



EMS Annual Meeting 2018
3–3 September 2018
Budapest, Hungary

Improving agrometeorological services for farmers in Niger

Vieri **TARCHIANI**¹, Maurizio BACCI¹, Aissa SITTA², Gaptia Lawan KATIELLOU², Moussa LABO²

¹ Institute of Biometeorology, CNR, Italy

² Direction de la Météorologie Nationale, Niger

Correspondent author: Vieri TARCHIANI, v.tarchiani@ibimet.cnr.it





1. Agrometeorological services for smallholder farmers

- WMO METAGRI and METAGRI Ops projects (2008-2015), 17 countries in West Africa
- ANADIA first phase (2012-2016) in Niger
- Support the Transition toward CSA
- Strengthening the Agricultural Innovation System



2. Objectives

Hypothesis :

- Agrometeorological services can effectively improve agricultural productivity and increase farmers' income
- Dissemination and uptake of climate services produced by National Met Services are the weak link in the chain

Objectives :

- Improve the effectiveness of agrometeorological services for farmers strengthening dissemination and uptake

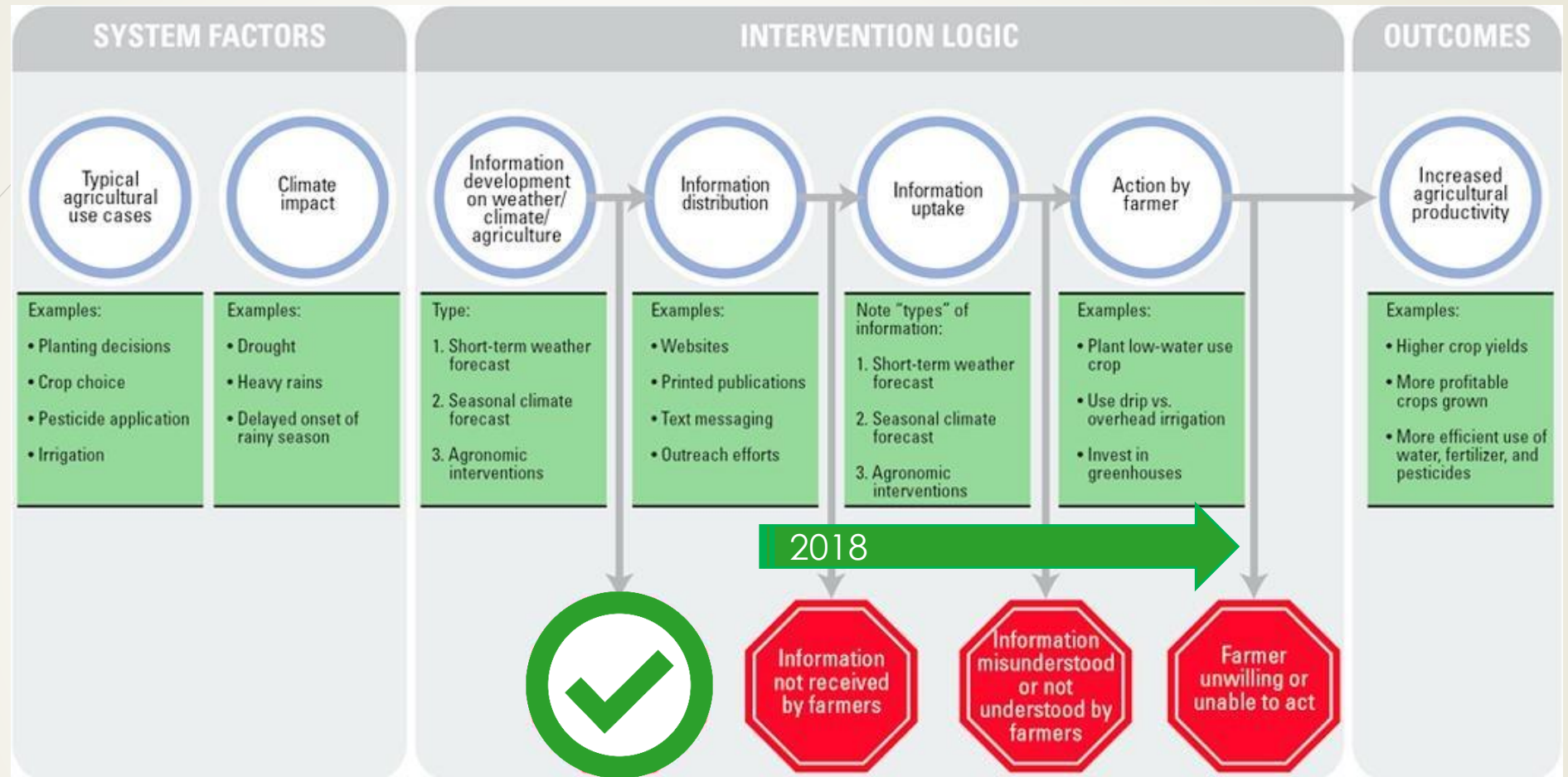


Image from: Jason Vogel, David Letson, Charles Herrick, A framework for climate services evaluation and its application to the Caribbean Agrometeorological Initiative, *Climate Services*, Vol. 6, 2017, Pages 65-76, doi.org/10.1016/j.cliser.2017.07.003.



3.1 The Assessment : Methodology

- Assesment in 2015/16
- 4 Municipalities
- 16 pilot and 16 control farmers

Survey tools

Period	Behavior (questionnaire)	Productivity (field measure)
Pre-season (RS)	General information about the farmer and farming system	
Mid-season	Information on the onset of the crop and practices used	Data on the crop after establishment
End of season	Information on the whole season and practices used	Data on the crop at maturity/harvest

3.2 The Assessment : Results

CS within Niger's Agriculture

