

Defining Village Boundaries in Northern and Central Benin: A Spatial Approach

Omoto Aurelle Christelle Sedegnan¹, Agnès Bégué², Comlan Hervé Sossou¹, Laurent Gazull²

Organisations: 1: Benin National Institute for Agricultural Research (INRAB), Benin;

2: CIRAD UMR TETIS, France

Villages where agricultural activities predominate depend on the availability of land resources for production. Moreover, as incomes vary greatly according to a village's land endowment, boundaries are essential for linking agricultural activities to space and natural resources. In Benin, there is no official information on the boundaries and size of village terroirs. The aim of this work is to develop an automatic method for delimiting village territories in northern and central Benin, covering five departments: Alibori, Borgou, Atacora, Donga and Collines. For this research, we used the geographical database of localities in Benin produced in 2018 by the National Geographical Institute of Benin, and the raster product "Global Human Settlement Layer" for 2018 at 10 m spatial resolution and showing the distribution of built-up areas. In addition, a field survey conducted in selected villages in the north and center of the country enabled participatory delineation of territories with the local population. Four automatic village boundaries delimitation methods were tested including circular buffers and Voronoi polygons, both in non-weighted and weighted versions (weight being proportional to the settlements densities). The results were evaluated using the field survey, and the impact of the choice of the method on village-level NDVI and landscape composition metrics was quantified. Ultimately, a virtual village terroir map was produced for northern and central Benin, to facilitate further village-level remote sensing studies.

Keywords : village boundaries, circular buffers, thiesen polygons, Voronoi polygons, Benin