

RZ

Farje

1°36'E

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Gothèye

Flood risk assessment of agricultural areas along the Niger river upstream Niamey

13º48'N

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Flood risk analysis in the mid Niger river





Guinea gulf



Flood risk analysis in the mid Niger river

Agricultural oreas

Endorheic basins

Sirba river Sahelian flood

Upper Niger river

Guinean flood





Case study at a glance



Investigated area along the **Niger river**: municipalities of Gotheye, Karma, Kourteye, and Namaro: 21 settlements, 1203 ha of paddy field, and 1353 ha of other irrigated crops

Multidisciplinary approach: hydrology, remote sensing, flood modelling, field survey, geomatics, land planning, economics

Complex hydrological behaviour: trends and strong seasonality (different runoff processes)

Involvement of local authorities and local communities of two countries

Very complex and interesting problem

See you at PICO 3.11





Article

Flood Damage Risk Mapping Along the River Niger: Ten Benefits of a Participated Approach

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Climate 2025, 13, 80 https://doi.org/10.3390/cli13040080

Risk understanding process





Flood regime upstream Niamey





Study of recent floods: August 2024 – Sahelian flood February 2025 – Guneian flood



Remote + on site survey





Mapping of assets



Karma

Yomadarou

DN1

Pumpkins

Pond rice

Boubon

Horticulture

Sweet potato

- Jurisdiction limits

from Sentinel-2)

from Sentinel-2)

13936'N

Water plain 16/02/25 (MNDWI

Water plain 20/08/24 (MNDWI

Settlement

— State road





Reconstruction of 2024/2025 events, but also support for flood risk mapping and planning initiatives

Some final remark



- Communities are not involved as sensors collecting data but for their ability to interpret the observed dynamics and validate the results.
- Heavy rainfall generates damages due to flash floods along the minor tributaries. Pluvial and fluvial hazards are both important.
- > Quantitative risk mapping requires more information for each asset.
- > Damage evaluation is complex and requires multi-crops evaluations.
- This case study provide a ground validation of flood extent, important to avoid underestimation of flooded areas.
- > Spatio-temporal permanence of assets: it makes easier to map risk, but not difficult the relocation.
- > No benefits were found after flooding.
- ➤ Horticulture is at the highest risk.
- The estimated flood damage is 16% to 29% of the value of all irrigated agriculture in the zone. However, it may have intergenerational and intergroup implications, pushing small farmers with only their field flooded into greater insecurity.
- Risk maps could be integrated with hydraulic modelling to produce flood risk scenarios and early warning systems.