LEAC 4CEEC Preview

Integration of geographical and statistical data in the environmental accounting framework; methodological development based on two case studies:

Action 1: Accounts of the impacts on Forest and Biodiversity of Land Cover/Land Use changes; case from the land cover changes 1975-90 in the 4 Central and Eastern European countries

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LEAC 4CEEC – Basic facts

• in 2002, the EEA and Eurostat have initiated two case studies to test the implementation of land accounts as described in SEEA2003 Chapter 8 under the name of "Land & Ecosystems Accounts" using CLC data, in context of undergoing I&CLC2000 project

• Case A: for 4 CEEC, focused on Forest

done by GISAT, Charles University of Prague, ETCTE/UAB, EEA

• Case B: for European Coastal areas, focused on Tourism

done by ETCTE/UAB, EEA, University of Nottingham

LEAC 4CEEC – Aims

• test suitability of CORINE LC based data for 1975/1990 for the implementation of LEAC framework

• further develop LEAC framework methodology for core (basic) accounts production

• test sensitivity of land cover flows (LCF) definition for various level of CLC information available (Level2 vs. Level3)

• further develop LEAC framework for implementation of targeted (supplementary) accounts by example for Forest

LEAC 4CEEC – Extent

• case study covers area of Czech Republic(CZ), Hungary(HU), Romania(RO) and Slovakia(SK)
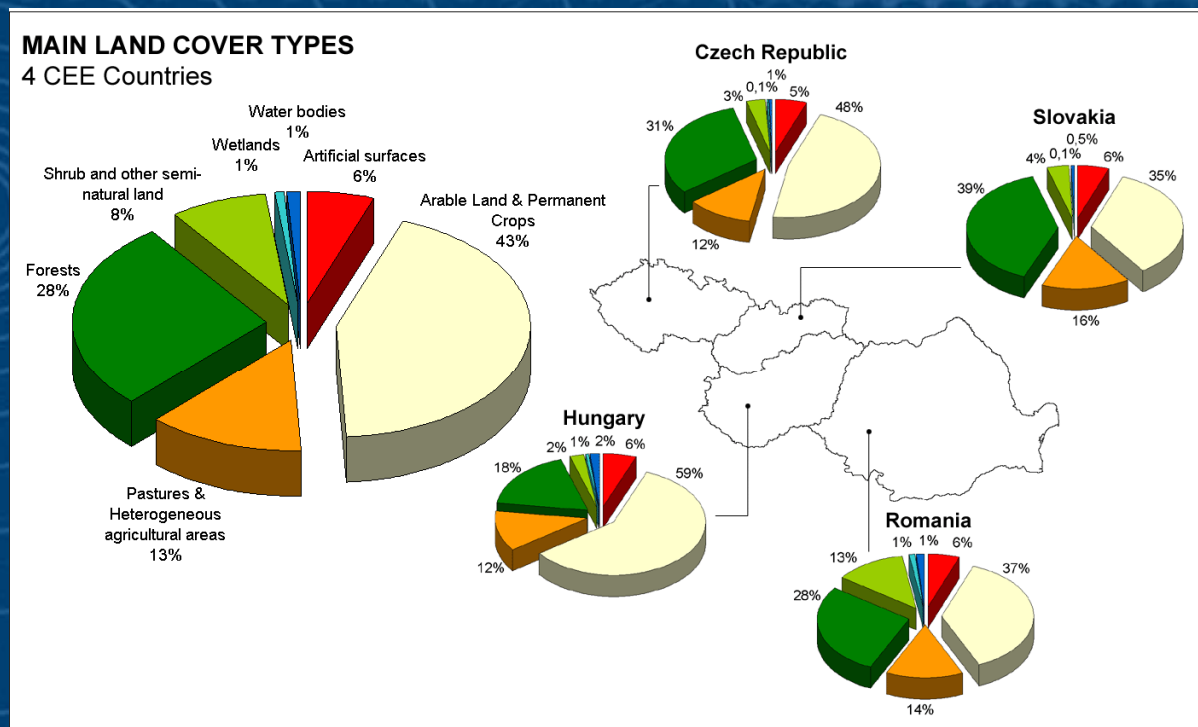
• *core (basic) accounts for all countries*

• *landscape analysis - Dominant Landscape types (DLT)+elevation breakdown for all countries*

