1990 were depleted between 1990 and 2015 in order to expand small scale farmlands and commercial farmlands. the commercial farmlands increased fivefold from 395 ha to 1,874 ha (Figure 5.111).

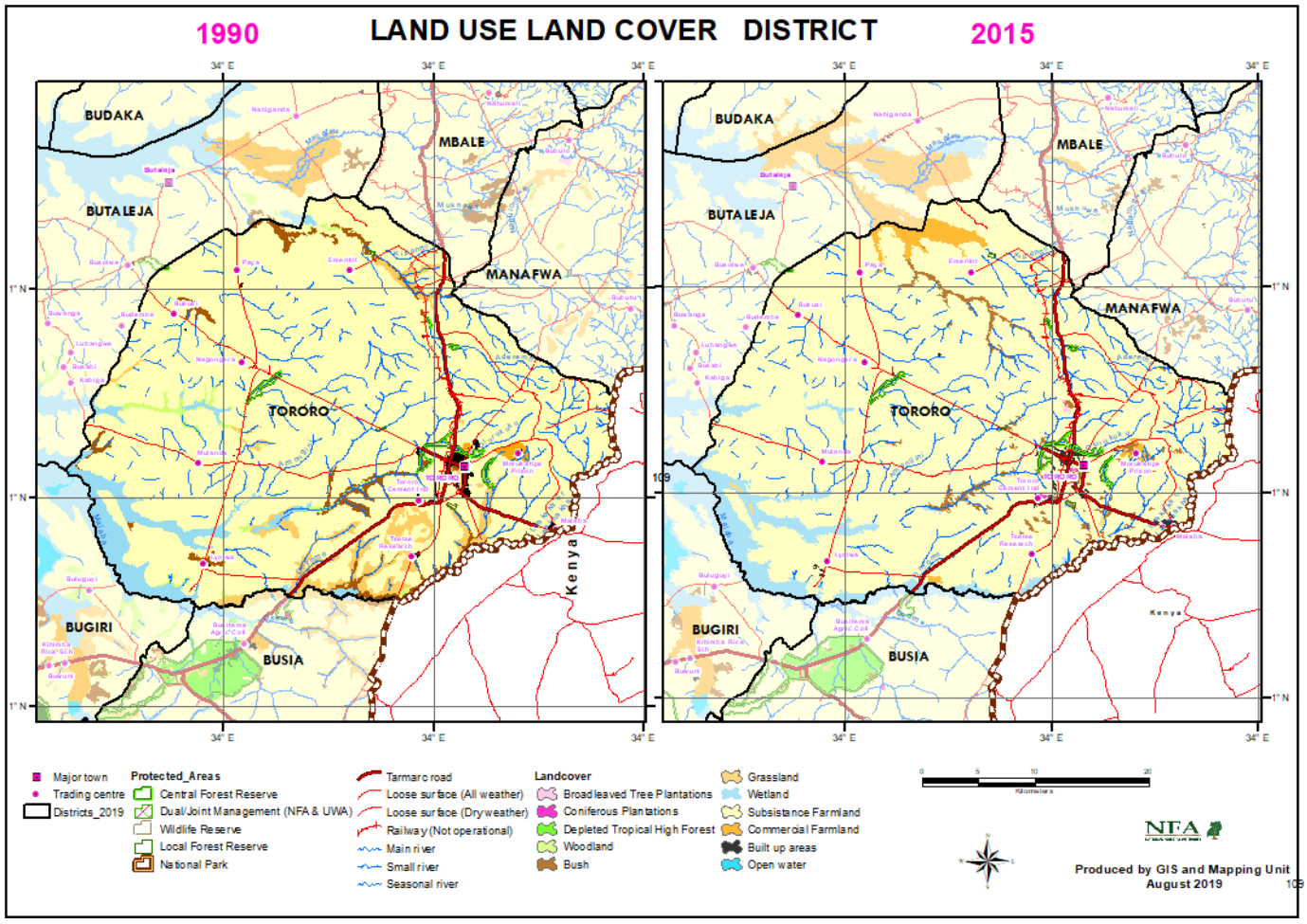


Figure 5.111: Land cover/ land use for Tororo District

5.2.110 Land Physical Accounts for Wakiso District

Wakiso District had a land cover of 280,775.2 ha largely distributed between small scale farmlands (41%), open water (32%), tropical high forests (10%) and grasslands (7%) in 1990 (Table 5.110). Between 1990 and 2015, large proportions of grasslands, tropical high forests and woodlands gave way to built up areas, wetlands and forest plantations. Small scale farmlands reduced by only 6%.

