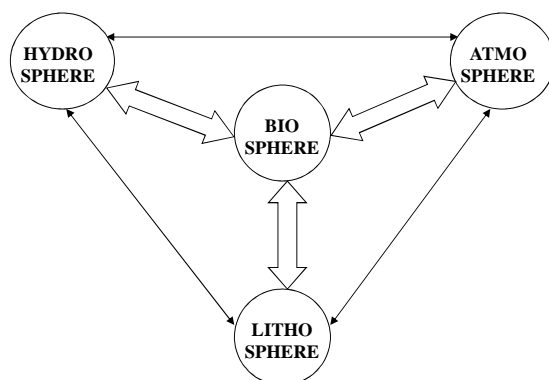


An Assessment of the Pull between Landuse and Landcover in Southwestern Nigeria and the Ensuing Environmental Consequences

R.O. OYINLOYE and J. OLOUKOI

INTRODUCTION



MAJOR COMPONENTS OF THE ENVIRONMENTAL SYSTEM

INTRODUCTION (cont'd)

We imagined that the entire land mass area of the earth was originally covered by vegetation

Then human population was small and the global environment was in its “ideal” state

As population increased and technology advanced:

- The quest for economic development gained ground
- The demand for forest/forest products and other vegetation resources kept rising

Land use for different purposes emerged

The landscape and the original vegetation cover continued to be modified – **now above threshold**

This study assessed the pull between landuse and landcover (LULC) in our contemporary time

- Highlighting some of the attendant environmental consequences/impacts
- Major Data: Landsat satellite multi-temporal datasets covering the study area

LANDUSE Vs LANDCOVER

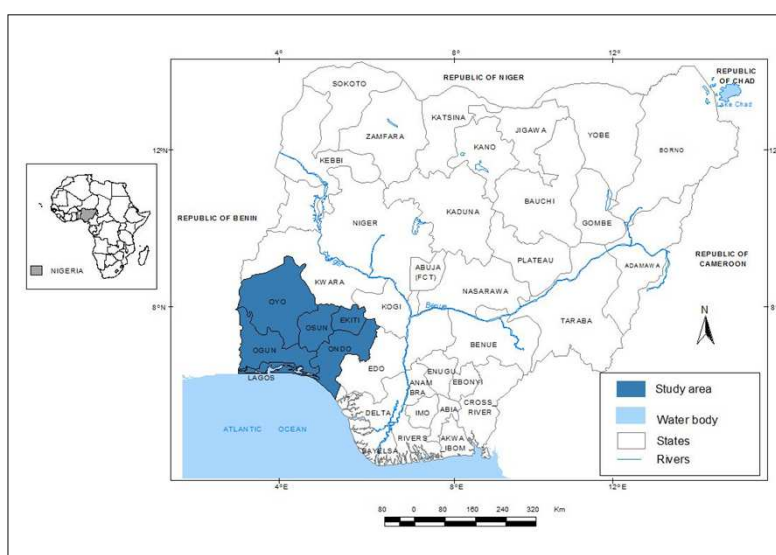
Landcover - defined here as the biological and physical features (including infrastructural facilities) that cover the earth's surface or portions thereof at a given point in time (Townshend, 1981 and FAO, 2005)