• *targeted (supplementary) accounts on forest; implementation focused on CZ*

LEAC 4CEEC – framework *(basic accounts)*

CONCEPTUAL SCHEMA
CONSTRUCTION OF STOCK ACCOUNTS FOR LAND COVER AND LAND USE
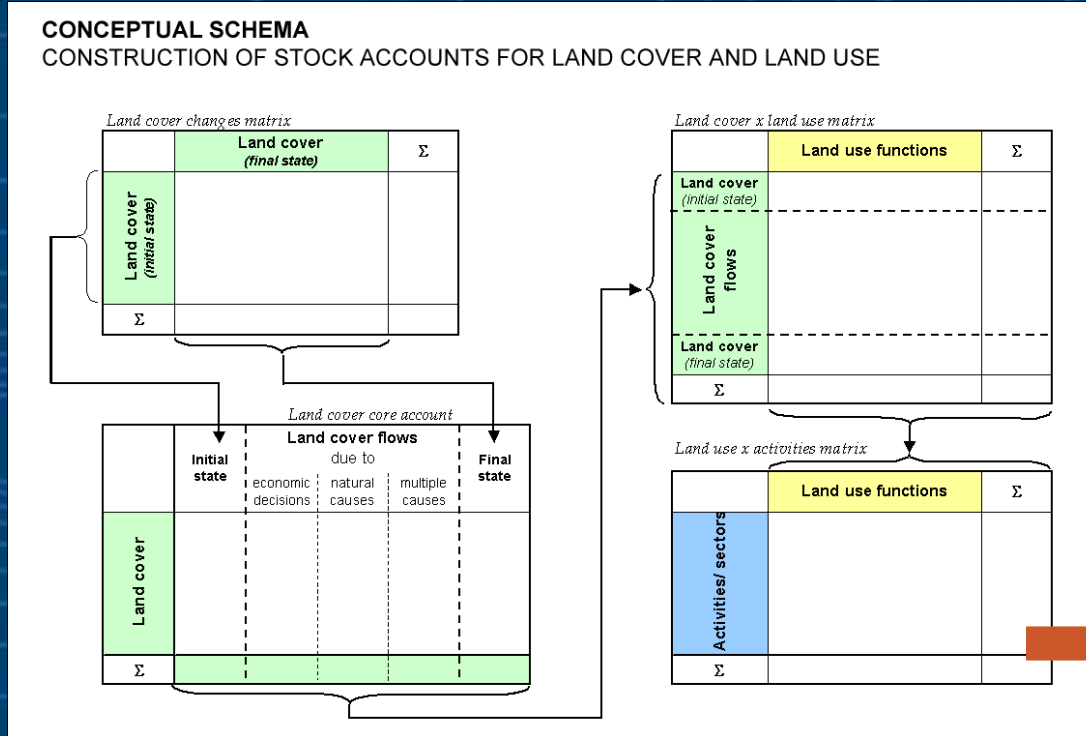
- *Matrix of Land Cover Change*

- *Account of Land Cover Change*

- *Account of Consumption and Formation of Land Cover*

- *Account of Use of Land Cover Resource (Mixed Table)*

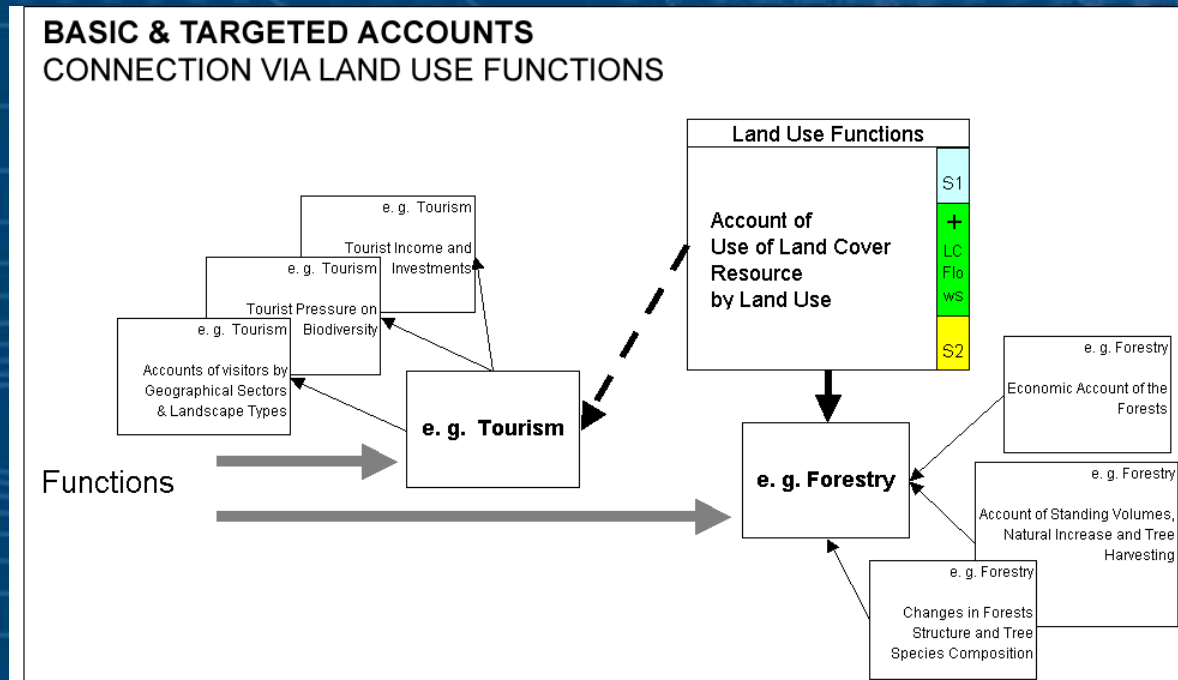Targeted (Supplementary) Accounts via LU functions

- *Land Cover Flow Matrix*

Flows expressed as processes on the basis of the analysis of elementary pairs of consumption and formation of land cover type. Hierarchical grouping provides a very useful interpretation of the individual CLC changes (LCF sensitivity issue)

GENERAL CONCEPT OF FLOW ACCOUNTS

DO GAINS COMPENSATE LOSSES?
DOES QUALITY OF STOCK CARRIED OVER CHANGE?
WHICH ARE THE PROCESSES IN QUESTION?

