FloodSmart

Approach

Nelen & Schuurmans

“Let No One Be Surprised By A Flood”

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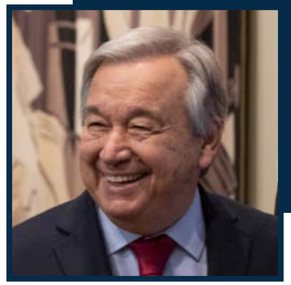
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A call to action

FloodSmart;

“Let no one be surprised by a flood”



Early Warning Systems and the ability to act on them are proven life savers.

-António Guterres
UN Secretary-General

In 2022 UN Secretary-General António Guterres in collaboration with the World Meteorology Organization (WMO) launched the Early Warnings for All initiative. This initiative states that it is impossible to avoid all flooding and other extreme weather events, but the objective by the end of 2027 is to make sure that no one in the world is surprised by natural hazards.

Currently, only half of the countries worldwide have adequate early warning systems. Africa, South Asia, South and Central America, and small island states are vulnerable to climate- and weather-related natural hazards. These regions are often the least protected by early warning systems. They face different challenges ranging from gaps in the preparedness for disaster risk management to low coverage of observing networks. To meet the ambition of the UN, considering the current challenges, we have developed FloodSmart. Based around the vision “let no one be surprised by a flood” we developed a proven approach including a selection of supporting high-end software solutions. Within this E-book we will introduce the essential concepts of Flood Early Warning, how we have applied these concepts within FloodSmart and what is needed for a successful implementation.

CHAPTER 1:
The FloodSmart approach

According to the global natural disaster database EM-DAT, floods are historically among the most impactful natural hazards, both in number of casualties and in terms of economic damage. This impact is only intensifying due to the escalating effects of climate change.

In response to this concern there is a growing demand for flood early warning for a diverse group of possible end users. These users vary in terms of their experience, financial capabilities, and organizational roles. They encompass both well-established organisations and those with limited resources, as well as independent operational bodies and organisations with more directional roles. Despite these differences, they aim for the same result: that in their area of interest no one is surprised by a flood.

To support that mutual goal, we have developed FloodSmart, designed to eliminate the element of surprise in the face of flooding events. FloodSmart is effectively applicable regardless of the type of end user or region.

FloodSmart is built around three key concepts.



FloodSmart has truly impressed me with its ability to cover every angle of early flood warnings. – Via Floodsmart I can implement effective early warning systems for my customers all over the world.

-Omar Saleh,
Director SLAMDAM B.V.





The three pillars of FloodSmart

Local understanding is key.
The most important role in the implementation of early warning services is local understanding. The determining factor for the quality and success of a flood early warning system is thorough understanding of flood risk, the behaviour of the (local) water system and understanding of the end-user to communicate the warnings in the right way.

“Think big, start small”.
A step-by-step approach for the development of a flood early warning service increases the chances for a sustainable implementation. People and organisations need to adapt to new information and new systems, and the availability of data differs per region. The step-by-step approach gives guidance to the development of a tailored implementation of the service. It helps to structure the process for user engagement, data collection and including unforeseen needs and demands within the system.

Ready-to-use, proven software solutions. The FloodSmart approach entails the use of ready to use software solutions. A flood early warning system is a technical bundle of different software components. For each of the components – such as meteorological forecasts, data storage, hydrodynamic modelling software and warning dissemination services – technology develops continuously. The FloodSmart approach uses a modular architecture in which open standards are utilized to make it possible to develop a tailored and flexible service that can connect to local knowledge and infrastructure to meet the requirements of end users.

CHAPTER 2:
Think big, start small

Flood early warning systems contain large amounts of data and information. They contain obseved data from rain and water level gauges and combine these with models for weather prediction and flow calculation. Based on the results of these models, warnings are automatically disseminated to flood forecasters, emergency services, public and other stakeholders.

