TEXT BOX

“Pampa Inteligente“; A new way of managing the Salado river basin in Argentina as a Smart Territory

Country: Argentina

City/region where project is based: Salado river basin

Population (of area where the project is based): 1,300,000

Key organisations /stakeholders involved in the project: BerecoLabs (Leader and General manager of the project, system design and mathematical modelling), Tecmes SRL (IoT hardware company), La Plata National University (Research on territory aspects), Northwest Buenos Aires National University (Research on economic and social issues).

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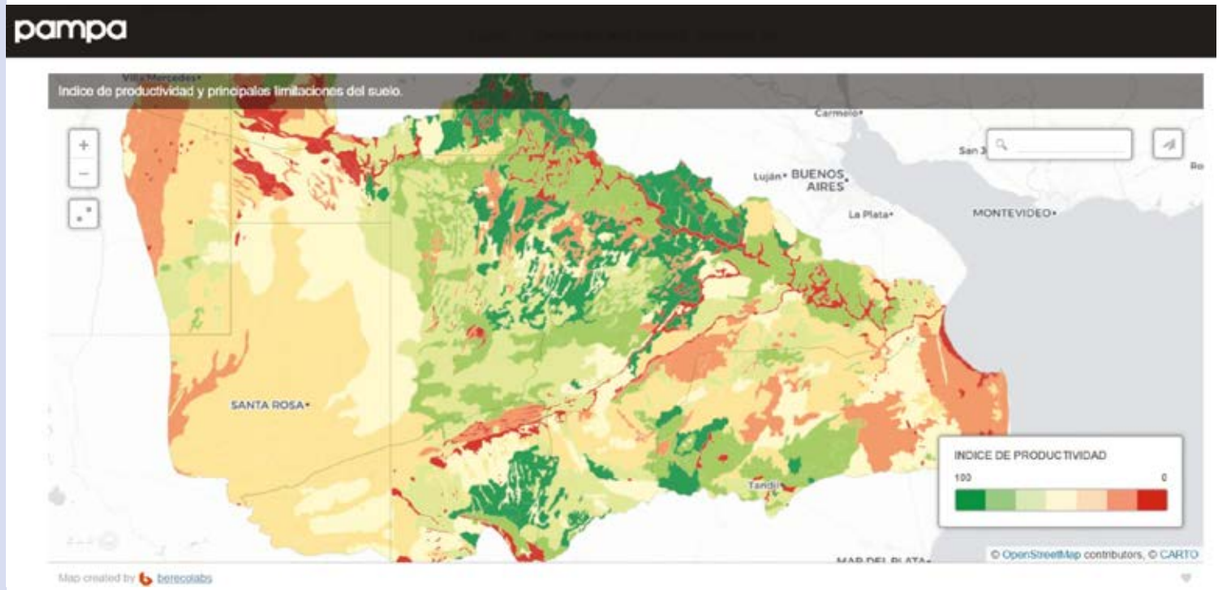

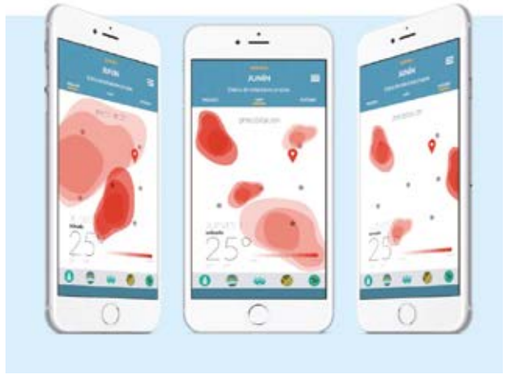

Water challenge

Periodic and recurring floods and droughts are generating growing losses in the productive system of the Salado River Basin at both the environmental and social dimensions, increasing population and economic vulnerability in the area.
In addition to this, unlike most other rivers, the landscape topography of the region that the Salado river flows through is extremely flat (endorreic watershed) and the agricultural production has had a net impact increasing the water table level. This creates a unique challenge for the Salado river as traditional mitigating hydraulic infrastructure such as dams rely on elevation gradients. A flat terrain reduces the options for conventional water management in the Salado.

Project approach

To address these challenges, a mobile phone app (application) has been designed, for the farmers and the citizens in the Salado river basin. The App, which includes a map feature, allows users to access key hydrological variables such as ground humidity, precipitation, groundwater level, and road conditions. It embodies the concept “Past, Present and Future”, making it possible for users to see the evolution of these variables through the past and receive a prediction about the future using adaptive local algorithms. Furthermore, by providing hydrological and meteorological variables at a local level, the app aids users in choosing the best path to take when an extreme event is presented (based on rural transportation routes and flood pathways) and to schedule farming tasks accordingly.

By assessing the groundwater level, the application allows users to determine when it is likely to be available for irrigation (1-2 m below the surface) or when it is elevated above the ground surface, representing a threat of flooding. The App explains the risks of an elevated water table. It also allows assessment of flooding impacts on rural population and roads.

The app provides the representation of certain hydrological variables plotted on a map, as well as user alerts about related issues like blocked transport routes.

In order to provide the hydrological and meteorological information within the App, the project uses Internet of Things (IoT) from hydrometeorological stations, satellite imagery combined with learning adaptive algorithms to predict the future, to elevate the resilience of the area and the regional economy towards climate variability and change (i.e. through user and algorithmics based alerts, early warnings and progressively further wheatear related optimal decision making).

Results and next steps

As of July 2018, the project has successfully developed the App with a library of reliable hydrological and climate data for the Salado river basin. In this beta phase, around 100 people have tested the App and send BerecoLabs their feedback and reviews that are being used to improve it.

The proposed next steps for the projects are:

- Improve the forecasting model with AI techniques.
- Communicate the potential of this tool to the concerned population.
- Scale up the tool with more sensors in the region.
- Replicate in other basins or countries.

More info at: http://pampainteligente.com
and http://berecolabs.com

SWM solution and scaling

This project is based 100% on smart technologies using ICT data in real-time, satellite information and local IoT sensors. It has a collaborative platform where its performance increases as the users interact on the App by sending alerts (for example, when a rural route is blocked or in a bad condition) and early warnings. This collective intelligence results in a smart way to reduce vulnerability to extreme weather conditions, helping populations adapt to climate variability and climate change.

Future improvements could be made by scaling up the number of meteorological stations in the region enabling an increase in information and accuracy. The main constraint to scaling up the project at this stage is the lack of adequate financial support, which will be required to install more smart technology hardware on terrain.