The Evolution of Forestry

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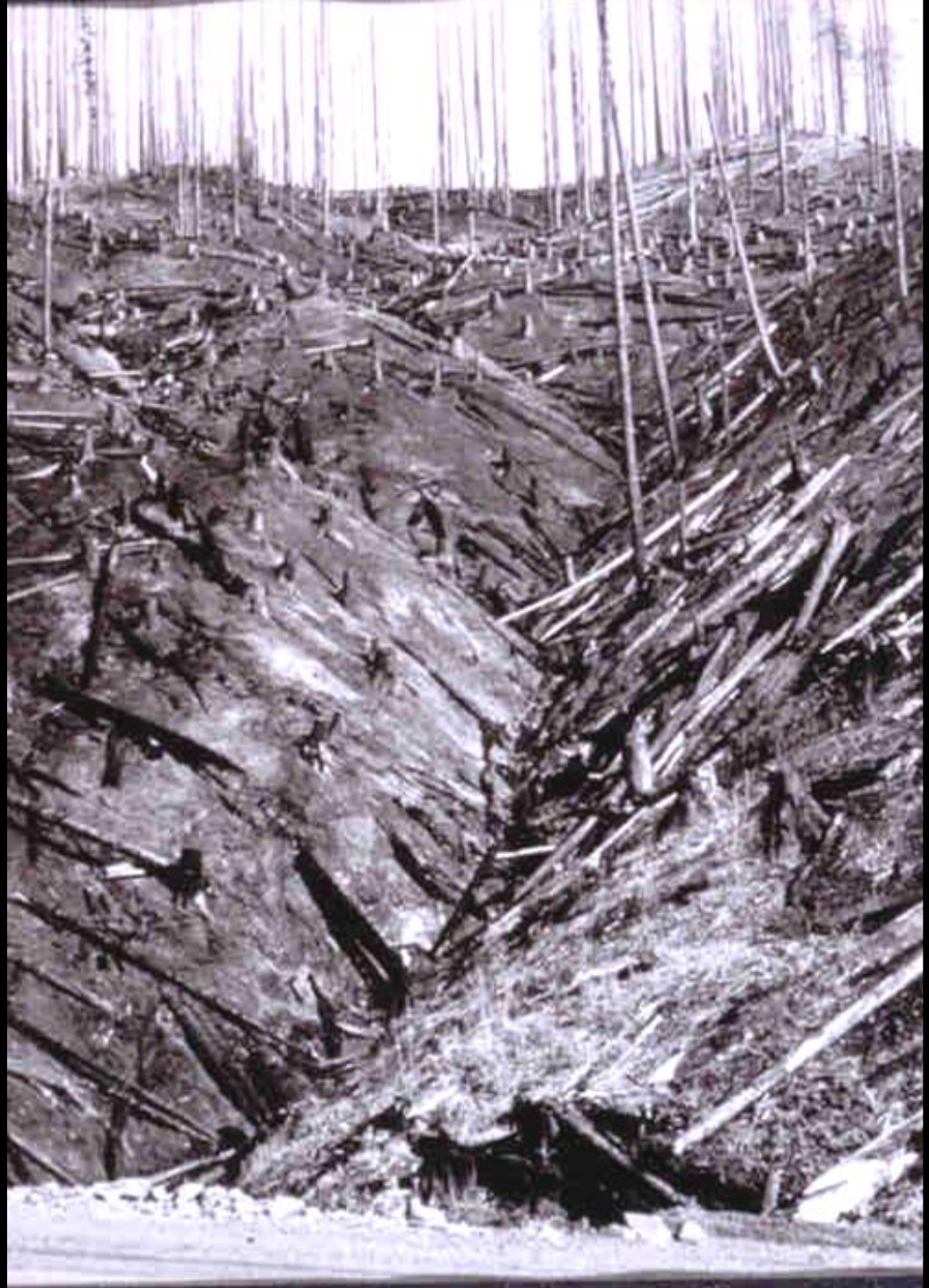
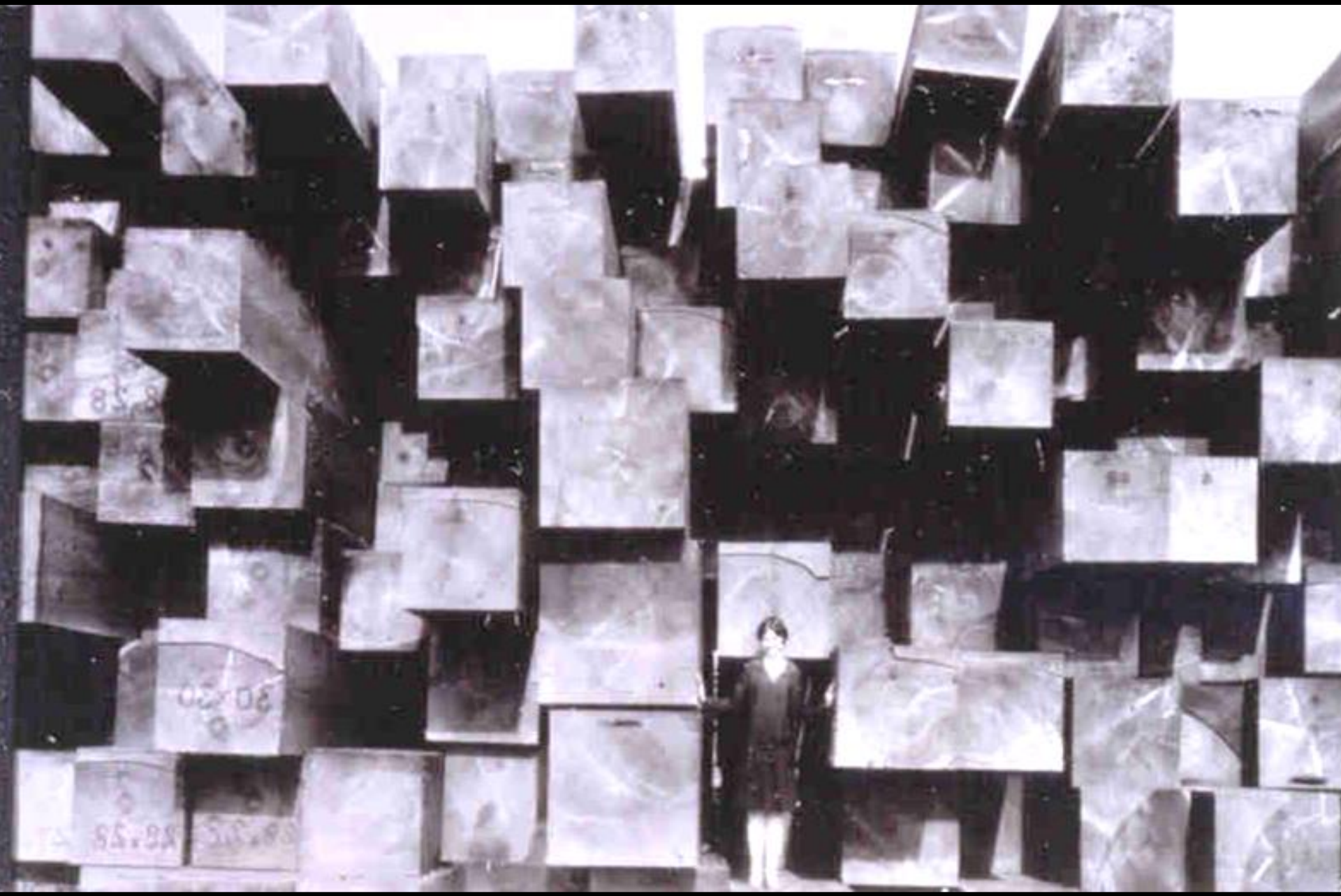
Kiev, Ukraine

September 30, 2010




PULP & PAPER
CO.



SILVICULTURAL OPERATIONS

PRESCRIBED FIRE

SITE PREPARATION

PLANTING

PRUNING

THINNING

HARVESTING


3 15:03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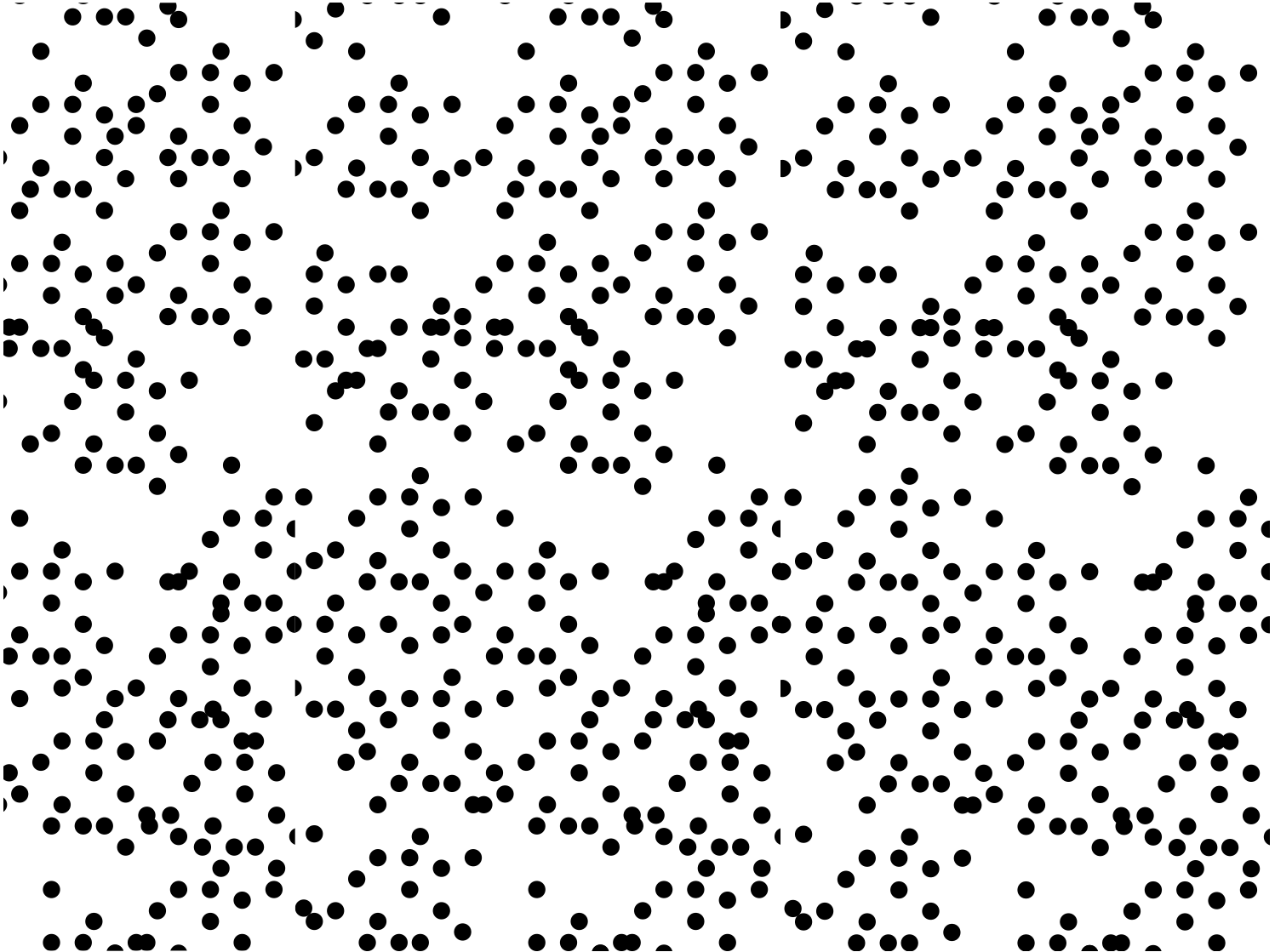
Ecosystems as a Hierarchy

