



Land use dynamics in the Khor Abu Habil alluvial fan, Sudan

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African wetlands in arid and semi-arid regions provide a multitude of ecosystem services and have been described as the “heart of Sahelian life systems”. The Khor Abu Habil alluvial wetlands (Khor is the name given to ephemeral rivers in Sudan) are situated in the semi-arid zone in the southern part of the Sudan. These ephemeral wetlands are fed by seasonal wadi streams and remain for several months. They provide a habitat for migratory water birds and play a fundamental role in supporting the human population (agriculture, grazing, fishing, hunting and construction). In this study we analyse the Land Use and Land Cover (LULC) dynamics related to agricultural activities. We choose agriculture as an entry point because it is the main activity and the main LULC changing factor in the study area. A questionnaire and semi-structured interviews were conducted in the study area, documenting different agricultural activities and land uses. Additionally, remote sensing data and field data on LULC were collected and analysed with Google Earth Engine, R and GIS software. Different types of agriculture are practised depending on the soil type. The agriculture in the wadi pathways depends on floods and the agriculture on the wadi banks is a rain-fed. Accordingly, two agricultural calendars were created, namely a rain-fed agricultural calendar and a flood-dependent one. Additionally maps illustrating the LULC change over a year were created. The results helped us to understand the annual changes in the LULC between the classes agriculture, vegetation, grassland, water and bare soil. Indeed, the same piece of land may be a grassland used by pastoralists as well as an agricultural land used by farmers, depending on the period of the year. This is a challenge for the creation of classical LULC maps. Wadis or Khors are particular ecosystems that occur in semi-arid regions. In our study area, the economic activities show a relationship between land uses and different human communities: the agriculturalists and the pastoralists, who live in synergy with the natural cycles of the seasons and the wadi waters. The agricultural activities and the different LULC classes are dynamic and vary over the year depending on the wadi flood waters. This characteristic distinguishes the Khor Abu Habil ecosystem from other ecosystems where LULC classes remain stable most of the year. Our research is part of the FAO-supported project RESSOURCE with the overall goal to localise and study wetlands of international importance in the sub-saharan Africa and declare them as Ramsar protected zones.