LEAC 4CEEC – framework *(targeted accounts)*

BASIC & TARGETED ACCOUNTS
CONNECTION VIA LAND USE FUNCTIONS

Land Use Functions

e. g. Tourism

Tourist Income and
Investments
e. g. Tourism

Tourist Pressure on
Biodiversity
e. g. Tourism

Accounts of visitors by
Geographical Sectors
& Landscape Types

Functions

e. g. Tourism

Account of
Use of Land Cover
Resource
by Land Use

S1
+
LC
Flo
ws
S2

e. g. Forestry

Economic Account of the
Forests

e. g. Forestry

e. g. Forestry

Account of Standing Volumes,
Natural Increase and Tree
Harvesting

e. g. Forestry

Changes in Forests
Structure and Tree
Species Composition

• *based on the concept of the Land Use Functions*

• *formally connected to land cover accounts in terms of total stock use as well as land cover consumptions*

• *flexible to address individual functions in way to match policy requirements in terms of environmental, economic or social data*

LEAC 4CEEC – framework *(land use functions)*

UF1 Residence, incl. services

UF2 Commerce

UF3 Transport

UF4 Industrial production

UF5 Energy production

UF6 Mining & quarrying

UF7 Waste dumping

UF8 Water management

UF9 Farming, food production

UF10 Forestry

UF11 Tourism & Recreation

UF12 Nature conservation

UF13 Other uses

LEAC 4CEEC – framework *(BA & TA linkage)*

Use of Land Cover Resource by Land Use Functions	UF1 Residential, incl. services	UF2 Commercial	UF3 Transport	UF4 Industrial production	UF5 Energy production	UF6 Mining & quarrying	UF7 Waste dumping	UF8 Water management	UF9 Farming, food production	UF10 Forestry	UF11 Tourism & Recreation	UF12 Nature conservation	UF13 Other uses	ADJUSTMENT FOR MULTIPLE USES	TOTAL
Initial surface															
1 Artificial surfaces															
2.1+2.2 Arable Land & Permanent Crops															
2.3+2.4 Pastures & Mixed agricultural areas															
3.1 Forests															
3.2+3.3 Shrub and other semi-natural land															
4 Wetlands															
5 Water bodies															
A - TOTAL INITIAL SURFACE ~1975															
Net Formation of Land Cover by Use															
LCF1 Urban land management															
LCF2 Urban sprawl															
LCF3 Extension of economic sites and infrastructures															
LCF4 Agricultural rotation and intensification															
LCF5 Conversion of land to agriculture															
LCF6 Forests creation and management															
LCF7 Water body creation and management															
LCF8 Changes of Land Cover due to natural and multiple causes															
B - TOTAL Net Formation of Land Cover															**0**
Net Extension of Use without Formation of Cover															
1 Artificial surfaces															
2.1+2.2 Arable Land & Permanent Crops															
2.3+2.4 Pastures & Mixed agricultural areas															
3.1 Forests															
3.2+3.3 Shrub and other semi-natural land															
4 Wetlands															
5 Water bodies															
C - TOTAL Net Extension of Use without Formation of Cover															
Final Surface															
1 Artificial surfaces															
2.1+2.2 Arable Land & Permanent Crops															
2.3+2.4 Pastures & Mixed agricultural areas															
3.1 Forests															
3.2+3.3 Shrub and other semi-natural land															
4 Wetlands															
5 Water bodies															
D - TOTAL FINAL SURFACE ~1990 (D = A+B+C)															

LEAC 4CEEC – framework *(land use functions)*

UF1 Residence, incl. services   Targeted Accounts for Forest

UF2 Commerce

UF3 Transport

UF4 Industrial production

UF5 Energy production

UF6 Mining & quarrying

UF7 Waste dumping

UF8 Water management

UF9 Farming, food production

UF10 Forestry

UF11 Tourism & Recreation

UF12 Nature conservation

UF13 Other uses

LEAC 4CEEC – framework *(land use functions)*

UF1 Residence, incl. services

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UF9 Farming, food production