For example: Individual Plants or Animals

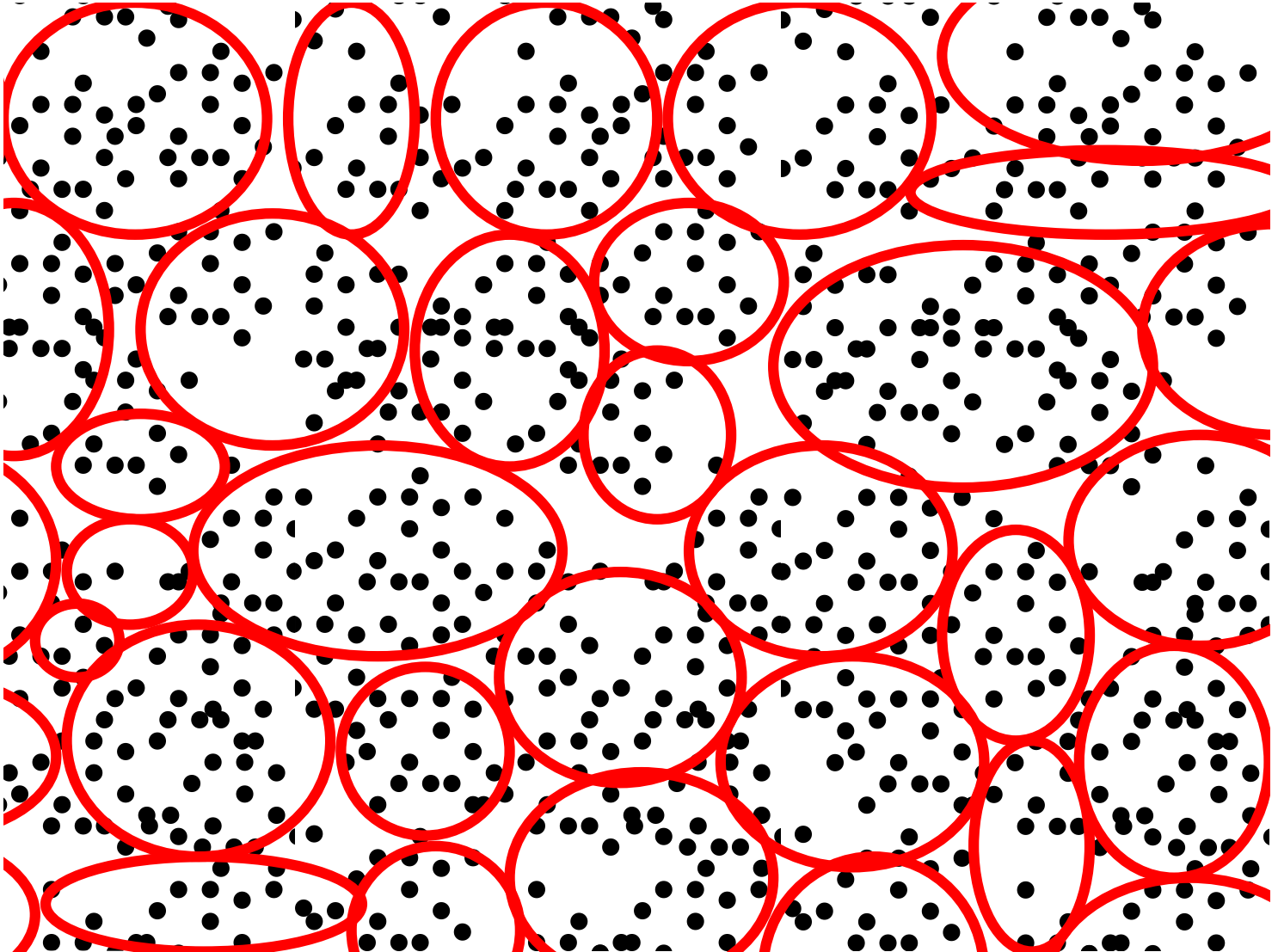


Ecosystems as a Hierarchy

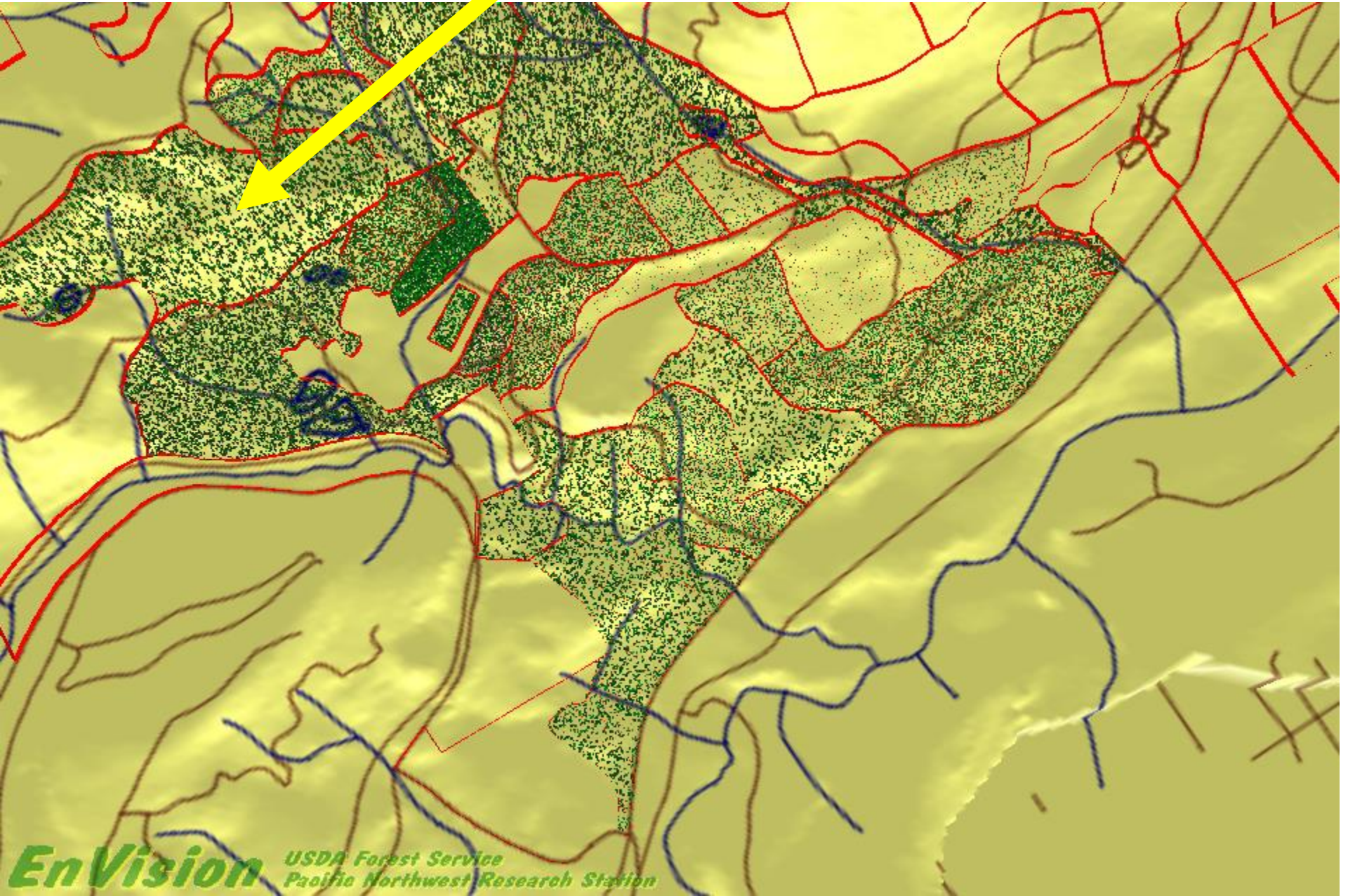
For example: Individual Plants or Animals