The effective operation of these advanced flood early warning systems require well-organized institutions:

- Human capacity to understand the flood early warning system.
- Alignment between risk management and the management of the system
- Ability to integrate flood risk assessments and studies
- Annual budgeting for operation, maintenance and system upgrades

To ensure organisations can evolve to meet these requirements, while simultaneously benefiting from an existing early warning system, we advocate a "Think big, start small" approach.



As climate-related impacts and disasters become more frequent, intense and deadly in Africa, the situation calls for better early warning services and systems. Such services or systems must be quickly adaptable to increase resilience in the various communities. FloodSmart provides the capacity as the "ready to use" technology for building that resilience in terms of its reach. It is a cost-effective and impactful way of protecting people and assets, providing more than a tenfold return on investment for Africans

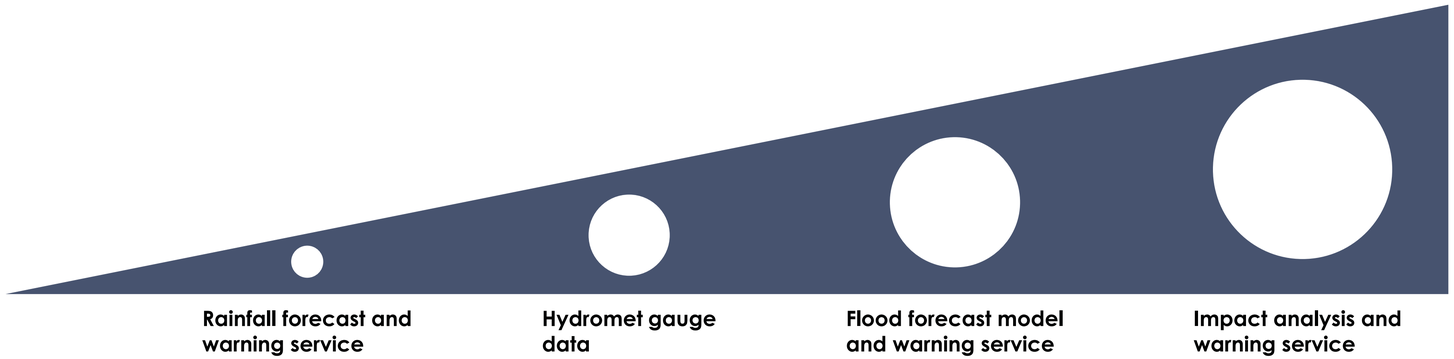
-Dr. Eugene O Itua,
CEO and founder, Natural Eco Capital

The foundation of this approach lies in taking incremental steps and setting up a flood early warning as a modular system. FloodSmart can be implemented as a basic system and then gradually expanded with additional features through an iterative process.

Do note that every feature comes with a certain data need. Unfortunately, many flood prone regions are also data scarce environments. Data is often unavailable, incomplete or inaccessible for operational use. Real-time data might not be available, flood risk might not be well captured within models or accurate precipitation forecasts might not be available. The rationale behind the FloodSmart approach lies in our commitment to guarantee that every region, including those with limited data availability, can access one of the following early warning mechanisms:

- Alerts on rainfall forecast (open data sets)
- Alerts on observed data
- Implementing a flood forecast model
- Impact analysis

Even though FloodSmart systems can be created with open data sets, such as global forecasts, we believe that truly successful systems require local data and knowhow to provide the most accurate flood warnings. Forecasts can be improved with in situ gauges and weather predictions from national meteorological institutes. Calibrated hydrodynamic models are important to improve flood risks and simulate the possible impact.





CHAPTER 3:
Ready to use, proven software solutions

Setting up an impactful flood early warning system requires the use of scalable and comprehensive software solutions. As described in the last chapter, we believe in a modular approach, this approach uses different building block to set up all aspects of an early warning system. With FloodSmart we aim to integrate the 'four pillars of early warning' from the Early Warnings for All initiative in our software solutions.