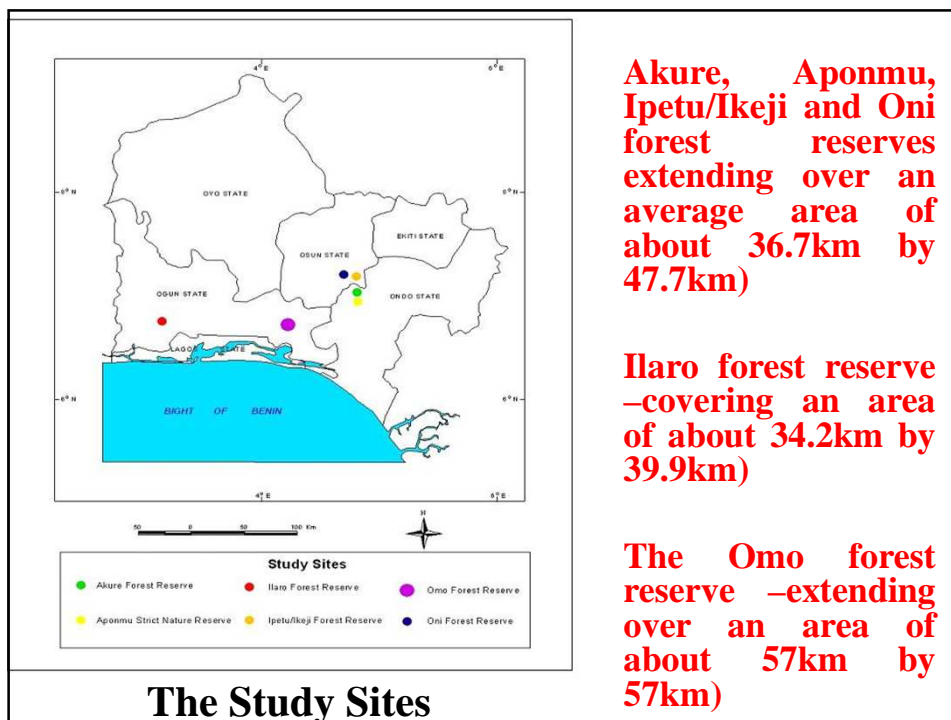
For example, forest types, lakes, built-up areas, grasslands/savannas, exposed rock surfaces, snow cover, ponds, games reserves, etc. are different types of landcover

Landuse – is the use to which a landcover is put for one purpose or the other in order to derive some benefits or perform some functions

It is characterized by the set of activities that humans undertake in a given landcover so as to meet their needs or maintain their environment (Townshend, 1981 and FAO, 2005)