Table 5.110: Land cover/ land use for Wakiso District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	THF well stocked	THF low stocked	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	322	16	6,823	21,638	9,229	4,620	20,910	6,474	115,087	2,401	3,085	90,109	61
Additions	2,294	382	-	308	3,780	7,288	7,673	18,784	28,966	3,448	27,794	784	306
Reductions	289	16	6,823	21,257	8,846	4,184	19,377	2,084	35,791	1,278	927	872	61
Closing stock	2,327	382	-	689	4,163	7,723	9,206	23,173	108,262	4,572	29,952	90,021	306
Net gains/ reductions	2,005	366	(6,823)	(20,949)	(5,066)	3,104	(11,704)	16,700	(6,825)	2,170	26,867	(88)	245

The major transitions for Wakiso District was the nine-fold expansion in built up area, 350% increase in wetland cover at the expense of grasslands, small scale farmlands and woodlands. Commercial farmlands doubled in area (Figure 5.112).

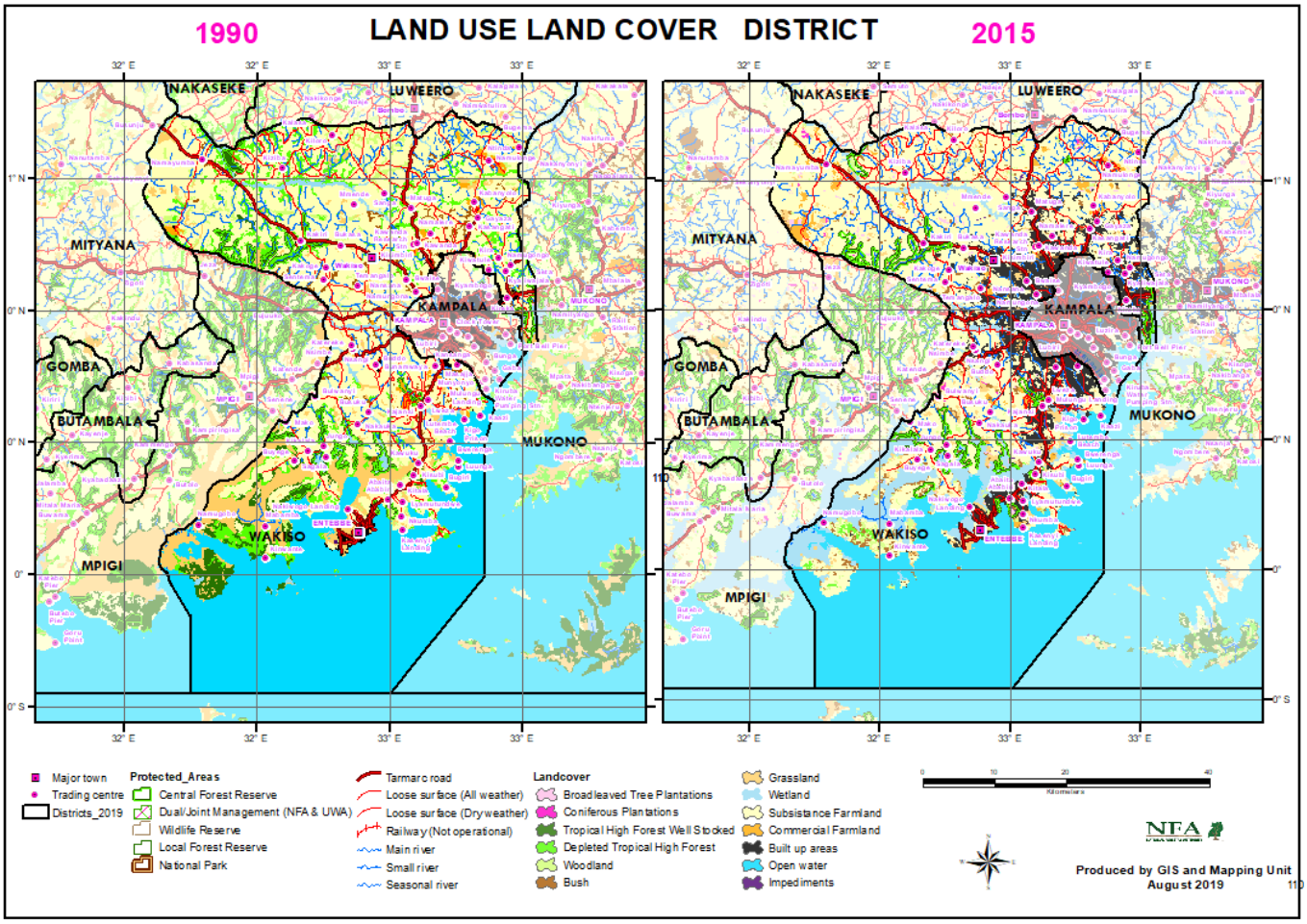


Figure 5.112: Land cover/ land use for Wakiso District

5.2.111 Land Physical Accounts for Yumbe District

Yumbe District had a land cover of 240,301.6 ha dominated by woodlands (58%), small scale farmlands (23%) and grasslands (18%) in 1990. By 2015, the land cover of small scale farmlands, grasslands and bushlands had increased by 132%, 74% and 5000%, respectively while woodlands declined by 90%. Commercial farmlands, built up areas and forest plantations also increased (Table 5.111).

Table 5.111: Land cover/ land use for Yumbe District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High Forests	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impedi-ments
Opening stock	65	-	-	138,510	339	43,700	1,263	55,293	-	5	1,002	124
Additions	319	92	-	4,057	17,388	54,355	754	81,520	289	954	246	4
Reductions	65	-	-	128,365	327	21,822	618	8,491	-	5	158	124
Closing stock	*319*	*92*	-	*14,201*	*17,400*	*76,232*	*1,399*	*128,322*	*289*	*954*	*1,089*	*4*
Net gains/reduction	(254)	(92)	-	124,308	(17,061)	(32,533)	(136)	(73,029)	(289)	(949)	(88)	120

The transition for the land covered showed that in Yumbe, small scale farmlands, grasslands, bushlands, forest plantations, commercial farmlands and built up areas all increased at the expense of woodlands (Figure 5.113). Between 1990 and 2015, woodlands in Yumbe District were depleted to cater for the expansions of all the other land covers with the exception of impediments. The woodlands are likely to have been exploited for wood fuel and the expansion of other land could be opportunistic conversion of already depleted woodlands.

