

Cartography with R and QGIS, which to choose?

Mike Spencer

A personal journey

- Public → private → academic sectors
- General move to programming
- Open source



Now



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Resilience

- Spatial data science
- Network analysis
- QGIS



Distance to community centre (km)

/// missing

0 - 4
4 - 9
9 - 15
15 - 21
21 - 28
28 - 36
36 - 44
44 - 65
65 - 77



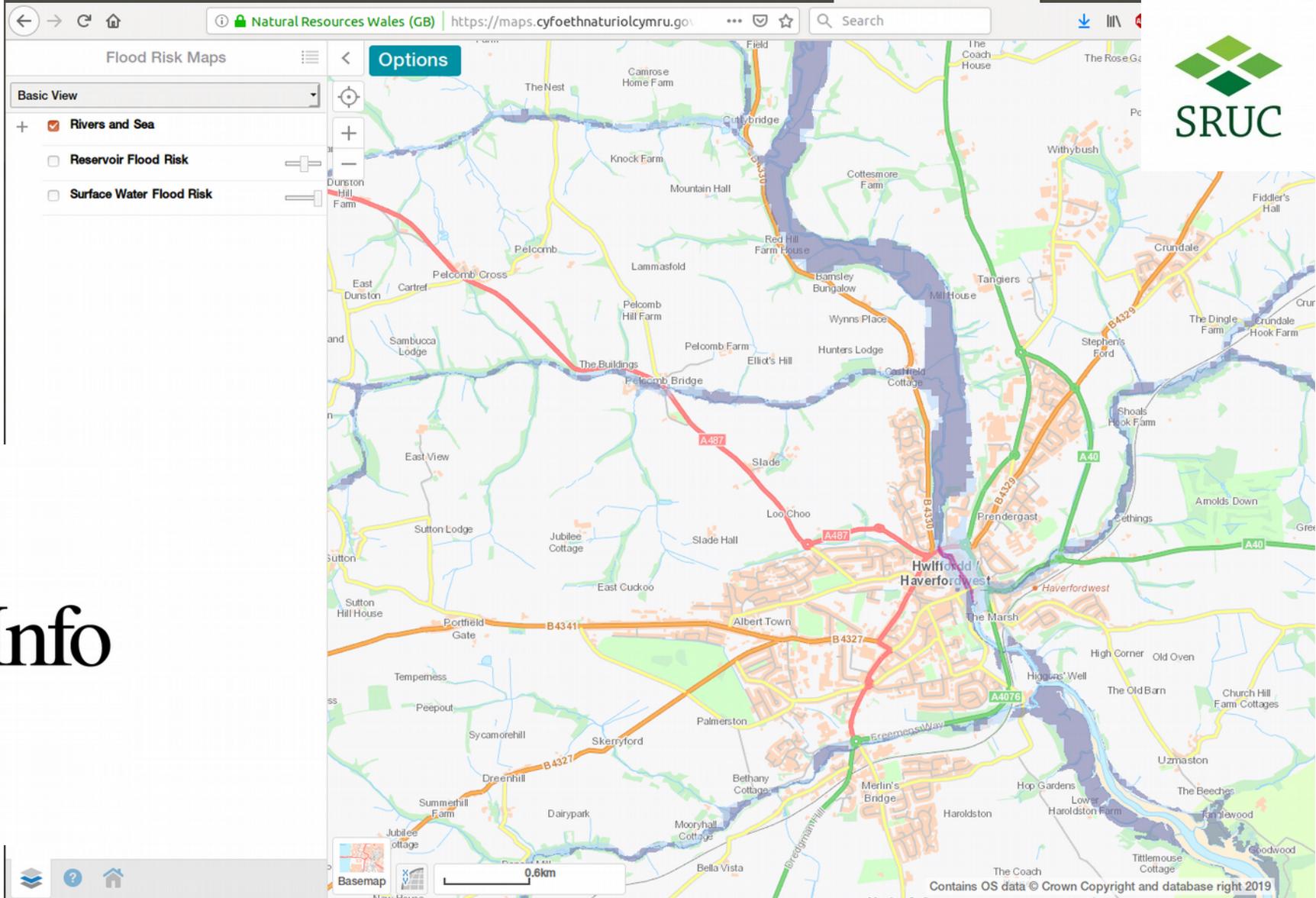
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Tools

- Open science
- Centrally managed software
- Local user groups
- Personal networks