Risk knowledge:
FloodSmart involves strengthening access, dissemination, and use of risk information, fostering stakeholder coordination, promoting innovation, and empowering decision-makers and vulnerable communities.

Flood hazard monitoring:
Our systems centre on observing, monitoring, analysing, and forecasting hazards. Our goal is to enhance understanding and forecasting capabilities for timely warnings.

Warning and dissemination: We focus on developing effective networks and channels to ensure timely and understandable warnings.

Preparedness and response: We aim to enhance readiness, build resilient communities, and strengthen response capacities.

By considering user experience within the framework of the four pillars, our FloodSmart systems can effectively convey risk information, facilitate timely response, and empower users to make informed decisions that protect lives, property, and livelihoods.

> **The software solutions chosen within Floodsmart are not only innovative but also sustainable. There is a significantly high adoption rate for new scientific advancements, aligning with our commitment to continually advance and apply emerging scientific knowledge in the context of flash floods.**
>
> -Dr Ahmed Hadidi,
> German University of Technology in Oman



The selection of software solutions to host our systems is based on our domain expertise and experience. We have been supporting both governments and non-governments in setting up Flood early warning systems all over the world. Our conclusion: a user-friendly system is the key to sustainable flood early warning.

CHAPTER 3: Ready to use, proven software solutions

A user-friendly system is a system that:

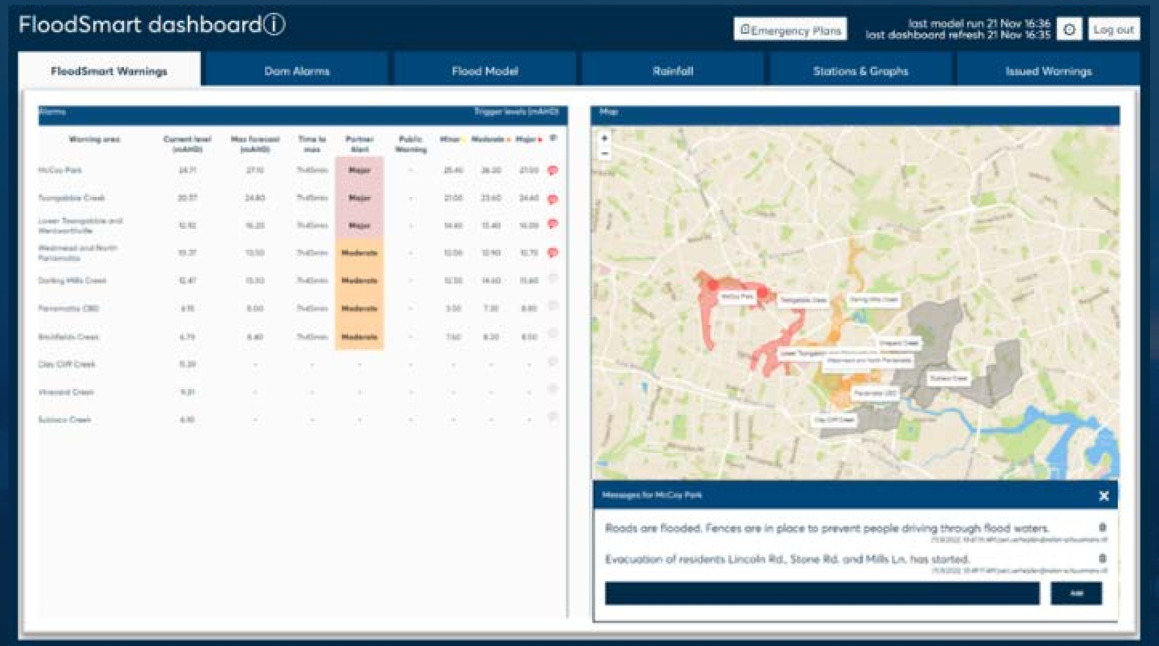
- Provides understandable and actionable warnings
- Is easy to handle, maintain and upgrade
- Can adapt to changing business needs