Innovation System

Baseline 2015:

- Information on weather extremes and climate change (through RS),
- Provision of training and rain-gauges to farmers (through RS),
- Seasonal forecasts, expected sowing periods and related advice (through RS, local media and extension services),
- Weather forecasts (1 day through national media),
- 10-days agrometeorological situation bulletins (through extension services).

Agriculture Innovation System

Agriculture Innovation System		
Partners	Agriculture Dept.	X
	Other Technical Services	X
	Research	
	Intern. Org.	X
Dissemination	Ag. Ext. Service	X
	NGOs	
	Farmers' Org.	
	National Media	X
	Local Radio	X
	Cellphone (texting)	X
	Griots	



3.2 The Assessment : Results

Traditional vs. informed decision-making



Practice	Traditional decision	Agrometeorological services	Main advantages
Land preparation	Soil moisture, empirical knowledge, indigenous indicators	Advice based on seasonal forecasts and crop calendar	Reduces weeds cover before sowing
Crop variety choice	Locally available varieties, good taste and marketable	Advice based on seasonal forecasts and crop calendar	Crop cycle better fits seasonal pattern (season length, dry spells)
Sowing	First rain, indigenous indicators	Rainfall on the rain gauge according to specific thresholds and in relation to the sowing calendar and weather/seasonal forecasts.	Avoids sowing failures, re-sowing, coincidence of most vulnerable crop stages with dry spells
Weeding	Abundance of weeds	Phenological phase, soil moisture and weather forecasts.	Reduces weeds growth
Fertilization	Late development, weak plants, yellow leaves	Phenological phase, soil moisture and weather forecasts.	Avoids fertilizers leaching and crop scorching
Pesticide treatments	Level of crop damage	In case of outbreaks, according to weather observation and forecasts	Avoids pesticides leaching