UF10 Forestry

UF11 Tourism & Recreation

UF12 Nature conservation

UF13 Other uses

Targeted Accounts for Forest

• *reflect "traditionally" the main function: UF10 - Forestry*

LEAC 4CEEC – framework *(land use functions)*

UF1 Residence, incl. services

UF2 Commerce

UF3 Transport

UF4 Industrial production

UF5 Energy production

UF6 Mining & quarrying

UF7 Waste dumping

UF8 Water management

UF9 Farming, food production

UF10 Forestry

UF11 Tourism & Recreation

UF12 Nature conservation

UF13 Other uses

Targeted Accounts for Forest

• *reflect "traditionally" the main function: UF10 - Forestry*

• *but should consider also other functions of forested land*

LEAC 4CEEC – framework *(land use functions)*

Forest functions	Land Use functions
Wood production	
Timber	UF10 Forestry
Pulp	UF10 Forestry
Firewood	UF10 Forestry & UF5 Energy production
Other wood products	UF10 Forestry
Non-wood production	
Food	UF9 Farming, food production
Animal breeding	UF9 Farming, food production
Medicinal plants	UF9 Farming, food production
Industrial extracts	UF4 Industrial production
Protective functions	
Biodiversity protection	UF12 Nature conservation
Soil protection	UF12 Nature conservation
Landscape maintenance	UF12 Nature conservation
Water protection	UF8 Water management
Socio-economic functions	
Recreation & tourism	UF11 Recreation & Tourism
Provision of employment	UF10 Forestry & UF13 Other uses
Research & education	UF13 Other uses

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LEAC 4CEEC – framework *(BA & TA linkage)*

Linkage via forest related Land Use Functions
summarized

Supply & Use of Land Cover Resource by Land Use Functions	UF5 Energy production	UF8 Water management	UF9 Farming, food production	UF10 Forestry	UF11 Recreation & Tourism	UF12 Nature conservation	UF13 Other uses	ADJUSTMENT FOR MULTIPLE USES	TOTAL CZ
Initial surface 1975									2597121.6
Consumption									163703.6
Formation LCF 61									26806.7
Formation LCF 83									2430.0
Total formation									29236.7
Final Surface 1990									2462654.6

- consider complex relation between LU and LC
  - ✓ *change of land use may/may not introduce change in land cover*
  - ✓ *multifunctional use of single land cover type* → *conflicting use*

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LEAC 4CEEC – framework *(targeted accounts)*

• **implementation of targeted accounts based on examples of forest accounts by SEEA2003, IEEAF2002, EAF**

• **3 considerations / constraints**

✓ functions to be addressed to meet policy requirements

✓ accounting units (scale) to be addressed to meet policy requirement

✓ statistical data availability

LEAC 4CEEC – framework *(proposed TA list 1/2)*

Theoretical level
Practical level

UF10.01 Forests by Dominant Landscape Types - broadleaves/coniferous (ha)
•Forests by dominant landscape types

UF10.02 Forests by districts and/or forest regions - broadleaves/coniferous (ha)
•Forests by regions

UF10.03 Forest composition / age /structure / ownership / monetary value, by districts and/or forest regions (ha)
•Age structure by regions
•Categorization of forests in the Czech Republic
•Owners structure of forests in the Czech Republic
•Sylvicultural system of forests in the Czech Republic

UF10.04 Forest stocks and use (m3) by districts and/or forest regions
•Annual felling by tree species by regions
•Annual afforestation by regions
•Non-wooded forestland available for afforestation in the Czech Republic -annual balance
•Development of real total felling in the Czech Republic – cumulated balance

UF10.05 Supply and use of wood (m3)
•Wood supply by regions
•Annual wood supply in the Czech Republic

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LEAC 4CEEC – framework *(proposed TA list 2/2)*

Theoretical level
Practical level

UF09.01 Forest non-wood products by districts and/or forest regions, in tons and in €
•Trap hunting in the Czech Republic – annual
•Hunting – shooting in the Czech Republic

UF12.01 Forests and protection, by (a) landscape types, or by (b) districts and or forest regions, ha, %
•Protected forests by regions

UF12.02 Forest composition and biodiversity, health of forest ecosystems by (a) landscape types, or by (b) districts and or forest regions (ha)
•Forest diversity by tree species in the Czech Republic
•Air pollution damage degree of conifers forests in the Czech Republic

UF13.01 Social account of forests, by districts and/or forest regions
•Employment by forestry in the Czech Republic
•Export from the Czech Republic
•Direct investments for 1 m^3 of wood

LEAC 4CEEC – reflections *(targeted accounts)*

Functions

- complex relation between land use and land cover exist

- multiple functions can be identified within land use function framework proposed

- functions to be addressed to meet policy requirements vs. statistical data available

Multiple functions (multipurpose use) of forested land resulting in potential conflicts is the key issue to assess

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LEAC 4CEEC – reflections *(targeted accounts)*

Accounting Units

• theoretically various units can be considered suitable
for different purposes like NUTS (country,regions, districts),
forest management units, UMZ, watersheds or other natural units
(bio-geographic regions, landscape types)

• in practical accounting units selected are based on
statistical data availability and policy relevance

Forest TA created for NUTS (country,regions, districts), forest
management units & landscape types *(e.g. DLT by CORILIS)*

LEAC 4CEEC – framework *(targeted accounts)*

Statistical data and their availability

- spatial aspect - connected to accounting units scale selected

  heavy influence on picture obtained

- compatibility aspect – European / national statistics

- stability aspect – change of units, change of definitions and change of data collected (valid especially for new MS and ACs)

accounts creation for period 1990/2000 should suffer less then case studies for period 1975/1990