Then

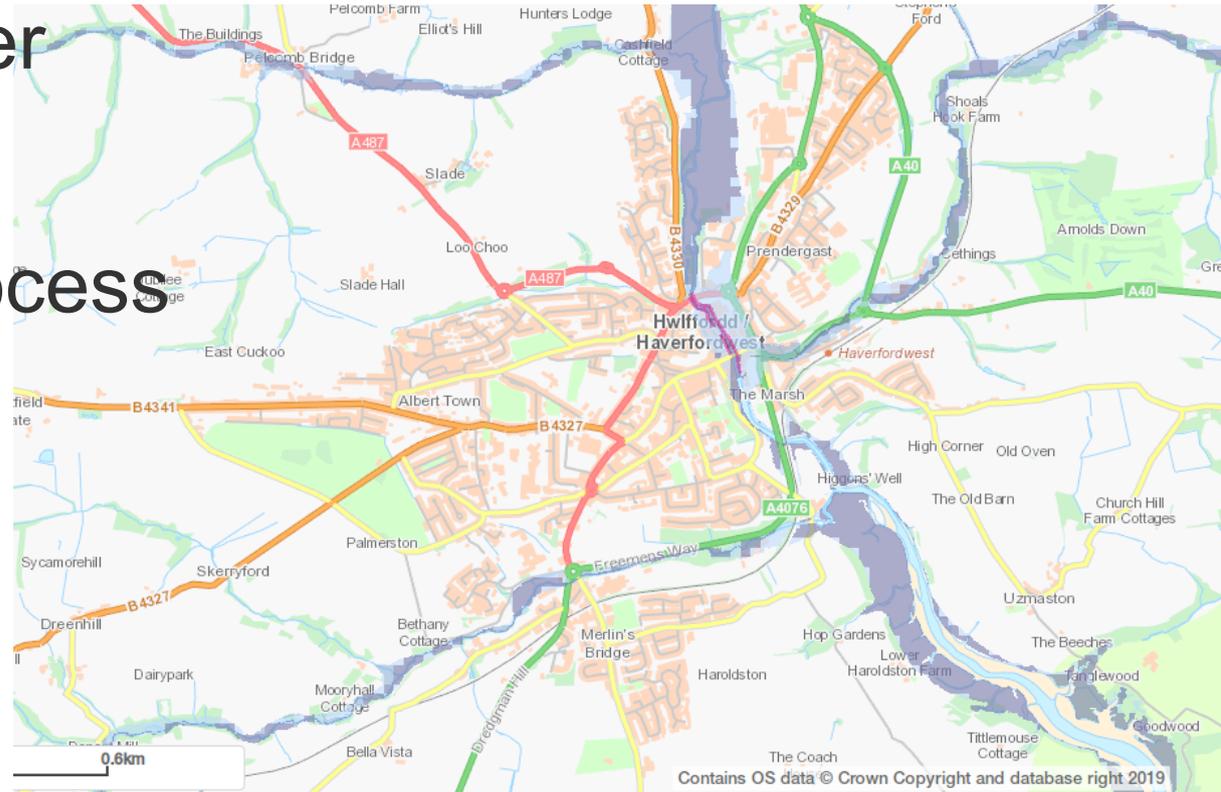


Difference?