Ecosystems as a Hierarchy

We Group Similar Individuals

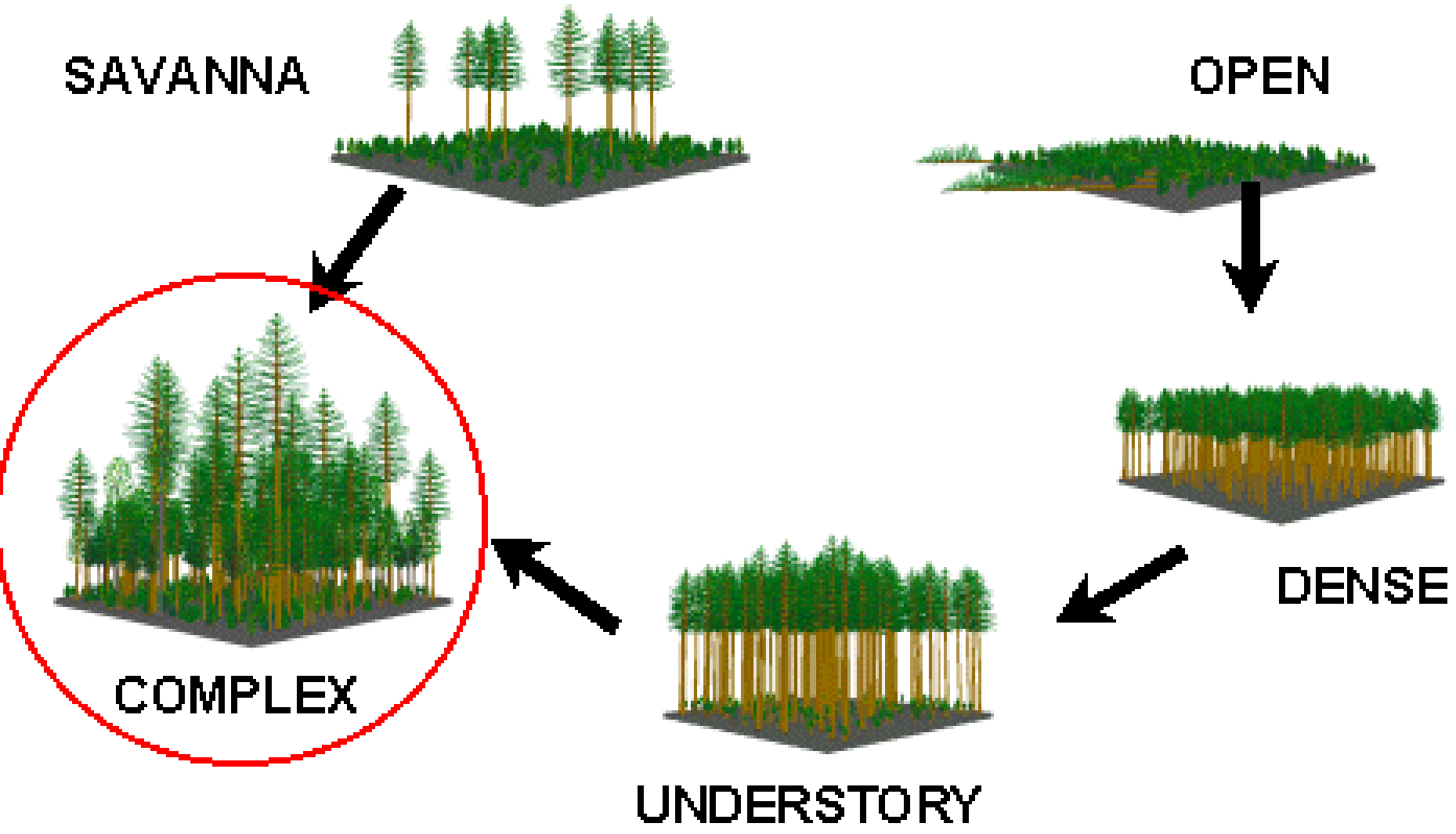


We Group Similar Individuals into Stands



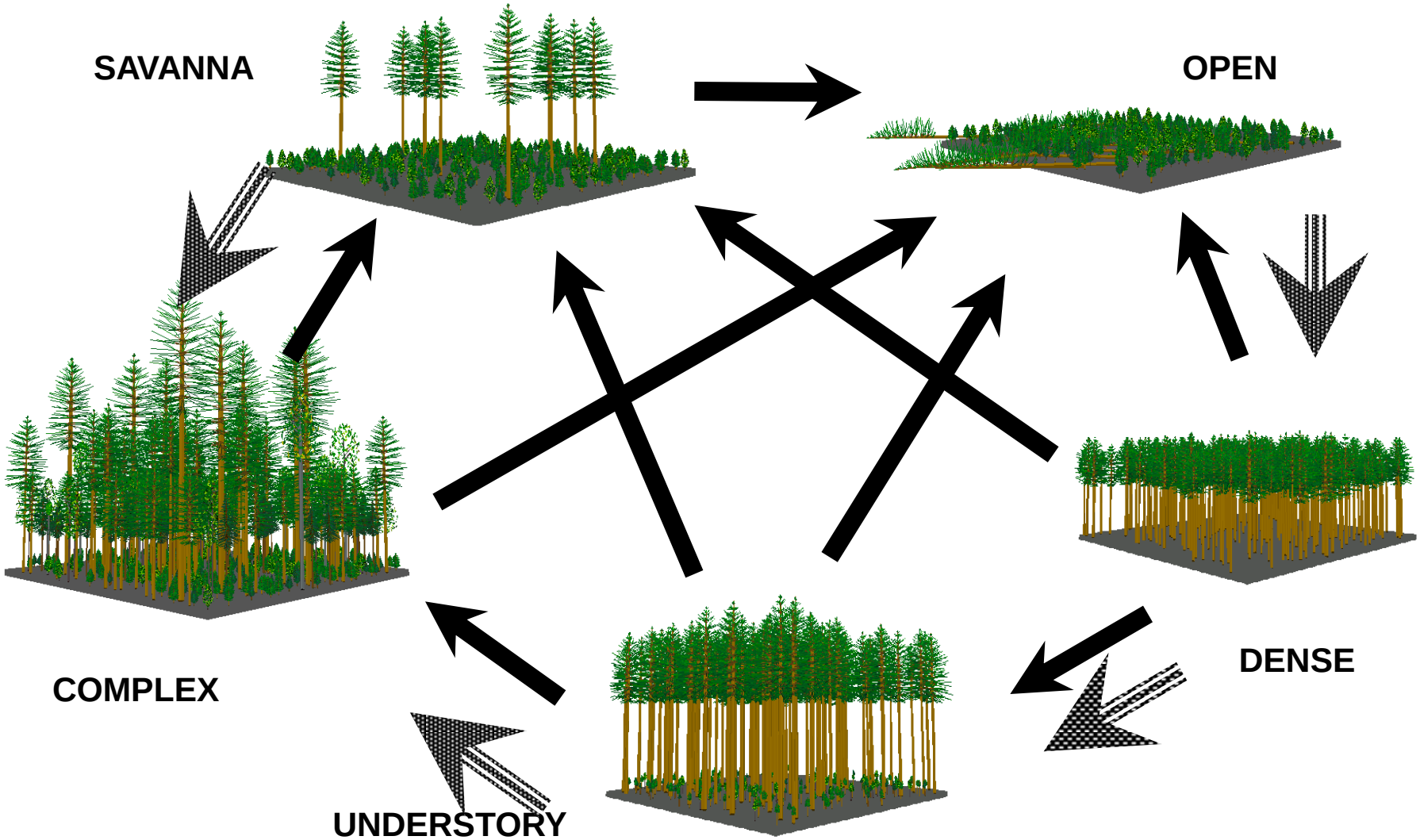
OUTDATED SCIENTIFIC PARADIGM:

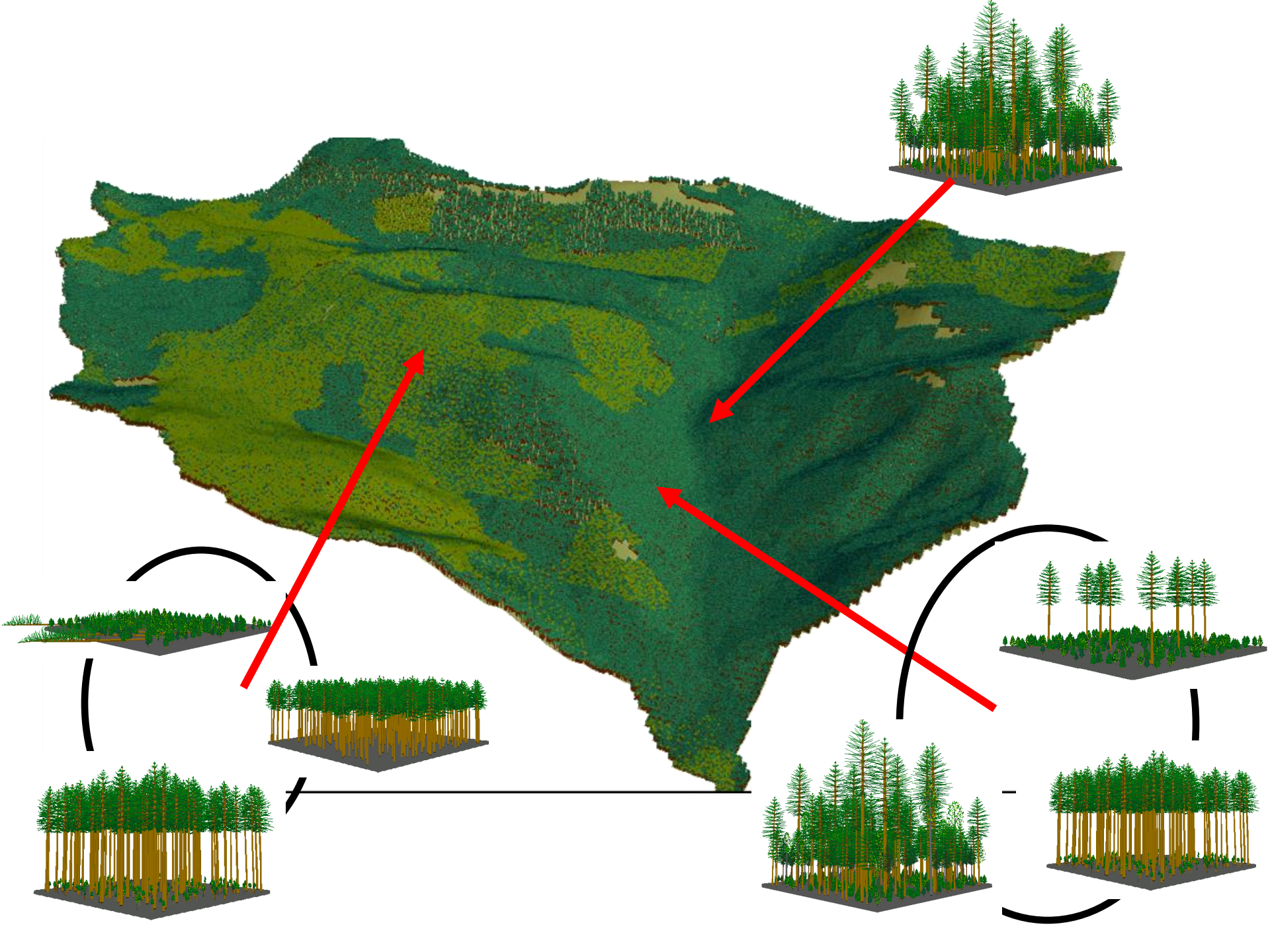
Forests grew to stable "old growth" ("complex")



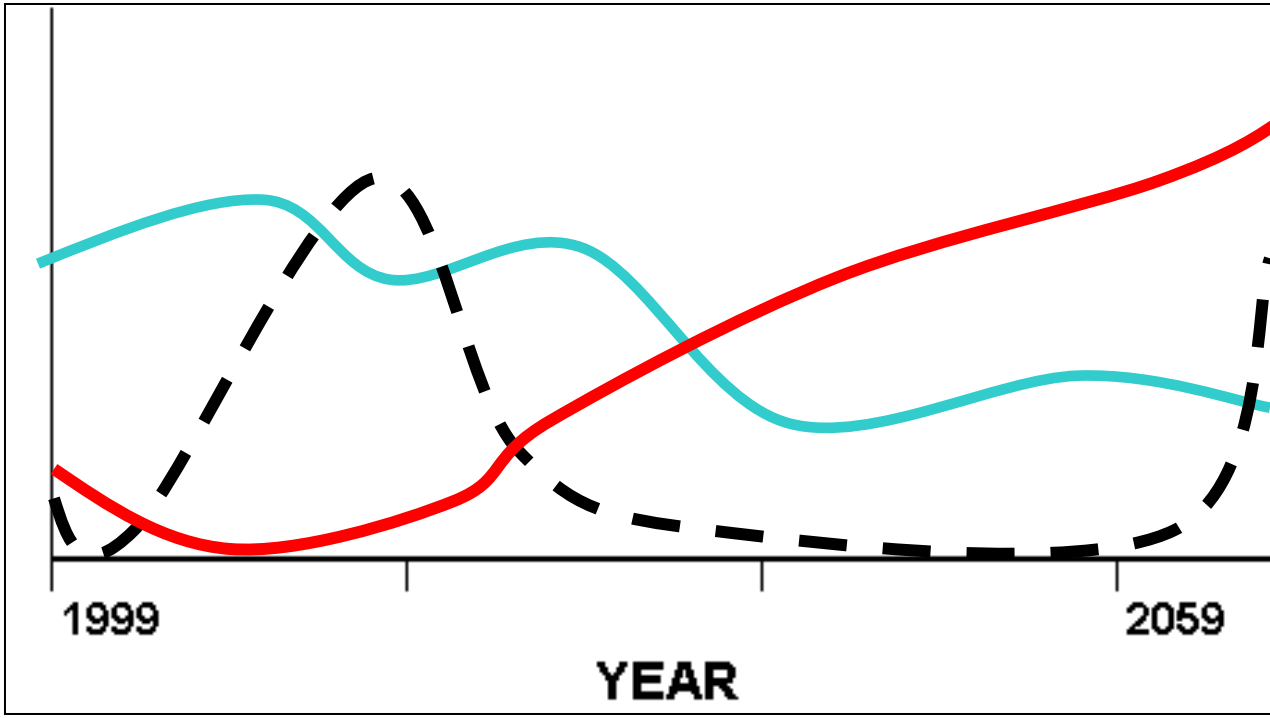
NEW SCIENTIFIC PARADIGM:

Forests are dynamic. They change with growth and disturbances. They contain many structures.





Objectives
(values)
Biodiversity?
Income?
Water quality?
Habitats?
Employment?
Other?

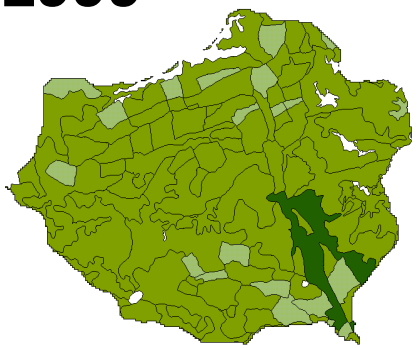


What Activities?

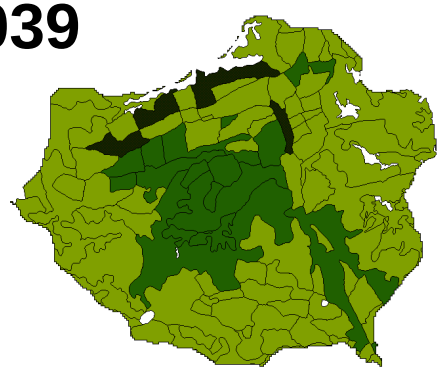
When?

Where?