THE STUDY AREA

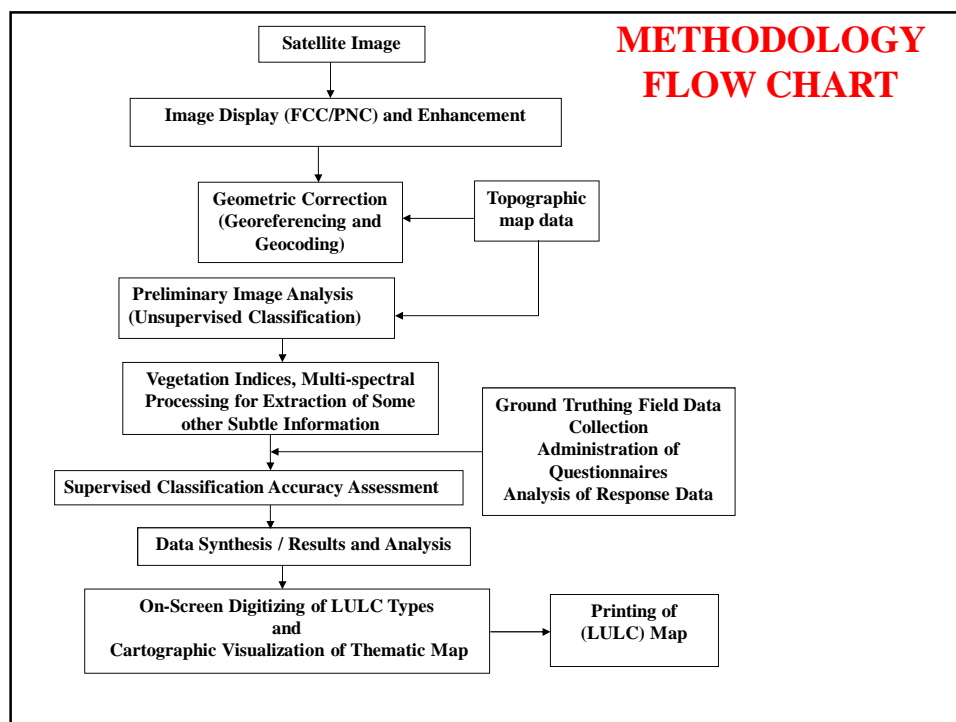




MATERIALS AND METHODS

DATA SOURCES

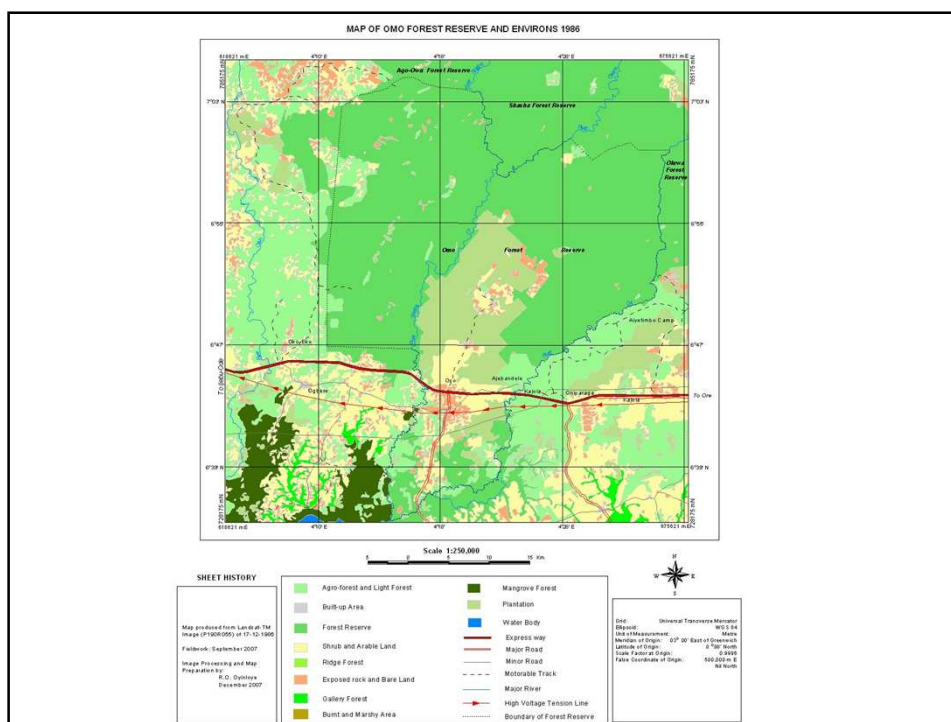
Landsat Scene	Acquisition Date	Location on WRS	Dimensions (in Pixels)	Actual Spatial Resolution
MSS	07/11/1972	P204R055	3796 x 4204	56m x 79m
TM	18/12/1984	P191R055	6389 X 6939	28.5m x 28.5m
TM	17/12/1986	P190R055	7327 x 7757	28.5 m x 28.5m
TM	05/01/1991	P190R055	5965 x 6967	28.5 m x 28.5m
ETM ⁺	06/02/2000	P191R055	8525 x 7512	28.5m x 28.5m
ETM ⁺	03/01/2002	P190R055	7549 x 8707	28.5 m x 28.5m

