

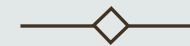
# MAPPING THE NORWEGIAN CADASTRES

—

A NEW WAY OF LOOKING AT  
QUANTITATIVE RESEARCH

Peder Gammeltoft

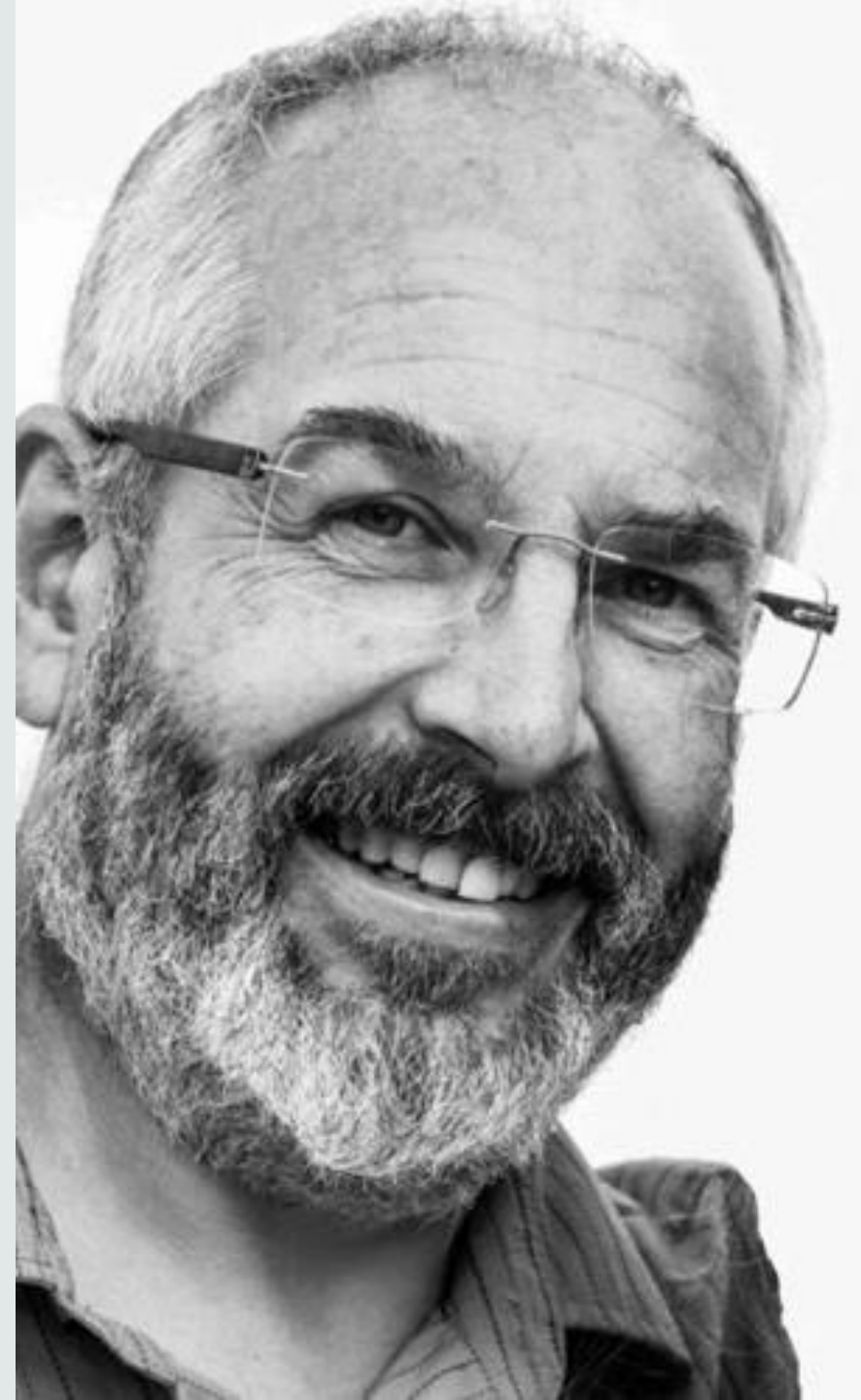
May 27th, 2022



# What am I Doing Here?



- Place-Name Researcher Since 1997
- Longstanding Interest in Digital Availability
- Part of DigDag Research Infrastructure Project
- One of the forces behind [www.danmarksstednavne.dk](http://www.danmarksstednavne.dk)
- Scientific Manager of the Norwegian Language Collections
- Current Project Norske stedsnavn | Norske stadnamn
- Looking in vain for solid Norwegian spatio-temporal data



# MAPPING THE NORWEGIAN CADASTRES



- Why is that Interesting?

# Cadastral – a wealth of information

**Cadastral** (*matrikkel*): An official register of real estate, containing information about property boundaries, addresses, buildings and property valuations.

- Norwegian historical cadastral:
  - Property name (bruksnavn)
  - Estate name (gardsnavn)
  - Administrative unit (county, municipality, sometimes also parish)
  - Cadastral codes (since 1886: cadastral number (gardsnummer), property number (bruksnummer))
  - Ownership
  - Valuation
  - (Previous valuation)

# Norwegian Cadastres

## Digital cadastres:

- Matrikkelen av 1838
- Matrikkelen av 1886
- Matrikkelutkastet av 1950
- Matrikkelen av 2010 (GAB-matrikkel)

## Non-digital:

- Skattematrikkelen av 1647
- Landkomisjonens jordebok av 1661
- Matrikkelen av 1665
- Matrikkelforarbeidet av 1723

## Contents:

- Property name (bruksnavn)
- Estate name (gardsnavn)
- County name
- Municipality name
- (Parish Name)
- Municipal code
- Cadastral number (gardsnummer)
- Property number (bruksnummer)
- Ownership
- Valuation
- (Former valuation)

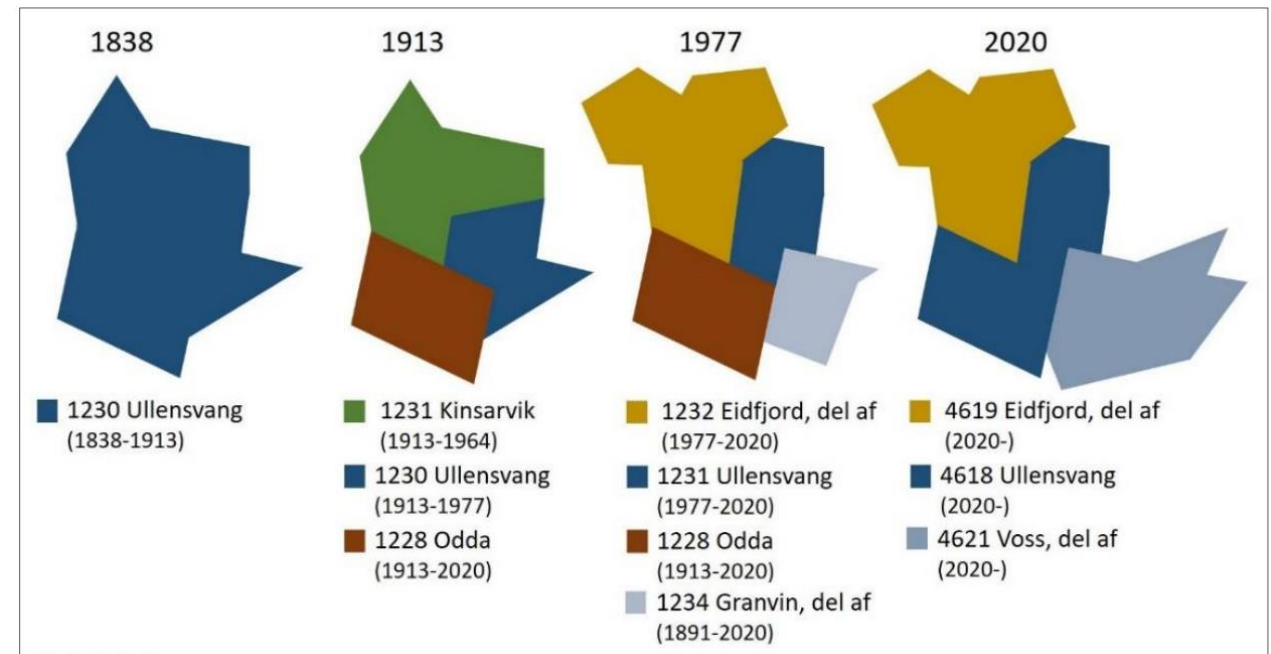
# How to make use of historical cadastres?