Examples
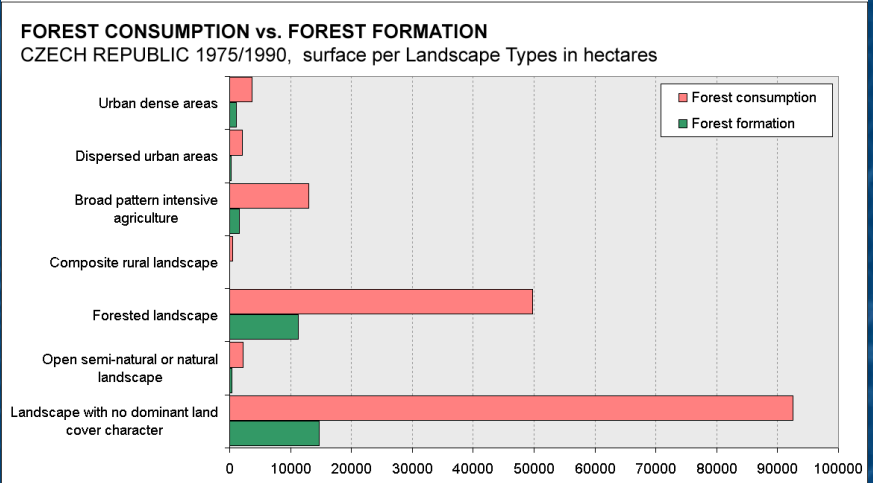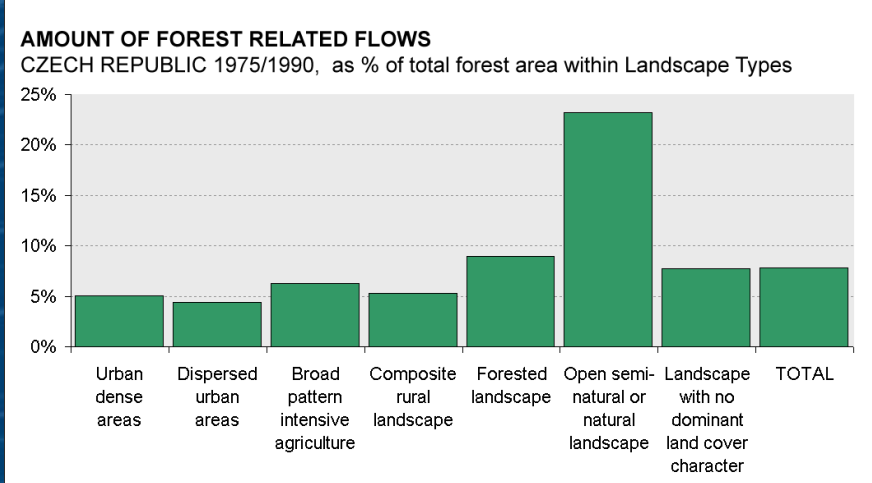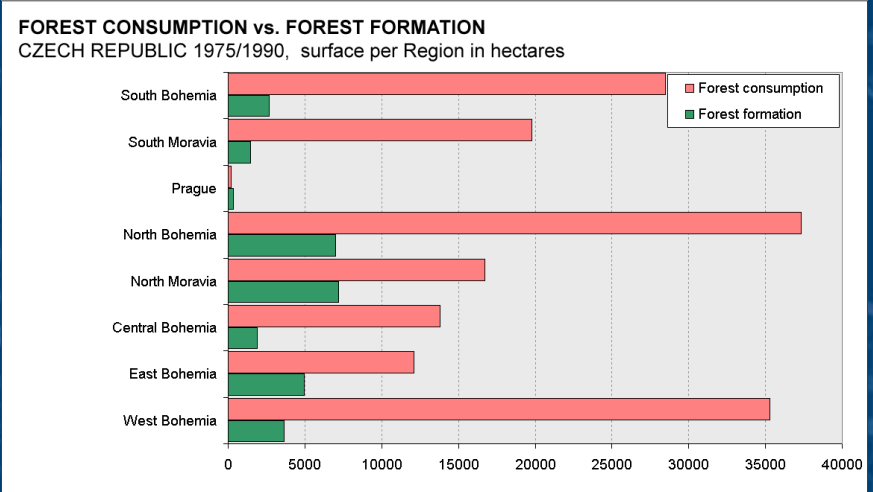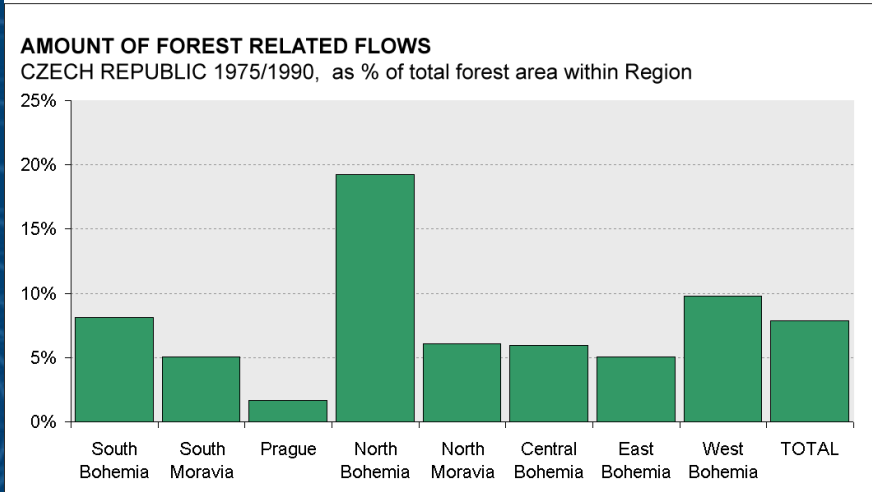
AMOUNT OF FOREST RELATED FLOWS
CZECH REPUBLIC 1975/1990, as % of total forest area within Region