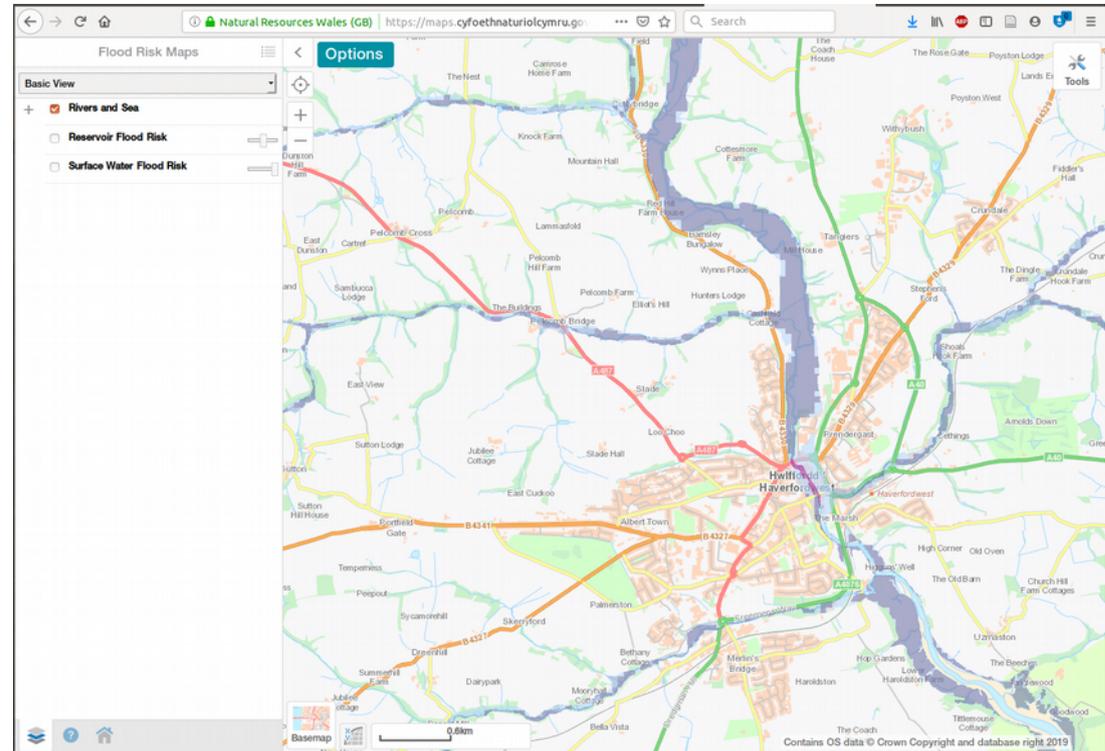
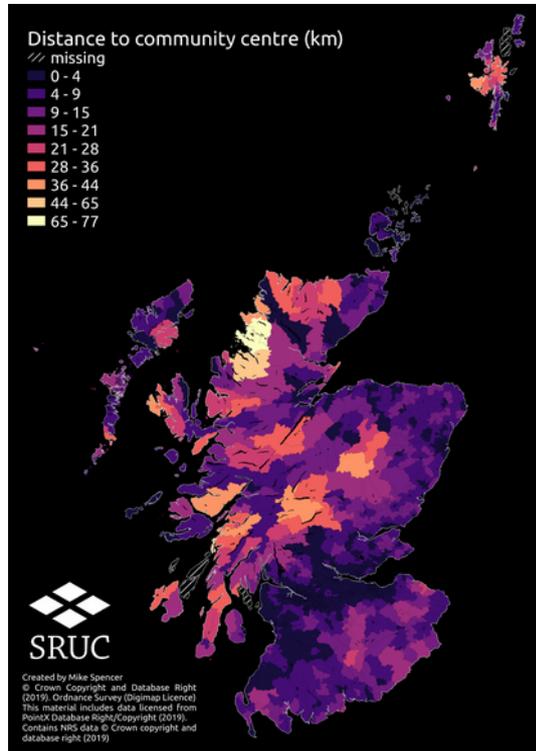
- Participation available to all
 - Cost is not a barrier
- Value has moved
 - From output to process

Difference?

- Participation available to all
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What is a map?



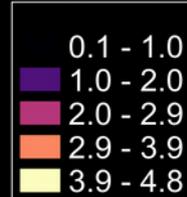
From full context background maps,
to maps as a plot.

Hill farming distribution QGIS



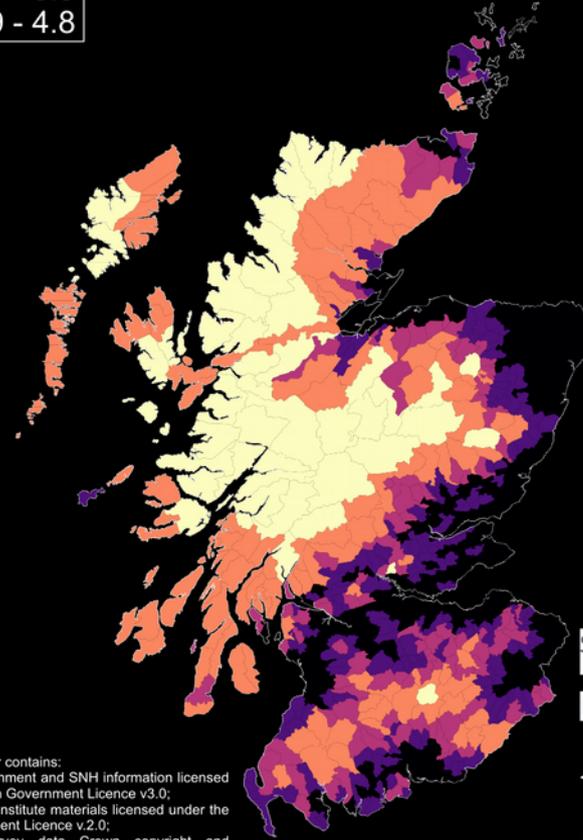
Scottish Government
Riaghaltas na h-Alba
gov.scot

Hill farming index



Higher values indicate parishes are more constrained to hill farming.