## Codification

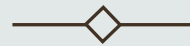
- E.g. 1723-56/2, Brusveet, Forsøl  
(concatenation of KNR, GNR & BNR)

## Temporal codification

Period	Code	Temporal code
1891-1901	1723-56/2	172300560002
1901-1968	1724-56/2	172300560002
1968-2012	1723-56/2	172300560002
2012-2017	1756-356/2	172300560002
2018-	5053-356/2	172300560002



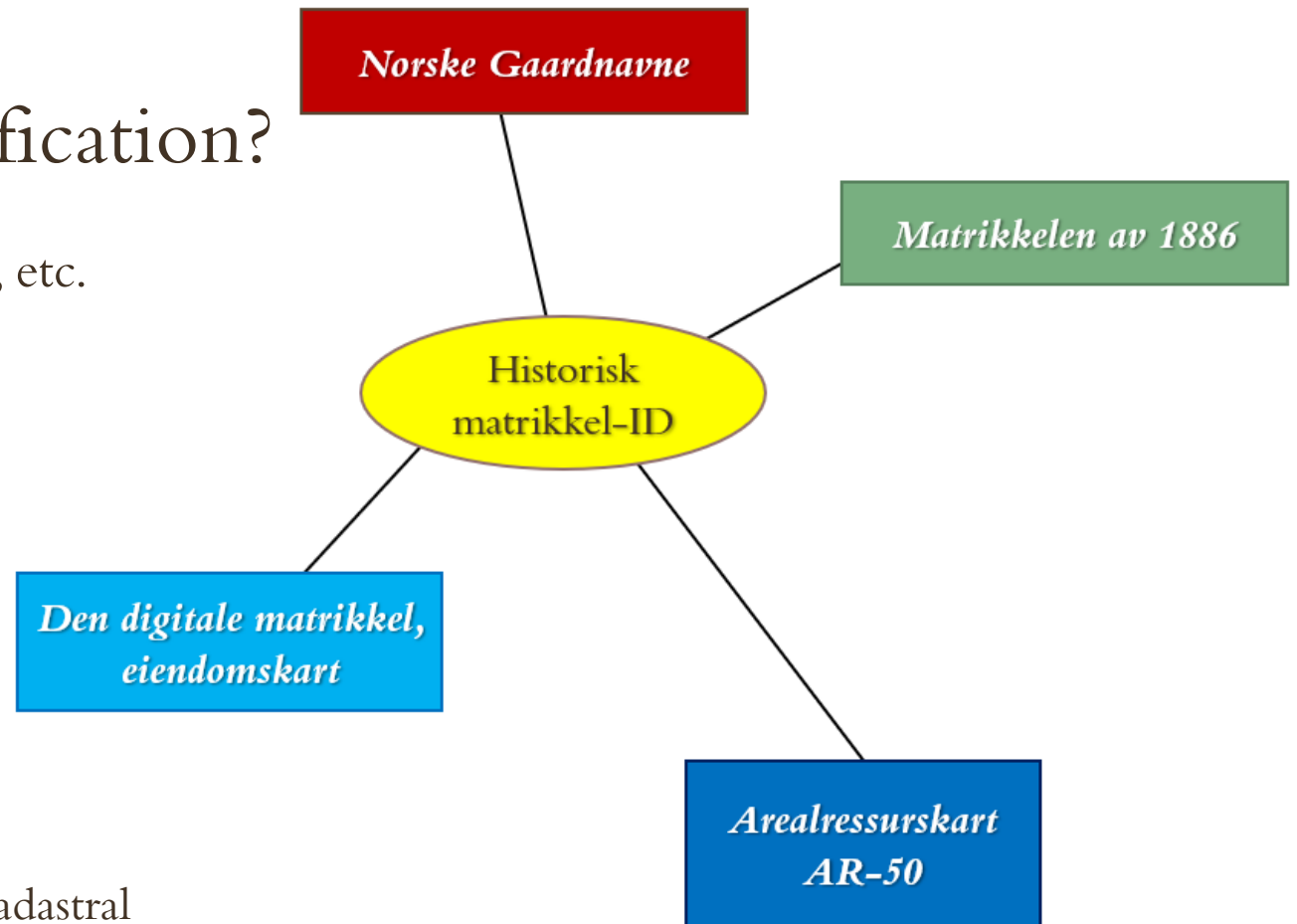
# TEMPORAL RESEARCH IN THE DIGITAL AGE



- Is that Possible?

# Benefits of temporal codification?

- Geodata from current digital cadastre, etc.
- Combine data from other sources
  - Name research
  - Archaeology
  - Geology
  - Land use
  - Census data
- (basically anything that relates to the cadastral system or has a spatial extent)





## But is it doable?

Yes, but you need to have comparable data

- That's where temporal codification comes in...

And you need to have compatible data

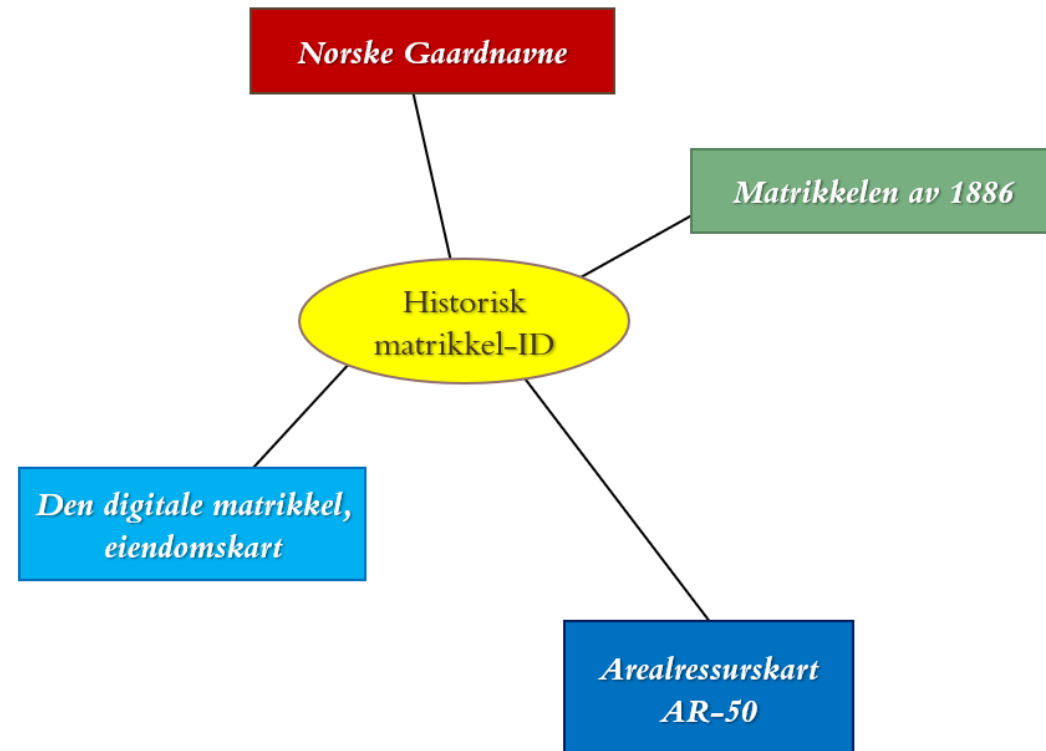
- Spatial datasets need to be coded in the same (UTM) coordinate reference system
- Datasets need to be available in compatible data formats

...Then you can basically do what your heart desires  
and the temporal cadastre is your 'gateway dataset' ...

# How to make use of historical cadastres?

Once the temporal code has been added to the cadastre, it is possible to:

- Link to current cadastral geo-datasets
  - Add coordinates
  - Make spatial queries
  - Link to other geodatasets
    - Directly through geocodes
    - Via spatial data from current cadastre
- Enable comparative studies between cadastres
- Link to Censuses
  - Demographic studies