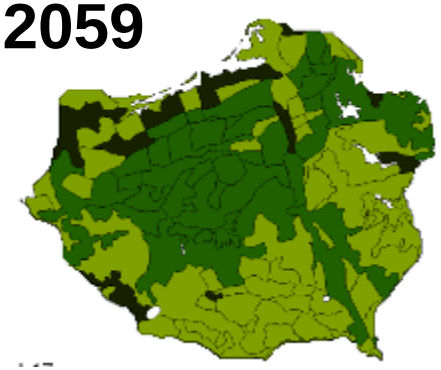
1999

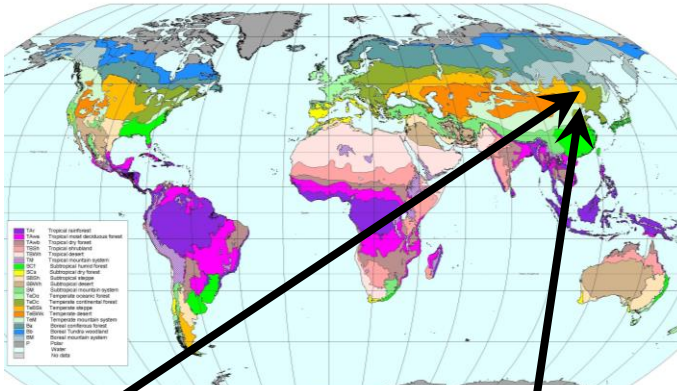


2039

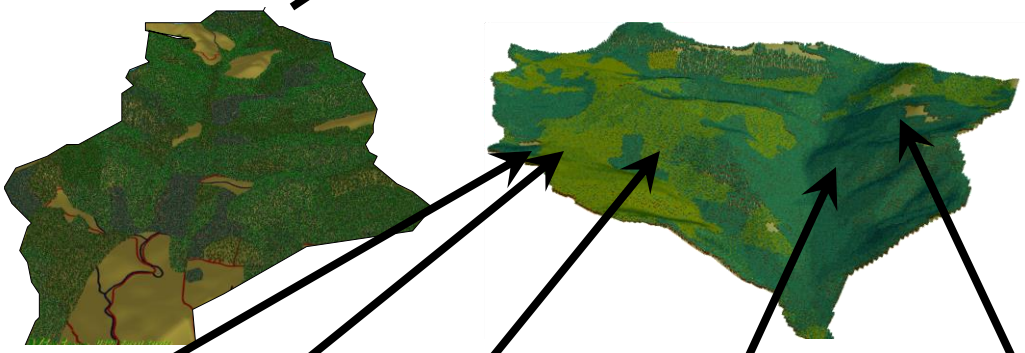


2059

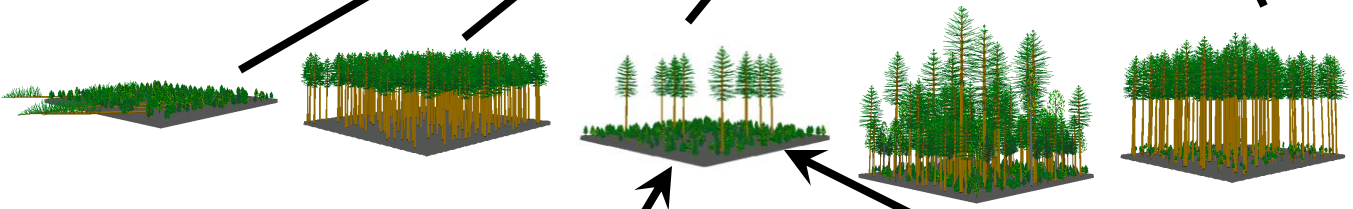




Global
Ecological Zones



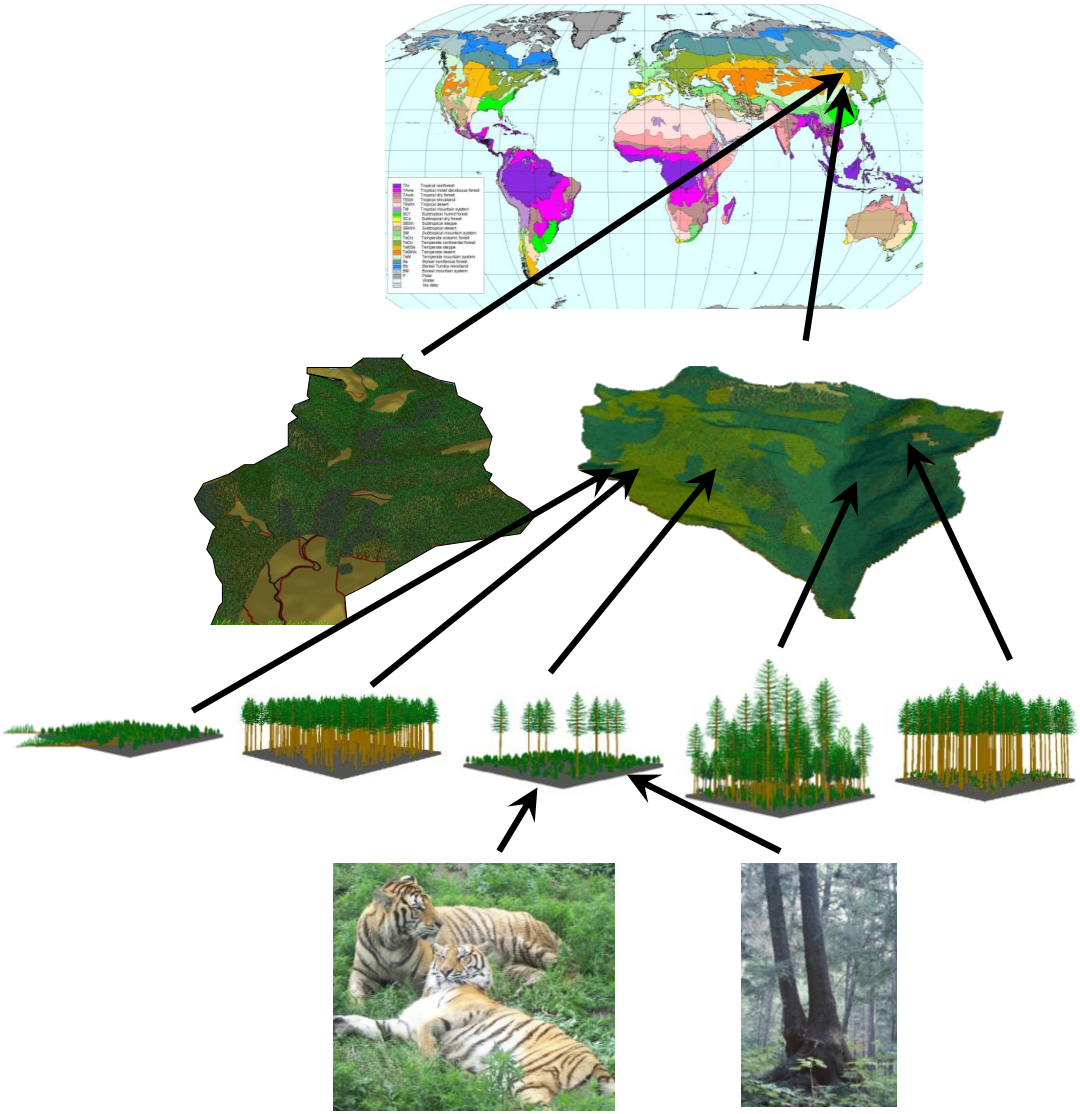
Landscapes



Stands

Individual
Organisms

“Classic Forestry”



