Historical Maps, Ancient Remains GIS database & other data in Landscape Analysis

Gustaf Svedjemo
Göteborg University
gustaf.svedjemo@hgo.se

Swedish Large-scale mapping

In 1628, the King Gustaf II Adolf gave instruction to Andreas Beréus to large-scale maps over all farms and villages showing all their "...fields, meadows, woods and land" of the realm.

- Also towns, mines, harbours etc…
- This is the start of The Swedish National Land Survey, Lantmäteriverket.

Geographical mapping = Small scale maps (> 1:10 000)
Geometrical mapping = Large scale maps (< 1:10 000)

Footnote: Andreas Beréus cousin, Johannes Beréus was the first director-general of the Central Board of National Antiquities (1609) and teacher to The King Gustaf II Adolf.

The start - Geometrical Cadastres

1630 - 1655 & 1670’s - 1750’s

- At first the main purpose of the mapping was to gain insight of the realms resources and later also:
  - Sweden had been successful in wars and large areas were incorporated into the realm.
  - King Karl XI’s reduction of the nobles land; villages and farms came under the Crown.
  - Fiscal reasons were also prominent.

Areas in present day Baltic states, Russia and Germany was also mapped.

Map & text (Code marking)

1. New Sarpsura
2. Sowing 18 barrels
3. Sowing 18 barrels
4. Sowing for hassle 5¼ barrel. In all fields is there clay soil mixed with sand.
5. Meadow together counted on both sides of the river, on average growth it yields 166 (wagon) loads
6. Eel fishing
Map over two villages in Karelia, Finland (now in Russia) 1648-49

Malma village mapped in 1636 by surveyor Anders Samuelssson

"här är rätteplats och en källa" (here is an execution place and prison)

Näs village, Blädinge socken och Kinnervads härad late 1630’s

Vävle village and Kapellgården, Sörmland 1634

A Runestone
The Runestone in Välve still stands at the original place.

New tasks - Land Redistribution

  - Storskiftesförordningen

  **Purpose:**
  - Redistribute land so farming could be more efficient.
  - Each farm's land had been split in very many small parcels scattered over the entire village area.

Map from 1702

Storskiftes map over a farm on Gotland 1821...
Every farm should have all land concentrated to one single lot.

- To strict for most of the country
- Few village was redistributed under this act

The Act of Enskifte
- The redistribution act of 1809

1827 – 1972
- Huge social consequences for the Swedish country side. The villages where split up and replaced by solitary farms
- The most informative and best maps ever produced in Sweden
- Scale normally 1:4 000

**Purpose**
- Redistribute the land of a farm to as few lots as possible, for efficient farming
- The farmer was no longer to take decisions in consensus with the other farmers in the village
- The farmer was "King in his realm", free to innovate
Since the mapping reasons mainly where economic in some sense, the features mapped where important economic features.

- Real action
- Co-ownership
- Prominent ancient remains
- Tax commodities
- Different constraints
- Owners and lessees
- Ways of acquisition
- Etc, etc.

But also:

- Infields (fields & meadows)
- Woods
- Grazing land
- Mills (saw & flour)
- Fishing hamlets
- Seat hunting places
- Building sites
- Etc, etc.

Very often the maps also contain information of great value today, which was not purposely mapped by the surveyor. One example is ancient remains visible as pieces of non-productive land in the fields.

Gotland was first mapped in large scale with the maps produced by 7 surveyors between 1693-1703. These maps are unique in the sense that **all farms on the entire island were mapped** and also the Town of Visby, since no Nobility owned land exists there.
The Maps

- The scale is 1:8000
- Made with triangulation without any geodetic references, which lead to an uneven distribution of errors.
- Remarkably good precision within smaller areas, but larger errors between areas.

