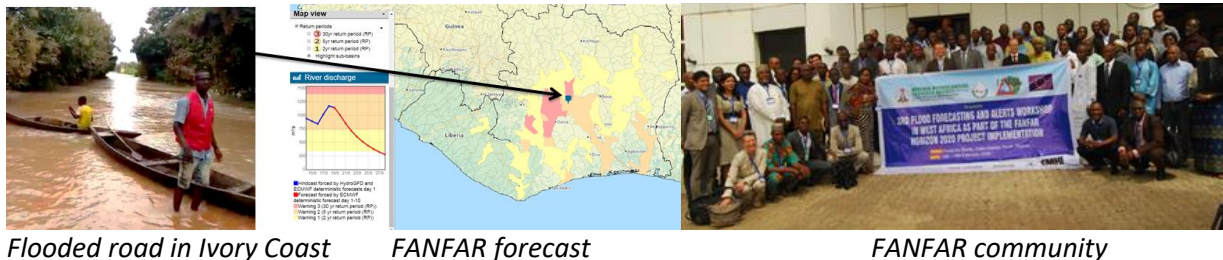


# FANFAR: Reinforced cooperation to provide operational flood forecasting and alerts in West Africa

## Concept Note for Phase 2



### FANFAR phase 1 partners

- Swedish Meteorological and Hydrological Institute (SMHI, government agency)
- AGRHYMET Regional Center (AGRHYMET, intergovernmental technical institute)
- Nigeria Hydrological Services Agency (NIHSA, government agency)
- isardSAT (Spanish SME) Satellite data and machine learning data provider
- TerraDUE (Italian SME) Cloud Infrastructure
- EAWAG Aquatic Research (Swiss research institute)

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## Justification and aim

Flooding is a rapidly growing concern in West Africa. Several floods have occurred recently with severe consequences including loss of lives, crops, livestock, housing, infrastructure, ecosystems, and with millions affected (OCHA, 2020). This undermines societies and fuels migration. Flooding is also projected to increase with climate change. Having access to accurate and up-to-date flood forecasts is essential to improve preparedness and response, and to minimize flood impacts. This contributes to safer societies better adapted to climate change (WMO, 2020).



In response, key West African and European organisations have co-designed and jointly developed the FANFAR pre-operational system providing updated information every day since September 2018. Building on the achievements to date, hydrological services, emergency management agencies, and river basin organisations now express a keen desire to sustain the long-term operation and improvement of the system, and to extend the capacity development. This is the aim of FANFAR Phase 2.

## Achievements to date

FANFAR is the result of 10 years of cooperation between West Africa and Europe. It is currently financed by the European Union's Horizon 2020 programme, building on earlier financing from the EU Copernicus programme, the Swedish International Development Cooperation Agency, and the European Space Agency.

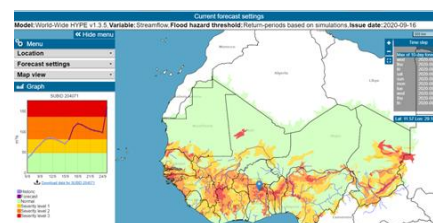
## Co-design & user experience

Four workshops were held in West Africa, drawing participants from over 30 organisations (hydrological services, emergency management agencies, river basin organisations, regional expert agencies) across 17 countries. User needs and behavioural analyses highlighted the need for high accuracy, clear flood risk information, reliable access and timely production. The users prioritize having an up-to-date system higher than a system with many or more complex features.



## Flood forecasting & alert system

FANFAR has developed a pre-operational system ([www.fanfar.eu/ivp](http://www.fanfar.eu/ivp)) providing openly accessible forecasts & alerts updated every day since September 2018 at West African scale. The system integrates meteorological forecasts, hydrological models, gauge & satellite observations, flood hazard assessments, and several distribution channels (web, SMS, Email and API). The system is collaboratively developed and operated on a cloud ICT environment.



## Capacity development & support

Hands-on training has been carried out at each workshop with 67 people trained so far. Moreover, in-depth courses and extended exchange visits have been held; and FANFAR has been integrated in parallel training events in the region (e.g. Masters courses at AGRHYMET and the PRESASS regional climate outlook forum). Open training material and support has been provided in English and French through an online Wiki, chat group and video tutorials in social media, offline reports, and a Help Desk ticketing system.



## Next phase and need for support

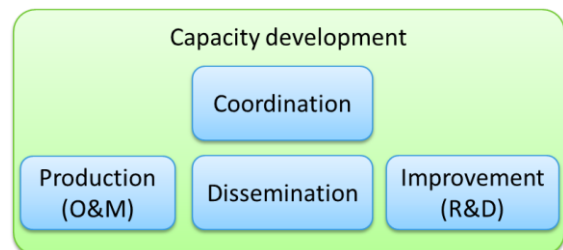
The need for up-to-date flood information in West Africa is urgent. Flood impacts in 2020 were broad and profound. For example, Niger experienced the worst flood ever recorded since 1929, with 71 dead, 350 000 people affected, and damages to crops, livestock, households and precious fauna (Le Monde, 2020-09-21).