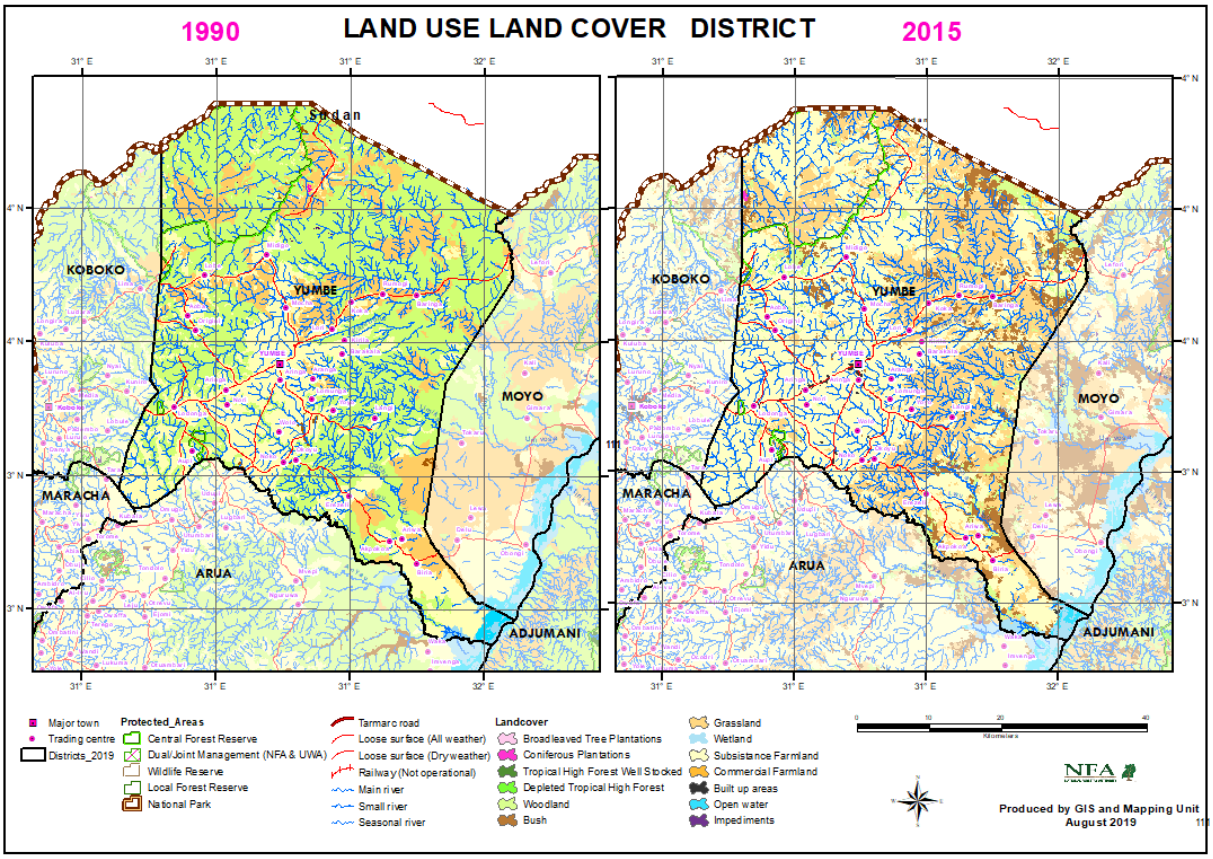


Figure 5.113: Land cover/ land use for Yumbe District

5.2.112 Land Physical Accounts for Zombo District

Zombo District had a land cover of 89,557.9 ha three-quarters of which was small scale farmlands in 1990. The rest of the land cover was generally concentrated in woodlands and grasslands (Table 5.112). Between 1990 and 2015, small scale farmlands, bushlands, broad leaved plantations and built up area expanded at the expense of woodlands, coniferous plantations, grasslands and wetlands.

Table 5.112: Land cover/ land use for Zombo District (in hectares)

1990 to 2015	Broad leaved plantation	Coniferous plantation	Tropical High Forest	Woodland	Bushland	Grassland	Wetland	Small scale farmland	Commercial farmland	Built up area	Open water	Impediments
Opening stock	123	2,058	-	9,359	713	9,672	375	67,216	15	27	-	-
Additions	1,116	208	-	3,153	1,781	6,778	120	11,950	4	771	33	63
Reductions	116	1,569	-	7,342	704	7,041	342	8,847	7	10	-	-
Closing stock	*1,124*	*697*	-	*5,170*	*1,790*	*9,409*	*153*	*70,319*	*12*	*788*	*33*	*63*
Net gains/ reductions	1,000	(1,361)	-	(4,189)	1,077	(263)	(222)	3,103	(3)	761	33	63

Even though, they were already the largest land cover, small scale farmlands strengthened with an expansion of 3,103 ha between 1990 and 2015 (Figure 5.114). Similarly, bushlands increased three-fold and broadleaved plantations increased 10-fold. Small scale farmlands, bushlands and broadleaved plantations expanded by replacing depleted woodlands while coniferous plantations may have been replaced with broadleaved plantations.