FOREST CONSUMPTION vs. FOREST FORMATION
CZECH REPUBLIC 1975/1990, surface per Region in hectares

AMOUNT OF FOREST RELATED FLOWS
CZECH REPUBLIC 1975/1990, as % of total forest area within Landscape Types

FOREST CONSUMPTION vs. FOREST FORMATION
CZECH REPUBLIC 1975/1990, surface per Landscape Types in hectares

Examples

MAIN FOREST CREATION AND MANAGEMENT FLOWS
4 CEE COUNTRIES 1975/1990, Surface by Landscape Types
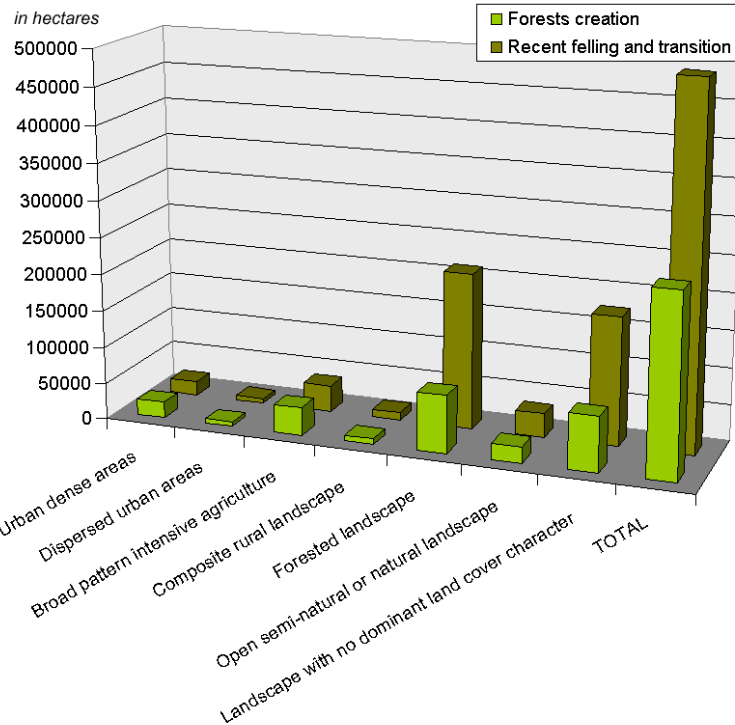
MAIN FOREST CREATION AND MANAGEMENT FLOWS
4 CEE COUNTRIES 1975/1990, Surface by Elevation/Slope zones
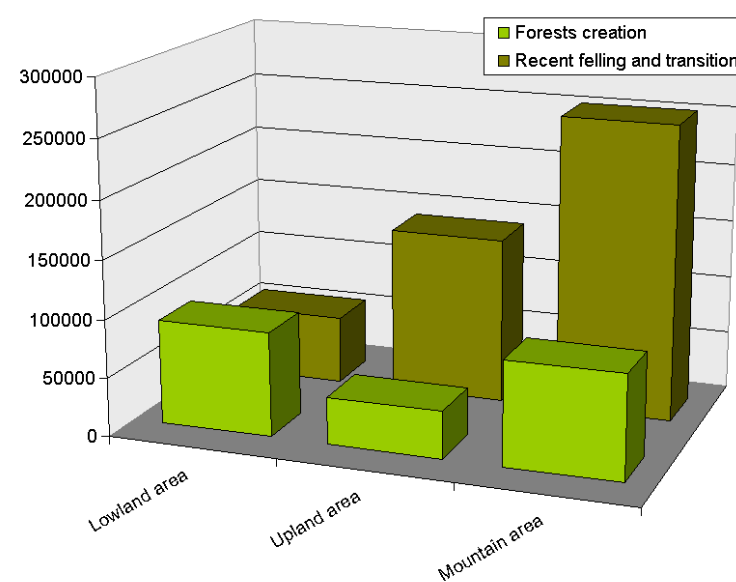
Examples

