Land Accounts (SEEA-CF & EA)

Day 5: Understanding Rwanda's Land Resources

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Today's Agenda

Morning (09:30-13:00)

- Land use vs land cover
- Asset tables explained
- Change matrices
- Rwanda's land data sources

Afternoon (14:00-16:00)

- Practical exercise
- Building a land account
- Interpreting change data

Today's Goal

Create Sample Land Account Tables for Rwanda

Why Do We Need Land Accounts?

Land is Rwanda's Most Important Asset

- Rwanda is one of Africa's most densely populated countries
- Land supports agriculture, housing, forests, and water
- Climate change is affecting how land can be used

Land accounts help answer:

1. How much land do we have in each category?
2. How is land use changing over time?
3. Are we losing forests? Gaining farmland?
4. How does land change affect water and climate?

What Are Land Accounts?

Simple Definition

Land accounts track how much land exists in different categories (forests, farms, cities) and how this changes over time.

Two frameworks we use:

SEEA-CF

Central Framework

- Focuses on land as asset
- Measures area in hectares
- Tracks physical changes

SEEA-EA

Ecosystem Accounting

- Focuses on ecosystems
- Measures condition
- Values ecosystem services

Today we focus on SEEA-CF physical accounts

Key Concept: Land Use vs Land Cover

Land Cover

What you SEE on the land

- Trees / Forest
- Grass
- Water
- Buildings
- Bare soil

Observed from satellites

Land Use

What the land is USED for

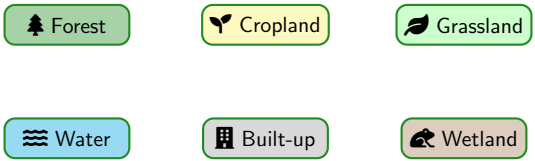
- Agriculture
- Residential
- Protected area
- Commercial
- Transport

Determined by planning/policy

Example

A piece of land can be COVERED by trees but USED as a protected national park

Rwanda's Main Land Cover Types



Rwanda's land (approximate):

- Cropland: ∼50% (mainly for food crops)
- Forest: ∼30% (includes plantations)
- Grassland & Wetland: ∼15%
- Built-up & Other: ∼5%

The Land Asset Table

What is it?
A table showing how much land exists in each category at the start and end of a period.

Land Type	Opening Stock	Additions	Reductions	Closing Stock
Forest	100 ha	+5 ha	-3 ha	102 ha
Cropland	200 ha	+10 ha	-8 ha	202 ha
Urban	50 ha	+4 ha	0 ha	54 ha
Total	**350 ha**			**358 ha**

Key equation:
Closing Stock = Opening Stock + Additions - Reductions

The Land Change Matrix

What is it?

Shows how land changes FROM one type TO another type.

From ↓ / To →	Forest	Cropland	Urban	Total Out
Forest	–	8 ha	2 ha	10 ha
Cropland	5 ha	–	3 ha	8 ha
Urban	0	0	–	0
Total In	5 ha	8 ha	5 ha	

Reading the matrix:

- Red: Land converted away (loss)
- Green: Land converted to (gain)
- Rows show what land LEFT that category
- Columns show what land ENTERED that category

Why the Change Matrix Matters

The change matrix tells a story:

Warning Signs:

- Forest → Cropland *(deforestation)*
- Wetland → Urban *(ecosystem loss)*
- Cropland → Bare land *(land degradation)*

Positive Signs:

- Bare land → Forest *(reforestation)*
- Degraded → Restored *(land restoration)*
- Planning → Protected *(conservation)*

Link to Climate & Water

Forest loss affects rainfall patterns and carbon storage.
Wetland loss affects water storage and flood control.

Coffee Break

11:00 – 11:15

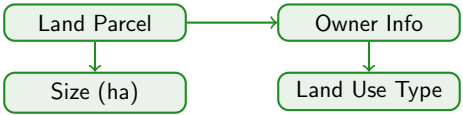
Rwanda's Land Data Sources

Where does land data come from?

1. **Rwanda Land Management Authority (RLMUA)**
   - Official land registry (cadastre)
   - Land use master plans
   - Parcel-level data
2. **Rwanda Forestry Authority (RFA)**
   - Forest cover data
   - Plantation records
3. **Satellite/Remote Sensing**
   - Land cover maps (ESA, Copernicus)
   - Change detection over time

The Land Registry (Cadastre)

What is the cadastre?
The official record of all land parcels in Rwanda.