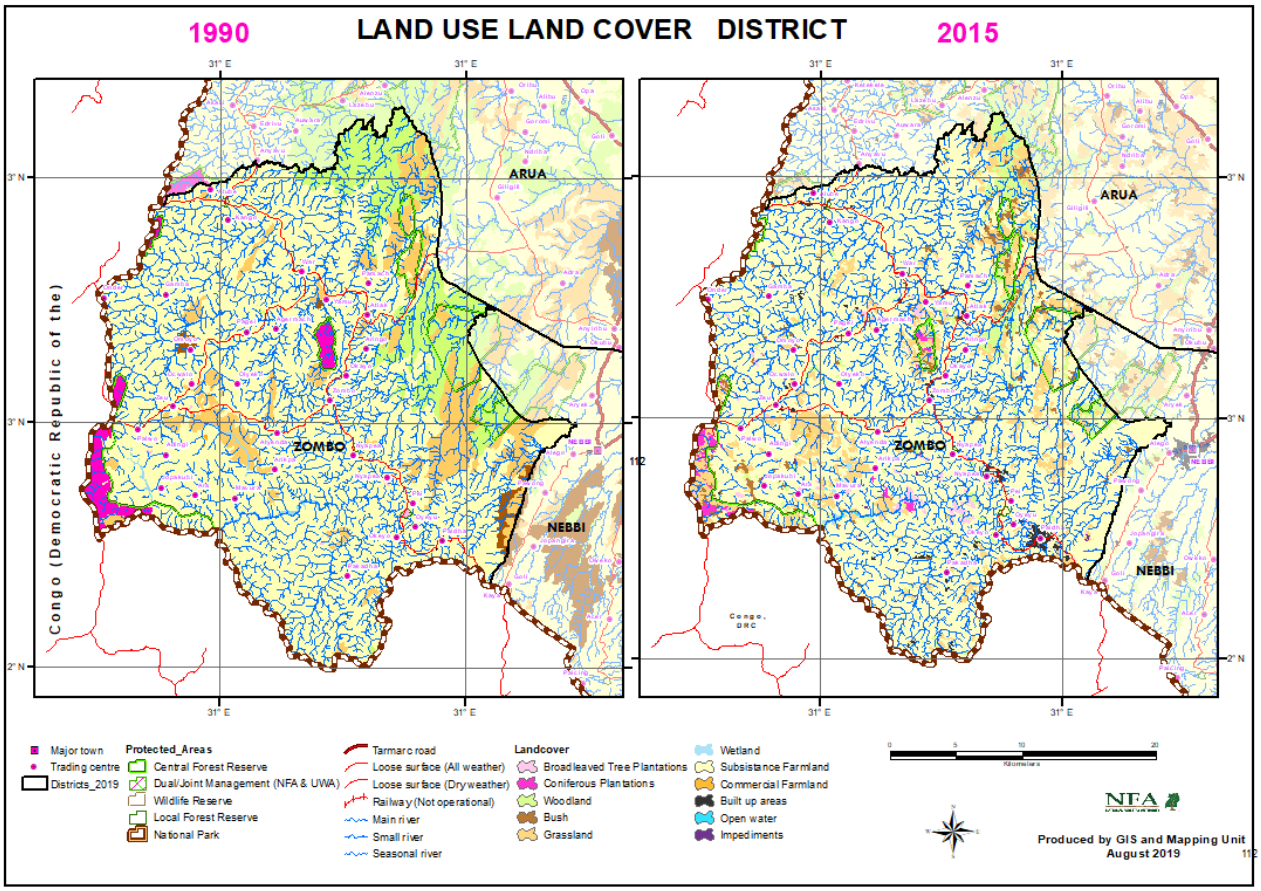


Figure 5.114: Land cover/ land use for Zombo District

CHAPTER 6
CONCLUSIONS AND EMERGING ISSUES

6.1 Conclusions

1. Based on national aggregates, the land cover class for small scale farmlands showed consistent increase while forest cover, particularly woodlands and tropical high forests generally declined. Grasslands stabilized after fluctuations, while bushlands increased. Wetlands increased from 1990 but reduced from 2000. Built up areas and plantations increased.

2. Areas with a high concentration of protected area or conservation activities with long-term perennial crop systems were fairly stable to land use/ land cover change. Long-term land use plans set for example protected areas and perennial crop production minimize regular land use/ land cover change.

3. There are indications that land as a factor of economic production may be less productive under grasslands and woodlands than crop lands, and tropical high forests.
4. Where good farmlands exist and there is access to water, there are good opportunities for increasing agricultural productivity through use of existing economic factors.

5. Existing policies and market structure are not adequate to allow sustainable harvest of woodlands. Moreover, external drivers such as influx of refugees from neighbouring countries or internal movements in search for farmlands also contribute to drivers of land use change.

6. The land cover/ land use system in the North-South-East Lake Kyoga Flood Plains sub-region was conducive for wetland conservation. There are lessons to learn on ensuring the wetlands can be maintained in other landscapes and catchments. On the other hand, there is limited evidence to show that the economic opportunity of the wetlands was fully exploited.

7. The Agro-ecological Zone I would typically be a conservation zone but it was found that more than half of it is under small scale farmlands. There is a need to scrutinize the economic activities to ensure that they do not encroach on critical ecosystems and landscapes.

8. The need for stable long-term enterprises is demonstrated by the compatibility of the East African Highland cooking banana with land areas of the agro-ecological zone. The South-Western zone is able to supply more than 60% of the country's banana, while there is still land left to have the largest herd of livestock and protected areas.

