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Flooding Analysis in San Rafael Neighborhood, Ciudad del Este, Paraguay

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Summary

San Rafael neighborhood is a coastal district that is located in the city Ciudad del Este, Paraguay. It is vulnerable to suffer flooding because its location and the sudden change in level of the stream running through it, called Acaray Mi.

This work aim is the determination of flood polygons of the Acaray Mi Stream, a tributary of the Paraná River, and the related costs of the events in the coastal neighborhood San Rafael.

To achieve the aim of this work were used free software developed by the Corps of Engineers of the United States: HEC-RAS for calculating the hydraulic component, and HEC-GeoRAS as a facilitator in the interconnection of hydraulic and geographic components.

Keywords

coastal district, sudden change, flood polygons

Issues addressed

Risks (mortality, economic losses caused by natural and human-induced disasters)

The sudden and recurrent increase in height of the water surface level of the Acaray Mi stream, generates considerable material and non-material losses. This increase is mainly caused by the rising level of the Paraná river. The location of the township facilitates the occurrence of undesirable events, since the district is located in the floodplain of the watercourse.

Tools for implementation

Technology: The study was conducted using software embodied and broadly disseminated to the realization of a modeling water level rises, with events occurring verified in order to establish a system of prevention or contingency, based on historical data.

Who is involved? Technology owners, technology seekers, funding institutions (both public & private sector), government institutions, IGOs

What were the objectives?

- Collect information on the basin that is useful for modeling and help better understanding of the hydrological response of the territory in question.
- Performing the analysis and consistency of the input data used in the modeling.
- Generation of geographic database basins analyzed using GIS software.
- Make the hydraulic modeling - hydrological basins using free software.
- Analysis, interpretation and dissemination of results obtained by a generation of thematic maps of water depths and / or other elements that help the interpretation of the results to different levels of government.

Implementation challenges: Social Responsibility Section of the Binational Entity ITAIPU, affected and non-affected community.

Main task/activities undertaken /Tools used:
- HEC Tools such as: HEC – RAS, HEC – GeoRAS, HEC-FIA
- GIS
- Microsoft Office Package

Main outcomes / impacts (what has changed?): The abrupt and frequent change happened in the water depth generates much losses in the neighborhood analyzed.
There are places very flat, with only a few centimeters, there is already quite occupation of building constructions. A cadastral survey of the type carried out in situ, it would be useful.

Lessons Learned:

Triggers: A lot of people affected by the increasing of the water level, mainly in the coastal neighborhood San Rafael.

Drivers: The technology applied to estimate with faith the magnitude of the phenomena occurred usually, with the main goal to help us to take decisions to decrease unwanted effects.

Barriers: The absence of a cadastral database that provides more precise information, because with a good database costs and impacts could be estimated more accurately.

What has worked well?: Due to the quality Itaipu´s data network, and the subsequent verification with real events, emerges the idea to establish an early warning system for the San Rafael neighborhood.

What can be improved?: Neighborhood´s cadastral database and local people registration (age and occupation) to be made by The District Authority.

The way forward: First, to establish and operationalize the early warning system
Then, see how to relocate people affected until maximum historical depth
Finally, evaluate the possibility to build linear parks.

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