Global
Ecological Zones

Landscapes

Stands

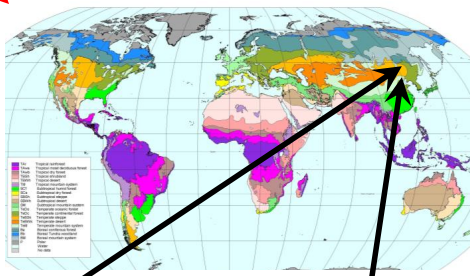
Individual
Organisms

Agriculture Changes

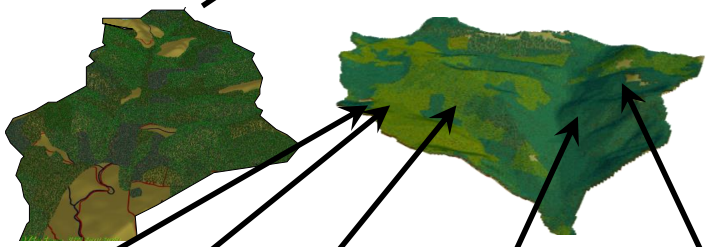
Urban Changes

Social Changes

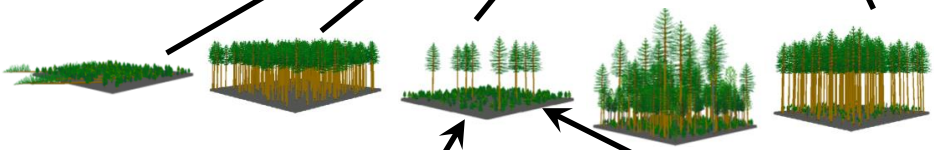
Technology Changes



Global Ecological Zones



Landscapes



Stands

Individual Organisms

AGRICULTURE REVOLUTION

1. RURAL SUBSISTANCE

2. MARGINAL LANDS ABANDONED

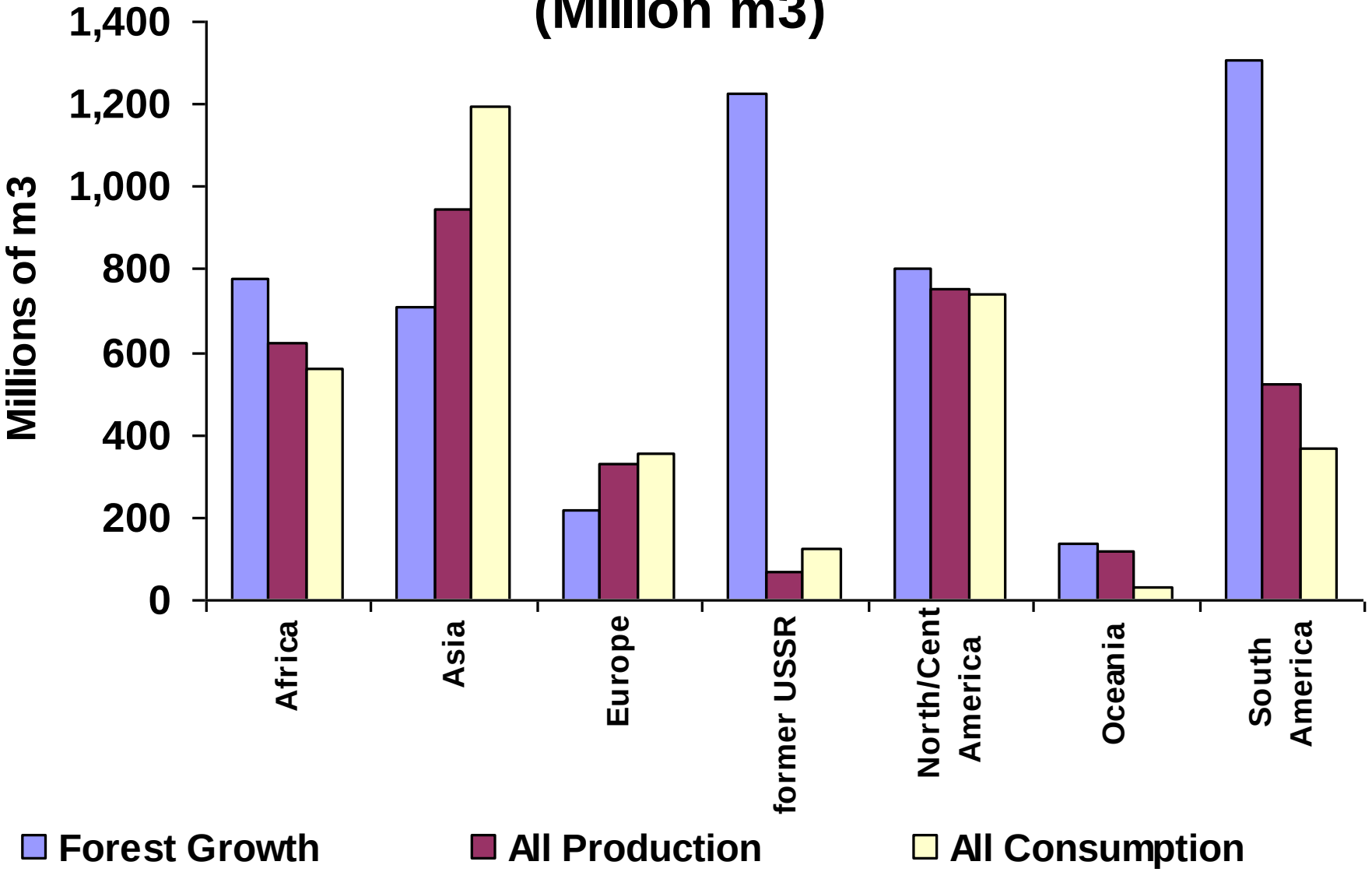
3. PEOPLE MOVE TO CITIES

Rapid, Inexpensive Transportation

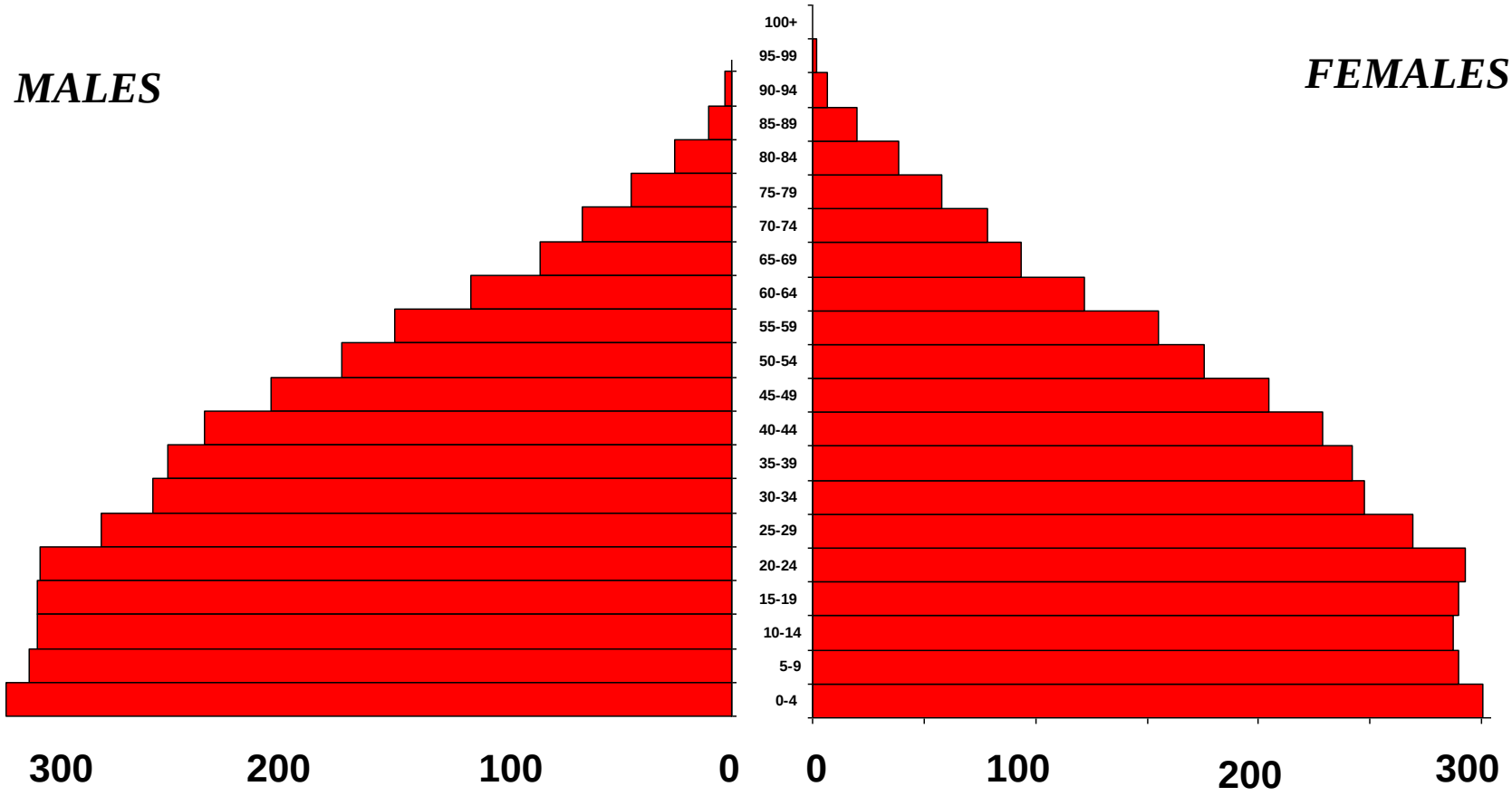
Fewer Farm Animals Needed

Global Shipping of Wood

Forest Growth (estimated 1.5 m3/ ha/yr), Total Wood Production & Consumption (Million m3)



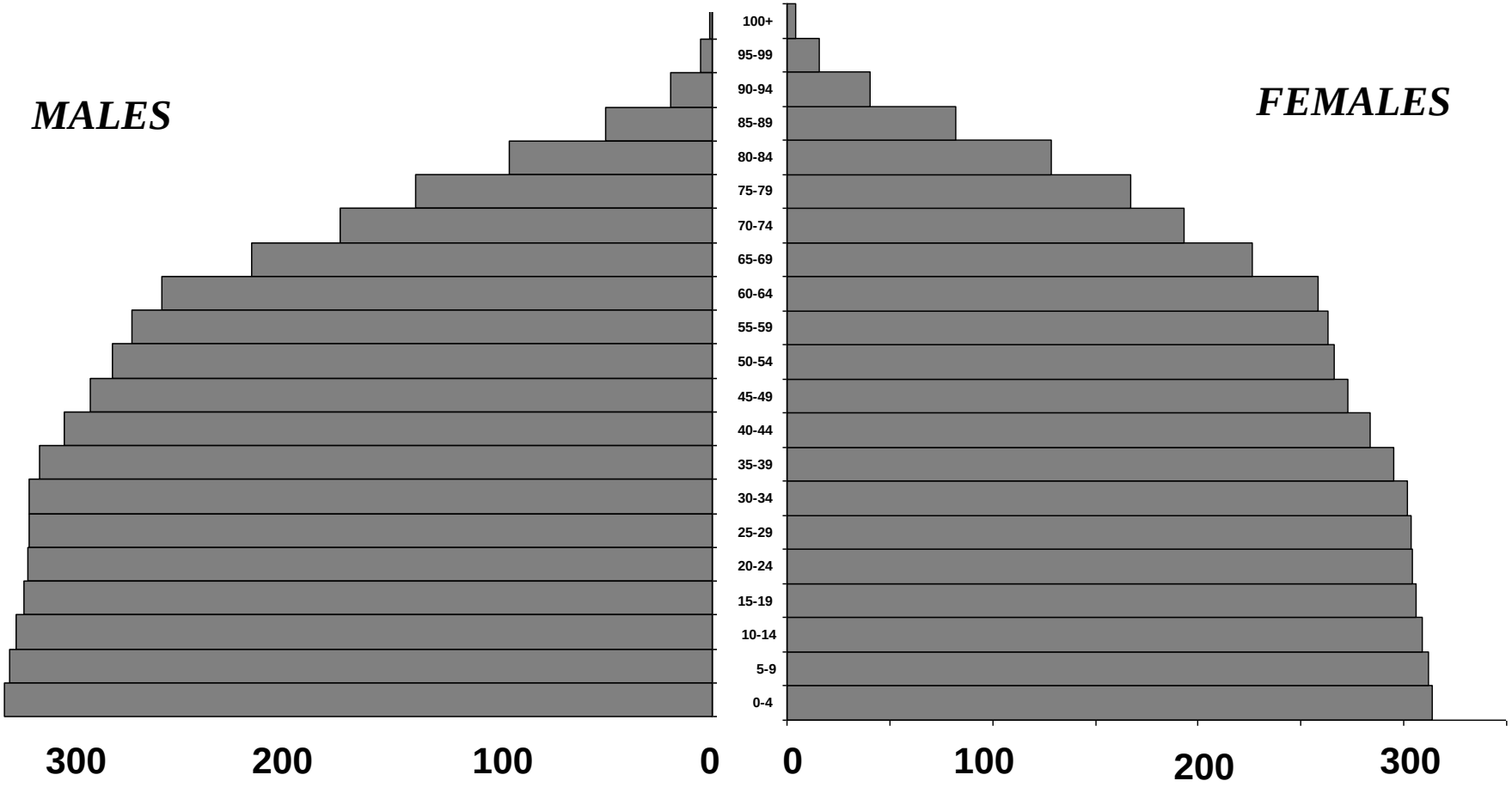
World Population Pyramid, 2010



<<< MILLIONS OF PEOPLE >>>

By 5-year age classes

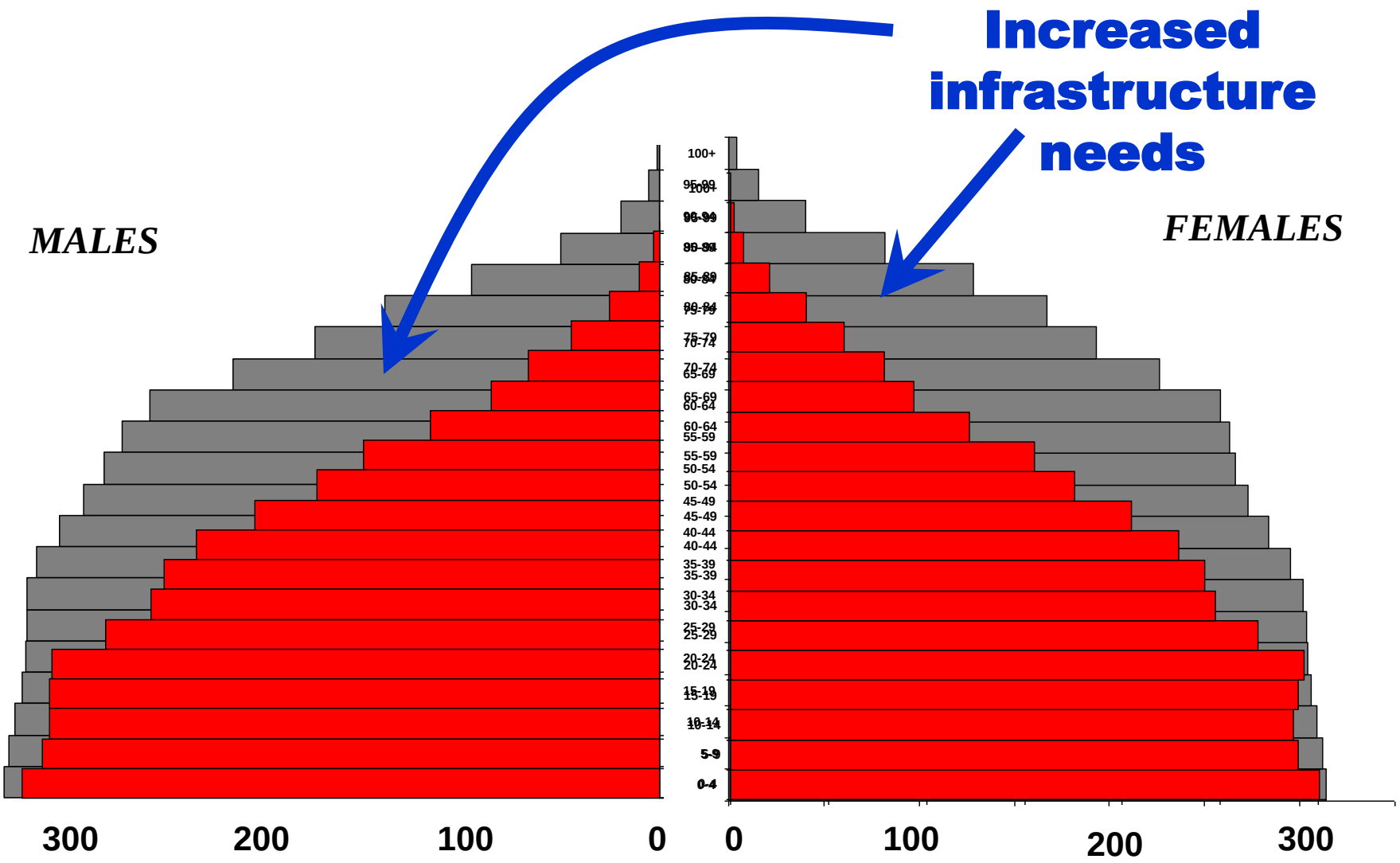
World Population Pyramid, 2050



<<< MILLIONS OF PEOPLE >>>

By 5-year age classes

World Population Pyramids, 2010 (red) & 2050 (grey)



<<< MILLIONS OF PEOPLE >>>

By 5-year age classes

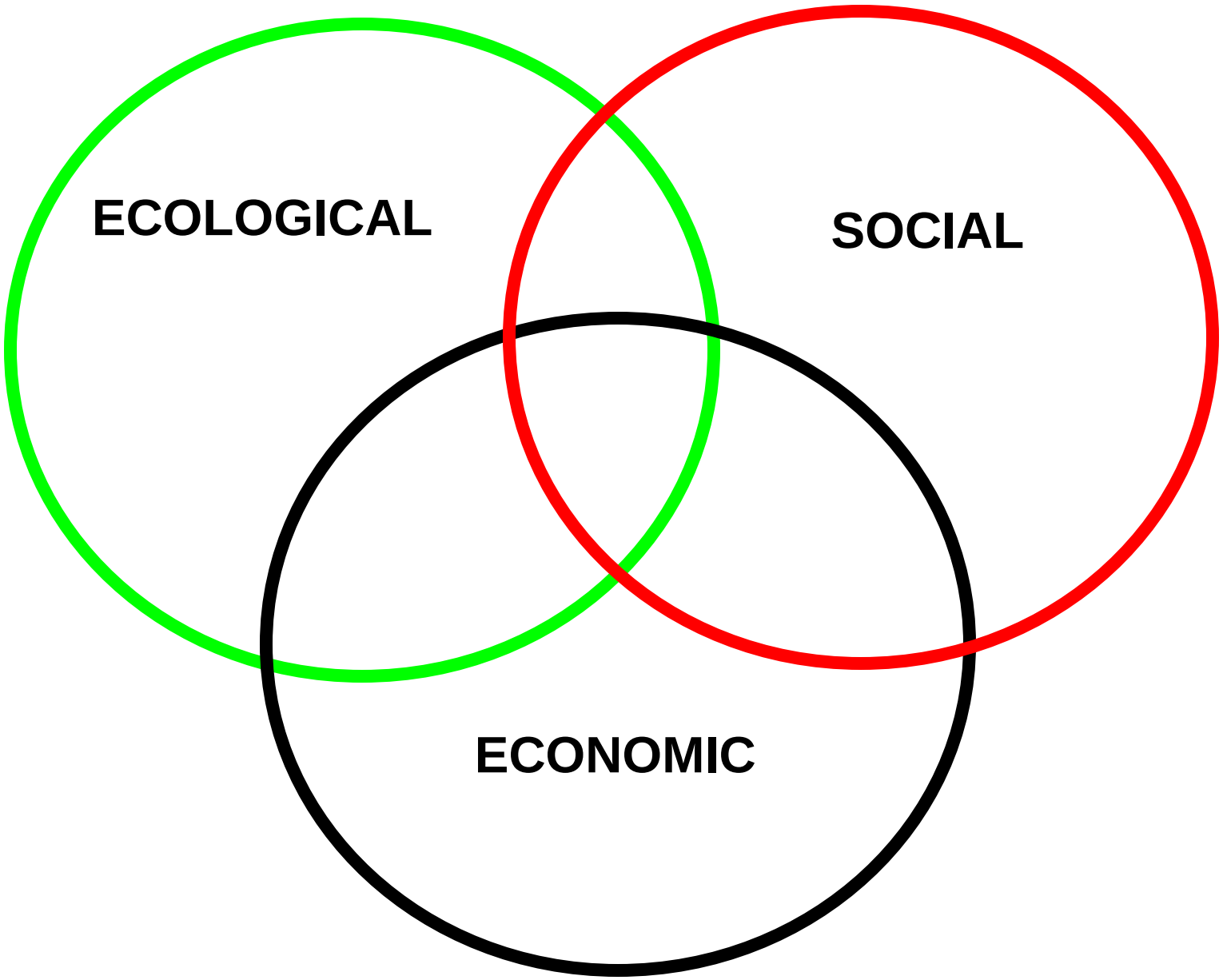
Sustainable Development

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own need."