3.3 The Assessment : Limits

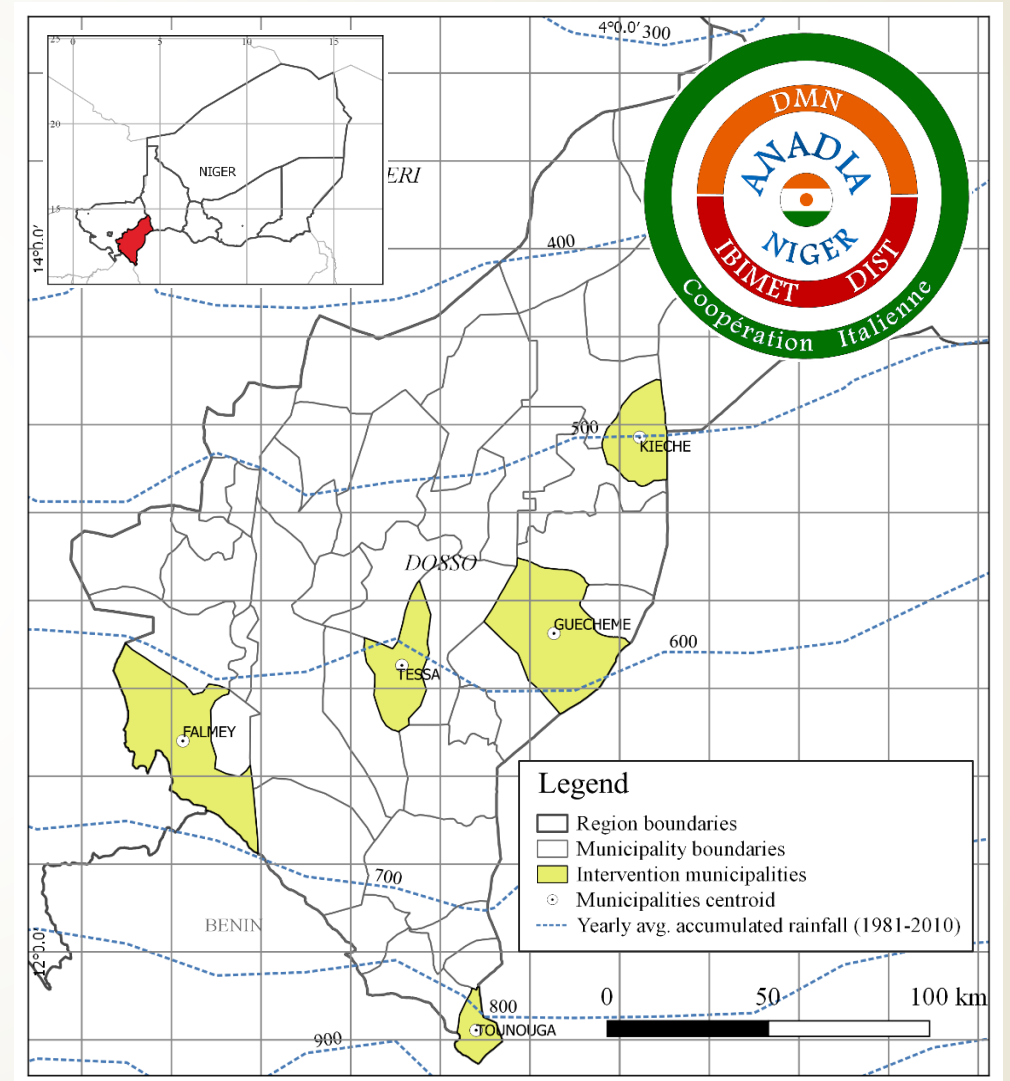


- ▶ The AIS in Niger is diversified (many actors working in the field) but not well structured (many initiatives working separately on a project basis).
- ▶ Farmers are very familiar with climate and weather information.
- ▶ Long distances, extent of the cropping area, limited resources for the extension service and poor collaboration negatively affect the adoption of some kinds of advice (e.g. sowing dates).
- ▶ Adoption is often hampered by social pressure (e.g. farmers show reluctance to apply advice on sowing that clashes with traditional choices).
- ▶ Agrometeorological services are not always disseminated to smallholders in a timely and understandable manner.
- ▶ Broadcasting of weather information by national media don't ensure uptake
- ▶ Need to enhance information communication and dissemination.

4. The innovation



- Strengthening NMS capacity to provide medium-range agrometeorological forecasts
- Strengthening the relationship between NMS and extension service
- Strengthening the relationship between NMS and local medias
- Strengthening the communication toward farmers





