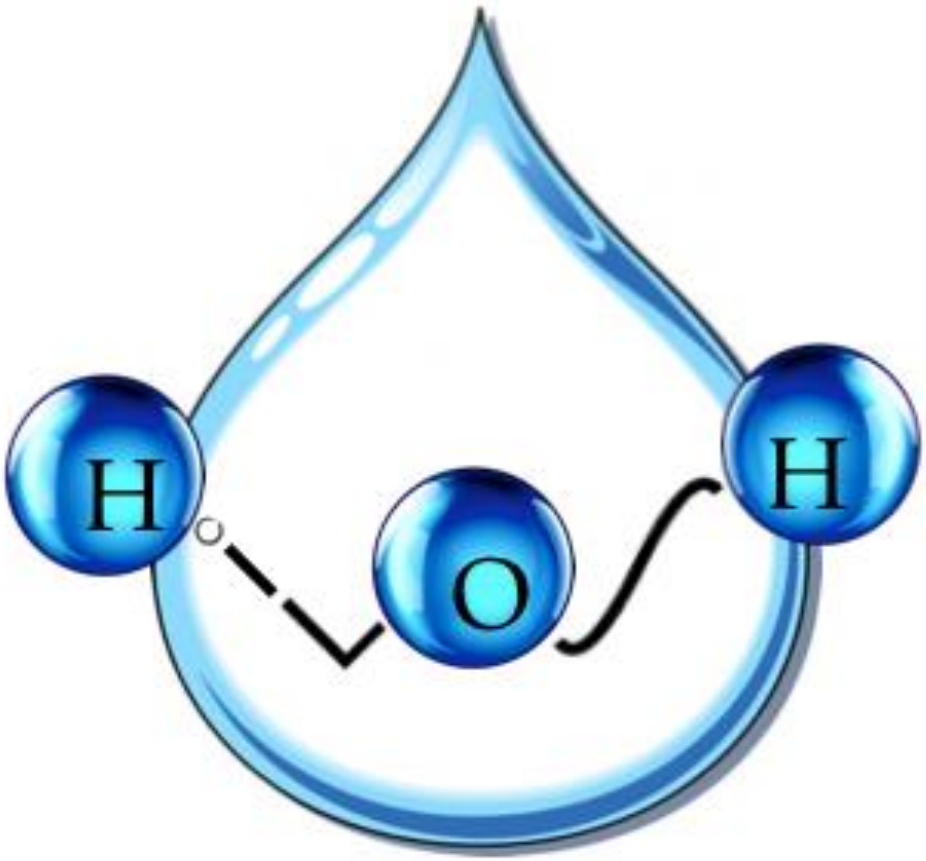


# HILOSH

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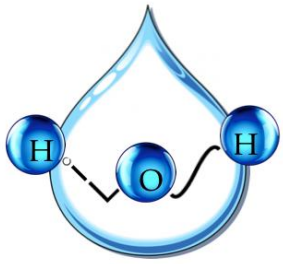



# HILOSH

## APLICACIÓN PARA LA DETERMINACIÓN DE RIESGOS DE INUNDACIONES EN LA REGIÓN DE SUR DE SANTA FE Y GENERADOR DE ALERTAS METEOROLÓGICAS

*"In an emergency situation, it is logical to act with urgency.*
*That is why we propose innovative solutions"*

**Introduction:**

Changes in the environment during the last 50 years due to industrial activity worldwide have had negative consequences for different communities. One of them is the increase in the frequency of floods in different regions of the world.

Although there is a wide variety of meteorological databases that allow us to generate early warnings for a natural disaster, we have found a lack of access to this important information by the very citizens who may be in-volved in this situation.

Therefore, this tool provides information management to prepare a flood risk map for a specific region, which focuses on the Paraná River and its tributaries in the South-East region of the province of Santa Fe.

HILOSH is a web application that analyzes meteorological data in real time in terms of key variables that determine the probability of flood risk of a given geographical point.

These data are obtained from reliable sources of information, belonging to official bodies. In addition, it allows the possibility of providing information to the government so that it can organize a contingency emergency plan and evacuation, to make decisions in a state of alert or emergency by flood. In addition, the application keeps a history of the most relevant weather events.