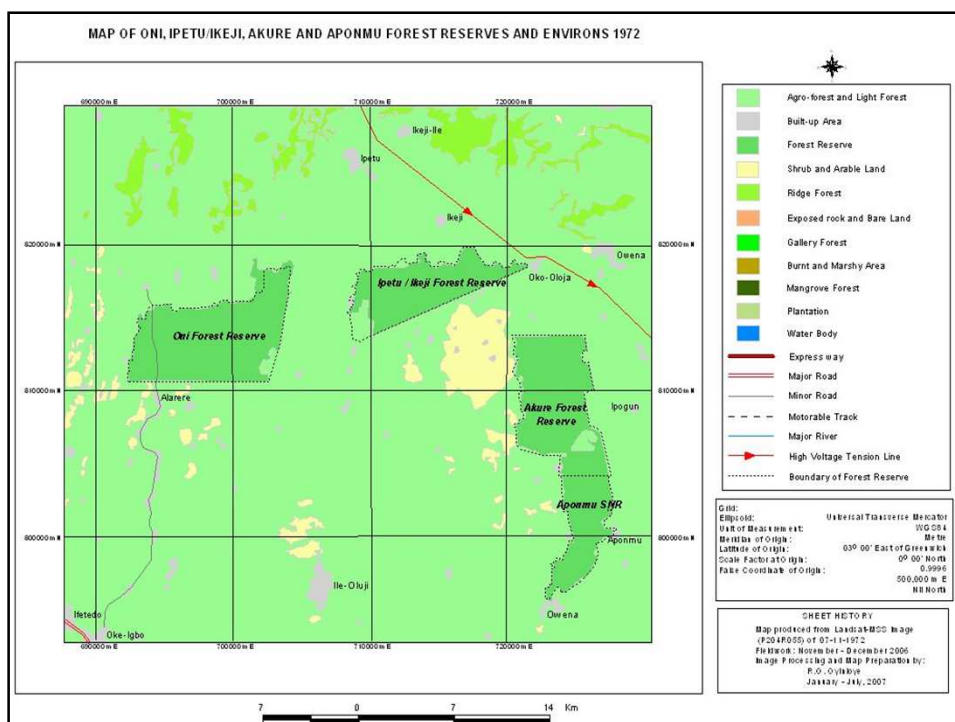
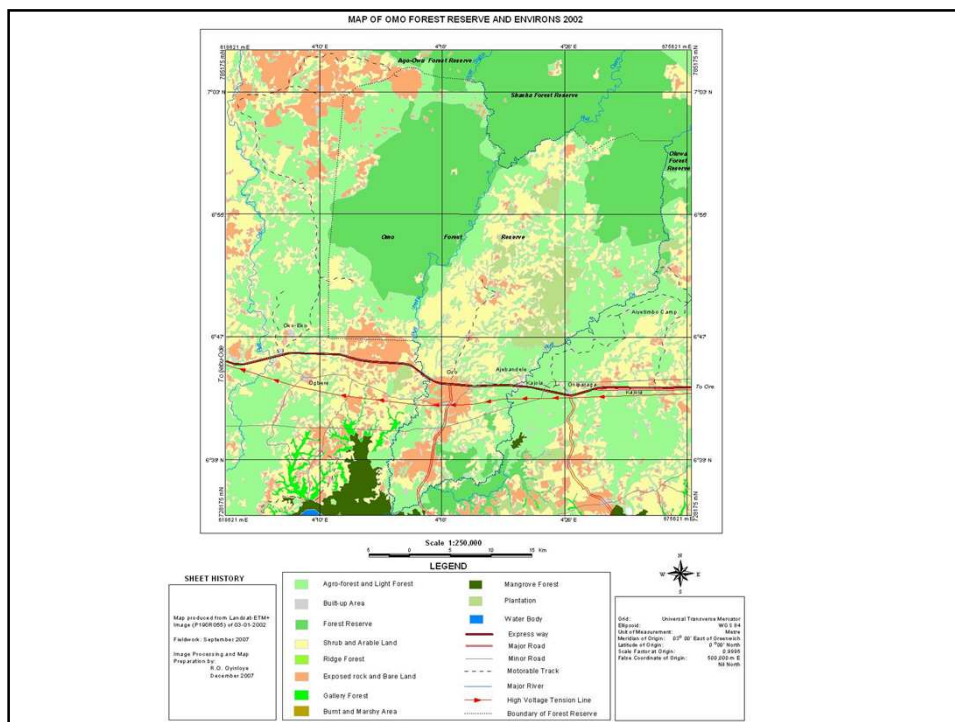