4.1 The innovation : ongoing activities

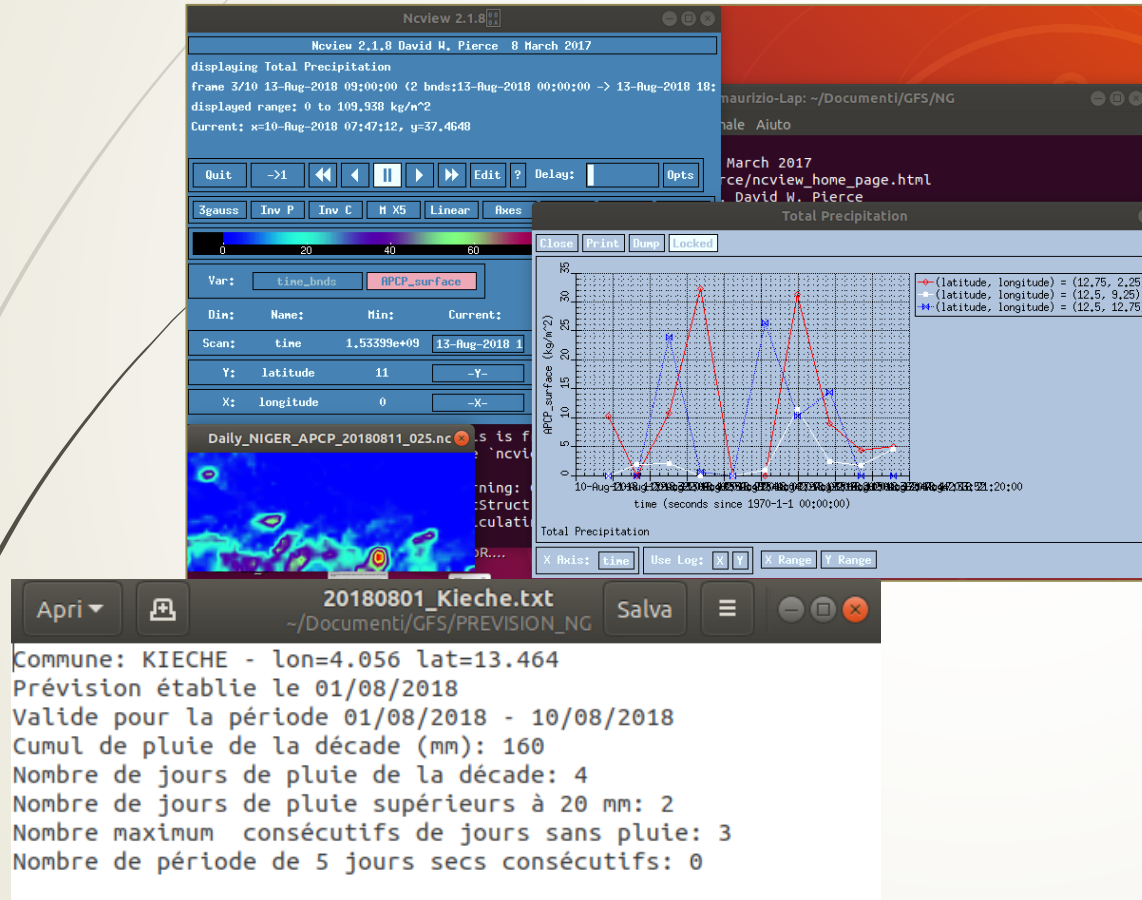
Strengthening the relation with Extension

- 10 days Agrometeorological forecasts
- Rainfall data collection
- Agrometeorological monitoring
- Agrometeorological bulletins and advises through whatsApp
- Communication by GFU

Strengthening the relation with Farmers

- Rural radios
- SMS texting

4.2 The innovation : 10 days Agrometeorological forecasts



- Forecast GFS based accumulated precipitation (APCP) for the next 10 days:
 - The 10-days precipitation amount
 - the number of days where daily precipitation amount (RR) is at least 1 mm
 - the number of days where RR is at least 20 mm
 - the largest number of consecutive days where RR is less than 1 mm
 - the number of dry periods of more than 5 days.

