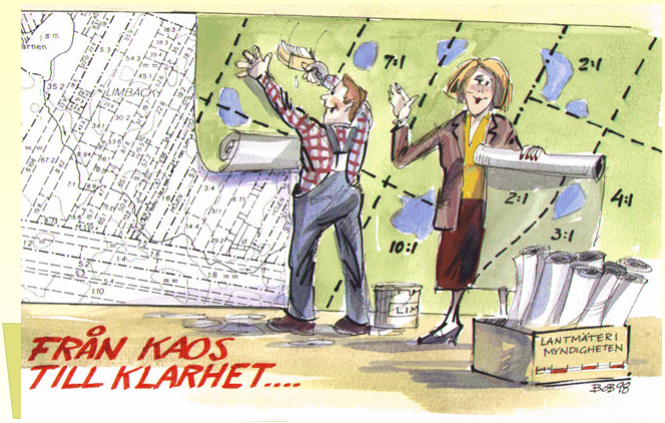


GIS in Land Consolidation

- the future tool to success

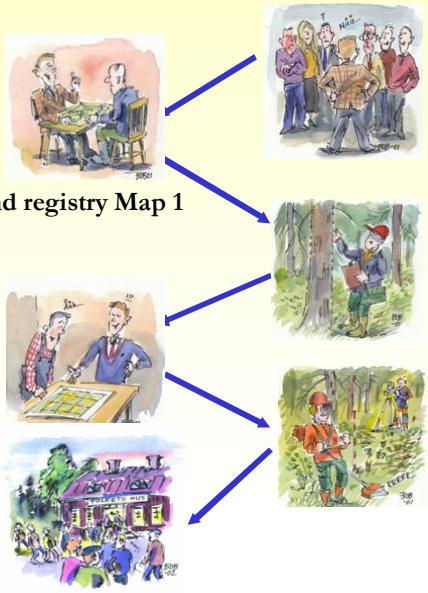
Experiences from Forest Land Consolidation in Sweden

FAO Workshop in Santiago de Compostela 2009

Mats Backman

Land Consolidation - Methodology

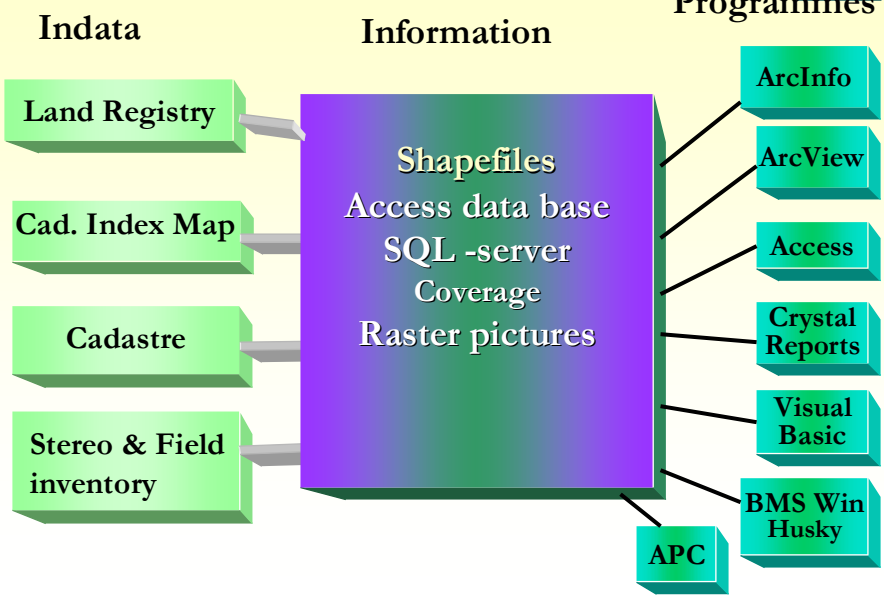
- **Adjudication**
- **Awareness campaign - initiation**
- **Interviews with the owners**
- **Inventory of cadastral maps and land registry Map 1**
- **Valuation**
- **Elaboration of Plan 2**
- **Surveys of the ”new” boundaries**
- **Decision making**