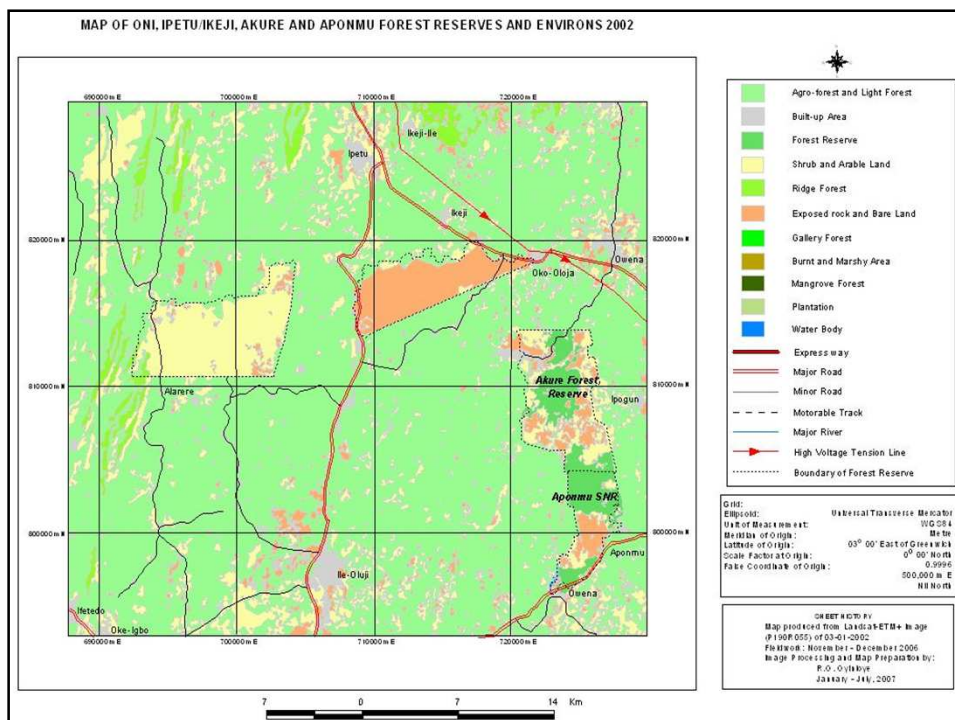
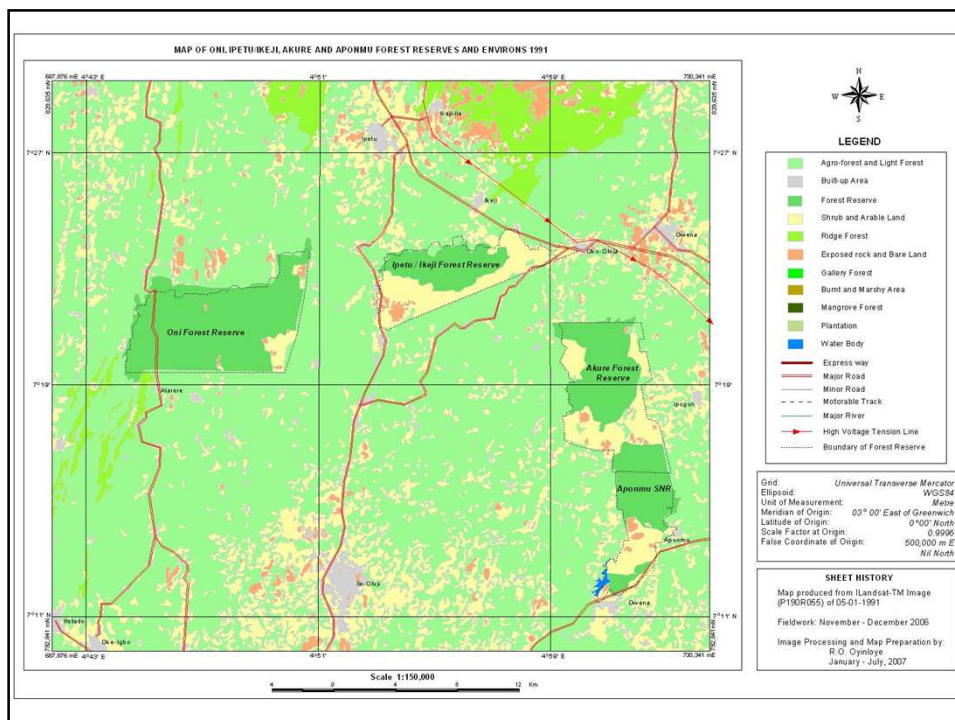
RESULTS AND ANALYSIS