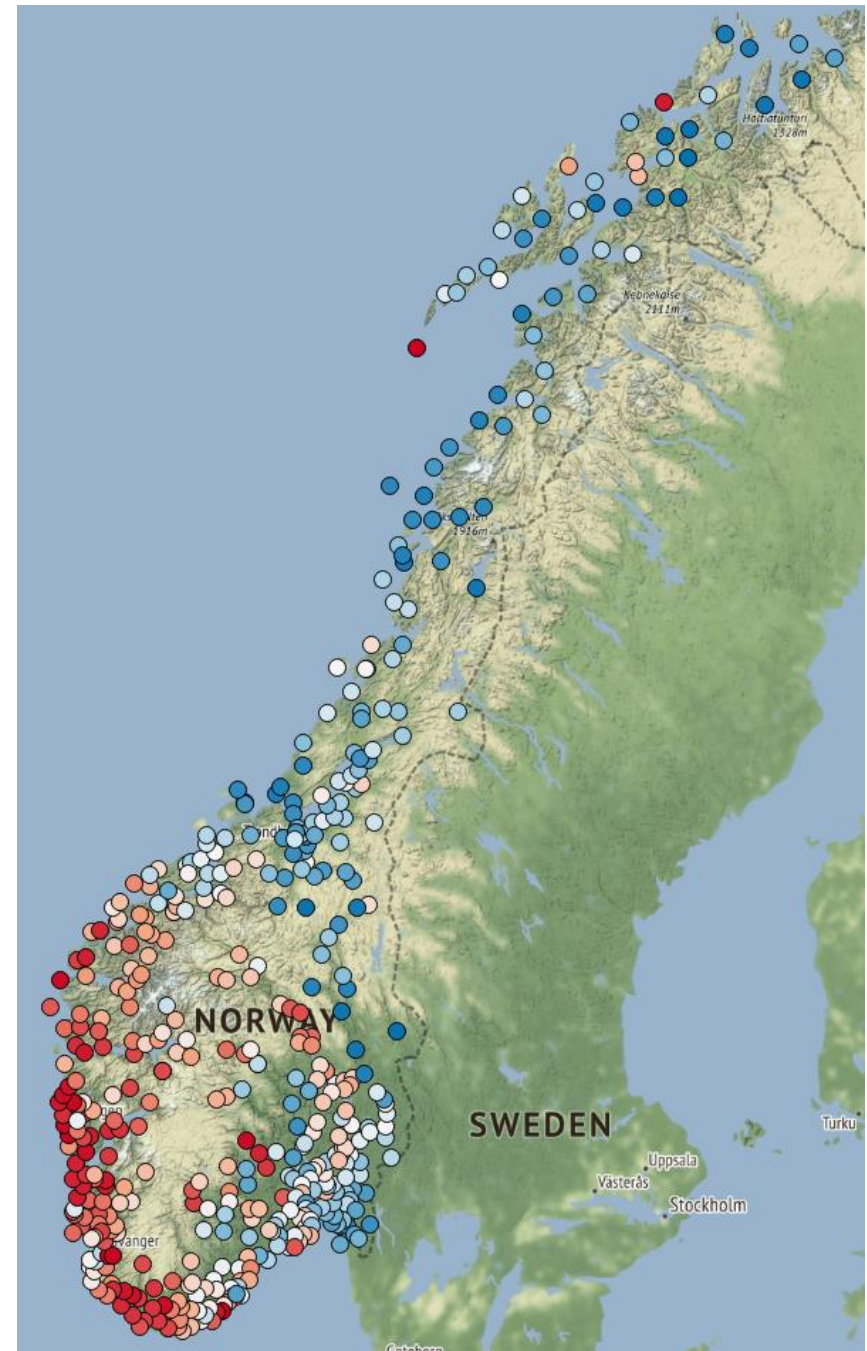
# Example:

## Valuation differences over time

Datasets: Cadastres 1838 and 1886

How (1/2)?

- Decimalisation of 1838 valuations needed
  - 1886 valuations in 'skyldmark', decimal, total assessment 500 000
  - 1838 valuations in 'skyldaler', not decimal, total assessment 249 068
    - Daler
    - Ort (5 ort to the daler)
    - Skilling (120 skilling to the ort)



# Example 1: Valuation differences over time

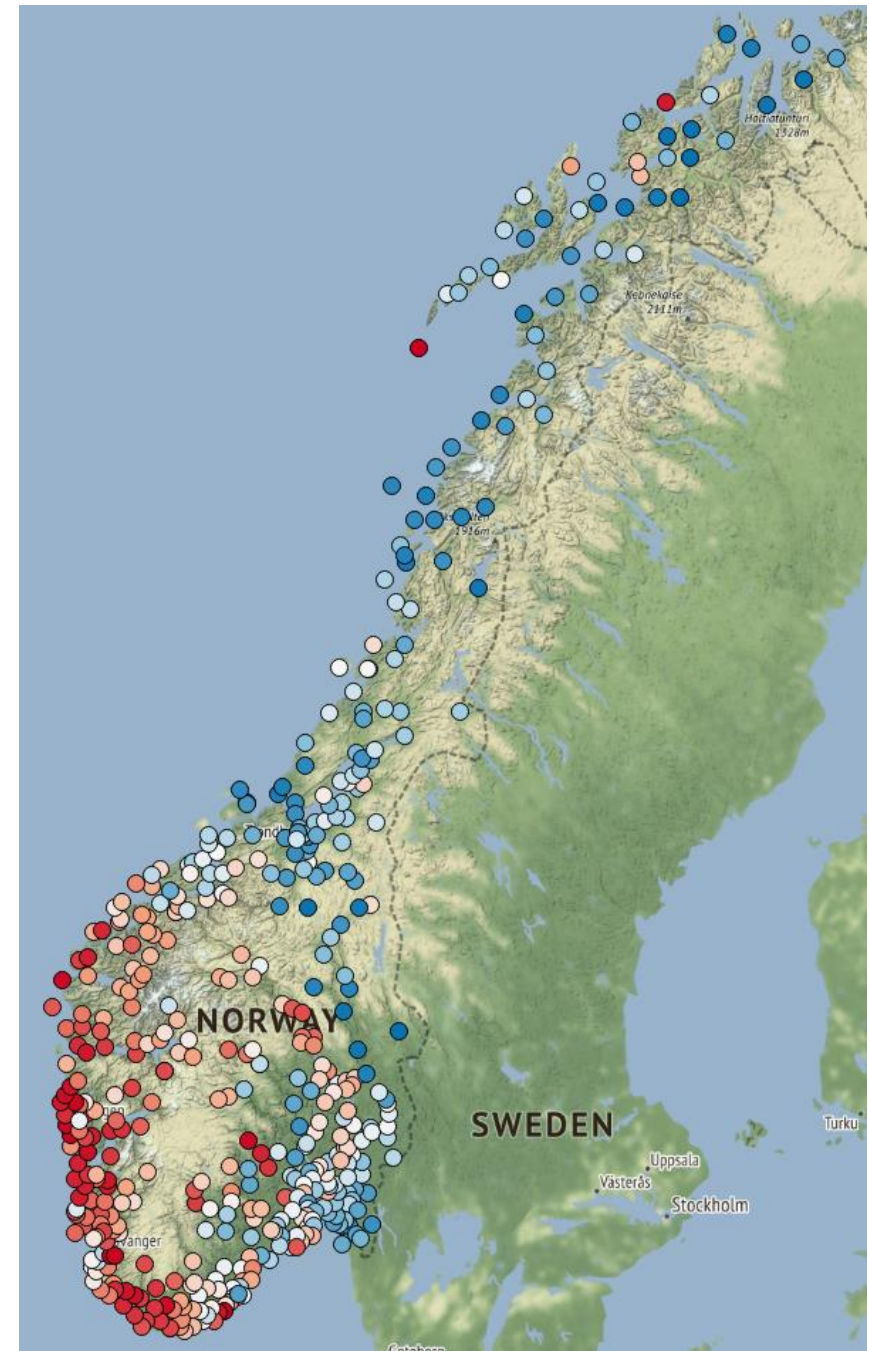
Datasets: Cadastres 1838 and 1886

How (2/2)?

- Indexation of valuations to make comparisons possible
  - Index set at 1,000,000
    - 1886 multiplied by 2
    - 1838 multiplied by 4,01497

What was the result?

- Distinct regional differences in valuation
  - Clear drop in valuation in southern and western Norway from 1836 to 1886
  - Eastern and northern areas increased significantly in valuation.



# THE RETROGRESSIVE METHOD



Using Later Sources to Analyse the Past

# Retrogressive method??

- The retrogressive method is a historical-geographical method to study past conditions by starting in a younger time period and travelling back towards older periods.

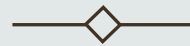
E.g. :

- Combine modern geodata with place-name research. Calculate:
  - How much land per place-name type
  - How much in use per place-name type
  - How much arable per place-name type
  - Cadastral valuations per place-name type
  - etc.