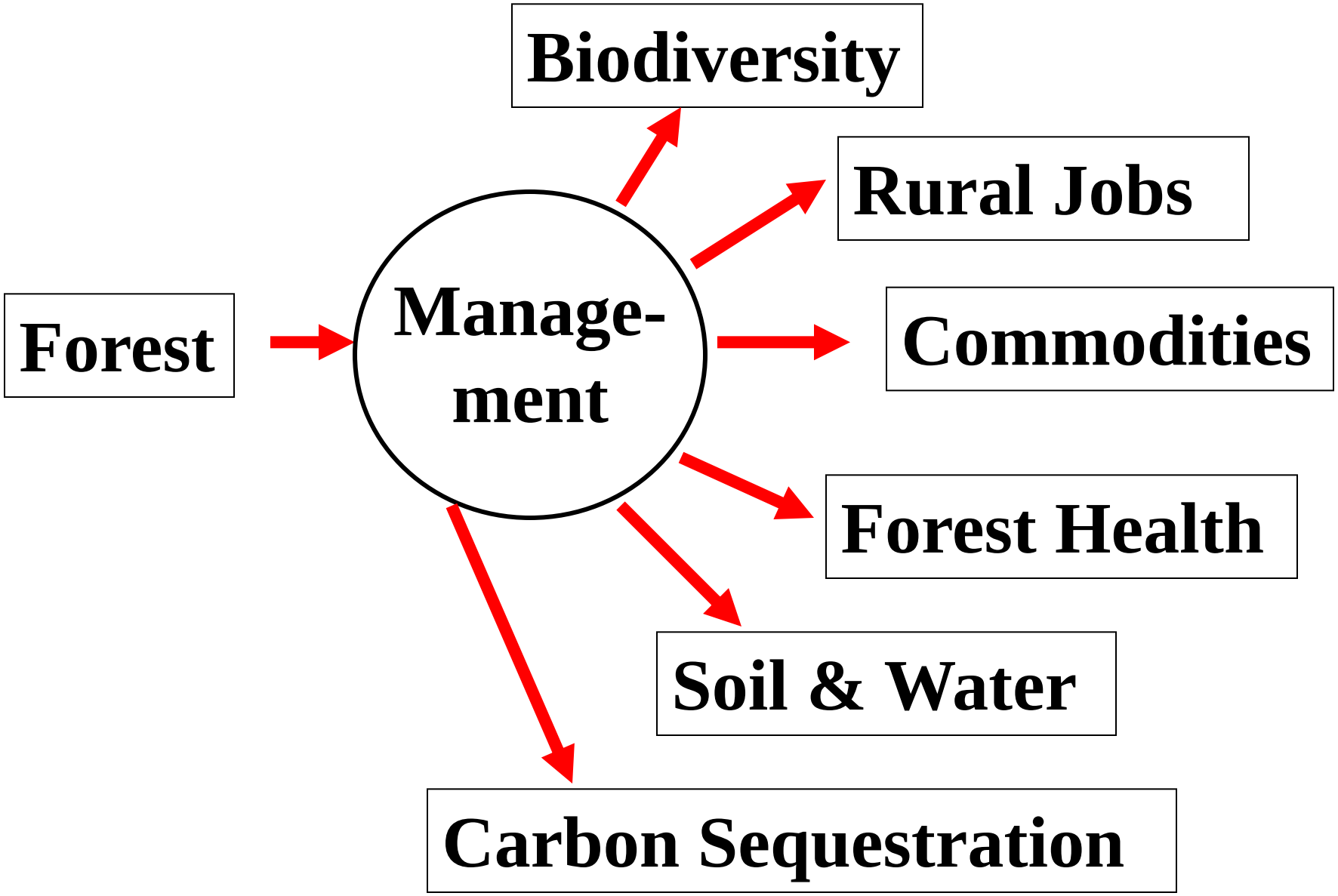
--Brundtland Report, 1987

United Nations

Venn Diagram view of Sustainability



Paying for Environmental Services



Landscapes commonly contain different land covers—each managed by a different discipline.

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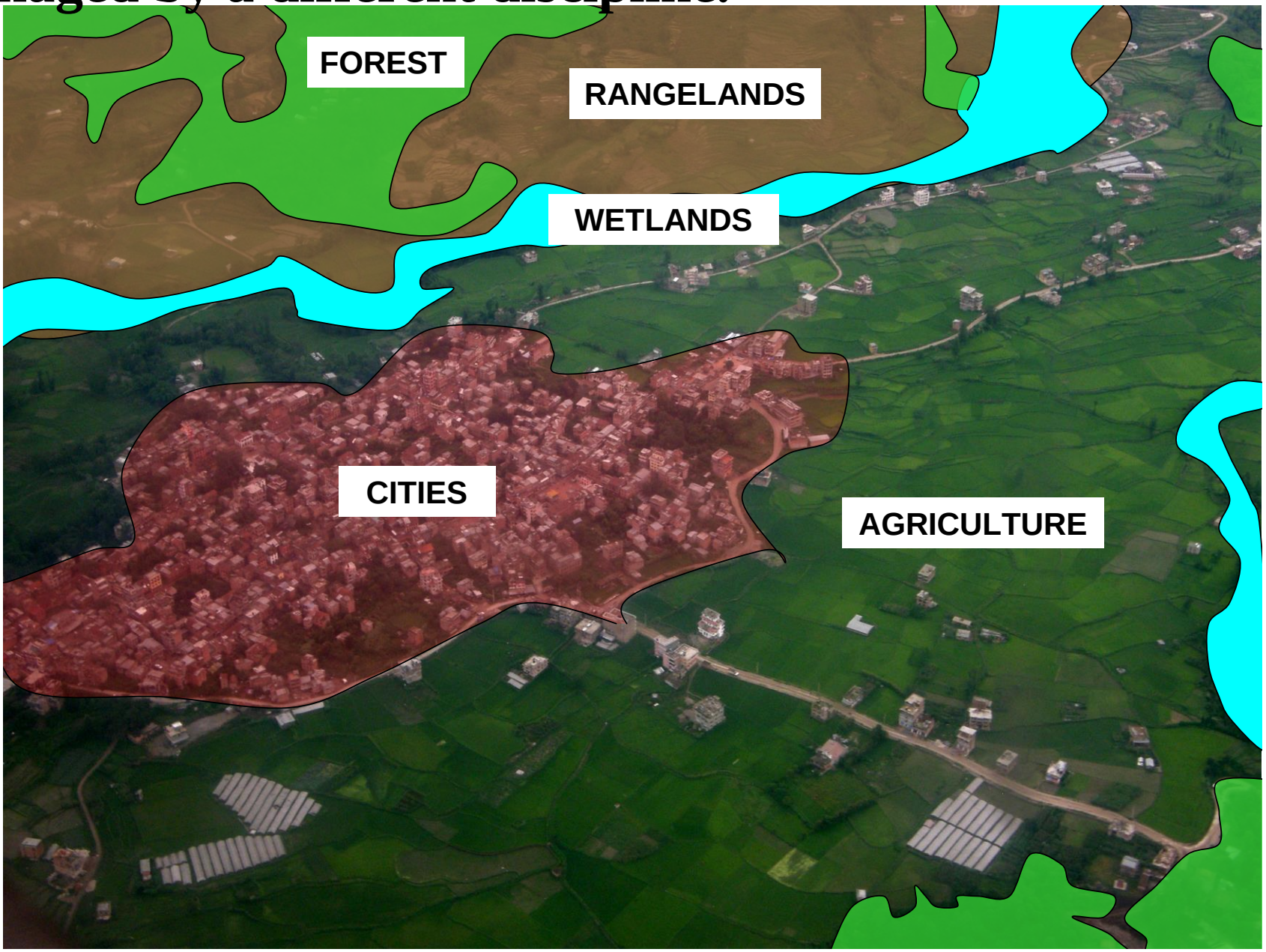
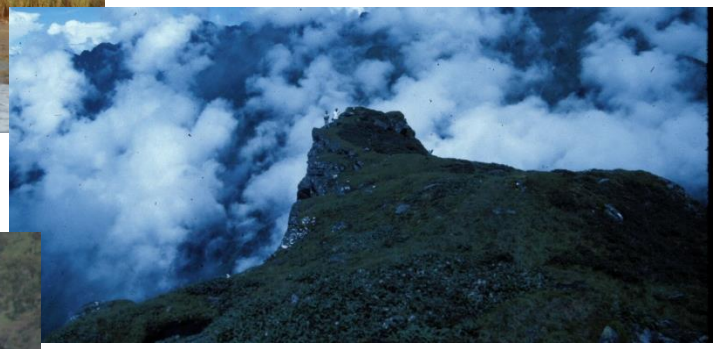


Landscapes commonly contain different land covers—each managed by a different discipline.

Forestry

Hydrology

Wildlife Biology

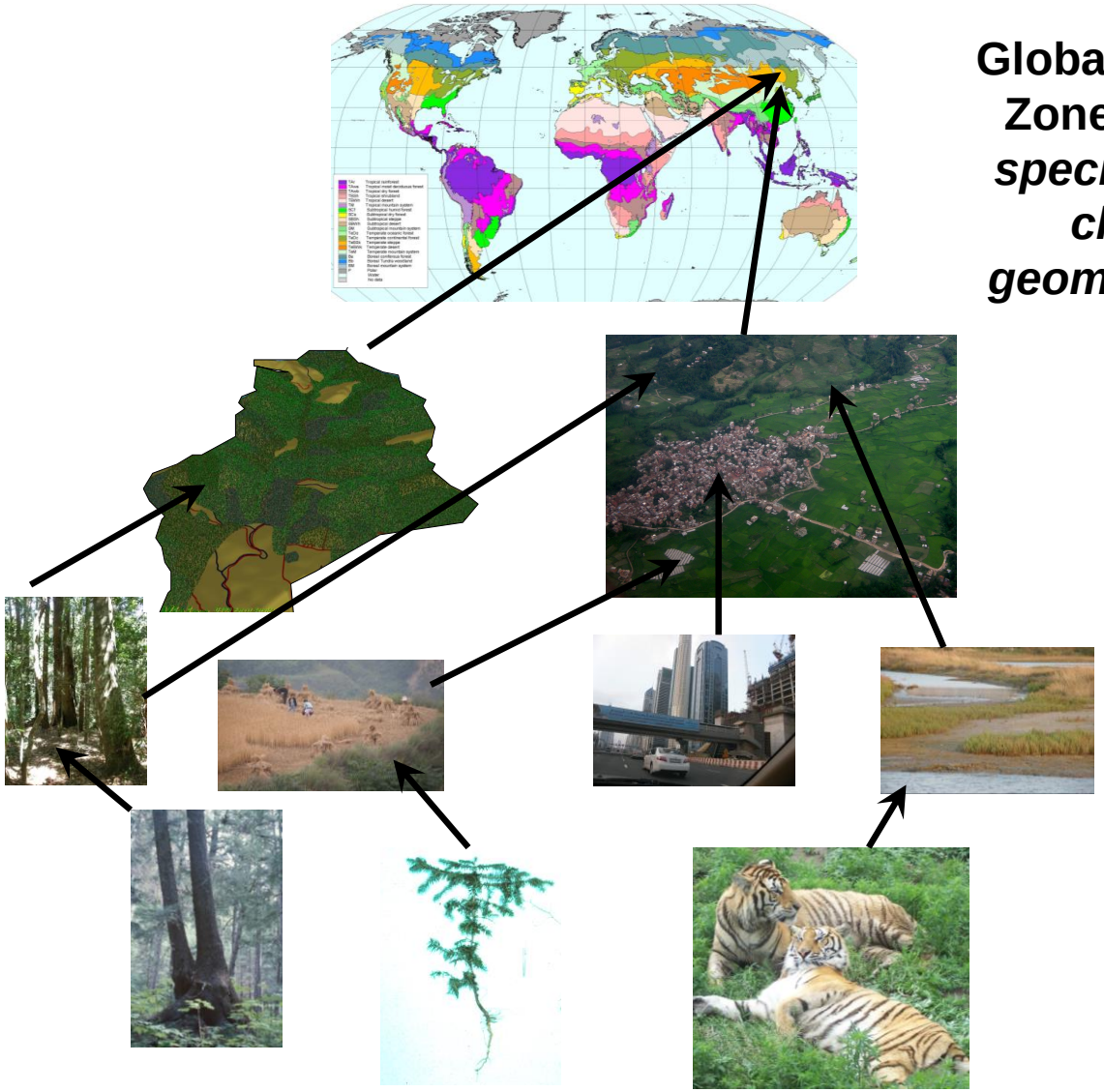


Rangeland Mgmt

City Planning

Agriculture

We need to learn to Integrate Management of Many Disciplines at the Landscape and Ecoregion Levels



Global Ecological Zones: ***(unique species groups, climates, geomorphology)***

Landscape Properties: (?)