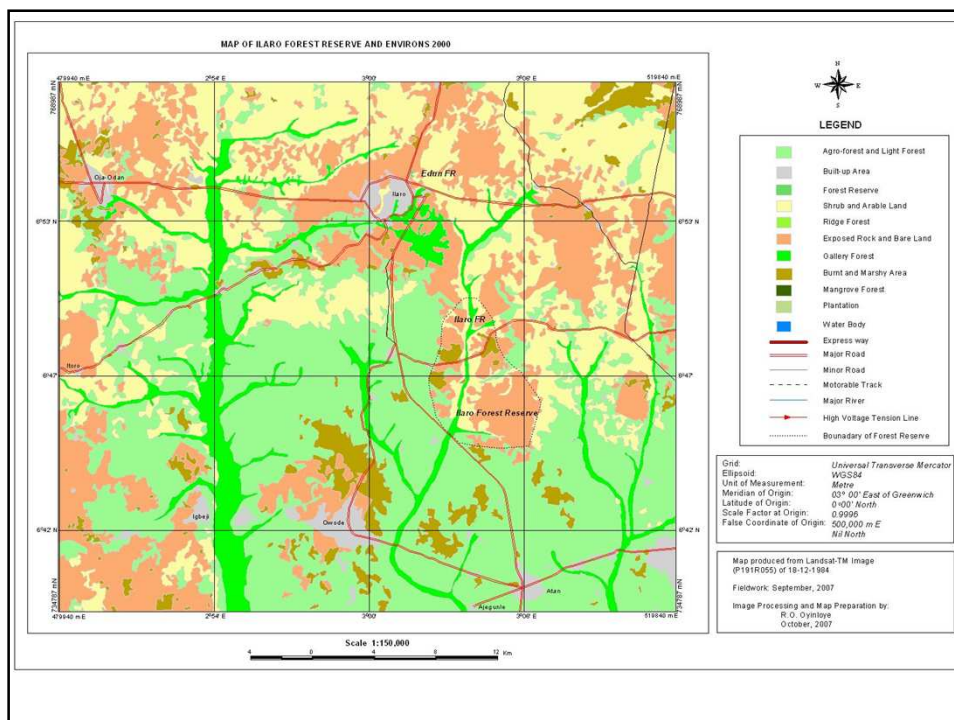
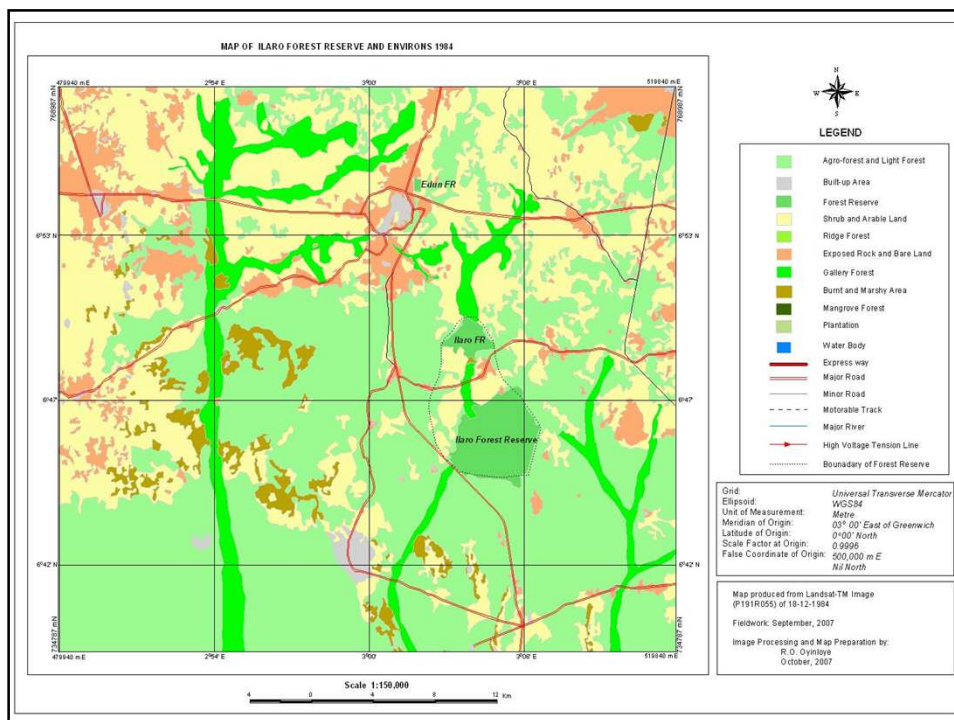
SELECTED LULC MAPS