Created by Mike Spencer.
Funded by the Scottish Government RESAS programme: Part of work package 2.4 – Rural Industries.



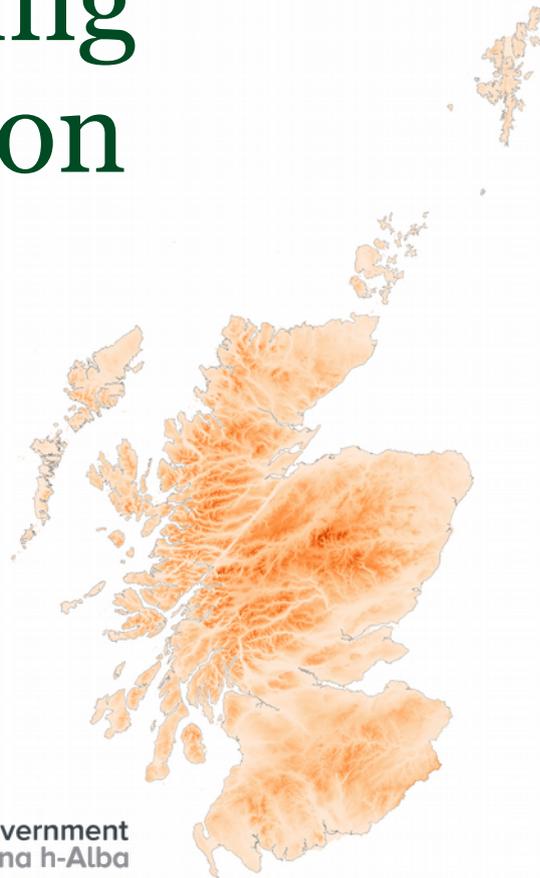
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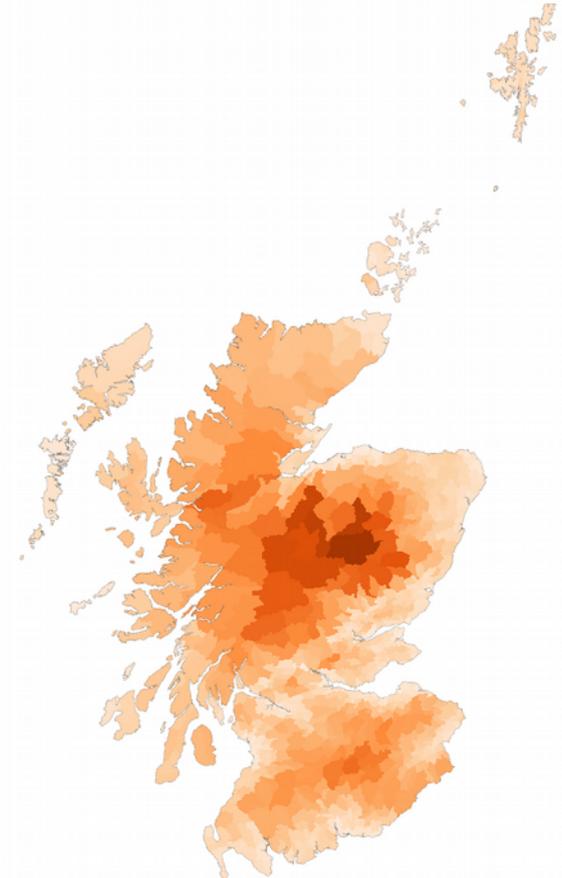
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Hill farming distribution R



Elevation
(metres)