*“We do not have forecasts to prepare action before the flood events come. We need to make an effort now to be able to provide information before the crisis comes, so that we can act, minimize detrimental impacts, and manage floods more efficiently!”* Abdou Ali, Head of Research at the AGRHYMET Regional Centre, in Niger



Key institutions with a mandate to provide flood information - such as AGRHYMET and the national hydrological services - need adequate support and tools to realize this vision. Already during the pre-operational phase, FANFAR has become a frequently used and well-known tool in the region. The objective for the second phase of FANFAR is to transform it to become the reference operational system used in flood management workflows at regional and national scale. To reach this objective a set of concrete actions are envisioned and need support:

- Coordination.** In the context of the West African flood management strategy, AGRHYMET will take over the overall coordination of the system. This includes e.g. managing contributing partners and technical components, human resources and financial sustainability, progress monitoring (e.g. production, behaviour, and impacts), and exploiting synergies. Political endorsement will be sought from ECOWAS and the national governments. This has already begun through an agreement between ECOWAS and AGRHYMET.
- Production.** The technical system will be sustained and maintained to operate continuously and produce new forecasts and alerts every day. It includes collection and processing of meteorological, hydrometric and satellite observations, hydrological modelling, alert calculation and distribution through web, Email, SMS and API, and automatic processing on the cloud ICT system.
- Dissemination.** A team of operational officers-on-duty will be established at West African hydrometeorological institutions to monitor, interpret and disseminate the flood risk information to regional, national and local stakeholders every day in the flooding season.
- Improved system.** Each system component will be scrutinized and refined in order to improve the accuracy, clarity, accessibility, and timeliness of the flood risk information, focussing on the most critical aspects following the co-design priorities. A particular emphasis will be placed on improved operationalisation, management and integration of local hydrometeorological observations.
- Capacity development.** The capacity will be raised at mandated West African institutions on all system components: coordination, production, dissemination and improvement. On the coordination level, AGRHYMET will employ a system coordinator, which SMHI will train. On the production level, West African ICT experts will be trained to successively take over responsibility for production-related tasks. On the dissemination level, the officers-on-duty will be trained to monitor, interpret and disseminate the information to enable stakeholders to act. On the development level, West African scientists will be trained on how to improve the system. This will be achieved through



a range of activities including: i) annual workshop with hands-on training, ii) in-depth courses on specific system components, iii) individual on-the-job training (extended exchange visits at partner institutions), and iv) assistance through e.g. social media. These activities will be supported by e.g. online and offline documentation on a wiki and video tutorials. The activities will be adapted to an online format in case physical meetings are not possible.

The **cooperation** among partners will be reinforced, and extended toward national, regional and international actors. An **agile tandem approach** will be employed to simultaneously i) operate system to provide direct societal value for the present, and ii) advance the capacity and system toward the vision through an annual iterative development and training cycle. **Synergies** with parallel initiatives will be sought in order to maximise the effectiveness of investments and flood resilience in society. This has already started, e.g. through data exchange with sub-national warning systems (<http://www.slapis-niger.org>), and by showing outputs from multiple models.

Supporting FANFAR is **climate adaptation in action**, in one of the most vulnerable regions globally. It builds **capacity** and **ownership**, transferring responsibilities at a realistic pace, while at the same time providing highly sought-after flood information updated every day. It can be applied in flood management at regional and national levels, and be tailored to use in dam management, disaster response, seasonal food security outlooks, and to design infrastructure better adapted to a changing climate.

### The voice of West African hydrological services and emergency managers

*“The funding of FANFAR is very crucial to saves lives and property. The capacity of our organization has increased, we are able to predict flooding and to take proactive steps to protect lives and property.*

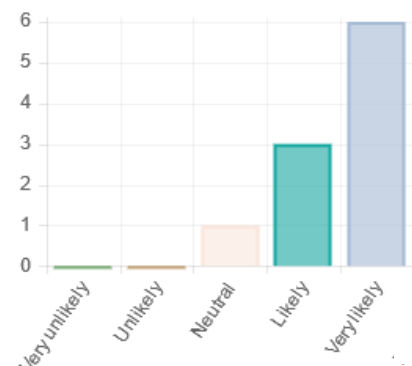
*“It is very important for FANFAR to have consistent funding. The accurate flood forecasts and alerts received on a daily basis helps stakeholders put up necessary preventive measures to avert floods.*

*“FANFAR is very important because climate predictions for West Africa shows that there will be more rain and increased rainfall intensity that will cause floods. Hence there is the need for FANFAR to be in existence to give early warning to people so that preventive measures can be adopted in time.*

*“L'importance de du financement de FANFAR est très important dans l'avenir. Il est important d'avoir un bailleur pour financer FANFAR car cette plateforme pourra jouer un rôle capital dans la gestion des risques liés aux inondations pour sauver des vies.*

*“IT IS IMPORTANT TO HAVE FUTURE FUNDING. IT PROVIDES A GOOD OPPORTUNITY FOR EARLY WARNING FOR FLOOD MITIGATION AND THUS SAVES LIVES, PROPERTY, AND ENVIRONMENT.*

**How likely is it that you will use FANFAR in the future?**



### References

- Le Monde, 2020. « Tout a fini par tomber, même les murs » : le Niger face aux pires inondations de son histoire. <https://tinyurl.com/hdfxwdu9>
- OCHA, 2020. West and Central Africa Flooding situation report as of 23 October 2020, UNOCHA, New York, USA.
- WMO, 2020. 2020 State of Climate Services: Risk Information and Early Warning Systems, WMO-No. 1252. Geneva, Switzerland.