

Landscape scale Disaster Risk Reduction

And the role of wetland ecosystems

90% of all hazards are water-related. To effectively address disaster risk, it is fundamental to understand how water behaves in the landscape, how factors such as infrastructure, vegetation, land use and climate change influence water flows, and to connect all water users and stakeholders. We work on initiatives to transform landscapes into safer and more prosperous environments.

Assessing risk across the Agusan river basin, Philippines

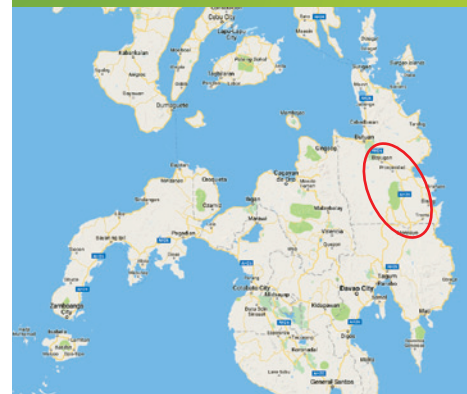
Multiple times a year, severe tropical storms and typhoons hit the Philippines. Fortunately, the population is very resilient. After each disaster, they reconstruct their lives with creative solutions.

In the past, the annual floods ensured that the soil was fertile, and the marshes were filled with fish. But nowadays, the river increasingly poses a threat. Natural buffers such as forests and marshes are disappearing and the impact of landslides and larger and longer annual floods is increasing.

Together with local communities we assess the risks both locally and in the entire river basin, upstream and downstream. After that we identified which measures need to be taken to sustainably improve land and water use and reduce risk.

Case Focus:

- Region: Agusan River Basin, Mindanao, Philippines
- Risks: floods, landslides
- Families affected: 150.000
- Ecosystems: marshes, forest, riverbeds
- Ecosystem services: absorbing excess water during floods, erosion control upstream to downstream



Interventions:

- Mapping rainfall patterns and water flows, identified linkages between upstream activities and downstream impacts
- Reforestation of hill slopes
- Awareness creation on ecosystem based solutions and planning interventions



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Landscape risk assessment

Through interviews, field assessments and review of data sources, we identified trends between 1990-2014 in weather patterns, forest cover, land use (river basin) and disaster frequency and impacts.

Some of our observations:

Floods: Annual floods increased in duration in a large part of the flood plain from 1 to 3-4 months, causing at least 30% harvest loss. Increase of flash floods are causing river bank erosion.

Rainfall: Extreme rainfall events are expected to increase. However, average yearly rainfall will not increase and with an increase in temperature, drought will also become a problem.

Vegetation: Upstream, due to logging, plantations and mining, forest cover disappears, including in protected areas. Without interventions, this will continue. Current land use, especially on steep slopes, leads to erosion and causes many large landslides.

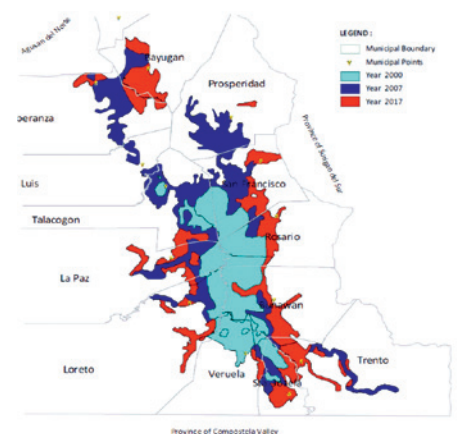
Marshes: Agusan Marsh has lost 29% of closed forest cover (1995-2013), not including conversion to plantations and drainage for agriculture. Due to upstream erosion, high sediment loads are clogging the marsh which is the major cause of increased flooding in the middle and lower basin.

Landscape approach to flood risk reduction

- Cause and effect of disasters occur on a basin scale making this the necessary scale of planning and cooperation between stakeholders.
- Land cover reduction is the major cause of increased disaster risk. Therefore, hill forest restoration, reduction of erosion on agricultural land and restoring the absorbing capacity of the marsh are they key measures.
- Increasing awareness, early warning systems and coping capacity further limits the number of casualties.

Our next challenge

We will show how landscape management may help to reduce hazard risks by demonstrating that:



Scenario of flooding map map for Agusan del Sur

- Current developments lead to loss of water storage during extreme rainfall, and water demand during drought.
- Landscape wide planning and ecosystem based solutions provide an opportunity for disaster risk reduction.

More information at www.wetlands.org.



Erosion upstream leads to landslides and clogging of riverbeds and marshes, decreasing their capacity to absorb excess water during (by Emmanuel Zegele)



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