Stands/etc.: ***(land uses, structures, etc.)***

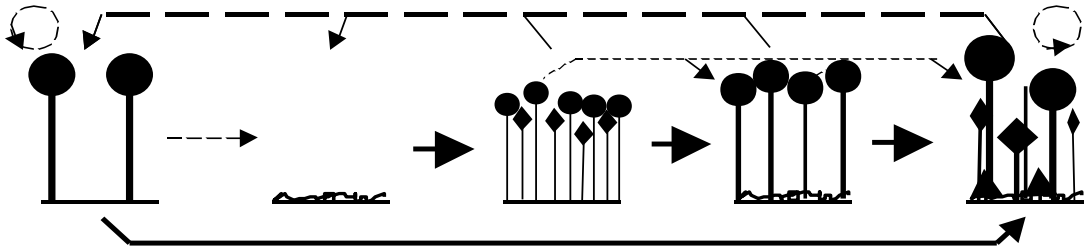
Individual Organisms: ***(vigor, life cycle, etc.)***

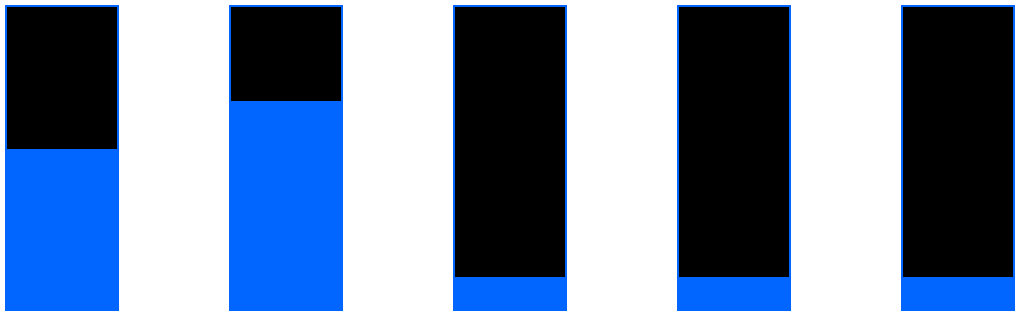
Sustainable Forestry

Each ecosystem type provides its “fair share” of values, both spatially and temporally.

Many Landscape Properties cross Land Use Disciplines: Water Distribution—proportions of precipitation that evaporates (black), flows overland into ditches & streams (red), & infiltrates into soil (blue).

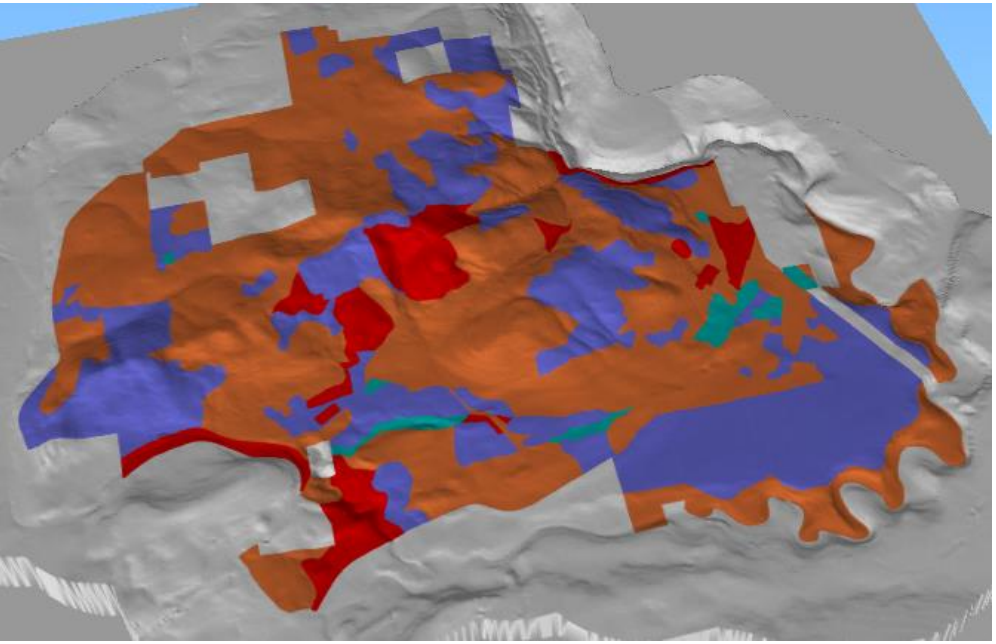
Forest Structures **Agriculture** **Cities**





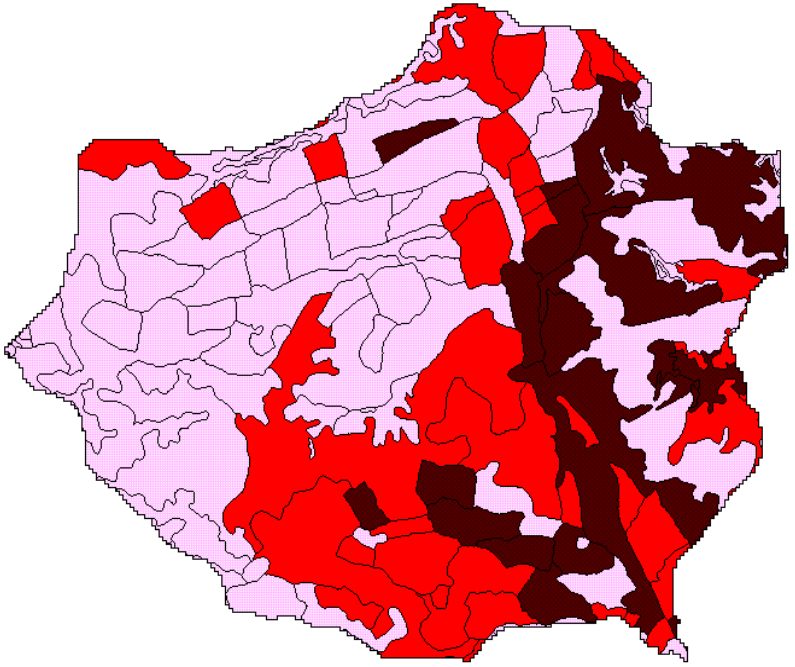
Landscape Property: Disturbance patterns—predictable patterns of wind and fire risk

Wind Risk



High
Medium
Low

Fire Risk



High
Medium
Low

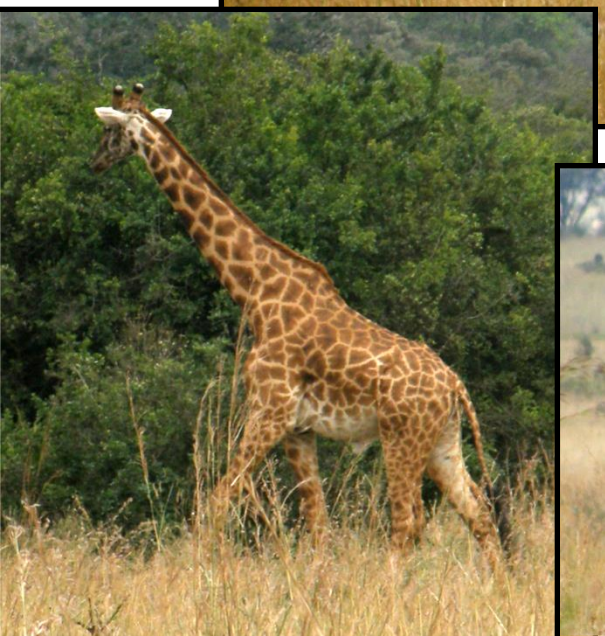
Landscape Property: Animal/human habitats—herd size, population density, percent of carrying capacity

People

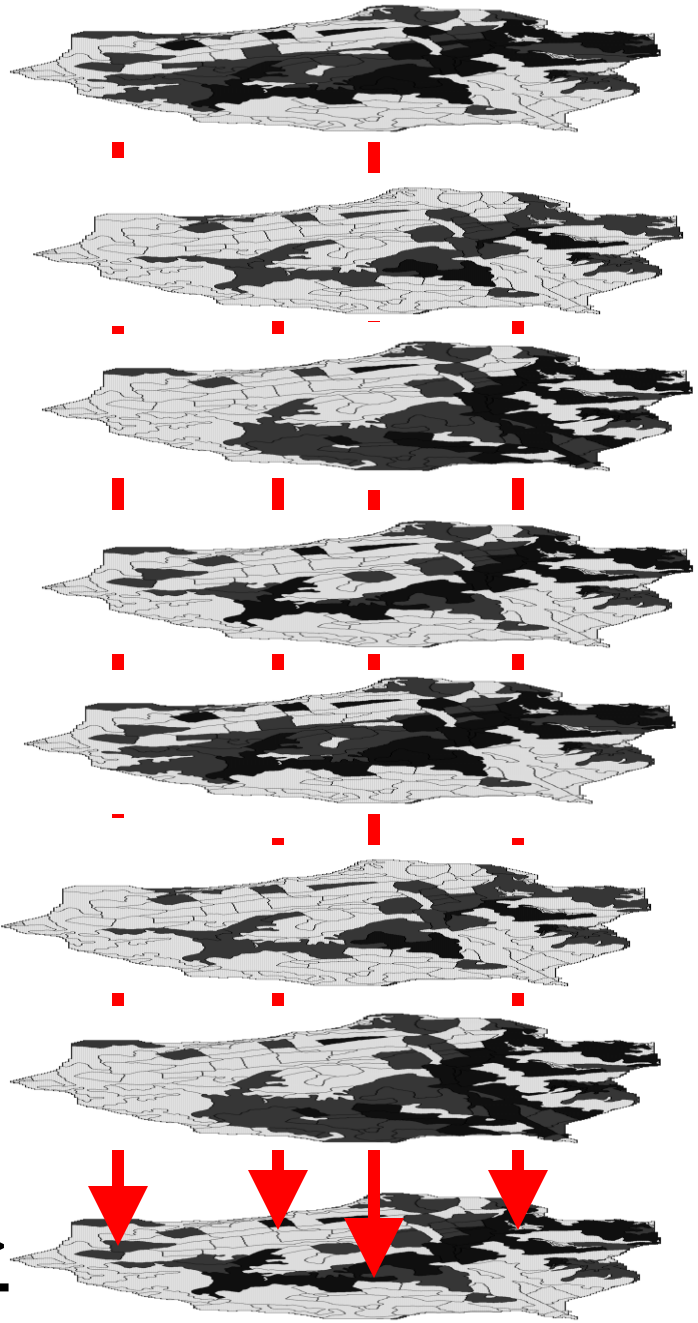
Domestic animals

Wild animals

Wild animal habitat area adjacent to Nairobi, capital city of Kenya

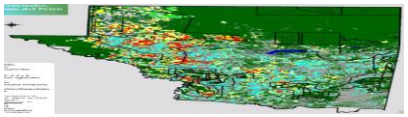


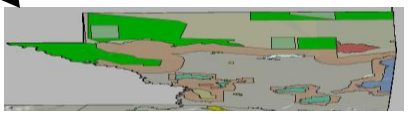
- **Landform**
- **Land Cover**
- **Water Availability**
- **Corridors/barriers**
- **Seasonal Cycles**
- **Disturbance Patterns**
- **Animal/human habitats**

