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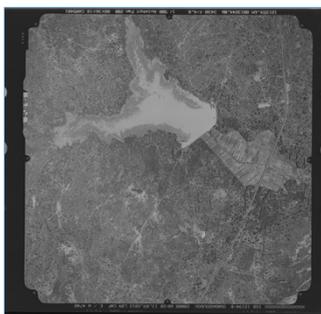
## INTRODUCTION

Base cartography at proper scale for land and water management is rarely present in Least Developed Countries. Although various national and interregional programs, together with national cartographic institutes, have often provided cartographic outputs at small/medium scales, the gap in the large scale map availability is still a matter of concern for land management planners. Despite the massive presence of international cooperation projects carried out in various countries, relatively low budgets are usually allocated for base data retrieval helpful for a wide range of on-site actions. In particular, a huge number of projects in these fields operates at a local level thus needing detailed base maps.

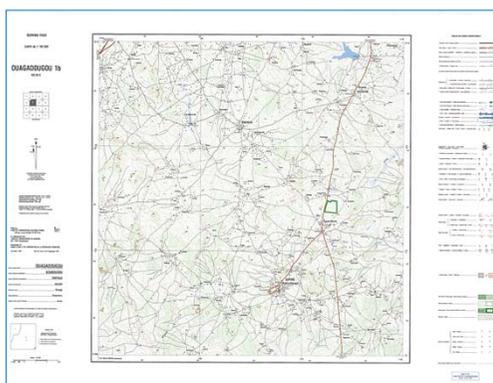
## DATA and METHODOLOGY

The national cartographic institute (Institut Géographique du Burkina Faso) performs photogrammetric **aerial surveys** on demand. Two surveys were conducted over the area of interest, in 1996 and in 2012 respectively. The obtained ortho-images are black and white, at 1:25.000 scale the oldest one, and at 1:20.000 the latest one. The frames present 60% forward overlap and 20% lateral overlap, therefore they are suitable for elevation information extraction. Even if this data is not freely accessible, its cost is relatively low and thus affordable for cooperation projects.

Thematic data extraction was carried out on: hydrological network, main transportation routes, land use. A **change detection** analysis and a **DSM** extraction were performed in order to understand and reveal the erosion phenomenon as well as the ongoing urbanization process.



Example of a 2012 frame focusing the Boulbi reservoir



Topographic map at 1:50,000 scale

## CASE STUDY - Central Burkina Faso

In support of a food security cooperation project in Burkina Faso, the present work aims at updating the existing cartography useful for hydrological modeling, land and water management planning and stakeholders capacity building in the use of a customized cartographic representation of their land. In particular, an updated cartography at large scale was needed in order to plan and design Soil and Water Conservation (SWC) measures at the catchment scale. These interventions are part of a comprehensive catchment management plan which has to be implemented in the near future. The existing official map of the study area at 1:50.000 scale is dated 1984 and does not constitute the appropriate cartographic support to intervene at the defined scale.



Erosion process in a watershed in central Burkina Faso



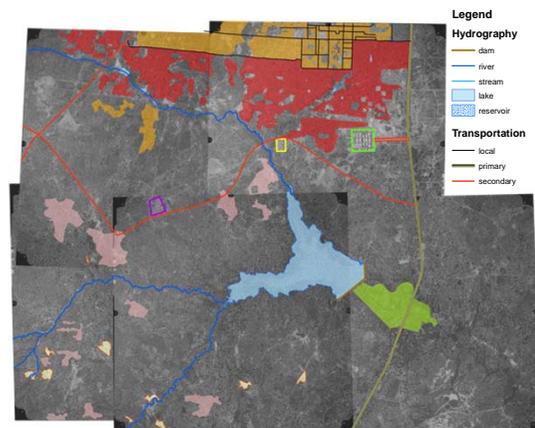
Site location in red



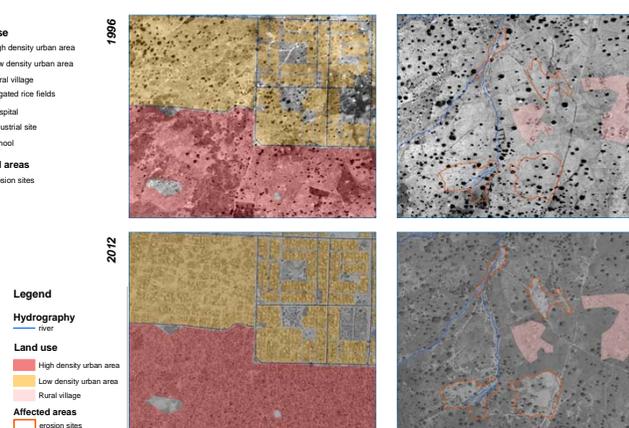
A view of the Boulbi reservoir and dam

## RESULTS

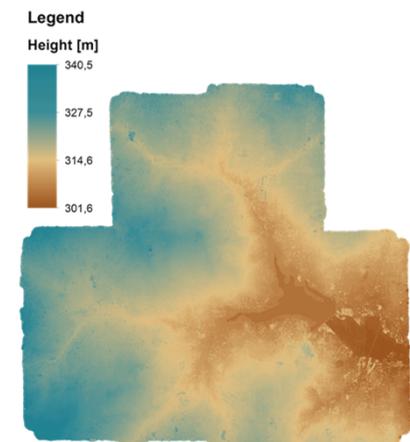
The analysis provided the base cartography to be used for land and water management purposes. Locations of new SWC interventions can be properly chosen thanks to a clearer view on the accessibility and neighborhood of erosion sites. The historical comparison gives an account of the ongoing urbanization phenomenon which is about to menace the rice production in the watershed. A **Digital Surface Model** (1m Z accuracy) was extracted with 2012 frames. The DSM may provide elements needed for hydraulic modeling prior to SWC *system design* (c.g. *riverbed slope*).



Example of feature extracted with 2012 aerial imagery



Change detection analysis: on the left built-up areas, on the right erosion sites



Digital Surface Model obtained with 2012 aerial frames

## FURTHER DEVELOPMENTS

The application of a simplified SWC planning model is envisaged in the near future. The extraction of 1996 DSM is also planned along with the subsequent comparison of the two DSMs for detecting erosion progresses. The generation of the Digital Terrain Model from the DSM is also planned as forthcoming activity. Monitoring of the changing in the riverbed slope due to past and recent SWC implementation is a desired outcome that may contribute to a deeper understanding of SWC system effectiveness.

## ACKNOWLEDGMENTS

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Abstract



Poster

