GridSample
A user-friendly tool to generate household survey sampling units in complex settings

Household surveys are our major source of information for development indicators in low- and middle-income countries. They provide critical information on development indicators and characteristics of a population, including age, sex, poverty rates, health status and many others. Household surveys are in most cases the foundation on which policy is set.

Household surveys utilise census population data, provided by enumeration area, to define the population (the sampling frame), from which survey samples are taken. However, with the current standard survey workflow, some populations are excluded from the sample frame due to outdated or inaccurate census data being used to construct the sampling frame. It is not uncommon for census data to become outdated within a year due to rapid urbanisation and migration. In addition, some countries have not conducted a census for more than ten years.

Poor and vulnerable people, as well as mobile populations, such as nomadic persons and seasonal migrants can be excluded through the standard procedure used for sampling (two-stage cluster sampling), as it introduces a time lag between the mapping and listing of households on the one hand, and the interviews on the other. GridSample addresses these issues through several theoretical and operational improvements.

About GridSample

GridSample is a **user-friendly tool to generate household survey sampling units in complex settings** using gridded population estimates.
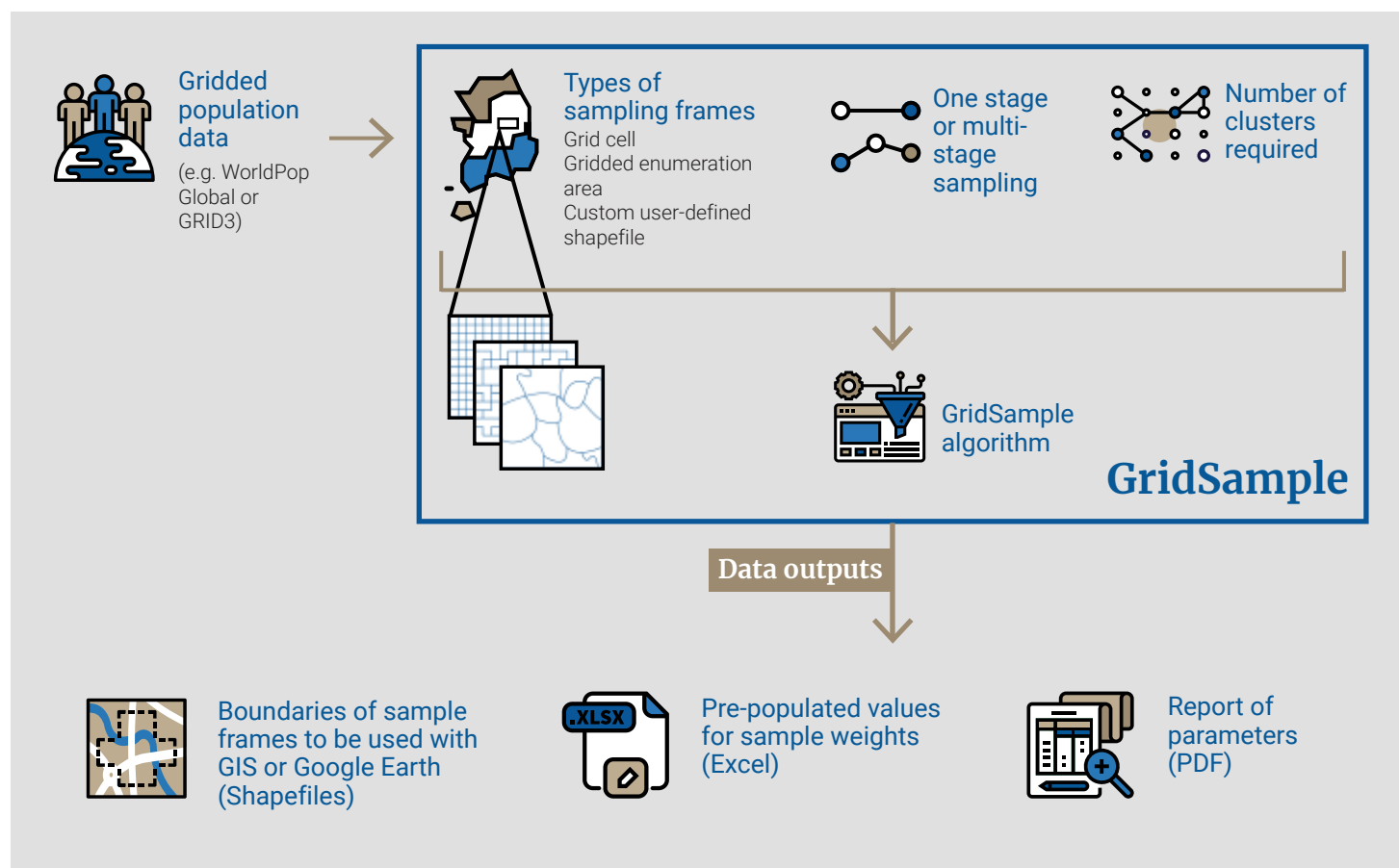
GridSample was developed to improve the accuracy and feasibility of household surveys. GridSample provides updated, detailed gridded population sample frames by utilising 100x100m gridded population estimates developed by WorldPop at the University of Southampton. Gridded population data are estimates of the population in small regularly-shaped grid squares as small as a city block.

In complex urban settings, the use of 100x100m population sample frames can also **improve the measurement of vulnerable populations** by enabling one-stage sample design. By interviewing everyone in a small sample area, atypical often highly vulnerable households - such as people living in the street and shopkeepers who live in their shops - are captured. This is because one-stage sampling involves listing and interviewing households on the same day, removing the months-long time-lag required in standard two-stage sampling. One-stage sampling also has the advantage of being faster and cheaper than two-stage sampling because fieldwork is targeted in small areas.

If the survey results will be used to make small area estimates, GridSample makes spatial oversampling easy, as it can improve the accuracy of these spatially disaggregated population estimates. The algorithm can choose the next cell from the under-represented population category, and repeat the process until the sample size requirement is met in each. For example, in practice, rural areas may be more difficult and expensive to visit, and thus a greater number of households might be sampled from rural areas than urban.

How GridSample works

Before using GridSample, users must determine a clear research question, decide the survey design and calculate sample size. Once these steps are done, users can start using GridSample. GridSample is designed with eight tabs, a click-and-point interface and pre-loaded datasets to ensure that the selection of the gridded population survey clusters is transparent and easy.

GridSample is an online tool (gridsample.org), pre-loaded with gridded population estimates from WorldPop Global and other datasets.

Before the tool can produce accurate gridded sampling frames, the user must determine a set of parameters, including the type of sampling frame. Users can choose between grid cells (100x100m size or larger), gridded enumeration areas or custom user-defined shapefiles).

Key survey design features must also be specified, including the number of sampling stages, the target population and average household size to transform WorldPop Global population estimates into household estimates, and the sample size.

Other optional parameters are available, including whether to include stratification and/or spatial oversampling.

In addition, GridSample provides protocols, field-based training and technical assistance packages to support successful delivery of gridded population sampling for household surveys.