# Retrogressive method

- Can be used on statistical material
  - individual instances can be compared with statistical averages
- Fully scalable to local, regional and national material
- Provides statistical proof, and
- Reveals tendencies in the historical material

# RETROGRESSIVE QUANTITATIVE RESEARCH

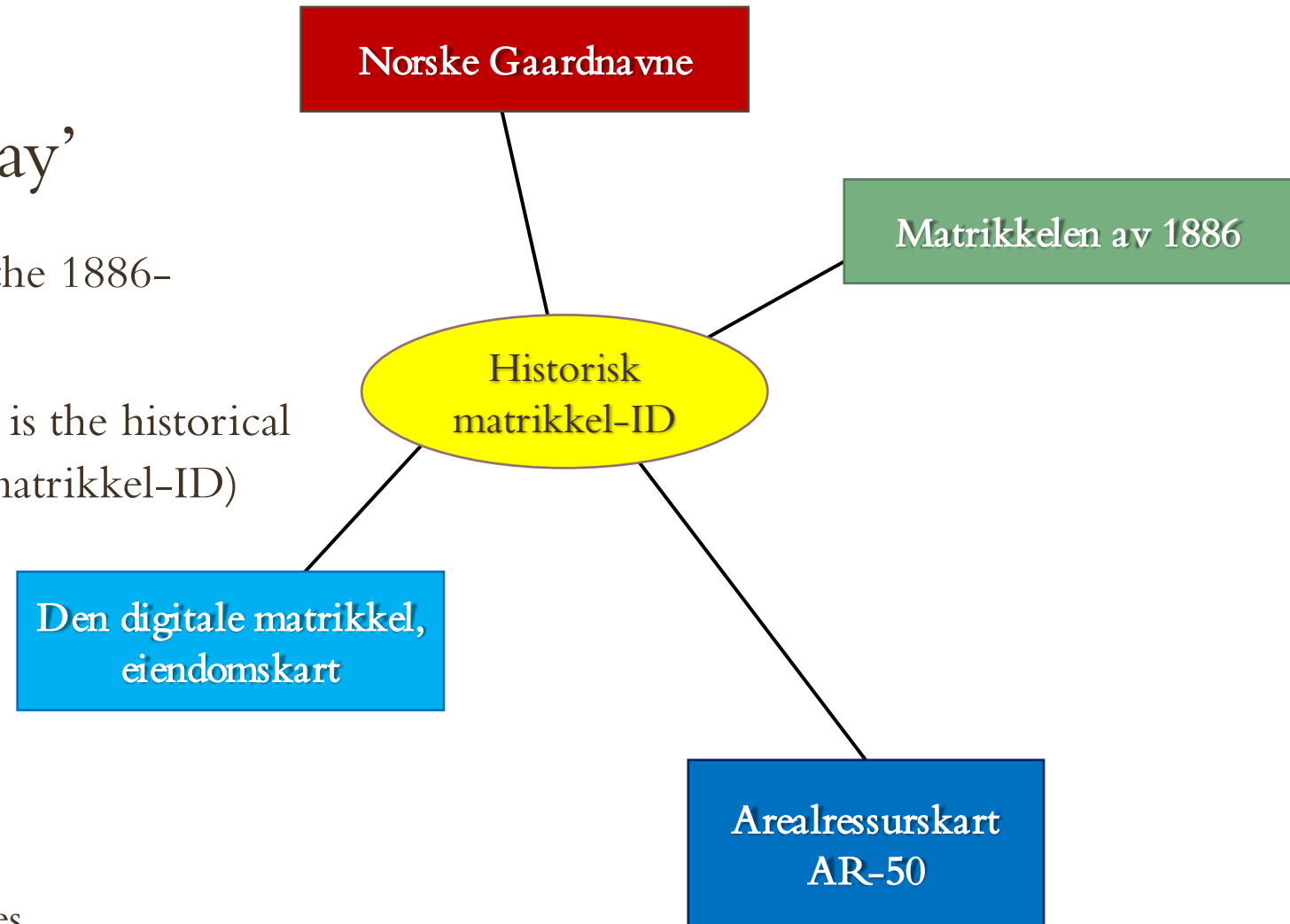


- Possibilities and Challenges



## Creating a 'gateway'

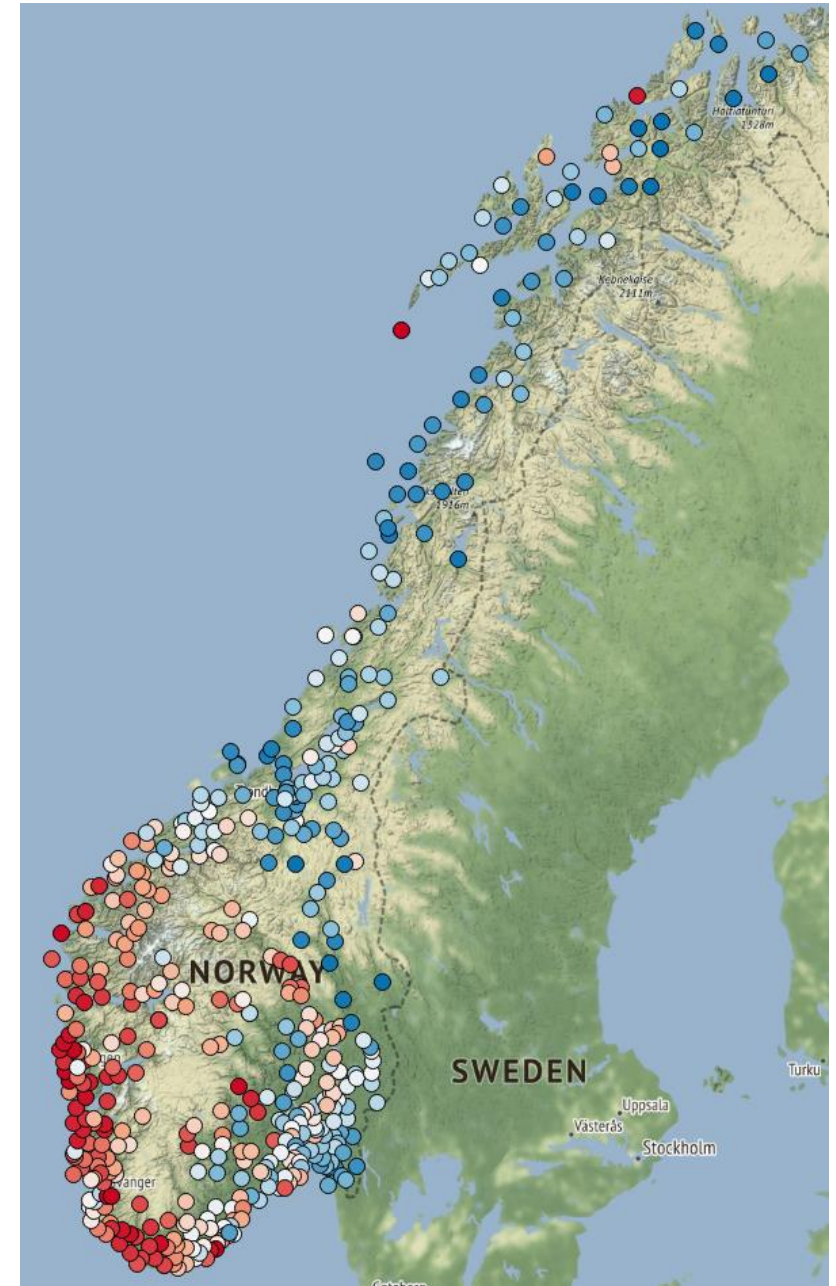
- The 'gateway dataset' is the 1886-cadastre
- The dataset linking it all is the historical cadastral ID (Historisk matrikkel-ID)
- Linked datasets:
  - Landed property map (digitale matrikkel)
  - Land-use map (AR-50)
  - Norwegian Farm-Names