9. Some farming systems are large but largely subsistence based. The purely subsistence activity seems to encourage low productivity and promote conversion of other land covers/land uses to sustain the functionality of the system.

10. There is need to intensify agro-forestry within the farmlands to provide fuel alternatives and reduce pressure on natural forests for wood fuel.

11. The seven climate zones are not well articulated in the wider national context. The typical season in Uganda is limited to the dry seasons and wet seasons. The importance of the differences will also help in land use planning.

12. Uganda's protected areas include National Parks and Wildlife Reserves managed by the Uganda Wildlife Authority (UWA), Central Forest Reserves managed by the National Forestry Authority (NFA), the Dual Joint Management (DJM) zone managed by UWA and NFA, and the Local Forest Reserves managed by Local Governments and Forestry Sector Support Department. Generally, land cover for protected areas with the exception of local forest reserves were relatively stable in land cover while local forest reserves ceded land cover to small scale farmlands between 1990 and 2015. For private lands, small scale farmlands increased generally at the expense of woodlands.

13. The land covers by District showed increasing dominance of small scale farmlands. However, the bushlands were also increasing which suggested that the conversion of woodlands was also likely driven by production of wood fuel. The bushlands represent the slack in terms of land that was not been converted into forest plantations, farmlands or built up areas, among others.

14. There was a general increase in built up areas and commercial farmlands, particularly in the Districts of Northern Uganda between 1990 and 2015. The largest increases in built up areas were for Districts in the central and eastern regions of the country.

6.2 Emerging Issues

6.2.1 Policy Issues

1. The large decline of woodlands exceeds the demand of land for agriculture. Woodlands conversion is mainly due to demand for wood fuel energy. Additional policy/ regulatory and market interventions are needed to regulate deforestation of woodlands.

2. The expansion of small scale farmlands is due to resilience of subsistence agriculture as main livelihood and increasing population.

3. Land use planning and enhanced land use efficiency are important for managing land fragmentation linked to growing population / reduced productivity. Strategic land use planning needs to incorporate internal and external factors that drive land use change.

4. There is a need to have strategic long-term planning for land use to stabilize and reduce continuous land use change, which also leads to degradation of some land covers.

5. Without necessary leading to land use/land cover change, there is need to explore increasing factor productivity of grasslands and woodlands. Even for areas with a better distribution of open water, there is a need to improve productivity in resource rich zone.

6. The economic opportunities of wetland, water resources, and small scale farmlands can be boosted for the North-South-East Lake Kyoga Flood Plains sub region.

7. New economic activities will likely exacerbate existing drivers of land use change e.g. population growth and limited livelihoods options. Therefore, some WMZs will experience larger changes in land use in the future.

8. There is need to plan for buffers in land use planning in order to protect existing natural capital (forests, farmlands, water resources and wetlands, among others).

9. The is critical need to reconcile agricultural land use and other land uses so that the need for land for farming does not overwhelm other land uses.

10. There is need to improve land use learning from community enterprises and enhance technical and economic efficiency attributes. Even small scale farming systems can achieve efficiency improvements to limit pressure to continually expand small scale farmlands.

11. There is a need for policy instruments and market incentives for agro-forestry in the small scale farmlands to reduce the pressure on woodlands for wood fuel and THF for other wood needs.

6.2.2 Technical Issues regarding the land accounts

1. Uganda's land accounts are only initial land accounts and two opportunities cannot be captured at this stage. The accounts will be maintained as Land Physical Accounts. The opportunity for developing monetary land accounts will be considered at a later stage. At the sub-regional level, the number of sub-regions were increased to 15 from 11; however, the breakdown was not available at the time of preparing this report.

2. The multiple subnational break downs in Uganda are useful for a national audience but would likely cause confusion for an international readership. Therefore, there will be need to a summary version of the land accounts that can be used for policy makers and users outside Uganda's target audience of public, private and non-governmental sectors.

3. Some land covers are articulated differently by sectors who would be beneficiaries of the accounts information. For example, the agricultural sector uses 10 agro-ecological zones while the land cover classes limit the agro-ecological zones to just four. There is a need to reconcile the two sets of data so that the land classification system can find more usefulness for the agricultural sector in the implementation of the ASSP. Similarly, the articulation of the climate zones is not readily available in literature on climate in Uganda. These differences mean stronger emphasis on description for the zones to improve awareness creation and consolidating the institutional position and that of the accounts.