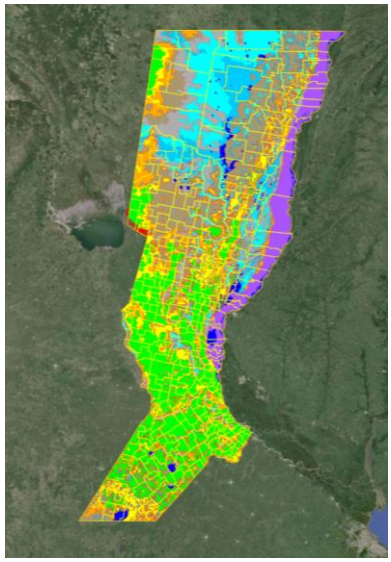

*Image 1: map of soil types In terms of their porosity - Santa Fe province - Argentina*

HILOSH relates the precipitation regime of the region of the Paraná Basin to the increase of the river's water level.

**Solicited information:**

- Regime of precipitations in the zone
- Surface's level of the Paraná River
- Weather forecast
- Winds's directions
- Slope of the ground
- Level or depth of the first water table,
- Land use: native vegetation, agricultural or urban use
- Texture, porosity and soil permeability
- Type of surface: natural floor or pavement

- Level of the Paraná River, taking into account the activity of hydroelectric dams upstream

In case of detecting a risk probability greater than 75%, HILOSH gives the following data:

- Meeting and refuge points
- Information on Non-Governmental Organizations that would provide drinking water, food and other basic goods to survive.
- Useful advice in case of a state of alert, such as habits to prevent diseases, how to obtain water and food and how to protect valuable material goods.
- Safe routes of mobility, such as routes and access to the locality on alert

**Coverage area:**

The coverage area is the Paraná River Basin, located in the South-East region of the province of Santa Fe, and North of Buenos Aires province Argentine Republic. The flow of this river is 14,180 $m^3/s$.

**Data update time:**

Data is updated in the application every 15 minutes.

**Data download mode:**

The data provided by the application is made through two profiles:
Citizen or Technician.

The *Citizen* profile provides general information in an emergency situation, in which the probability of a flood event occurring is equal to or greater than 75%. The same is intended for citizens of all types who have registered in the HILOSH application.

In this way, they will only receive the notification declared in "emergency status", in order to prevent situations of panic and disorganization by re-ceiving alerts notifying an actually lower probability that the event will occur.
The notification of the state of emergency arrives to the users by means of a smartphone app or SMS telephone messages and by electronic mail.

The information the citizen users will receive in case of a 75% or higher risk of flooding is customized to the specific location of the person's current residence, indicating the particular evacuation centre and evacuation trail that was assigned to their specific home.

The *Technical* profile provides information in greater detail, in real time, and for all possible probabilities that the event occurs. It also provides a platform in which authorities can design and develop a contingency plan in state of emergency. This package is intended for government authorities, non-profit organizations and emergency centers. In this way, these actors can have useful information to make decisions before the weather situation is declared "state of emergency".

The reason for creating two data profiles is the need to prioritize the information, prioritizing its availability to governmental authorities, non-profit organizations and emergency centers, because they are the agencies that are

trained to make decisions and to achieve an organized, efficient and controlled evacuation plan for citizens.

**Destinataries:**

- Urban communities
- Rural communities
- Radio stations
- Government agencies
- Nonprofit organizations
- Emergency centers: Police, Fire, Ambulances, Hospitals, Civil Defense, Prefectura Naval.

**Project justification:**

***What the photos do not show: the social, economic and environmental impact of floods***

A flood is a devastating event that causes serious difficulties for people, affects both the productive area and the natural area of the territory. The environmental impact of a flood can be difficult to recover.


- *Image 2: Flood in La Plata city: 2013.-*

Sometimes the only alternative is to leave the area and try to adapt to a new habitat. But the natural "disaster" is not the flood but its consequences, and depends on an efficient Management Plan to minimize many of the environmental, economic and social problems that occur, after the flood occurs. From the economic point of view, floods hit the province in a very strong way. Residents living in affected areas experience a financial burden in replacing lost items and repairing their homes.

Companies also suffer, not only because of loss of ownership, but because of the lack of customers and for some time after recovery. In addition, farmers also suffer loss of their crops. The towns and cities that are affected by a flood carry the financial burden of repairing public buildings, roads and other structures damaged by water. People who are affected can get financial problems because the business they work for can be damaged or unable to get to work. In another order, we find the environmental and social impact.

*- Image 3: Flood in Neuquén province: year 2014.-*

The cuts of the routes have already prevented many hospital transfers that are frequently made between our city and other localities in the region, as well as access to care centers that come to make consultations or treatments.