# The 1886 Cadastre – a gateway dataset

Digitised by **Registreringsentral** for historiske data

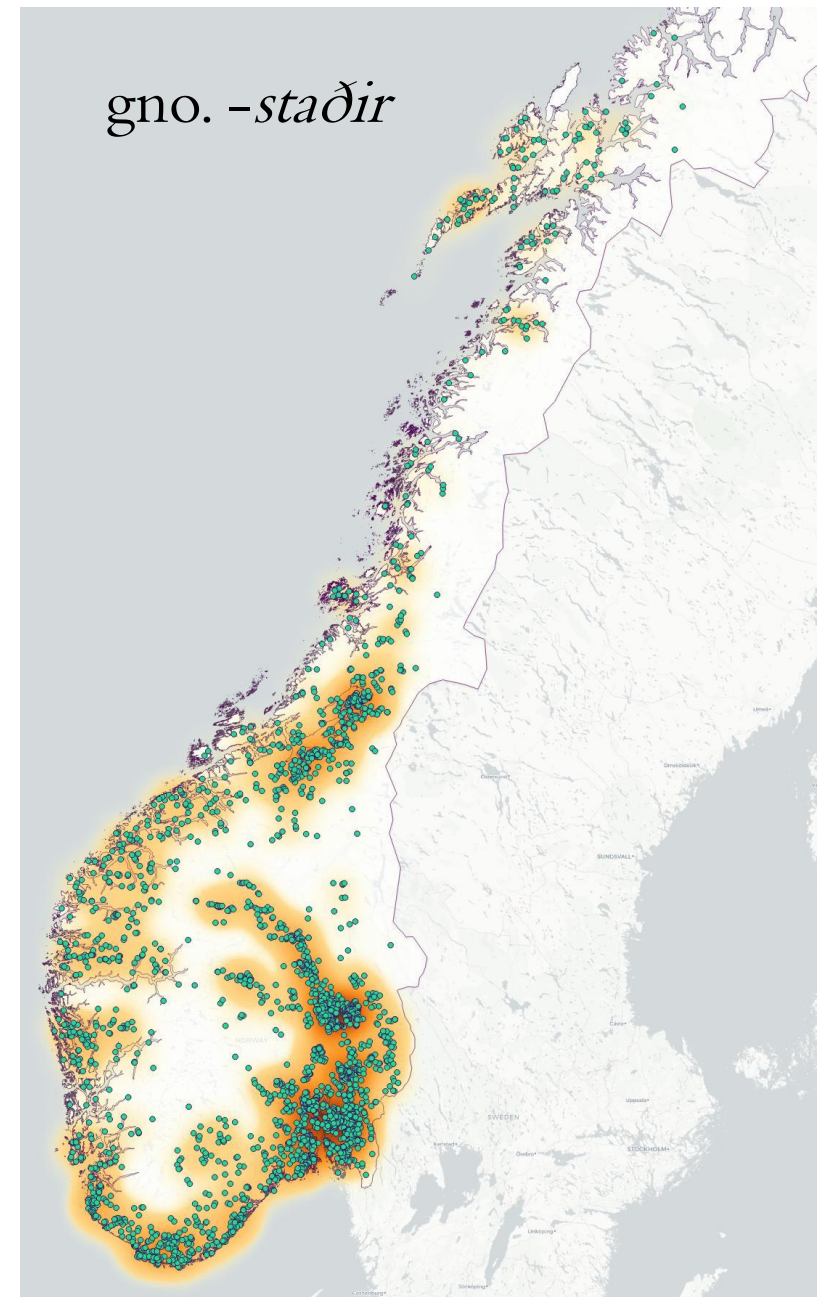
- Property name (bruksnavn)
- Estate name (gardsnavn)
- County name
- Municipality name
- Parish Name
- Municipal code
- Cadastral number (gardsnummer)
- Property number (bruksnummer)
- Ownership
- Valuation (markskyld)
- Old Valuation (skylddaler)



# Norwegian Farm Names

Dataset developed by **Dokumentasjonsprosjektet**

- Geocodes used to link to the historical cadastral ID
  - Municipal code (kommunenummer)
  - Cadastral number (gardsnummer )
- Analysis data
  - Linguistic interpretations
    - Generic element
    - (specific element)



# The Digital Cadastre, Property Map

Dataset from **Statens kartverk** at Geonorge.no

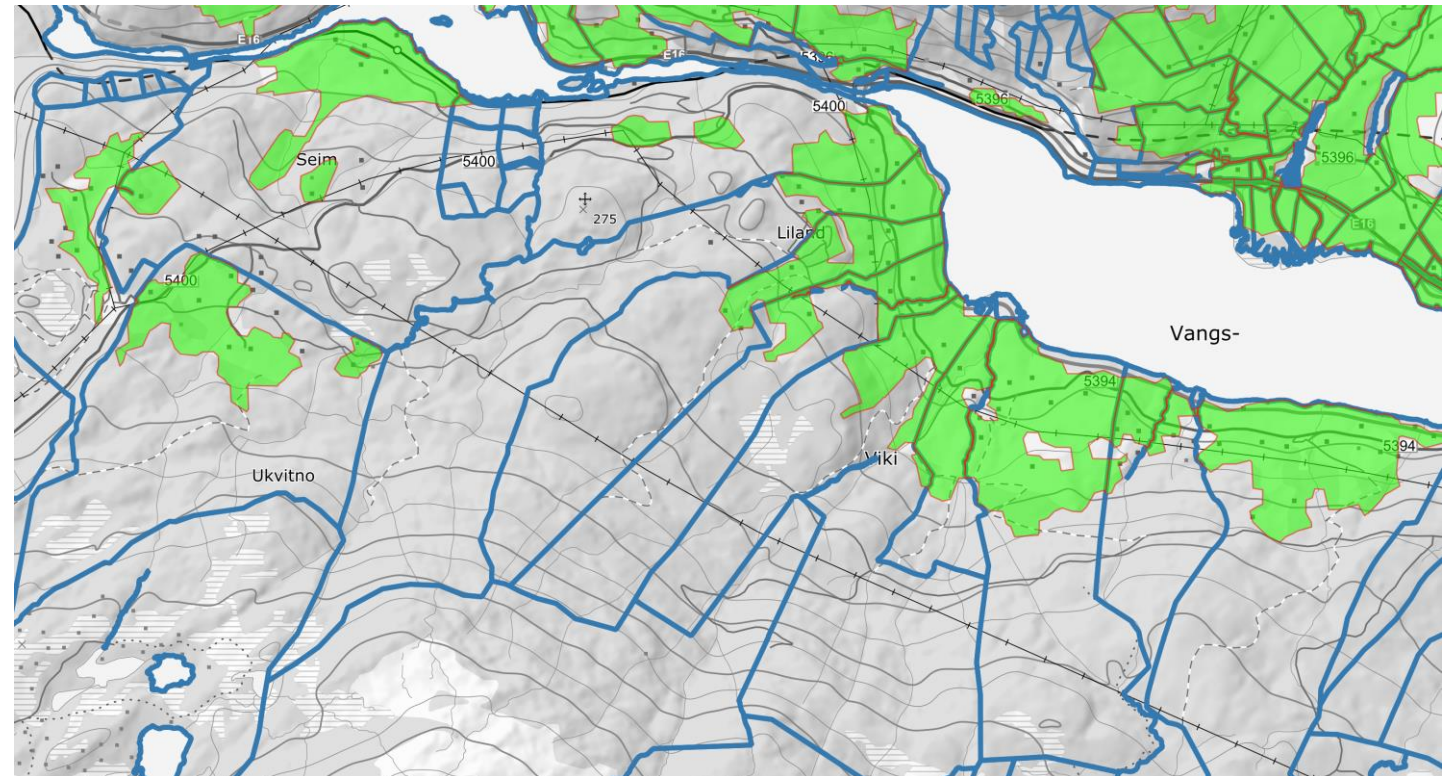
- Geocodes used to link to the historical cadastral ID
  - Municipal code (kommunenummer)
  - Cadastral number (gardsnummer )
- Analysis data
  - Polygon geodata
    - At property number level
      - Must be joined to represent cadastral number (Union), and from this calculate land size, size of the cultivated and land-use