- i. Landuse/landcover maps of Omo forest reserve and environs 1986 and 2002
 - The Omo forest reserve was originally 132,000ha (Oyinloye, 2008)
- ii. Landuse/landcover maps of Oni, Ipetu/Ikeji, Akure and Aponmu forest reserves and their environs 1972, 1991 and 2002
- iii. Landuse/landcover maps of Ilaro forest reserve and environs 1984 and 2000









Changes in the Areal Extent of Reserves from 1972 to 2002 and Projection to 2022

Forest Reserve	1972 Area (ha)	1986 Area (ha)	1991 Area (ha)	2002 Area (ha)	Annual Rate of Deforestation (1972 – 2002)	2012 Projection (ha)	2022 Projection (ha)
Akure	4,756.00	3,323.91	2,821.42	1,163.64	2.52%	864.07	564.49
Aponmu	2,276.00	1,619.59	1,402.82	1,143.80	1.66%	953.93	764.06
Ipetu/ Ikeji	3,490.00	2,191.64	1,178.08	Bare Land	2.21% (1972 – 1991)	Plantation	Plantation
Omo	132,000.00	95,651.99	68,900.00	49,855.45	2.07%	39,535.37	29,215.29
Oni	5,853.00	5,701.16	5,420.96	22.10	3.09%	409.06	161.24

Surface Area Dynamics of Ilaro Forest Reserve from 1972 to 2000 and Projection to 2022

Forest Reserve	1972 Area (ha)	1984 Area (ha)	2000 Area (ha)	Annual Rate of Deforestation (1972 – 1984)	2012 Projection (ha)	2022 Projection (ha)
Ilaro	4,844.00	2,681.33	Bare Land	3.72%	Plantation	Plantation

Computed Overall Average Rate of Deforestation for the forest reserves is 2.55% per annum

For computing the rate of deforestation per annum, e.g. between 1972 and 2002, the formula used is: $r = [(Area_{2002} - Area_{1972}) * 100] / [(Area_{1972} * (2002 - 1972))] \%$

Transition between Landuse and Landcover Types in Omo Forest Reserve and Environs from 1986 to 2002 through Change Detection

	ALF	BL	BUA	FR	P	SAL	WB	TOTALS 1986	GROSS LOSS
ALF	29,270.5	4,417.2	1,995.8	11,537.9	12,052.7	15,072.4	8.2	74,354.7	45,084.2
BL	1,603.9	6,057.5	1,099.3	333.9	998.3	5,258.5	2.8	15,354.2	9,296.7
BUA	270.9	774.9	901.9	60.6	176.6	741.9	2.8	2,929.6	2,027.7
FR	40,684.9	3,954.1	1,968.1	50,781.4	20,846.5	12,958.2	4.6	131,197.8	80,416.4
P	9,485.1	892.6	425.5	2,539.1	10,263.2	11,460.9	13.6	35,080.0	24,816.8
SAL	9,072.2	10,212.7	2,583.0	1,226.9	5,016.9	25,823.6	8.2	53,943.5	28,119.9
WB	3,566.6	519.1	648.3	4,660.2	1,331.5	1,132.4	182.4	12,040.5	11,858.1
TOTALS 2002	93,954.1	26,828.1	9,621.9	71,140.0	50,685.7	72,447.9	222.6	324,900.3	
GROSS GAIN	64,683.6	20,770.6	8,720.0	20,358.6	40,422.5	46,624.3	40.2		