Water that threatens the urban also carries waste, fertilizers and pollutants from fields and dumps located on the outskirts of the city, and may even lead to the appearance of species such as rodents, a landscape that indicates a high risk for health of the citizen. It is essential to understand the danger of flooding and to have prepared a widespread and efficient emergency plan, according to the characteristics of the community.

Mission To help local and regional communities prepare for and minimize the impact of floods, providing assistance of all kinds before the disaster strikes, providing strategic information to proceed properly before, during and after the event occurs.

**Vision:**

Over the last few years we have been able to observe the impacts of Climate Change. Is not only on the climate, but also on the Environment and the human being. Climate change is a radical and abrupt alteration of the environmental balance between man and nature, and its consequences can be harmful if no joint measures are taken to combat it.

It is essential that all countries take measures to invest in innovation and economic development, assuming their responsibility to the environment. Therefore, economic and industrial transformation, creates opportunities to act against climate change implicitly leading to the creation and development of technologies and markets. On the other hand, all economies will suffer great losses if they insist on ignoring Climate Change. In the long term, it is a profitable economic and social strategy, not just for governments, but for the entire planet.

Climate change needs an international response based on a shared understanding of the severity of the risks and the measures needed to address them. Technology cooperation is essential to share knowledge for the application of new technologies. At the global level, support for R & D should be increased to fuel technological innovation.

Floods can be caused by river floods, rising sea levels, tsunamis and hurricanes, with rainfall being the main factor Intense, are a natural phenomenon. Humanity has adapted to them, suffering its negative and positive effects. At present, due to the warming, the water cycle is altered and floods appear more frequently but, above all, with a virulence never seen. Those affected by the summer floods in West Africa exceed half a million people, nor is Asia immune to these disastrous precipitations. Torrential rains punished southern China causing several deaths and thousands of evacuees. The impact on the population is often disastrous. The poor condition of the buildings leaves the affected region without homes or public facilities, which are devastated by the rise of water.

The inhabitants are therefore without shelter and the community with public services destroyed or reduced to a minimum. Hospitals stop working, there is no public transport because of the destruction of bridges, roads, etc. The shortage of electricity, telecommunications services, water is widespread. Liquid and organic waste accumulates and causes disease. The accumulation of water and debris greatly hinders rescue activities. Most deaths are due to suffocation, illness, starvation or injury. In the short term, floods create a risk of overflowing glacial lakes, a detrimental effect on crops, the clearing that leads to the loss of mangrove swamps and coastal wetlands, which until now have helped prevent flood damage from coastal flooding, increased flooding frequencies Result of intense rains. All these effects and risks will produce great economic, social and environmental losses, increasing social inequalities between regions.

**Database:**

HILOSH accesses the following databases:

For the declaration of "Alert" and "Emergency" situations:

- Visor GeoINTA: http://geointa.inta.gov.ar/visor/?p=96
- CLIMATE SERV: https://climateserv.servirglobal.net
- NASA Earth data: https://earthdata.nasa.gov
- NASA IPAC INFRARED SCIENCE ARCHIEVE: http://irsa.ipac.caltech.edu/data/NED/
- NASA/IPAC Extragalactic Database: http://ned.ipac.caltech.edu

To provide useful information prior to "Emergency" situation:

- Gobierno de la Ciudad de Rosario: http://www.rosario.gov.ar/sitio/gobierno/gestion/voluntariado_funciones.jsp
- Gobierno de la Ciudad de Santa Fe: "*Recomendaciones desde el municipio a tener en cuenta, en caso de emergencia hídrica*": http://www.santafeciudad.gov.ar/ciudad/ciudad_saludable/consejos_medidas_prevencion_caso_emergencia_hidrica.html
- Gobierno de la Ciudad de Santa Fe: "*Plan de contingencia*": http://santafeciudad.gov.ar/blogs/gestionderiesgos/plan-de-contingencia-3/mas-organizados-mejor-preparados/
- Dirección Nacional de Vialidad: http://www.vialidad.gov.ar
- Dirección Nacional de Vialidad - Estado de rutas: http://www.vialidad.gov.ar/dnv-estado-de-rutas
- Dirección Provincial de Vialidad: https://www.santafe.gov.ar/index.php/web/content/view/full/67634
- ONG Movimiento Solidario Rosario: http://movimientosolidariorosario.blogspot.com.ar