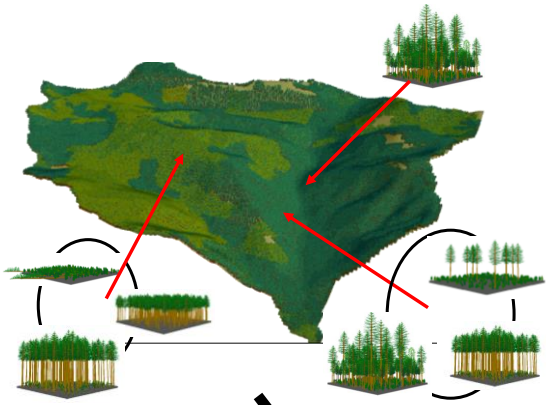


<u>Best Conditions & Uses >>></u>

Information Technologies







LANDSCAPE INFORMATION

stand	plots	location	siteindex	habitat	age	slope	aspect	elevation	latitude	acres
8	1	0	105	0	69	18	135	897	0	93
17	1	0	120	0	4	45	135	900	0	26
19	1	0								5
21	1	0								15
35	1	0								11
38	1	0	100	0	19	45	270	1320	0	31
43	1	0	107	0	15	22	90	1255	0	75
55	1	0	100	0	19	45	225	1340	0	0
								1481	0	
								1255	0	
								1245	0	41
								1476	0	80

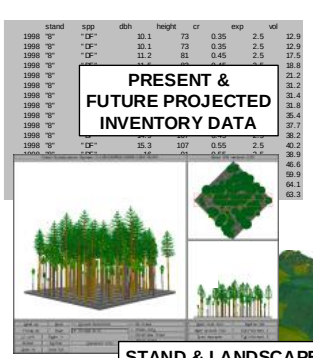
STAND INVENTORY

stand	spp	dbh	height	cr	exp	vol	
1998	"S"	"DF"	10.1	73	0.35	2.5	12.9
1998	"S"	"DF"	10.1	73	0.35	2.5	12.9
1998	"S"	"DF"	11.2	81	0.45	2.5	17.5
1998	"S"	"DF"	11.5	83	0.45	2.5	18.8
1998	"S"	"DF"	12	87	0.45	2.5	21.2
1998	"S"	"DF"	13.3	111	0.45	2.5	31.2
1998	"S"	"DF"	13.9	99	0.45	2.5	31.4
1998	"S"	"DF"	14	99	0.45	2.5	31.8
1998	"S"	"DF"	14.7	100	0.45	2.5	35.4
1998	"S"	"DF"					37.7
1998	"S"	"DF"					38.2
1998	"S"	"DF"					40.2
1998	"S"	"DF"	16	91	0.55	2.5	38.9
1998	"S"	"DF"	16.2	112	0.55	2.5	46.6
1998	"S"	"DF"	17.9	120	0.55	2.5	59.9
1998	"S"	"DF"	18.4	122	0.55	2.5	64.1
1998	"S"	"DF"	18.4	120	0.55	2.5	63.3

GIS INFORMATION

INFORMATION DISPLAY TYPES

PRESENT & FUTURE PROJECTED INVENTORY DATA



GRAPHS & CHARTS

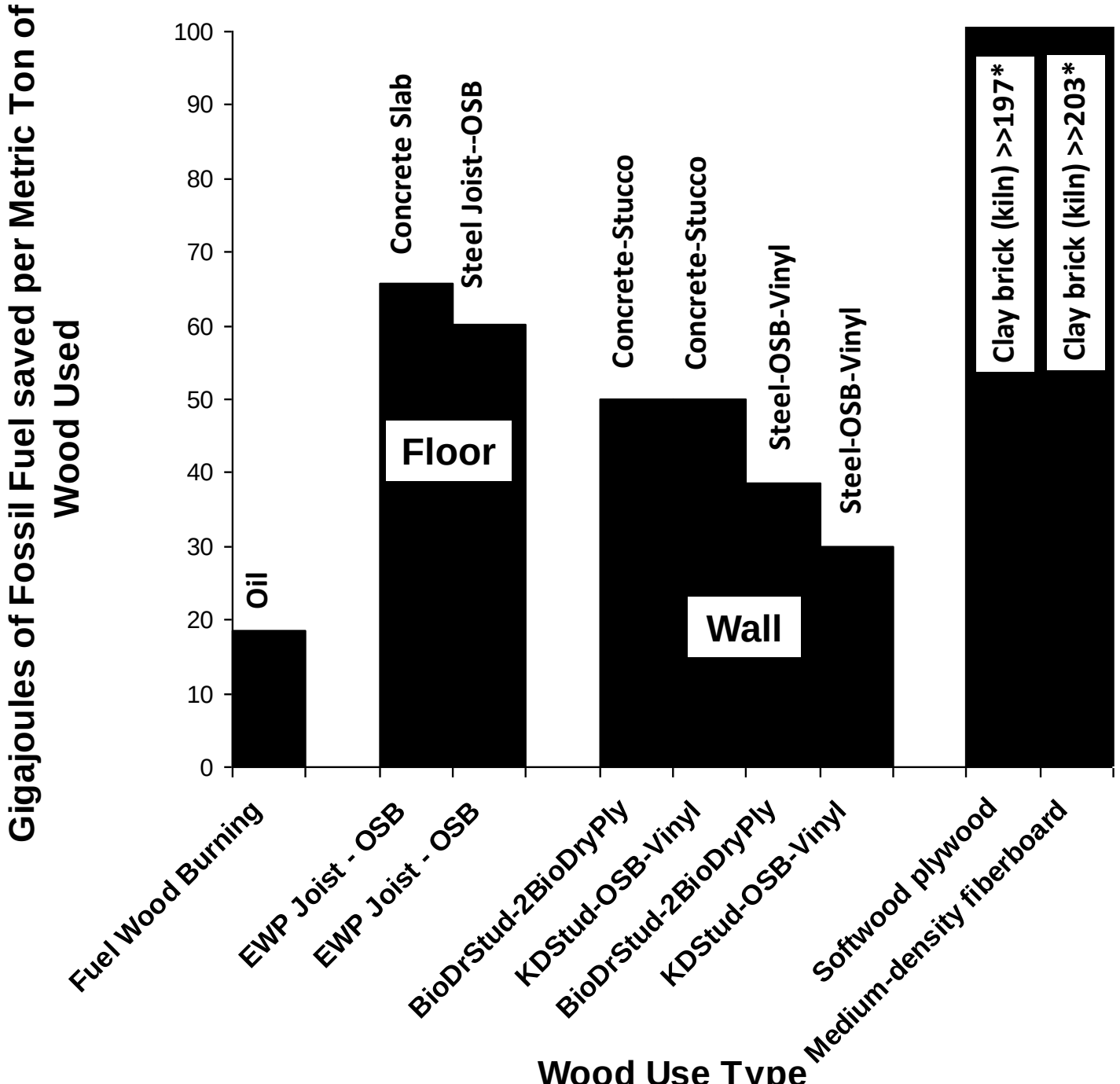
STAND & LANDSCAPE VISUALIZATION

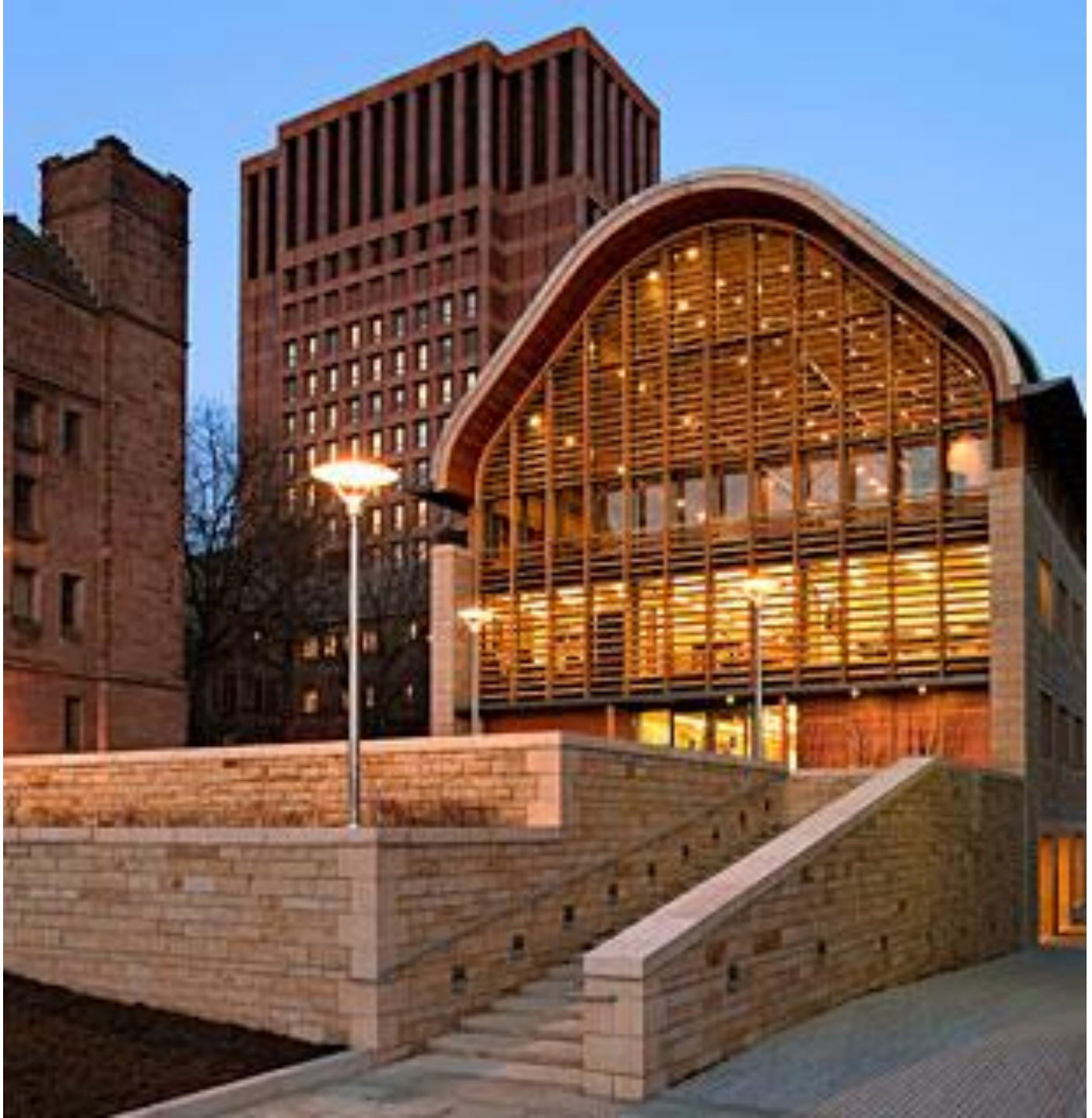
FORESTS SEQUESTER CARBON IN SEVERAL WAYS

PRODUCTS

FORESTS

FOSSIL FUEL CONSERVATION


Gigajoules of Fossil Fuel saved per Metric Ton of Wood Used
100
90
80
70
60
50
40
30
20
10
0
Oil
Concrete Slab
Steel Joist--OSB
Concrete-Stucco
Concrete-Stucco
Steel-OSB-Vinyl
Steel-OSB-Vinyl
Clay brick (kiln) >>197*
Clay brick (kiln) >>203*
Floor
Wall
Fuel Wood Burning
EWP Joist - OSB
EWP Joist - OSB
BioDrStud-2BioDryPly
KDStud-OSB-Vinyl
BioDrStud-2BioDryPly
KDStud-OSB-Vinyl
Softwood plywood
Medium-density fiberboard
Wood Use Type




AYGAZ
FEM
DİŞ HEK
SÜLEYMAN DO


OoHala! CAFE & BAR
WOODFIRE PIZZA & RESTAURANT
OoHala! CAFE & BAR
PIZZERIA PASTA SALADS
RISTRETTO ESPRESSO DIPPO MACCHIATO AMERICANO CAPPUCCINO
LATTE MOCHA BREVE ICED COFFEE BLENDED MOCHA
BLENDED MOCHA
Exclusive Textiles
GUIDE MAP International Pvt. Ltd.
The Bakery Cafe
ATM
ATM
NABIL BANK
the Bakery CAFE
THE BAKERY CAFE (P) LTD.