1000
500
0



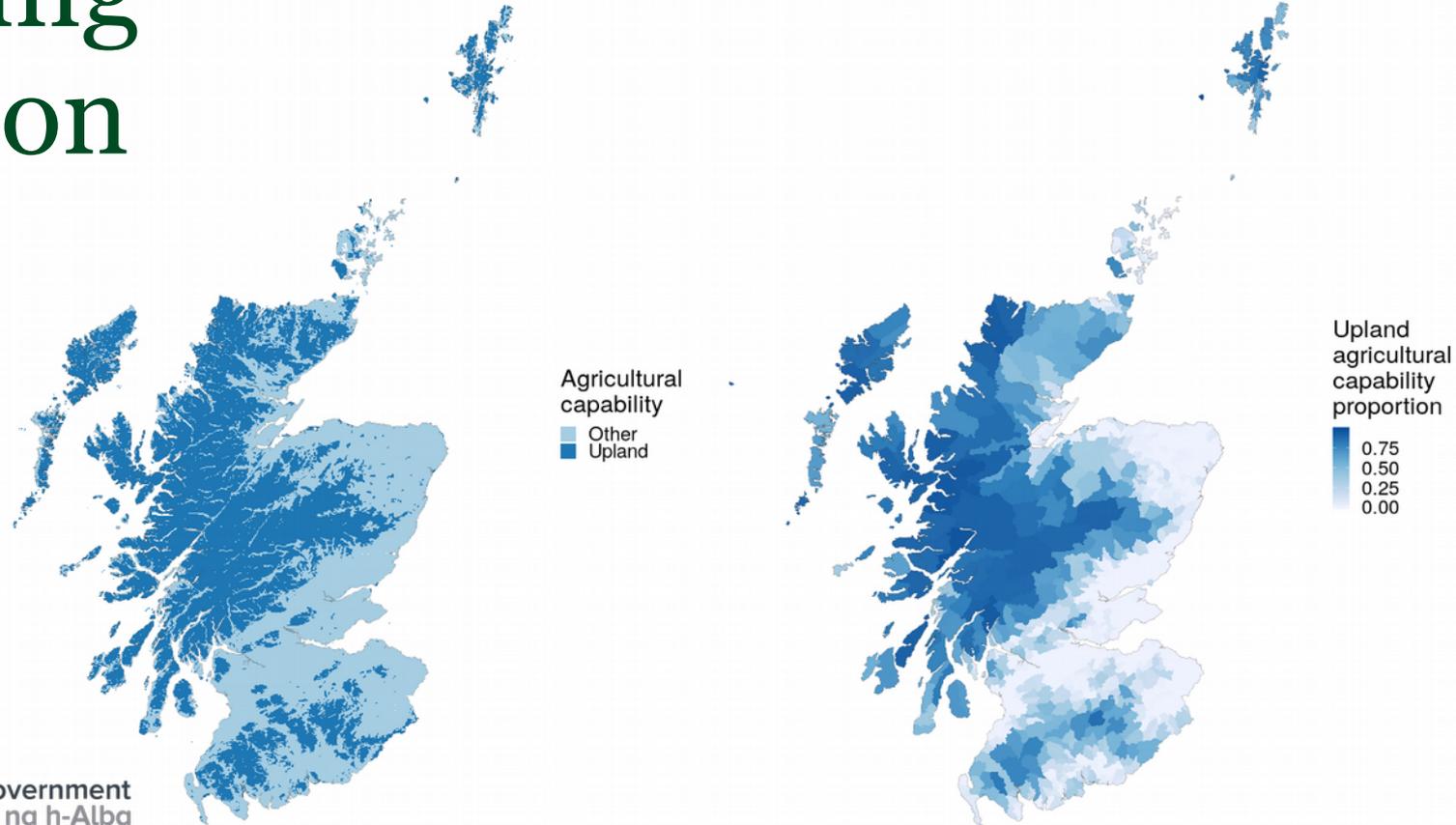
Elevation
mean (m)