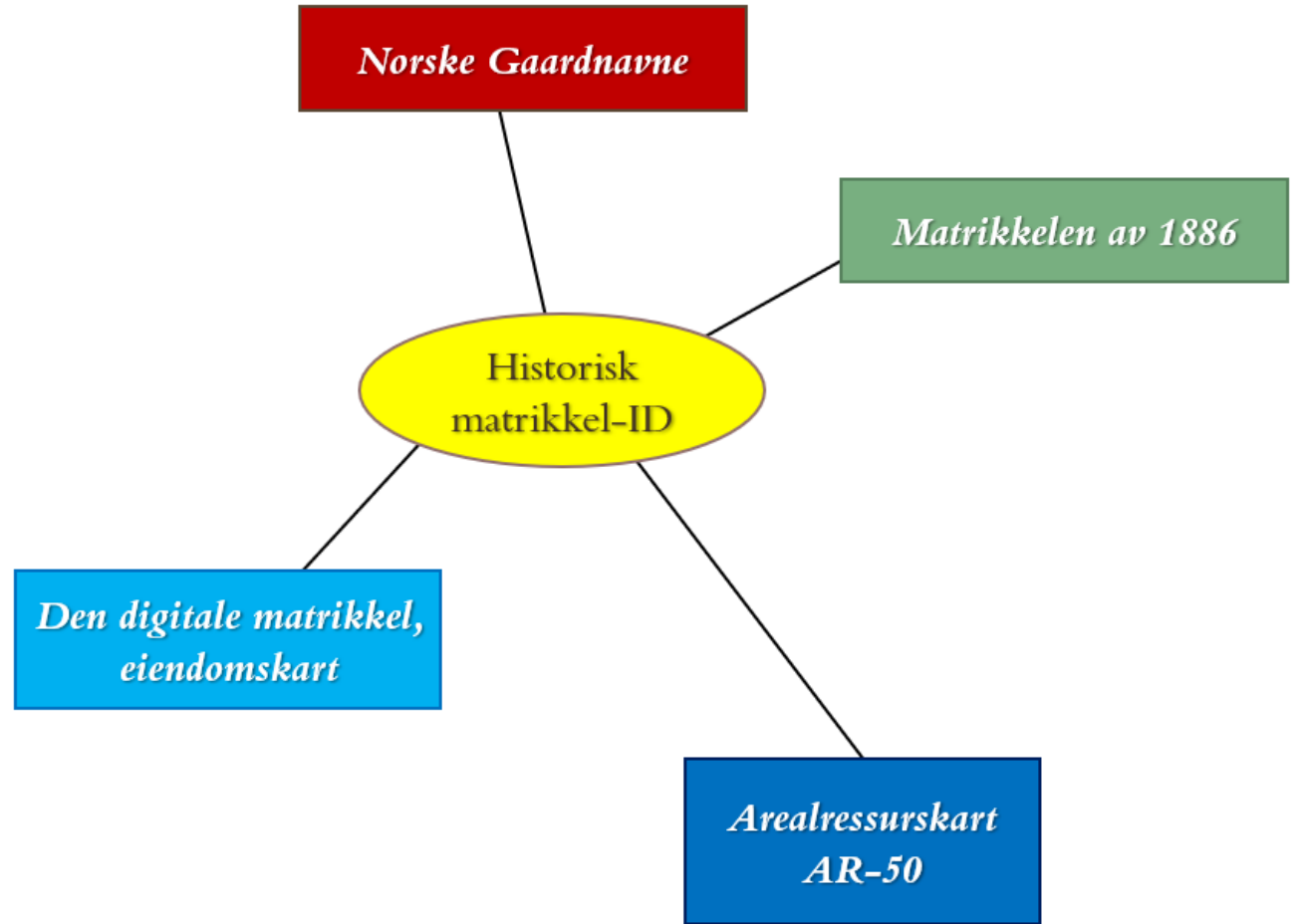
# Land Use Map, AR-50

Dataset from **Norsk institutt for bioøkonomi (NIBIO)** at [Geonorge.no](http://Geonorge.no)

- Geodata
  - Polygondata
    - Land-use areas
    - Land-use type 20 – cultivated land
    - Land-use type 10 – inhabited land
  - Analysis data
    - Land-use types joined (Union)
    - Joined land-use types then split up for each cadastral number (Split)
    - Land-use size calculated for each cadastral number



AND THE  
RESULT?



## Possible to make analyses from four parameters

- Overall size of cadastral unit
  - Size of cultivated area
  - Ratio (in %) between cultivated area and total area
  - Cadastral valuation
- To eliminate statistical 'noise', normal distribution/Gaussian distribution used

Note!

- This is a test and a 'work in progress' study

# Place-name types

## Central Iron Age types

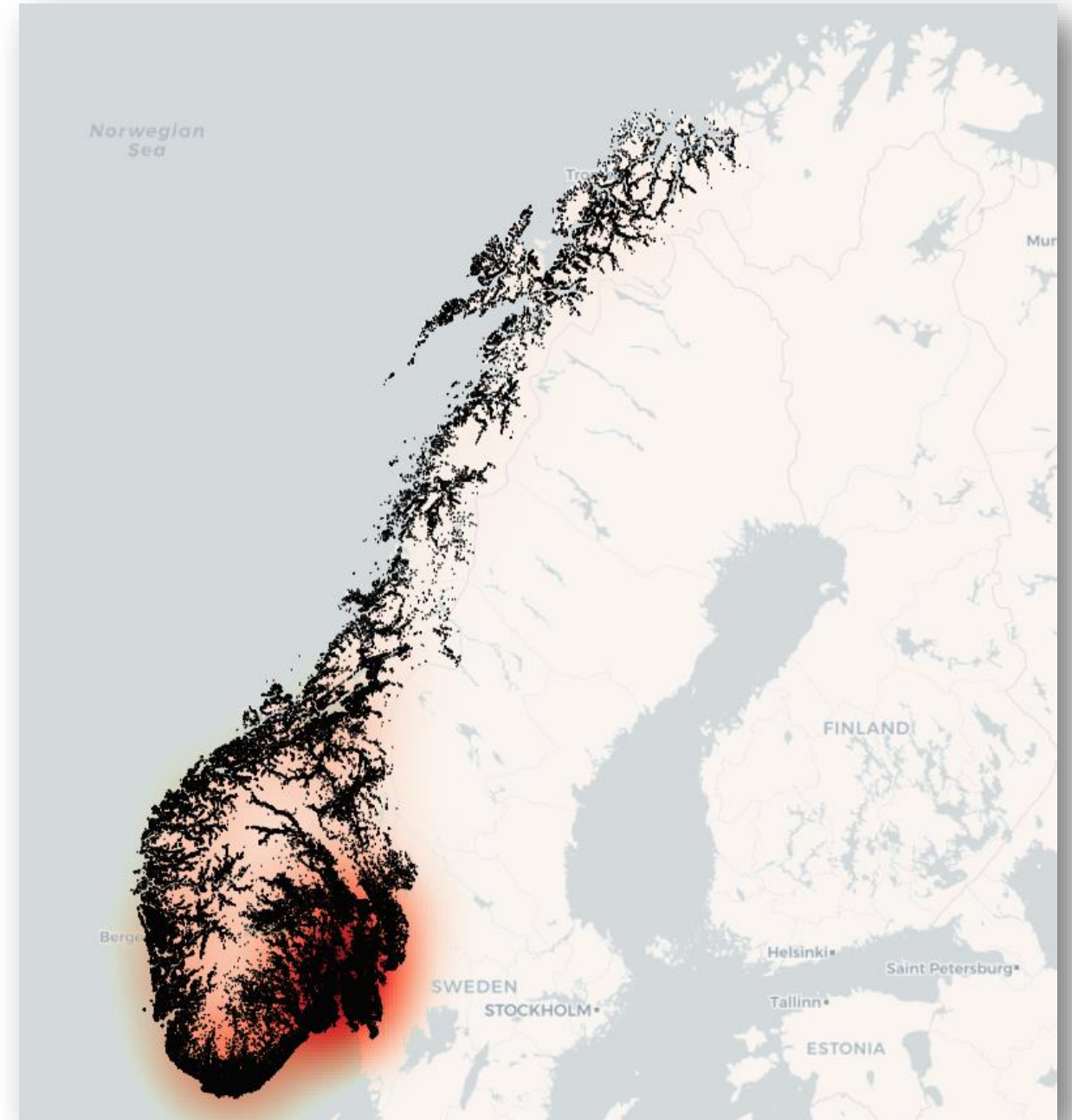
- ON *vin* f. ‘meadow, grazing’
- ON *heimr* m. ‘home, settlement’
- ON *land* n. ‘land’

## Viking Age, central types

- ON *bólstaðr* m. ‘settlement’
- ON *staðir* m. ‘settlement’

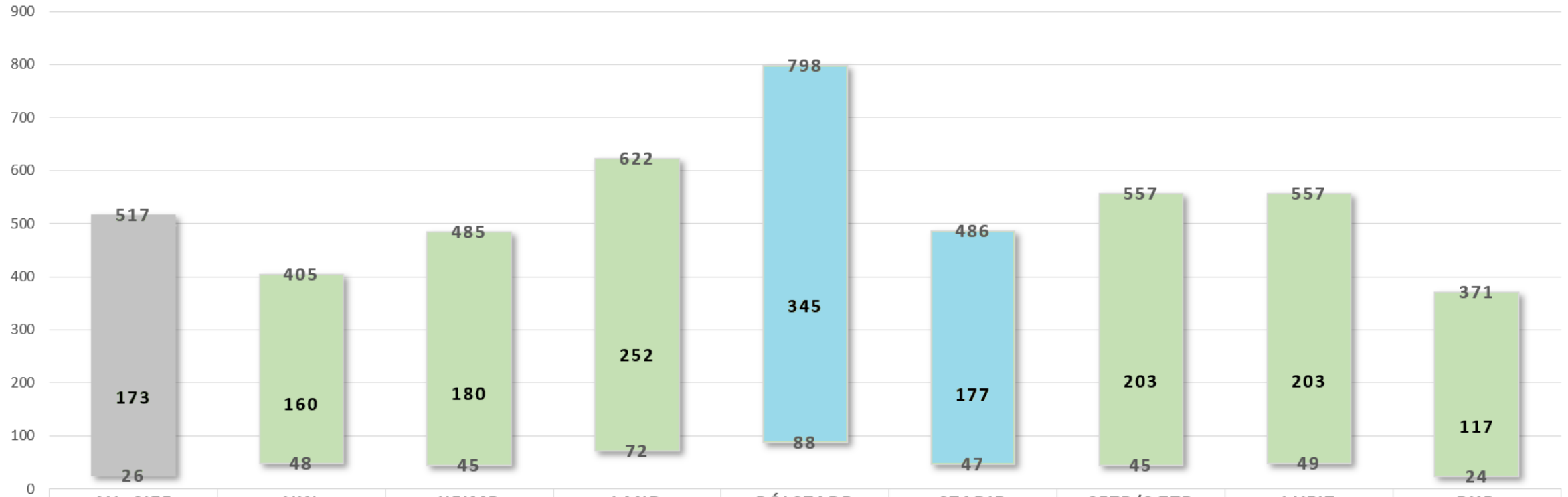
## Marginal types, Viking Age/Middle Ages