FMIS (ASIS)
The Swedish National Heritage Board Archaeological Sites Information System

The Swedish National Heritage Board Ancient Remains Surveys

The methodology

Primary survey 1937-1974
- Systematic surveying of all known ancient remains visible above ground
- To be recorded on the new Economic maps
- Started on Gotland
- Field surveying and interviews with local people

Purpose:
- To protect the ancient remains
- Service an information for community planning and cultural heritage management
Secondary survey 1974 - 2002

- Revision of the economic maps
- Urbanisation and rapid development of the Swedish society
- Non-field survey of archives
  - Central archives, county museums, excavation reports etc.
- Revisit to already registered remains
  - Not unusual that they could not be recovered
- Historical maps
- Registered on Ortho photo maps
- Each surveyor did around 1-2 km² per day

Ortho photo maps

The Swedish National Heritage Board
Archaeological Sites Information System (ASIS)

- GIS database
- 1.7 million Ancient Remains
- 600 000 locations

Type of information in ASIS

- Archaeological sites, ruins, stray finds and standing monuments from the Palaeolithic to the Industrial Age
- Geographical positions - points, lines and polygons
- Classification according to NHB’s standard nomenclature, legal status and descriptions
- Images and references to other relevant databases
Problems & Limitations

Irregular surveying
- Different number of surveys in different areas
- Surveyors had different specialities
- Surveyors had different level of attainment

Knowledge change over time
- Different priorities at different times and geographical areas

The Archaeological Sites system is only the tip of an uneven iceberg

Village sites in Småland

ASIS system architecture

Other data
Modern topographical data

Geological maps

Field mapping
Necessary in detailed (large scale) studies

Phosphate mapping
Stray finds

- Millions of finds in different museum databases
- Most are accessible via the Internet
- Recorded on 100,000’s different find-places

Examples of Applications

Disappeared Ancient Remains

- The Uggarde farmstead in Rone parish, Gotland
- A Modern economic map, GIS database of Ancient remains and the Lagaskifteskarta (taxation map) from 1876 overlayed
Text descriptions

A5 1-4 Barley field is of clay and mould, good. Rain after house or stone fence, non-productive land.

H1 2 Meadow by an old road…

13 b Well field of the same quality, but ½ an acre is wet…

The land is used by the late Hans Boterarfvas widow for grass fee… Not within living memory has someone lived here. The houses are all gone and the courtyard is turned to a field. Only ruins and some of the walls to an old stone house is seen.

The Christianisation of Gotland

Research question:
Who took the initiative to erect the parish churches and decide where it should be placed. A single “chief” or all farmers?

Hypothesis:
The zero hypothesis was that the physical location of the church was a joint decision by the farmers and it was placed as “fair” as possible, which means that it should have a central location, in relation to all of the farmsteads.
The Christianisation of Gotland (continued)

Thiessen polygons generated around the churches are the “optimal” parishes

Spatia discrepancy between the optimal parish and the real parishes

Misplaced farms (5 %)

The Christianisation of Gotland (continued)

Centre of gravity (minimum transport distance) between of all farms in a parish (black dots). Churches are red dots

Distance between centre of gravity and churches in each parish

Retrogressive analysis

- Recreating the situation hundreds or thousands of years prior to the map creation date
- The map is a “summary” of the landscapes history

The Fjäle farmstead

Courtesy of Dan Carlsson

Oblique aerial photo over the settlement area

Iron Age stone house foundation

Normally dates to 100-600 AD

“The ruins of the gnome of Fjäle’s house”

© Gustaf Svedjemo 2008

© Dan Carlsson 2008
Yield of a deserted farm, Fjäle, calculated based on the grading of the soils in a 19th century land redistribution-map, and translated to probable emblements (fertility) in the Middle Ages.

**Data:**
- 17th century map
- 19th century map
- Field mapping (fossilised fields)
- Geological data

Fjäle is deserted around 1350-60

**Study of cultivated land**

The extension of cultivated land in Köinge socken from pre-historic times until 1995.

- The calculation is a hypothesis and is based upon the national Database of Ancient Remains. Graves, fossil fields.
- Based on Storskiftes (Landreform of 1757) maps.

- Based on Häradskartan (district map) from around 1920

- Based on the modern economic map

Data:
- 17th century map
- 19th century map
- Field mapping (fossilised fields)
- Excavations
- 14C dating
- Geological data
- Etc., etc.