



## **Evaluation of sensitivity to desertification by a modified ESAs method in two sub-Saharan peri-urban areas: Ouagadougou (Burkina Faso) and Saint Louis (Senegal)**

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Desertification is regarded as one of the major global environmental problems of the 21st century. The African sub-Saharan is often quoted as the most seriously affected region with a significant loss of biological and economic productivity of the land due to climate characteristics and fluctuations, unsustainable land uses, overgrazing and inappropriate agricultural practices. Due to its complexity, dynamism and extent, desertification is complicated to check and assess. The absence of an agreed methodology for the identification of affected areas is a critical point in desertification monitoring and assessment. An integrated approach which uses both qualitative and quantitative measures is crucial to reach the aim of sustainable resource use and has to be reflected in application of sets of indicators. The selection of appropriate indicators and their integration and interpretation should be conducted by the objectives to be achieved and the questions to be answered. This study, carried out within the FP7-ENV-2010 CLUVA project (Climate change and Urban Vulnerability in Africa), aimed to assess the sensitivity to desertification in peri-urban areas of both Ouagadougou (Burkina Faso) and Saint Louis (Senegal) cities. The approach was based on the implementation and adaptation to the local conditions of the modeling methodology developed within the MEDALUS project (Mediterranean Desertification And Land Use). The model is characterized by a multi-factor approach based on the assessment of both environmental quality indicators (vegetation, soil, climate) and anthropogenic factors (land management). All local data, arranged in a GIS environment, allowed the generation of maps identifying Environmentally Sensitive Areas (ESAs) and an Index of Environmentally Sensitive Areas (ESAI). Changes and integrations to the original methodology have been set taking into account the environmental and social features of the whole sub-Saharan west Africa in order to allow the use of this tool also in other peri-urban areas of this region. As expected, both study areas were critically sensitive to desertification. In Ouagadougou peri-urban area, the zones poorly vegetated and overexploited as a result of heavy demographic pressure were found as the most sensitive to desertification. The northern part of Saint Louis area was critically sensitive to desertification mainly due to the overexploitation of natural resources by grazing and domestic use. Compared to Ouagadougou, worst climate features, due to lower Aridity Index and mean annual rainfall, have a major impact on the sensitivity to desertification in Saint Louis. Finally the developed desertification maps can represent a valuable tool to promote a more efficient management of the affected areas and to orientate effective policies of desertification prevention, mitigation and adaptation. At the same time, this approach provides the basis for future studies, considering the dynamic character of at least some of the considered environmental factors (e.g., vegetation cover).