For NCA, the cadastre provides:

- Total area by land use category
- Changes when land use is officially changed
- Administrative boundaries (districts, sectors)

Satellite Data for Land Cover

Satellites show us what's actually on the ground

Advantages:

- Covers entire country
- Regular updates (yearly)
- Consistent methodology
- Detects actual changes

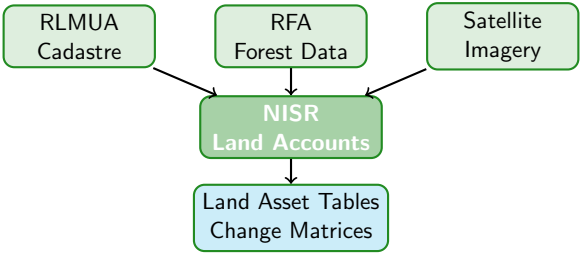
Common Sources:

- Copernicus (EU)
- Landsat (USA)
- Sentinel (ESA)
- National surveys

Important

Satellite data shows land COVER (what you see)
Cadastre shows land USE (official designation)
Both are needed for complete land accounts!

Combining Data Sources



NISR's role:

- Collect data from all sources
- Reconcile differences
- Apply SEEA standards
- Produce official accounts

Land Accounts and National Planning

How do land accounts support NST2?

1. **Track Green Growth Progress**
   - Are we increasing forest cover?
   - Is urban expansion sustainable?
2. **Support Land Use Planning**
   - Identify areas of rapid change
   - Inform zoning decisions
3. **Monitor Environmental Commitments**
   - 30% forest cover target
   - Wetland protection
   - Climate adaptation

Lunch Break

13:00 – 14:00

Building a Land Account

What we will do:

1. Look at sample data for a district
2. Complete a land asset table
3. Build a change matrix
4. Interpret the results

Sample Data: Musanze District

Land cover data for Musanze District (sample)

Land Cover Type	2020 (ha)	2023 (ha)
Forest	15,000	14,200
Cropland	25,000	26,500
Grassland	5,000	4,300
Wetland	3,000	2,800
Urban/Built-up	2,000	2,200
Total	**50,000**	**50,000**

Note: Total stays the same – land doesn't disappear, it changes category!

Exercise Step 1: Calculate Changes

Fill in the "Net Change" column:

Land Type	2020	2023	Net Change
Forest	15,000 ha	14,200 ha	_____
Cropland	25,000 ha	26,500 ha	_____
Grassland	5,000 ha	4,300 ha	_____
Wetland	3,000 ha	2,800 ha	_____
Urban	2,000 ha	2,200 ha	_____

Formula: Net Change = 2023 value - 2020 value

Take 3 minutes to complete this...

Exercise Step 1: Answers

Land Type	2020	2023	Net Change
Forest	15,000 ha	14,200 ha	**-800 ha**
Cropland	25,000 ha	26,500 ha	**+1,500 ha**
Grassland	5,000 ha	4,300 ha	**-700 ha**
Wetland	3,000 ha	2,800 ha	**-200 ha**
Urban	2,000 ha	2,200 ha	**+200 ha**

What does this tell us?

- Forest, grassland, and wetland are decreasing
- Cropland and urban areas are increasing
- Total change sums to zero (land is converted, not created)

Exercise Step 2: Interpreting the Change Matrix

Given this change matrix, answer the questions:

From ↓ / To →	Forest	Crop	Grass	Wetland	Urban
Forest	–	700	0	0	100
Cropland	0	–	0	0	100
Grassland	0	600	–	0	0
Wetland	0	200	0	–	0

Questions:

1. How much forest was converted to cropland?
2. What is the main source of new cropland?
3. How much wetland was lost?

Discuss with your neighbor...

Exercise Step 2: Answers

1. **How much forest was converted to cropland?**
   700 hectares (row: Forest, column: Crop)

2. **What is the main source of new cropland?**
   Forest (700 ha) followed by Grassland (600 ha)

3. **How much wetland was lost?**
   200 hectares converted to cropland

Policy Implication

Most new cropland comes from forest and grassland conversion.
This has implications for carbon storage and water retention.

Interpreting Results for Policy

What do these land accounts tell policymakers?

Concerns:

- Forest loss of 800 ha
- Wetland shrinking
- Agricultural expansion into natural areas

Actions Needed:

- Strengthen forest protection
- Intensify existing cropland
- Protect remaining wetlands
- Monitor urban sprawl

Link to Climate & Water

- Less forest = less carbon stored = more climate impact
- Less wetland = less water storage = flood risk

Next Steps for Rwanda's Land Accounts

Building the Full System:

1. **Establish data sharing**
   - MOU between NISR, RLMUA, RFA
   - Regular data updates (annual)
2. **Standardize classifications**
   - Align with SEEA categories
   - Create mapping from national categories
3. **Produce first official accounts**
   - Pilot for 2-3 districts
   - Scale to national level

Today's Output: Sample Land Account Tables for Rwanda

Today's Key Messages

What We Learned

1. **Land cover** = what you see; **Land use** = what it's used for
2. **Asset tables** show stocks at different times
3. **Change matrices** show how land converts between types
4. Rwanda has good data from **RLMUA, RFA, and satellites**
5. Land accounts support **NST2 green growth** monitoring

Murakoze Cyane!

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