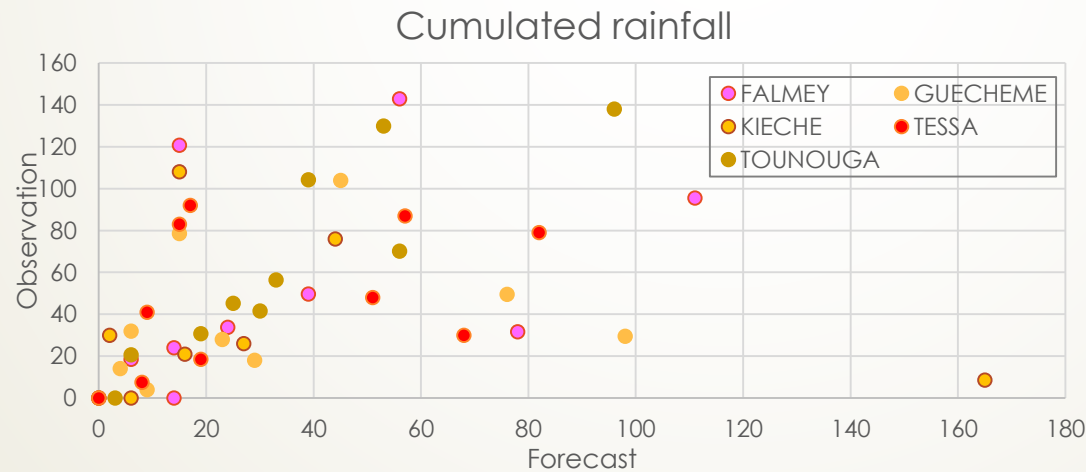
SMS sent to extensionists (pilot)

4.2 The innovation : preliminary results

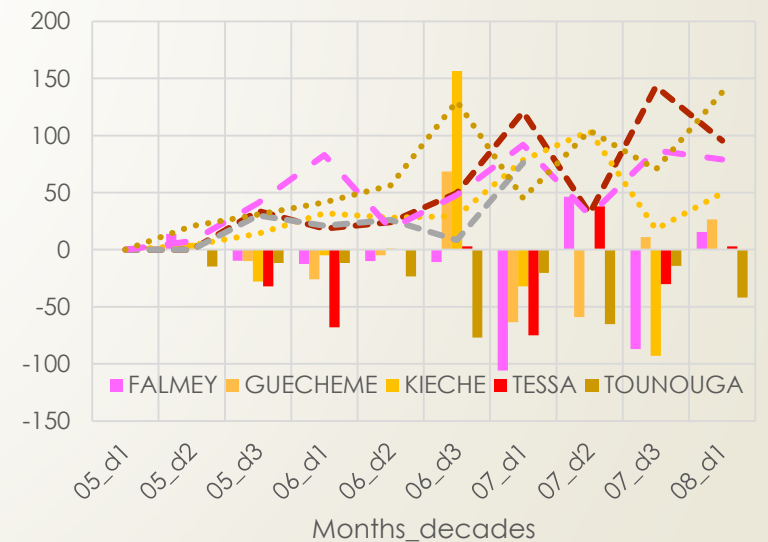


Agrometeorological forecasts

Variable	R	Perception
Cumulated rainfall (10 days)	0.35	Moderate
N° days rainfall > 1 mm	0.66	Fairly Good
N° days rainfall > 20 mm	0.21	Good
Max N° cons dry days	0.72	Good



Observations and Diff. Cumul. rainfall



5. Conclusions



SWOT

- Strengths: stronger relation among NMS, extension and pilot farmers, interest in receiving forecasts and advices
- Weakness: project based approach, staff at NMS, impact assesment (to be done in 2019)
- Opportunities: ICT in information and advices dissemination; integration with local knowledge, synergies with other elements of the AIS
- Threats: mobile network coverage, ratio farmer/extensionists and Km²/extensionist, cultural barriers,

6. The way forward



- Demonstration to foster uptake by other farmers
- Improve communication (ICT and training)
- From projects to AISs (innovation/sustainability)
- Improve agrometeorological forecasts
- Impact assessment (2019)
- Analysis of behavioural and social aspects



Thank you

Vieri Tarchiani

Institute of Biometeorology – National Research Council

Florence, ITALY

v.tarchiani@ibimet.cnr.it

<https://training.climateservices.it/anadia-niger/>

- *Tarchiani, Vieri, et al. "Smallholder Farmers Facing Climate Change in West Africa: Decision-Making between Innovation and Tradition." Journal of Innovation Economics & Management (2017): art13_I-art13_XXVI.*
- *Tarchiani, Vieri, et al. "Agrometeorological services for smallholder farmers in West Africa." Adv. Sci. Res. (2018): 15, 15–20. doi:10.5194/asr-15-15-2018*