Powerful data support

- Why?
- Objectives
  - access to cadastral register and maps, land register and to keep the this information up-to-date
  - calculation of the values of stands, properties and land owners
  - Calculation of the economical settlements for the land owners
- The elaboration of the re-allotment design by GIS-technique and the analysis of alternative designs

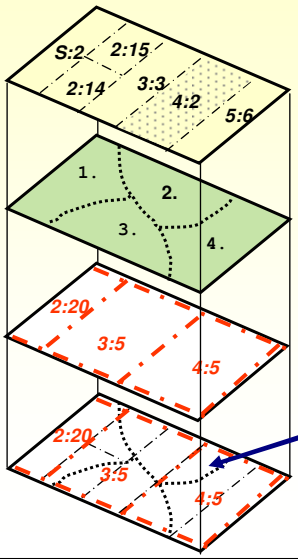
GISOM – GIS system in Land Consolidation



Overlay-technique in Land Consolidation

Layers

- Properties
- Forest stands
- Re-allotment design



Economic settlements are calculated by intersection between

- *"old"* properties
- forest stands
- *"new"* properties

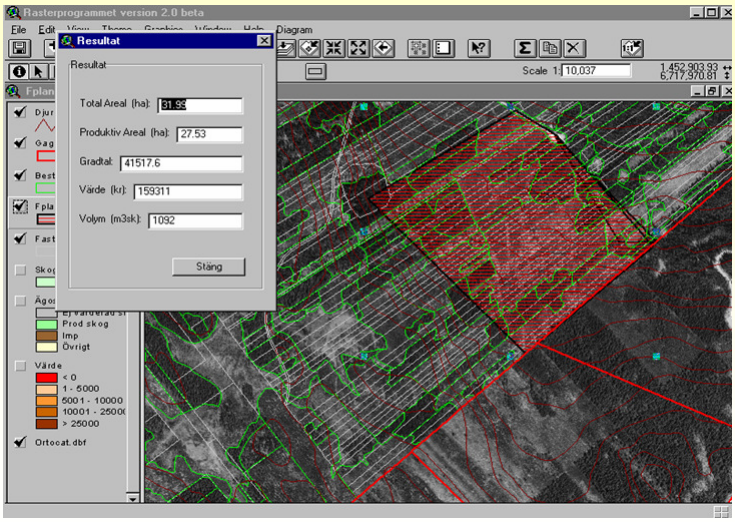
Each little figure has information about:
previous owner, new owner and value

Elaboration of the new re-allotment design

Factors to be considered

- The wishes of the Land Owners
- Area, timber volume, site class, age, tree species, timber quality etc and value of their *"old"* possessions
- Topography, lakes, rivers, wet areas
- Road network
- Environmental/cultural values

Re-allotment design by GISOM



Advantages of GISOM

- The land owner can be shown the location of the his *"old"* parcels and his proposed consolidated property
- The land owner's economic settlements can be discussed
- GISOM is cost-efficient
- GISOM can easily be used in Land Consolidation in agricultural areas

Valuation in Forest Land Consolidation

Valuation of forest land

- photo-interpretation and laser scanning
- supplementary field inventory
- inspection by the owners
- calculation of the value by the BM-method

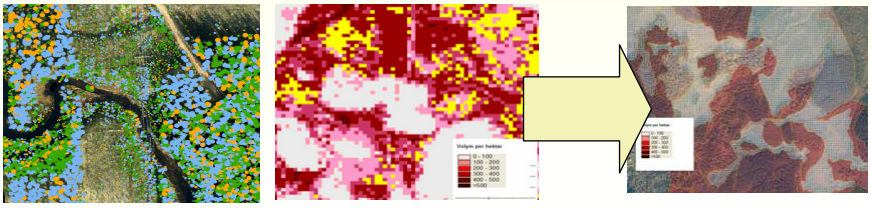
Why laser scanning?