600
400
200



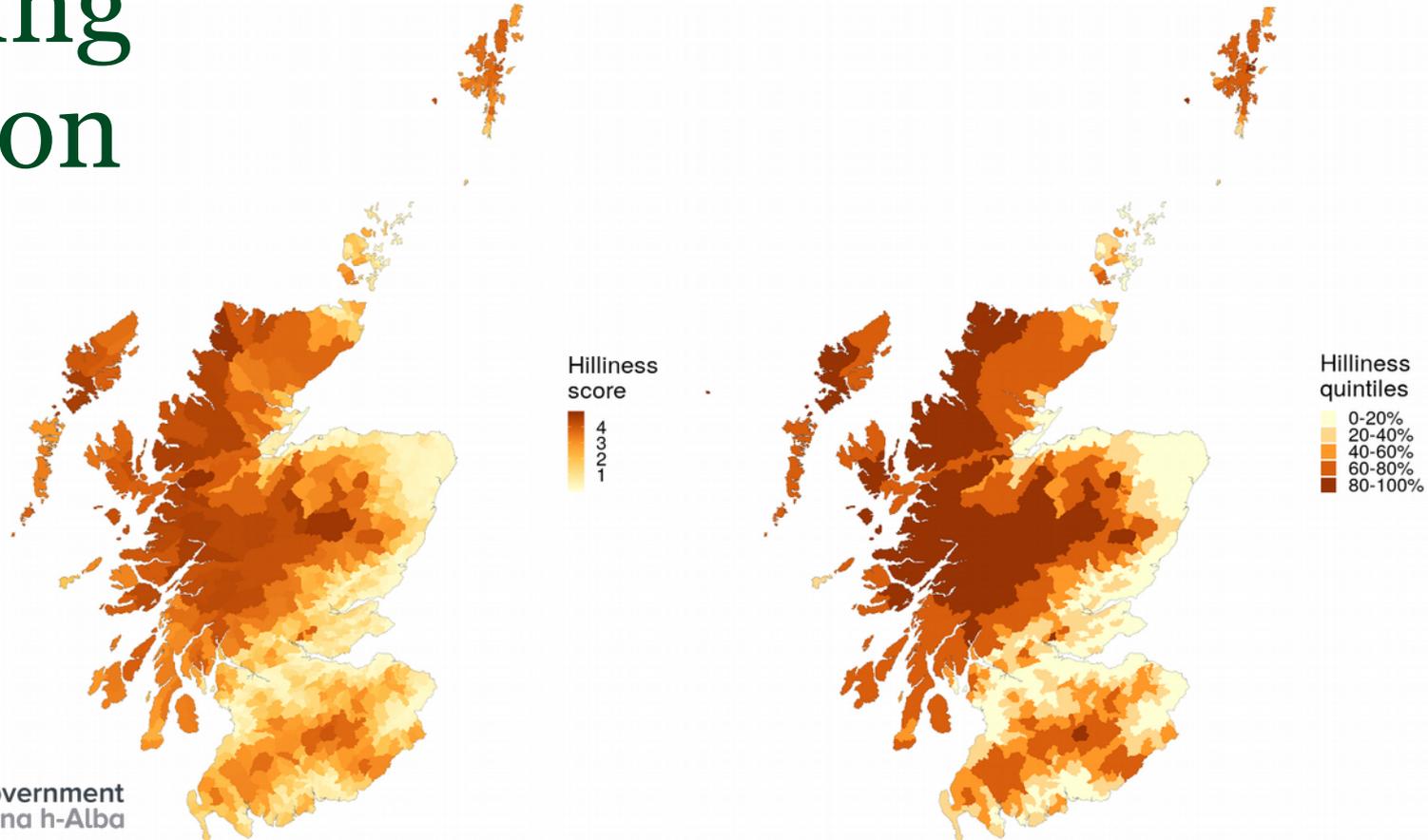
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Hill farming distribution R



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Hill farming distribution R

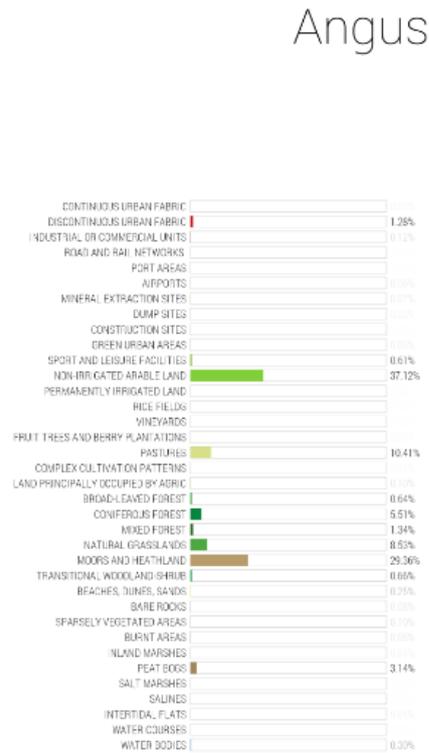


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gov.scot

What's different?

but...