- ON *setr/sætr* n. ‘shieling’
- ON *þveit* f. ‘clearing’
- ON *ruð* n. ‘clearing’



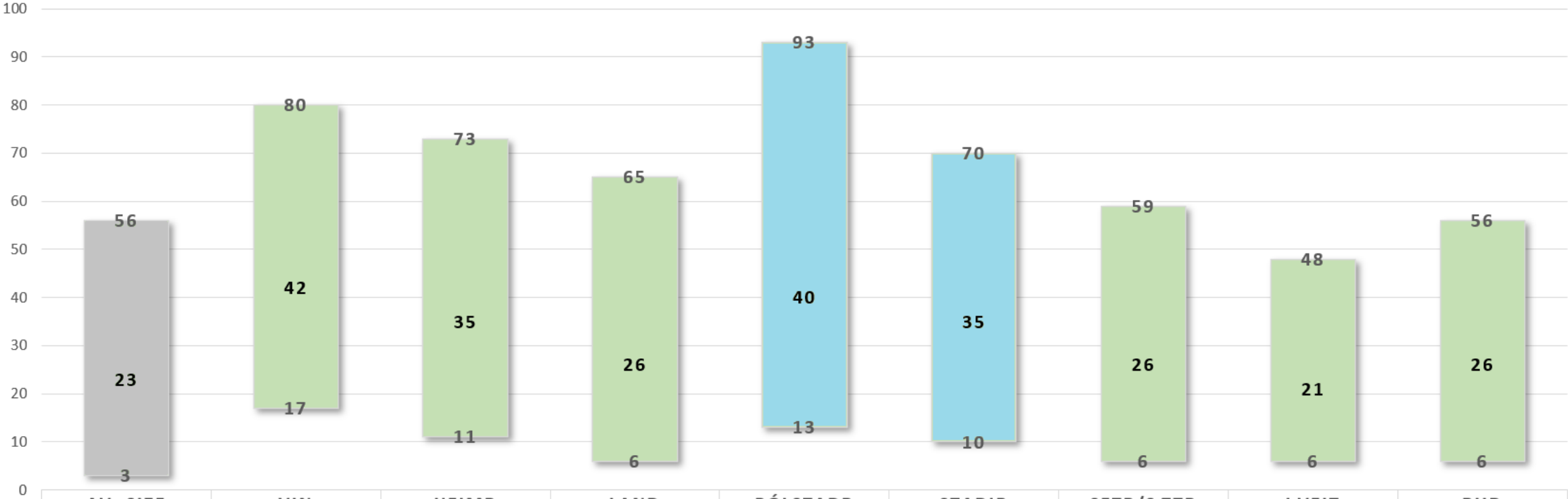


Average Size and Gaussian Distribution Range of Select Norwegian Name Types,  
Hectares (Ha.) per Cadastral Unit (Gard)



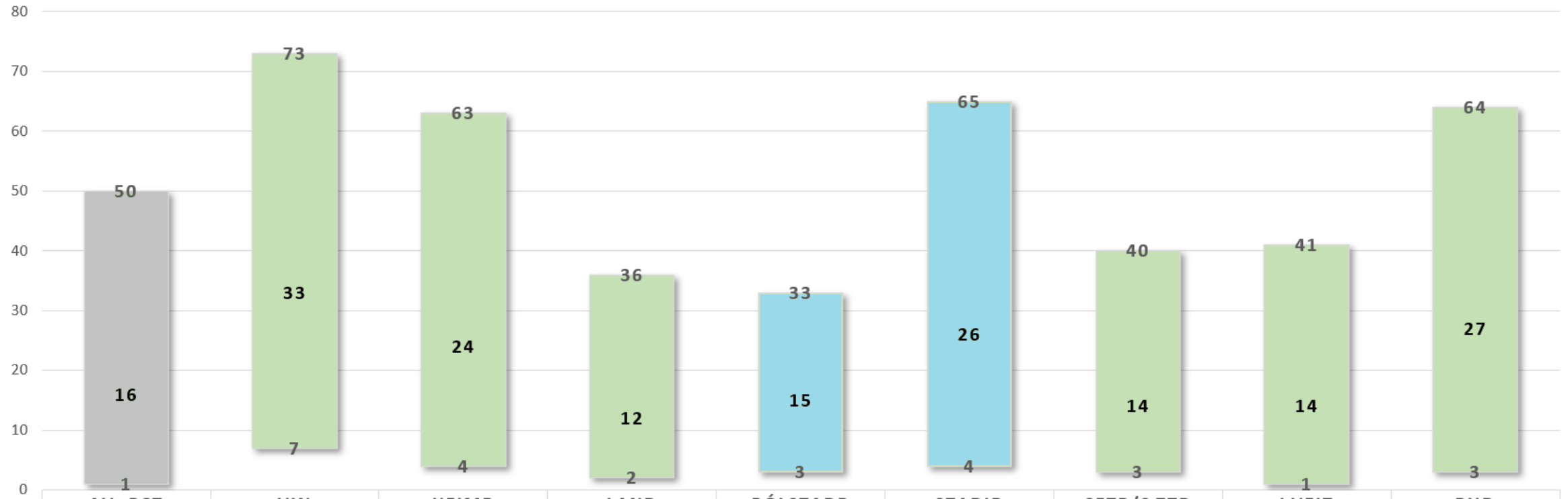
	AV. SIZE	VIN	HEIMR	LAND	BÓLSTAÐR	STAÐIR	SETR/SÆTR	ÞVEIT	RUÐ
Min.	26	48	45	72	88	47	45	49	24
Average	173	160	180	252	345	177	203	203	117
Max.	517	405	485	622	798	486	557	557	371

Average Farmland Size and Gaussian Distribution Range of Select Norwegian Name Types,  
Hectares (Ha.) per Cadastral Unit (Gard)



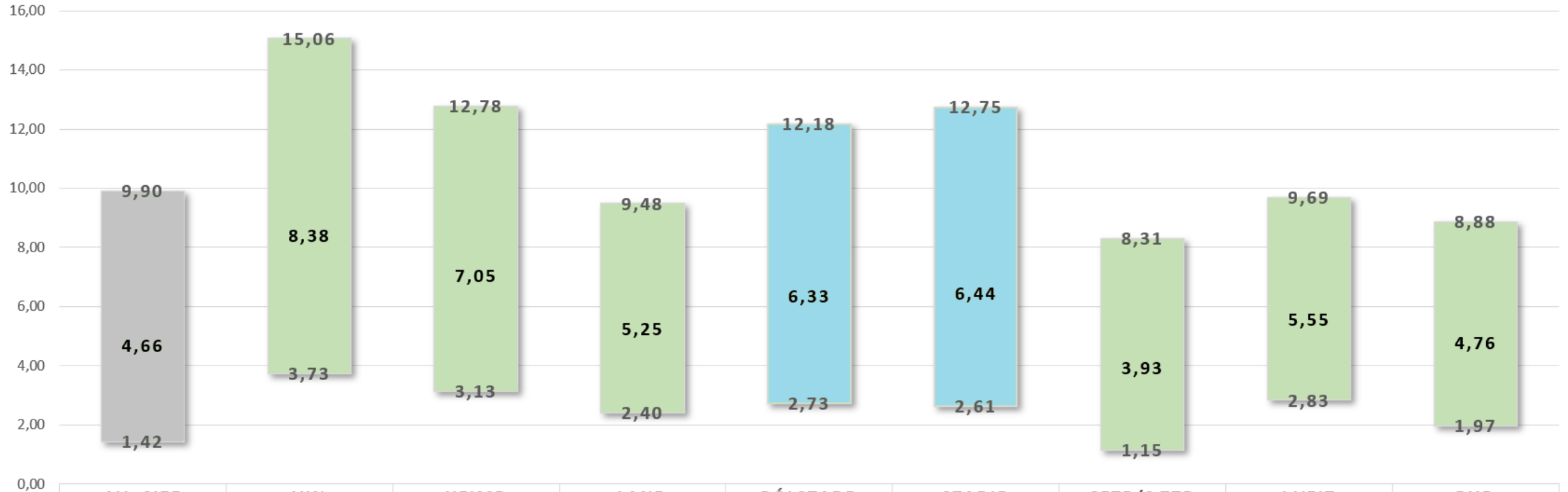
	AV. SIZE	VIN	HEIMR	LAND	BÓLSTAÐR	STAÐIR	SETR/SÆTR	ÞVEIT	RUÐ
Min.	3	17	11	6	13	10	6	6	6
Average	23	42	35	26	40	35	26	21	26
Max.	56	80	73	65	93	70	59	48	56

