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# Population Sampling

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# Outline

- Simple sampling
- Complex sampling
- Spatial sampling

# Simple sampling

- simple random sample
- systematic sample

# Simple sampling: simple random sample

- Drawing a sample of X number from a full list of members of a fixed population.

Lottery



Random number table

Number	Household
1	Aweno
2	Serrano
3	Coopsman
4	Franco
5	Oka
6	Parvanta
7	Roquefort
8	Moki
9	Stirling

Random number table				
7648	2352	6959	1937	
2554	6804	9098	4316	
4318	2346	7276	1880	
7136	9603	0163	3152	
7000	2865	8357	4475	
9804	0042	1106	7949	
2932	9958	9582	2235	
1140	1164	7841	1688	

# Simple sampling: systematic sample

- Determine a **sampling interval**

$$\text{sampling interval} = \left\lfloor \frac{\text{number of samples needed}}{\text{total number of population}} \right\rfloor$$

- Select a random number from the series of numbers between 1 and the sampling interval. This will be the **random starting point** for the systematic selection.
- Using the **random starting point** and the **sampling interval**, select the samples from a list of all members of the population starting from the random starting point position and then for every successive sampling interval position.

# Simple sample: systematic sample

<i>Benguema</i>	1
<i>Fabaina</i>	2
<i>Koya</i>	3
<i>Gbendembu</i>	4
<i>Songo</i>	5
<i>Madonkeh</i>	6
<i>Urugli</i>	7
<i>Barupi</i>	8
<i>Redpu</i>	9
<i>Borioboolagah</i>	10
<i>Portei</i>	11
<i>Tombo</i>	12
<i>Ashu</i>	13
<i>Foulah</i>	14

Apply Sampling interval

Apply Sampling interval

Apply Sampling interval



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# Complex sample

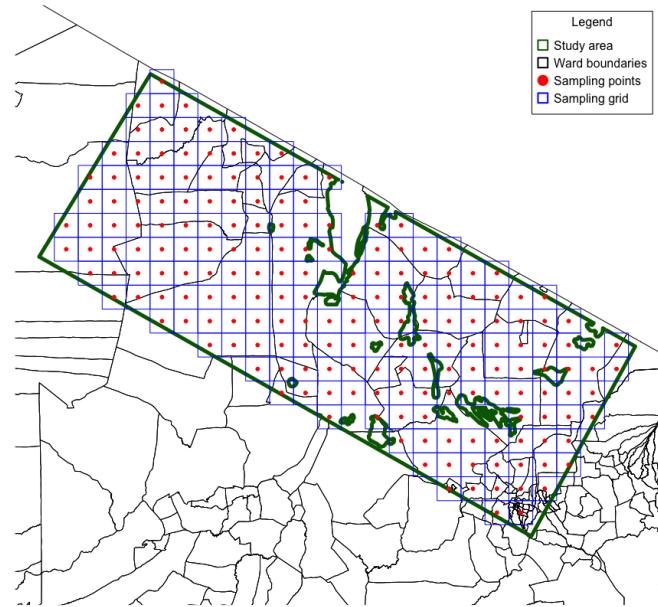
# Complex survey design: two-stage/multi-stage random cluster sample

- First stage sample - sampling of clusters
  - draw a simple random sample of X clusters
  - draw a systematic sample of X clusters
  - draw a sample of X number of clusters selected proportional to population size
- Second stage sample - within-cluster sampling
  - draw a simple random sample of Y members of the selected clusters
  - draw a systematic sample of Y members of the selected clusters
  - draw a spatial sample of Y members of the selected clusters