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ANNEXES

Annex 1: Technical Working Group, Technical Support and World Bank/WAVES Team

TECHNICAL WORKING GROUP

Representatives	*Ministries, Departments and Agencies*
Samuel Echoku	Uganda Bureau of Statistics
Margaret Nakirya	Uganda Bureau of Statistics
Sam Mugume Kojo	Ministry of Finance, Planning and Economic Development
Ronald Kaggwa	National Planning Authority
Evelyn Atuhaire	Forestry Sector Support Department, Ministry of Water and Environment
Issa Katwesigye	Forestry Sector Support Department, Ministry of Water and Environment
Margaret Athieno Mwebesa	Forestry Sector Support Department, Ministry of Water and Environment
Lucy Iyango	Wetland Management Department, Ministry of Water and Environment
Collins Amanya	Planning and Policy Department, Ministry of Water and Environment
Lillian Natukunda	Planning and Policy Department, Ministry of Water and Environment
Godwin Kamugisha	National Environment Management Authority
John Diisi	National Forestry Authority
Edward Senyonjo	National Forestry Authority
Xavier Mugumya	National Forestry Authority
Richard Kapere	Uganda Wildlife Authority
Technical Support Team	
Aliziki Khaudha	Uganda Bureau of Statistics
Chris N. Mukiza	Uganda Bureau of Statistics
Christopher Tumuhiirwe	Uganda Bureau of Statistics
Edgar Niyimpa	Uganda Bureau of Statistics
Imelda Musana Atai	Uganda Bureau of Statistics
Roland Muhumuza	Uganda Bureau of Statistics
Theophilus Musimenta	Uganda Bureau of Statistics
Maria Vidal	World Bank Spatial Analysis/GIS Specialist
Leonah Mbonimpa	GoU/ World Bank Communications Specialist
Moses Masiga	GoU/ World Bank SEEA Specialist
Damalie Nyanja	Administrative Support, World Bank Uganda Country Office
The WAVES Team	
Ross Hughes	World Bank
Sofia Elisabet Alhroth	World Bank
Lesya Verheijen	World Bank
Juan Pablo Castaneda	World Bank

Annex 2: **National Physical Asset Accounts for Land, 1990 – 2015 (in hectares)**

National land cover stocks	*Broad leaved plantation*	*Coniferous plantation*	*Tropical high forest well stocked*	*Tropical high forest low stocked*	*Woodland*	*Bushland*	*Grassland*	*Wetland*	*Small scale farmland*	*Commercial farmland*	*Built up area*	*Open water*	*Impediments*
Opening stock (1st Jan 1990)	18,682	16,384	651,111	273,062	3,974,523	1,422,263	5,115,477	484,031	8,401,602	68,447	36,572	3,689,603	3,741
Additions	8,059	3,787	186,030	158,163	1,111,145	3,324,510	1,170,999	493,471	1,953,081	59,297	13,213	57,882	1,799
Reductions	16,896	8,673	133,210	204,673	2,250,920	738,857	3,492,509	138,960	1,438,574	24,417	23,469	66,593	3,683
Net gains/reductions	8,838	4,886	(52,820)	46,511	1,139,775	2,585,652)	2,321,510	354,512)	(514,506)	(34,881)	10,256	8,710	1,884
Closing stock (31st Dec. 1999)	9,845	11,498	703,930	226,551	2,834,747	4,007,916	2,793,967	838,542	8,916,109	103,327	26,315	3,680,892	1,857
Opening stock (1st Jan 2000)	9,845	11,498	703,930	226,551	2,834,747	4,007,916	2,793,967	838,542	8,916,109	103,327	26,315	3,680,892	1,857
Additions	13,107	11,489	68,654	124,979	1,319,547	1,534,777	2,538,925	217,502	1,525,134	45,672	78,141	62,147	7,541
Reductions	8,166	4,246	171,626	159,835	1,376,233	2,573,989	1,269,274	303,002	1,593,548	42,369	7,186	36,550	1,594
Net gains/reductions	(4,941)	(7,243)	102,972	34,857	56,686	1,039,212	1,269,652)	85,500	68,414	(3,303)	(70,956)	(25,598)	(5,947)
Closing stock (31st Dec. 2004)	14,786	18,741	600,959	191,694	2,778,062	2,968,704	4,063,619	753,042	8,847,695	106,630	97,271	3,706,490	7,804
Opening stock ((1st Jan 2005)	14,786	18,741	600,959	191,694	2,778,062	2,968,704	4,063,619	753,042	8,847,695	106,630	97,271	3,706,490	7,804
Additions	18,460	33,710	87,904	90,494	678,877	1,593,059	2,644,084	296,031	2,328,810	65,861	48,049	35,251	9,001
Reductions	12,251	8,708	123,911	161,432	2,008,061	2,189,972	1,639,403	238,623	1,404,221	37,576	46,870	52,373	6,191
Net gains/reductions	(6,209)	(25,002)	36,008	70,938	1,329,184	596,913	1,004,681)	(57,408)	(924,589)	(28,286)	(1,179)	17,121	(2,809)
Closing stock (31st Dec. 2009)	20,995	43,743	564,951	120,756	1,448,878	2,371,791	5,068,300	810,450	9,772,284	134,916	98,450	3,689,369	10,614
Opening stock (1st Jan 2010)	20,995	43,743	564,951	120,756	1,448,878	2,371,791	5,068,300	810,450	9,772,284	134,916	98,450	3,689,369	10,614
Additions	34,128	27,538	37,951	59,186	441,480	1,094,221	1,566,083	161,431	1,782,267	153,258	70,790	72,621	4,962
Reductions	10,886	7,795	73,778	78,078	677,407	1,498,778	1,537,011	256,400	1,279,582	32,324	33,673	12,408	7,795
Net gains/reductions	(23,242)	(19,743)	35,827	18,892	235,927	404,557	(29,072)	94,970	(502,685)	(120,935)	(37,117)	(60,213)	2,834
Closing stock (31st Dec. 2014)	44,237	63,486	529,124	101,864	1,212,951	1,967,234	5,097,372	715,481	10,274,969	255,850	135,567	3,749,581	7,780