Average Farmland Percentage and Gaussian Distribution Range of Select Norwegian Name Types,  
Percent (%) per Cadastral Unit (Gard)



	AV. PCT	VIN	HEIMR	LAND	BÓLSTAÐR	STAÐIR	SETR/SÆTR	ÞVEIT	RUÐ
<b>Min.</b>	1	7	4	2	3	4	3	1	3
<b>Average</b>	16	33	24	12	15	26	14	14	27
<b>Max.</b>	50	73	63	36	33	65	40	41	64

Average Taxation Value in the 1838 Cadastre and Gaussian Distribution Range of Select Norwegian Name Types, Skylddaler (desimal value) per Cadastral Unit (Gard)



	AV. SIZE	VIN	HEIMR	LAND	BÓLSTAÐR	STAÐIR	SETR/SÆTR	ÞVEIT	RUÐ
<b>Min.</b>	1,42	3,73	3,13	2,40	2,73	2,61	1,15	2,83	1,97
<b>Average</b>	4,66	8,38	7,05	5,25	6,33	6,44	3,93	5,55	4,76
<b>Max.</b>	9,90	15,06	12,78	9,48	12,18	12,75	8,31	9,69	8,88

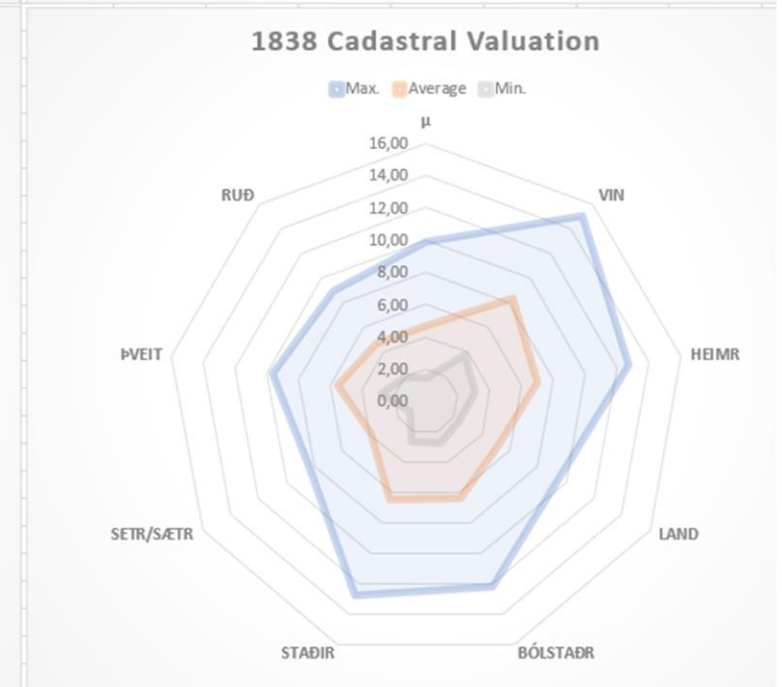
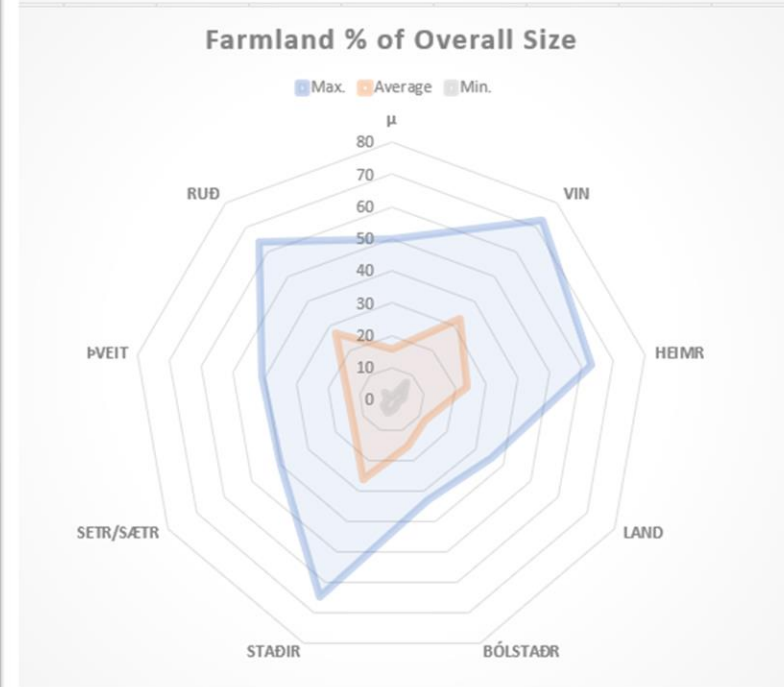
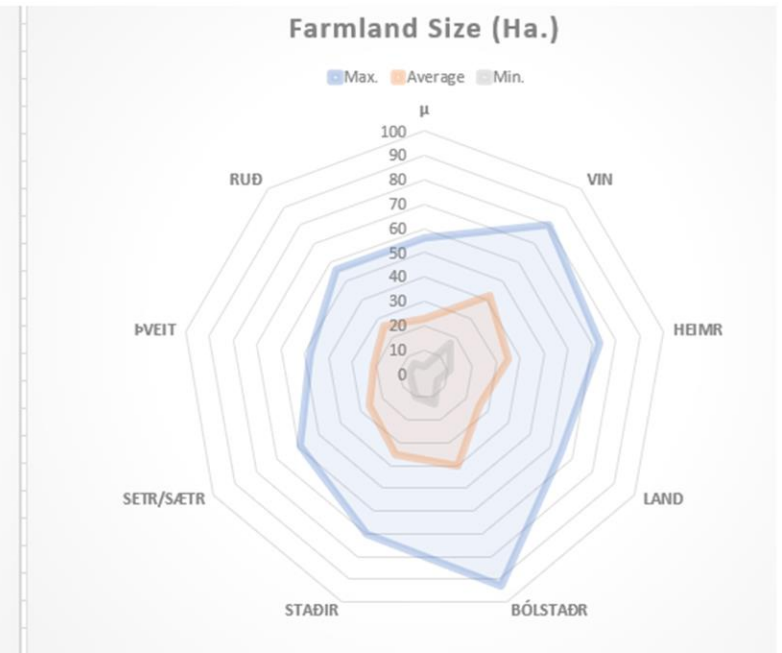
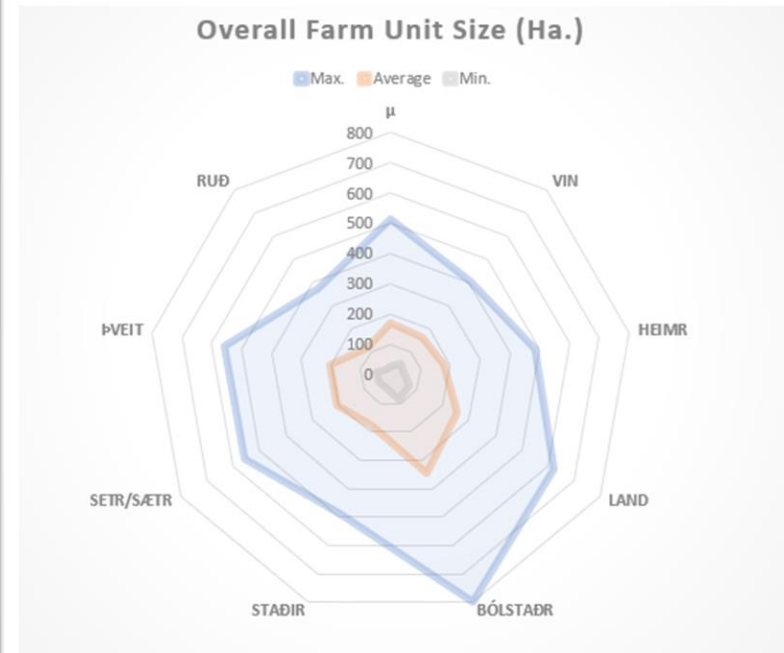
# What do we see?

Signs of diversified usage

- Differences farming focus

Age generally matters

- Older = the better valuation
- Older = more cultivated land
- Older = better soil



# Is it any good?

Yes, we get quantitative data for place-name types

More certain name type descriptions

BUT one must be aware of limitations and problems present in the material

- Place-names were coined *c.* 1700-900 years ago
  - The cadastre is from 1886
  - The cadastral unit valuation is from 1838
  - Geodata (land size and land use) is from 2018
- 
- The material may show later conditions than those present at coinage
  - 'Noise' eliminated through mathematical models.

QUESTIONS?