Rae's landcover atlas - QGIS



Corine Data 2012 copyright texts with the European Commission



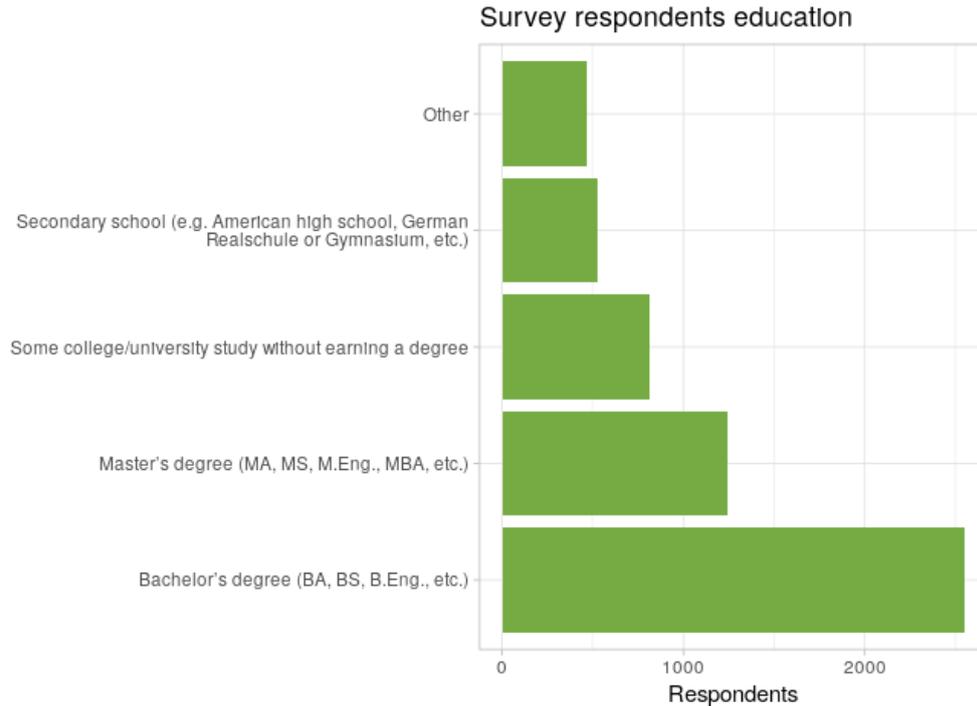
What about interactive?

- R
 - Shiny
 - Leaflet
 - Etc.
- QGIS
 - Carto
 - QGIS2Web
 - Etc.

So what is different?



```
df %>%  
  drop_na(EdLevel) %>%  
  mutate(EdLevel = fct_lump(EdLevel, 4),  
         EdLevel = str_wrap(EdLevel, width = 60),  
         EdLevel = fct_infreq(EdLevel)) %>%  
  ggplot(aes(EdLevel)) +  
  geom_bar(fill = "#75ab42") +  
  coord_flip() +  
  labs(title = "Survey respondents education",  
       x = "",  
       y = "Respondents") +  
  theme_light()
```



Workflow

- QGIS
 - Output is valuable
 - Workspace preserves settings
 - Hard to explain how
- R
 - Output is valuable, but!
 - Code recreates output
 - Code is reusable instructions

Workflow

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<https://scottishsnow.wordpress.com/2019/09/03/doi-for-your-code/>

<https://zenodo.org/communities/sruc-lees>

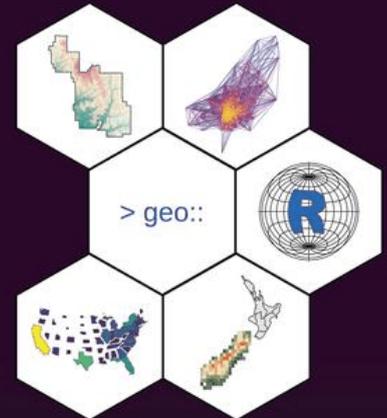
The Zenodo logo is a blue rectangle with the word 'zenodo' in white lowercase letters.The GitHub logo is the word 'GitHub' in a bold, black, sans-serif font.