- ONG Ecovolta: http://www.ecovolta.org
- ONG Banco de Alimentos Rosario: http://barosario.org.ar
- ONG Puentes del Alma: http://puentesdelalmavt.blogspot.com.ar
- ONG Rosario Solidaria: http://www.quieroayudar.org/Ong/Rosario-Solidaria

**Floods´s causes:**

Floods are not alien to the occupation of the soil. The flow of rivers is usually very variable over the years. In fact, hydrology establishes a range of maximum flows associated with the time of return for rivers. Generally, local populations, when they have been settled in the area for a long time, are aware of the areas occupied by the avenues of the river or ravine, and thus respect the area of the river and its channel, avoiding occupation of the river and its Flood to avoid flooding of its populated centers. Hazard alert systems are well developed through meteorological prediction, observation of river gauges that determine a hydrological alert and tsunami detection systems. Other causes: Asphalting more and more surfaces, the soil is waterproofed, which prevents water from being absorbed by the earth and facilitates the rapid flow of water to the river channels through drains and gutters. The clearing of forests and the crops that strip the soil of its vegetation cover facilitate erosion, which brings to the rivers large amounts of materials in suspension that aggravate the effects of flooding. The canalizations solve the problems of flood in some sections of the river but aggravate in others to which the water arrives much more quickly.

The occupation of the riverbeds by constructions reduces the useful section to evacuate the water and reduces the capacity of the flood plain of the river. The consequence is that the waters rise to a higher level and that more water arrives to the next sections of the river, because it has not been able to be embalmed by the plain of flood, causing greater overflows. On the other hand the risk of losing life and personal injury is very high in the people living in those places.

Causes of floods will have greater consequences in relation to the point where they occur. At other times poverty is what motivates the probable misfortune, it is the occupation of people with few resources that are installed in the riverbanks of the rivers that show their fury and drag people and things

Consequences of floods and prevention of possible diseases for men and animals

Climate change, emergence of emerging and reemerging diseases, both on humans and animals. In this context, flooding causes serious health problems. In the short term, there are diseases transmitted by important factors in situations of natural disasters such as lack of sanitation or by vectors, some of which must be taken into account due to their zoonotic importance in all areas.

In those areas where evacuations were made, where hygiene conditions were nil, and lifeless animals and many stagnant objects appeared, cases of Leptospirosis may occur. This implies an infection caused by exposure to the infected urine of mammalian carriers, can be directly or via contamination of land or water. The possibility of contagion is stronger in cases of abrasions, cuts and remaining submerged or immersed in water for an extended time.

One of the most important to consider are parasitic diseases, a contagious infectious disease. Parasites generally exist for lack of hygiene, for consuming contaminated food, vegetables and fruits or where there is a high presence of contamination.

Other very important diseases are those transmitted by vectors. The combination of humidity, contamination of water sources and stagnant water, high temperatures and migration of rodents to houses, facilitates the reproduction of mosquitoes and other vectors, which could generate the conditions for the Dengue and Leishmaniasis, among other vector diseases.

After the floods, it is essential to attend health centers and apply the necessary vaccines, as well as animals, and to prevent outbreaks of these diseases and epidemics, it is essential to take basic sanitary measures and to thoroughly clean the Homes and water purification. Health policies that are implemented after floods will be crucial in the short and medium term to prevent and to carry out effective control of zoonoses.

***Testimonies in various regions of the country***

Ángel Boschetto - CREA Rafaela-: *"A harvest that could not fail to clean up trailing liabilities is failing at a crucial moment. The final damage is not yet visible"*

Aníbal Tripputi - Technical Zone Rosario-: *"The soybean harvest has stopped a little over a week with records of about 150/200 millimeters in the following days"*
Juan Pablo Regonat - Technician Avellaneda Region: *"In the case of soybean cultivation there are already lots with losses of either quantity of kilos or as grain quality*

Rodolfo Rossi - President of Acsoja: *"Floods have already been flooded and the drainage is no longer normal. We begin to see pods opening"*

- *Image 4: Floods in Avellaneda, Santa Fe city: Year 2015.*

**Social impact:**

What comes after losing everything? The emotional impact on people who suffered a natural disaster, such as the floods in Comodoro Rivadavia, comes later, when one returns to his house and realizes that he lost everything. Specialists attribute it to the shock that is suffered by having been saved and by the loss of things that took so long to get.

The most common disorders are post-traumatic stress, anxiety, anger and depression. Although they clarify that everything depends on the psychic resources of each person, they insist on the importance of generating a therapeutic space so that people can relieve themselves.