FOREST CONSUMPTION FLOW: LCF63 - FOREST FELLING & TRANSITION
CZECH REPUBLIC 1975/1990, Intensity by Regions and by Districts
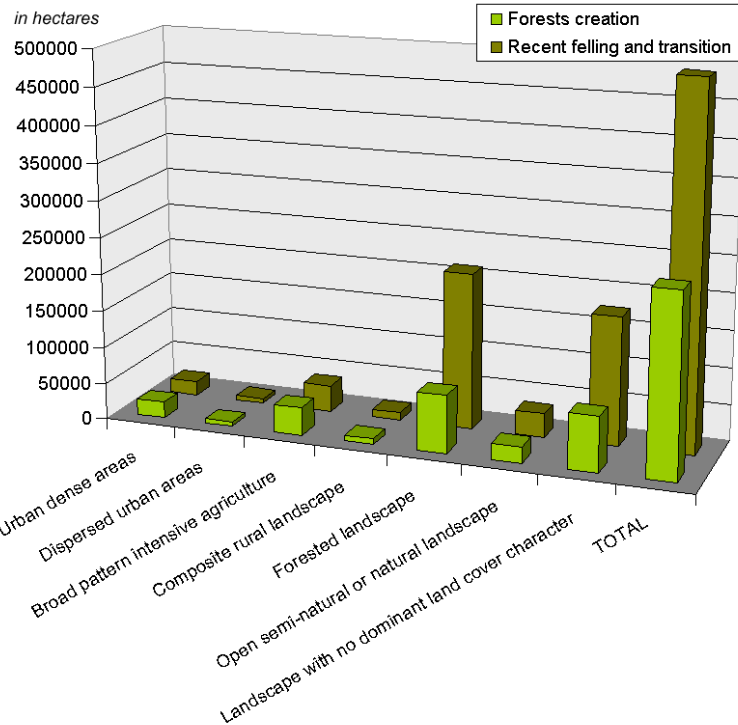in % of total forest area
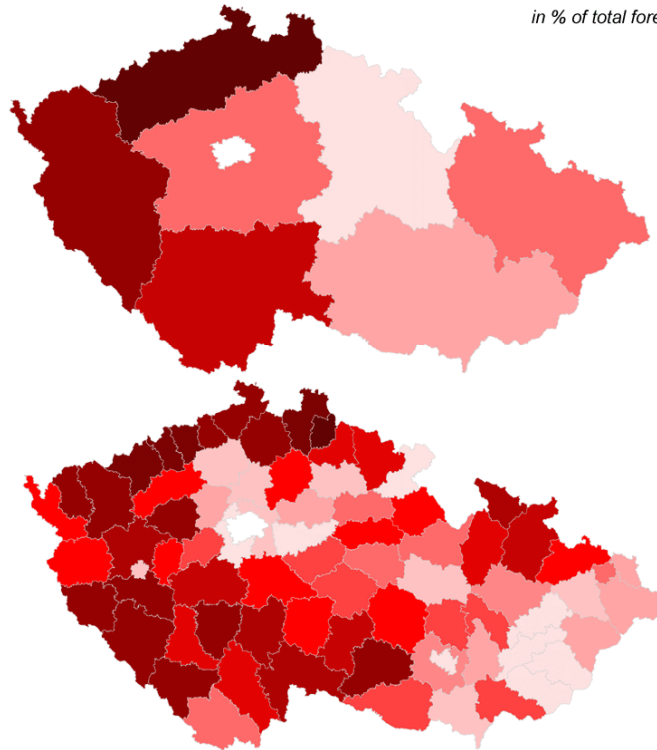
FOREST FORMATION FLOW: LCF61 - FOREST CREATION
CZECH REPUBLIC 1975/1990, Intensity by Regions and by Districts
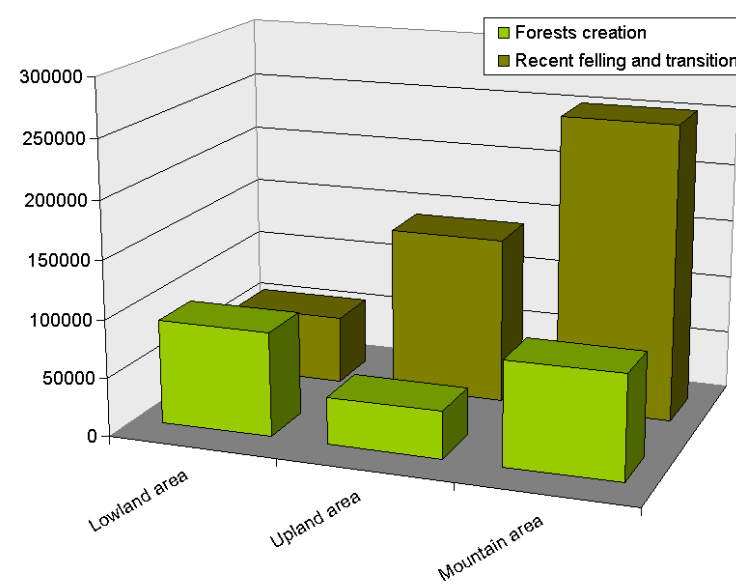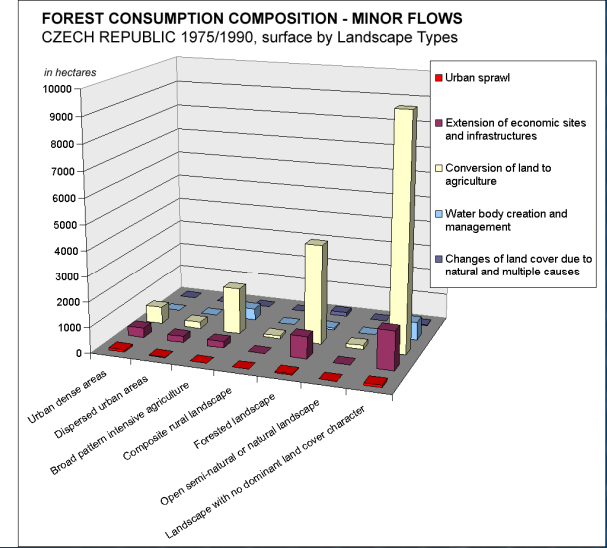in % of total forest area