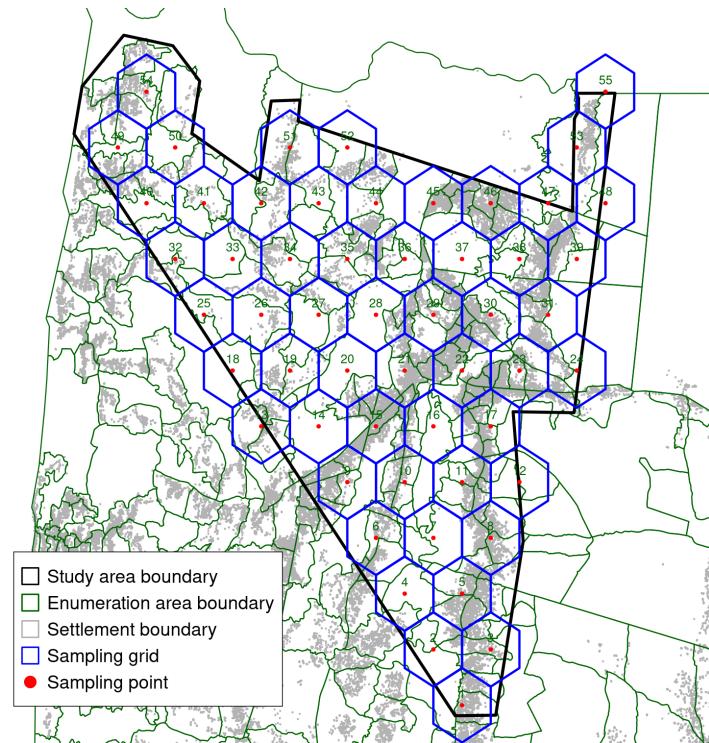
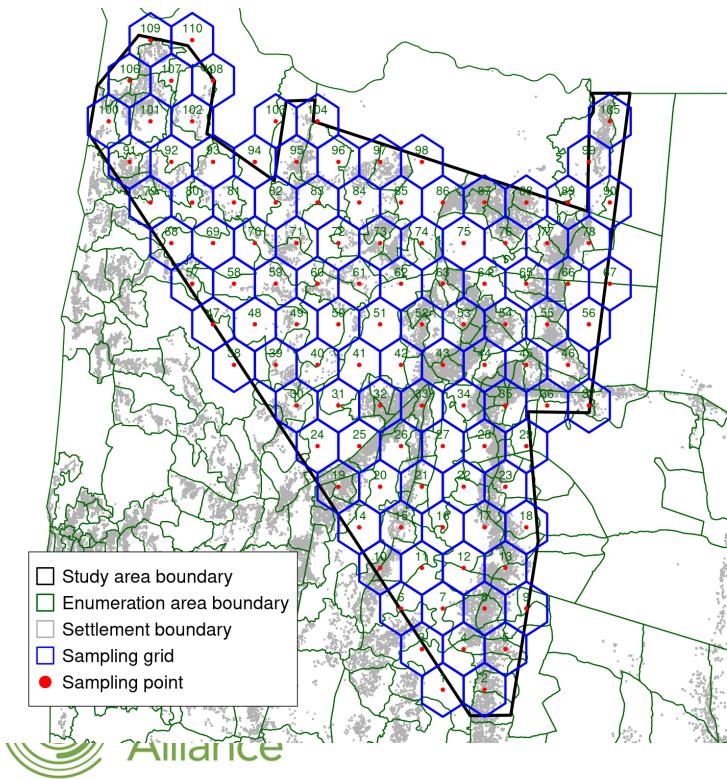
# Spatial sampling

- techniques such as Centric Systematic Area Sampling (CSAS) are known to approximate a simple random sample
- useful as an alternative to other sampling approaches particularly when typical sampling frames are not available

# Spatial sampling examples - CCHF project



# Spatial sampling examples - RVF2 project



# Thank you!

Slides can be viewed at <https://ecohealthalliance.github.io/population-sampling> or  
PDF version downloaded at <https://ecohealthalliance.github.io/population-sampling/population-sampling.pdf>

R scripts for slides available at <https://github.com/ecohealthalliance/population-sampling>