Actual Total Surface Area of Image = 324,900ha

ALF: Agro-forest/Light forest; BL: Bare land; BUA: Built-up area; FR: Forest reserve; P: Plantation;
SAL: Shrub and arable land; WB: Water body

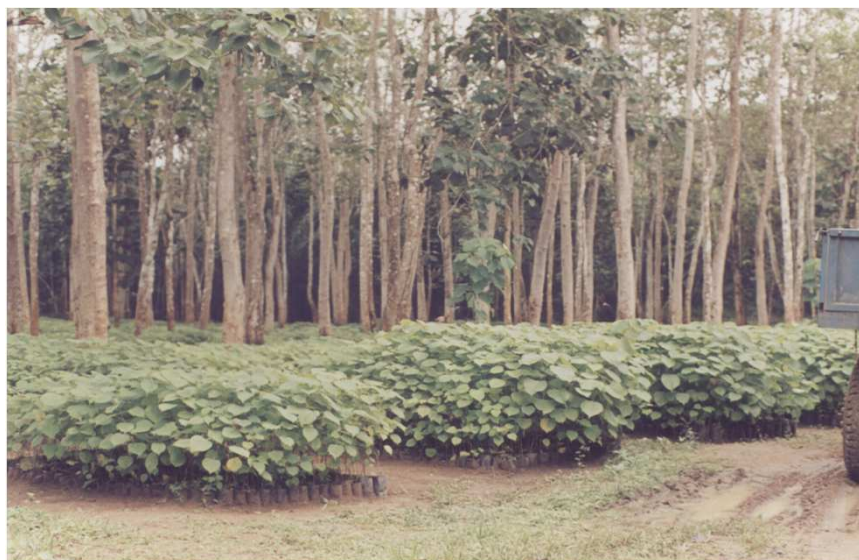


Plate 1: Teak and Gmelina Nursery Site within Omo Forest Reserve



Plate 2: On-Going Clearing for farming within the Remaining Natural Vegetation of Omo Forest Reserve



Plate 3: Vast Cassava Farmland Sharing Boundary with Teak Plantation within Omo Forest Reserve

ENVIRONMENTAL CONSEQUENCES / IMPACTS

LULC change appears to be one of the most striking human activities that has strong link with global warming and climate change:

- i. Climate change is a real phenomenon and it is threatening to cause the largest refugee crisis in human history. E.g. in Africa and Asia in the next century if current trend is not addressed
- ii. Climate change resulting in flash floods and wild bush fires causing significant loss of flora and fauna, loss of fertile soil, extreme weather events, drought, water scarcity, desertification, famine, loss of lives and properties, etc. E.g. Devastating floods in Pakistan (2010), Nigeria and China (2012), Australia (2013)
- iii. Diminishing and erratic volume and distribution of rainfall is another consequence of climate change
- iv. Global warming and climate change are causing instability of the ecological systems in the various ecoregions. They are also causing instability in the major environmental systems – Atmosphere, Biosphere, Hydrosphere and Lithosphere

CONCLUSION

This study has assessed the competition between land use and land cover in southwestern Nigeria and highlighted the ensuing environmental impacts using Landsat multi-temporal data sets acquired between 1972 and 2002

The data sets were processed and analyzed using ILWIS version 3.3 software

The major land use and land cover types have been identified and presented in map form for better visual perception and in tabular form for complete understanding

The land use types are fast colonizing the forest reserve land cover type in the study area

From the projection made, it has been observed that there would be no forest cover in the area if no measure is taken to check or control the land use practices within the next two to three decades

The study has shown that there is urgent need to embark on environmental sustainability programmes globally to avert impending life-extinguishing disasters in the next 1,000 years.

WE
THANK
YOU
ALL
FOR
YOUR
ATTENTION