Examples

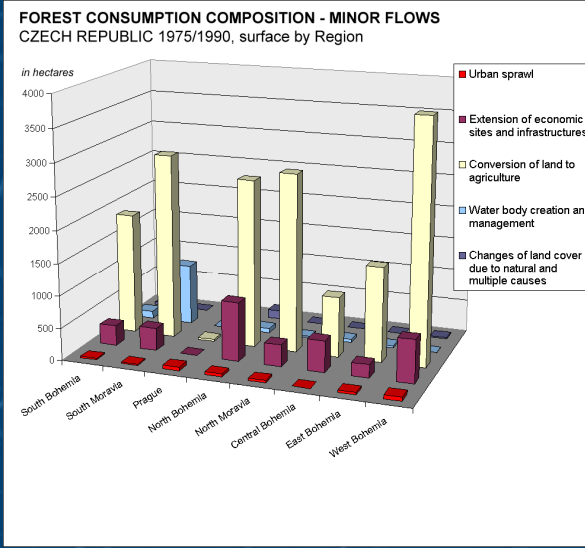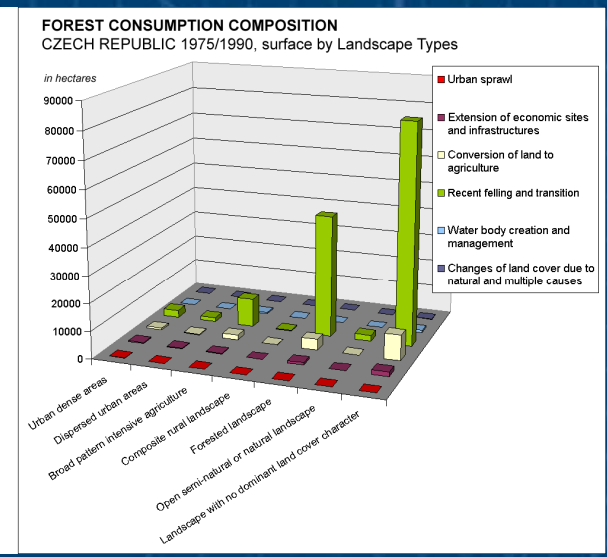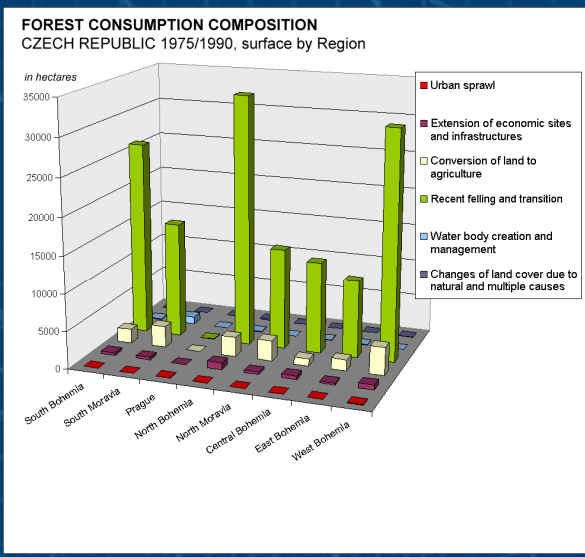**MAIN FOREST CREATION AND MANAGEMENT FLOWS**
4 CEE COUNTRIES 1975/1990, Surface by Landscape Types

MAIN FOREST CREATION AND MANAGEMENT FLOWS
4 CEE COUNTRIES 1975/1990, Surface by Elevation/Slope zones

Examples

FOREST CONSUMPTION COMPOSITION
CZECH REPUBLIC 1975/1990, surface by Region

FOREST CONSUMPTION COMPOSITION
CZECH REPUBLIC 1975/1990, surface by Landscape Types

FOREST CONSUMPTION COMPOSITION - MINOR FLOWS
CZECH REPUBLIC 1975/1990, surface by Region

FOREST CONSUMPTION COMPOSITION - MINOR FLOWS
CZECH REPUBLIC 1975/1990, surface by Landscape Types

Thank you !