FORAN Group
FORESTRY AND NATURE CONSULTING
www.forangroup.com +46 (0)23 633 00

- Lower cost for inventory
- Larger areas accomplished with the same staff
- Avoid subjective valuations and variation between valuators
- Better accuracy for forest data

Data are produced for three levels - trees, squares (15*15 m) or aggregates to stands.

Single Tree® ForestGrid[tm] Stand data

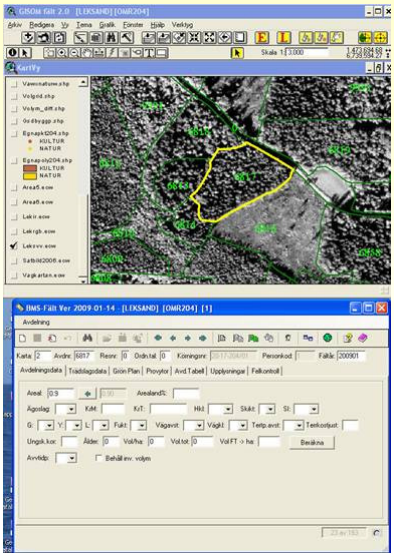


Laser scanning - Single Tree® method

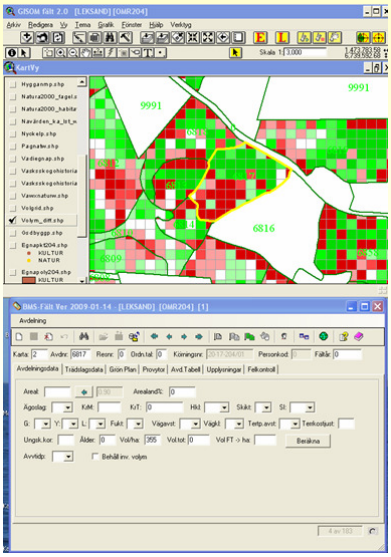
Every tree is enumerated!

- Single Tree® is a registered trade mark for FORAN
- The method was established in co-operation between SLU and FOI
- Further development of research-algorithms for application to commercial volumes
- Collects position and properties for the individual trees by pulse intensive laser

Aerial photo interpretation



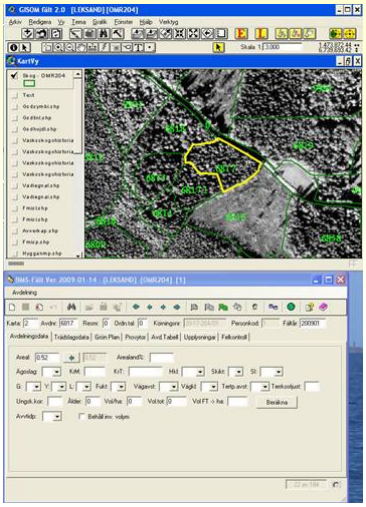
ForestGrid



Red squares = volume below the average

Green squares = volume higher than the average

Adjusted boundary for stand nr 6817



Result – more homogenous stands nr 6817 and 68171

Data support for Land Reforms in East European countries

- Large number of data require a powerful data support
- Co-operation between East European countries is recommended for the development of an efficient GIS – system and valuation methods
- FAO is recommended as co-ordinator of this technical development
- Existing technical systems should be used as much as possible

Overview of GISOM- real case from Ål Land Consolidation project

ArcView

- Show the owner of a certain figure
- Show one land owner's properties from the list
- Land bank nr 1874
- Olle Bergkvist nr 140

AcessAjour

- Reports
  - Owner list with properties
- Valuation, total per owner
- Basic data, valuation

Raster

- Collect property nr via 1:1? and show the figures related to property 5257
- Select the central area near Knippbodberget
- Start the marking of the first proposal

- Property 5257
- 129,6 hectares
- 3 976 000 SEK forest land
- 3 300 SEK arable land
- 22 700 m^3 solid wood