Tips

Geocomputation with R:
<https://geocompr.robinlovelace.net/>

The R Series

Geocomputation with R



Robin Lovelace
Jakub Nowosad
Jannes Muenchow

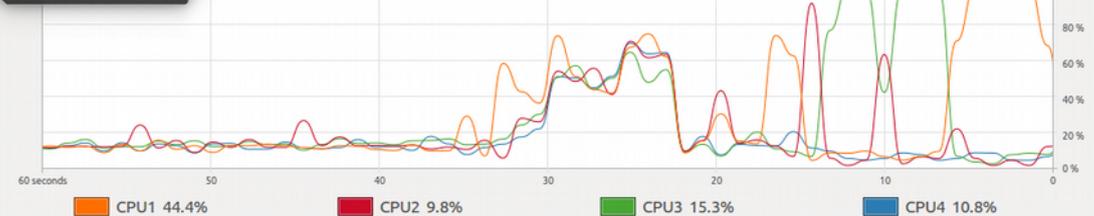
Limitations

- Interactivity
- Computation time

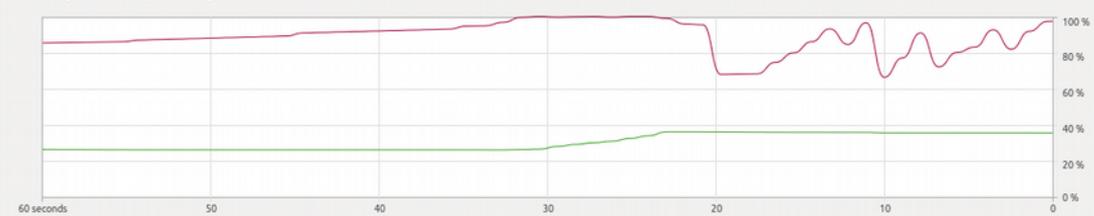
Processes Resources File Systems

CPU History

Firefox Web Browser



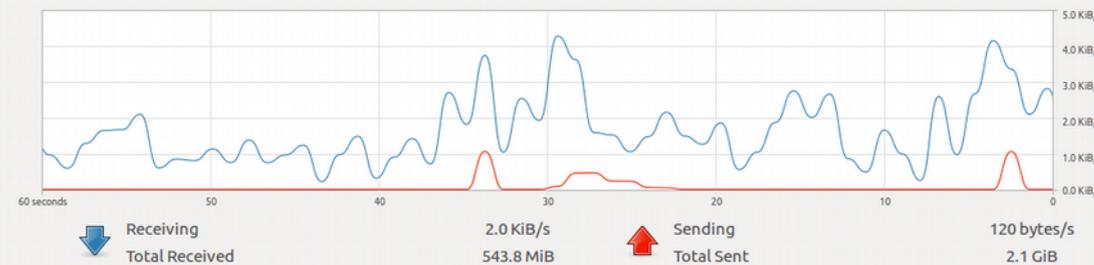
Memory and Swap History



Memory
8.5 GiB (54.6%) of 15.6 GiB

Swap
5.0 GiB (16.9%) of 29.8 GiB

Network History



• slope Large SpatialGridDataFrame (128294096 elements, 978.8 Mb)
• x 8 obs. of 2 variables

Values

f chr [1:3] "CivilParish1930.shp" "OutputArea2011_MHW.shp" "OutputA...

Functions

apped
17.444

```
height=1080, width=800)
(fill=band1)) +

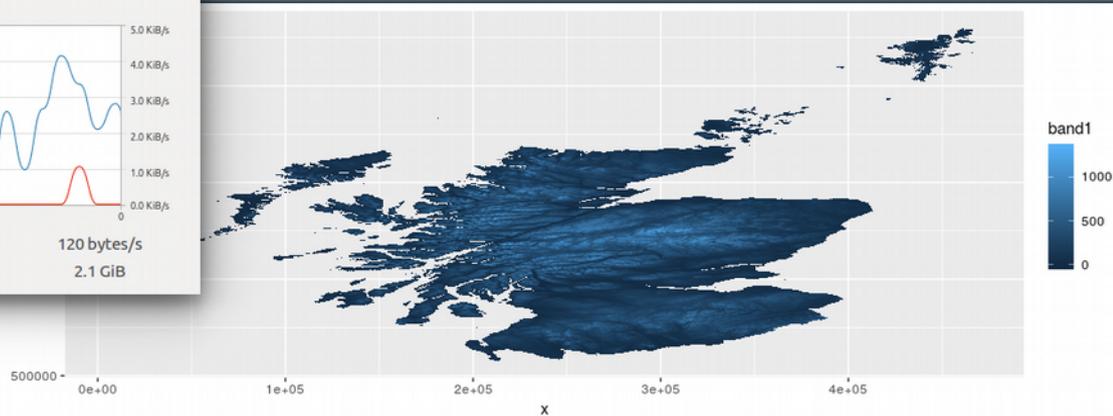
Scotland, aes(long, lat, group=group),
fill="grey30", fill=NA, size=0.1) +

er(palette="Greens", direction=1) +
on\n(metres)") +

ement_blank(),
ement_blank(),
blank(),
text(size=20)
```

Viewer

Publish





Summary

- Programming captures methods
- R and QGIS capable of beauty
- Vector graphics/QGIS for ‘traditional’ maps
- Learn lots of tools!



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