"*It is very important to talk after these episodes. When one encounters adversity, it is when more help is needed. For each physical wound, there are two psychic wounded. And we must be attentive to the mirror factor. It is usually 70% likely that a person will do the same as the one in front. That's why emotional support prevents depression and even suicide…",* explains Paula Saavedra, who offers an emotional help line for Commodore neighbors who operate at her home in Trelew on her own initiative…*"Please, help me, I'm afraid. We are seeing how they are entering the house of the neighbor that is empty and we do not know what to do…"said* an elderly couple a few days ago to Paula, on the other side of the phone*: "They call people in shock who often do not know what to do. And from here we try to guide them. "*

*"They need to talk about what happened because when something disruptive happens in people's lives, the story makes them able to incorporate it into their own history, their identity*," adds Ana Paula Canudas, who was part of the Intervention Team In Catastrophes belonging to the College of Psychologists of Buenos Aires province, in the floods of Santa Fe in 2004.

**Losses:**

According to the psychopedagogue, what hurts most is losing pets. A duel is made as if a relative died. And the material things that people call most concerned are the most precious documents they lose, such as the wedding book, books. Many are distressed by their mates. They wonder where they will be. There are many sad to lose the clothes of their children. But it is understood that these objects are the most painful because they are related to shelter, with protection.

For Ana Paula Canudas, "*the people who hurt the most were the memories, the photos. That happened in Santa Fe in 2004* ".

Get ahead. Bety is 80 years old and lives in the barrio Juan XXIII, while talking with PROFILE was with the mud to the knees. "*He'll pull everything out, throw the chairs away. It's no good anymore*…", he told his grandchildren who were helping her. She was watching TV, when she suddenly sees how "*a cascade of mud enters under my door*". At that moment, the first thing he did was unplug everything, tried to save some of his books, mattresses, clothes. But he could not. The only thing he could save was Neca, his four-year-old Rottweiler: "*I lost everything. I am living in friends' houses, relatives. The first night I spent in a gym. But I do not care, I have what matters most to me. My bitch. It's all I have left. My six children are already big and live alone. I see this as an opportunity to take strength and not lower your arms. All I ask is that they help us...*"

Today you are being charged $ 20,000 to clean a wall. So we help each other. And because we're old, they do not give us credit either. "

**El Bajo Parana: The mouth of the Paraná River**

As it flows into the Paraná, the Paraguay River produces a "backwater", caused by the propeller or volute movement of the Paraná waters, and pours its waters through three arms, Humaitá, Atajo and Paso de la Patria, where the Color contrast between the clear waters of upper Paraná and reddish Paraguay resulting from the discharge of sediments from the Bermejo River,

which highlight the significant importance of water erosion in the basin that threatens soil productivity and triggers Sedimentation that endanger the hydroelectric and fluvial routes. The expansion of the agricultural frontier at the expense of forests and the lack of conservation practices facilitate water erosion.

Projects of powerful dams can cause irreversible environmental changes in a very large geographic area. Criticism of these projects has increased over the past decade. More severe critics argue that the social, environmental and economic costs of these dams outweigh their benefits and that, therefore, the construction of large dams is not justified. Others mention that in some cases, environmental and social costs can be avoided or reduced to an acceptable level by carefully assessing potential problems and implementing costly corrective measures.

This dam has presented great inconveniences in the last cyclonic seasons, due to its low capacity of drainage and also to that its two landfills begin to operate after the reservoir is full.

The area of influence of a dam extends from the upper limits of the reservoir to the estuaries, coastal and offshore areas, and includes the reservoir, dam and river basin downstream. There are direct environmental impacts associated with dam construction (dust, erosion, problems with borrowed material and wastes), but the most important impacts are the result of the water dam, the flooding of the earth To form the reservoir, and the alteration of the water flow downstream.

These effects have direct impacts on soils, vegetation, wildlife and wild lands, fisheries, climate and the human population of the area.

The indirect effects of the dam include those associated with the construction, maintenance and operation of the dam (access roads, construction camps or power transmission lines) and the development of activities Agricultural, industrial or municipal that makes possible the dam. In addition to the direct and indirect effects of the construction of the dam on the environment, the effects of the environment on the dam should be considered.

The main environmental factors that affect the operation and life of the dam are those that relate to the use of land, water and other resources in the catchment areas upstream of the reservoir (eg agriculture, colonization Or deforestation) that can cause a greater accumulation of silt, and changes in the quantity and quality of the water of the reservoir and the river.