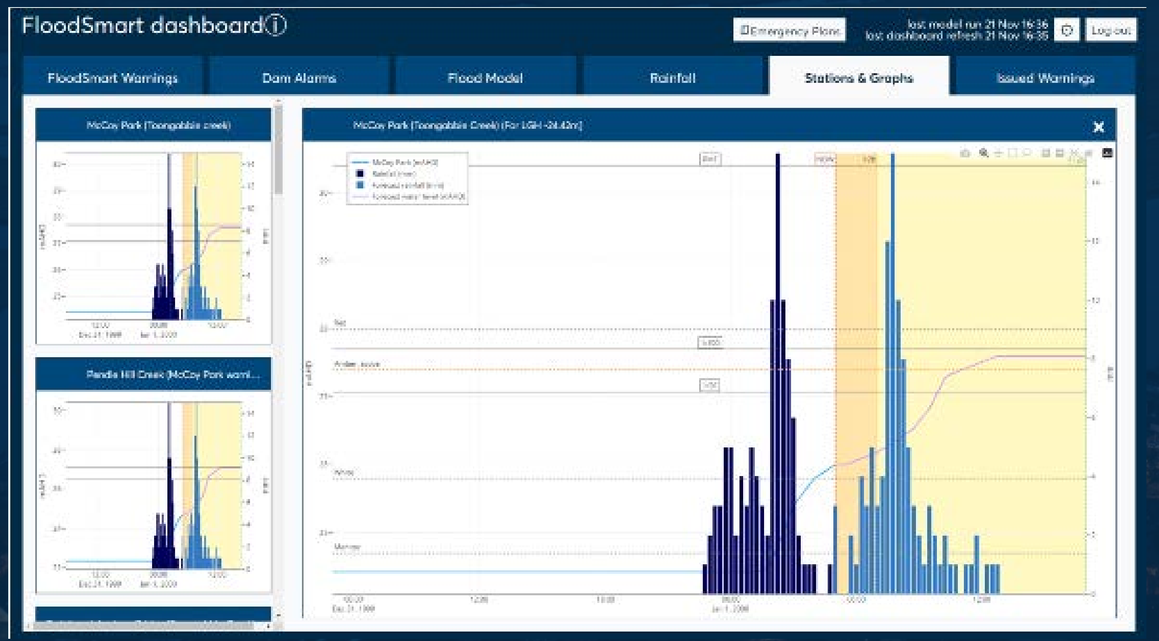


FloodSmart is an invaluable tool that gives us the confidence to prepare ourselves and the community for what it has predicted.

-Adam Murphy,
catchment systems coordinator at the city of Parramatta, Australia.

FloodSmart systems can meet these requirements independent of the type of organisation in need. Delivering user-friendly flood information and forecasting services for forecast operators, all levels of government, emergency responders, communities, media and public. We believe user experience is key in effectively communicating risk information to users. A FloodSmart system presents warnings, alerts, and other critical information in a user-friendly and easily understandable manner. This includes using plain language, visual aids, and intuitive interfaces that facilitate quick comprehension and decision-making.





A call to action

Are you interested and do you want to know more about FloodSmart? Do you want to learn more about the supporting technology? Please reach out to schedule an introductory meeting.

REQUEST A MEETING



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> We proudly provide the Flash flood forecasting service to multiple clients, offering swift solutions for flash flood preparedness. Our strategic partnership with N&S enables us to consistently improve and expand our services, keeping our clients ahead in safeguarding against flash floods.
>
> -Herman de Jonge,
> Senior Consultant flood risk management at Royal HaskoningDHV

Do you want to use FloodSmart within a project? Together we can make an impact. FloodSmart is also available for partners. Partners from around the globe use products developed by Nelen & Schuurmans Technology to help their clients with flood early warning challenges and grow their businesses. Interested in growing your business with early warning services? Please reach out.