Annex 3: Regions and Districts located in the Districts

Central	Eastern	Northern	Western
1. Bukomansimbi	1. Amuria	1. Abim	**1.** Buhweju
2. Butambala	2. Budaka	2. Adjumani	**2.** Buliisa
3. Buvuma	3. Bududa	3. Agago	**3.** Bundibugyo
4. Buikwe	4. Bugiri	4. Alebtong	**4.** Bushenyi
5. Gomba	5. Bukedea	5. Amolatar	**5.** Hoima
6. Kalangala	6. Bukwo	6. Amudat	**6.** Ibanda
7. Kalungu	7. Bulambuli	7. Amuru	**7.** Isingiro
8. Kampala	8. Busia	8. Apac	**8.** Kabale
9. Kayunga	9. Butaleja	9. Arua	**9.** Kabarole
10. Kiboga	10. Buyende	10. Dokolo	**10.** Kamwenge
11. Kyankwanzi	11. Iganga	11. Gulu	**11.** Kanungu
12. Luwero	12. Jinja	12. Kaabong	**12.** Kasese
13. Lwengo	13. Kaberamaido	13. Kitgum	**13.** Kibale
14. Lyantonde	14. Kaliro	14. Koboko	**14.** Kiruhura
15. Masaka	15. Kamuli	15. Kole	**15.** Kiryandongo
16. Mityana	16. Kapchorwa	16. Kotido	**16.** Kisoro
17. Mpigi	17. Katakwi	17. Lamwo	**17.** Kyegegwa
18. Mubende	18. Kibuku	18. Lira	**18.** Kyenjojo
19. Mukono	19. Kumi	19. Maracha	**19.** Masindi
20. Nakaseke	20. Kween	20. Moroto	**20.** Mbarara
21. Nakasongola	21. Luuka	21. Moyo	**21.** Mitooma
22. Rakai	22. Manafwa	22. Nakapiriprit	**22.** Ntoroko
23. Sembabule	23. Mayuge	23. Napak	**23.** Ntungamo
24. Wakiso	24. Mbale	24. Nebbi	**24.** Rubirizi
	25. Namayingo	25. Nwoya	**25.** Rukungiri
	26. Namutumba	26. Otuke	
	27. Ngora	27. Oyam	
	28. Pallisa	28. Pader	
	29. Serere	29. Yumbe	
	30. Sironko	31. Zombo	
	32. Soroti		
	33. Tororo		