

Climate risk assessment in irrigated rice: Farmers perceptions and biophysical analysis

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Farmer's observations and comments :

« sowing date are more and more out of the recommended sowing windows, and that works! Farmers get good yields! »

« It looks like the climate have changed »

Questions :

Did farmer's practices change ? Why ? Is there any relationship with climate ? or others constraints ?

Did climate change ? How ?

Are recommended sowing windows still valid ?

What can we learn from those evolutions ?









Objectives :

- The final objective is to define the most adapted sowing windows for recommended irrigated rice varieties of Senegal River Valley and Niger River Valley in Mali in order to reduce climate risks and then maximize production, and to assess the "residual" risks related to those sowing windows ;
 - for "present" climate
 - also for "future" one using data coming from climatic scenario
- Second main objective is to assess if cropping systems have changed in the last years and if it is the case, to understand why ?
- Third main objective is to have a crop model (or several) able to correctly simulate developments and yields of recommended irrigated rice varieties in Senegal River Valley and Niger River Valley in Mali

Fourth: Capacity building for production and management of climatic risks









Senegal River Valley











CLIMATE CHANGE AGRICULTURE AND FOOD SECURITY

Activities (already) :

Focus-groups and survey: to understand possible changes in farmer's practices and their constraints, and their eventual evolutions during the last years, Which kind of constraints, which changes, farmers climate perception? April 2012 ---.

Crop model improvement (following RISOCAS project)

Cirad+IRRI+Hoheinheim colleagues (Dingkhun etc..) worked on Samara-RIDEV improvement to better assess phenology (difficulty is Twater-Tair relationship) and impact of extreme temperatures on grains development

Punctual agronomical trials :

Sen : - (Tw; Tair) under different LAI for calibration / validation models Feb-June 2012 - comparison of "Sahel108" lines for detecting eventual genetic drift? Mali : « mini-rice garden » for variety characterizations

On-farm experimentation: Monitoring of rice development in farmers fields all over the 2 valleys to get data for models calibration and validation Since February 2012

<u>Weather stations installation:</u> (T, rain) networks (13 in SRV & 6 in NRV) + rehabilitation of meteo (Niono, Kayo-Macina) + 2 CIMEL (Ndiaye and Fare) circle (Note the state of the state o





Activities to be developed : Focus-groups and survey: to finish surveys

<u>To calibrate/validate models</u> : Samara-RIDEV (+ Oryza) Work to be done with Michael Dingkhun, Sabine Stürz => Test on the data from SRV and NRV

Modeling analysis :

Assess through modeling the impacts of climate since 30 years according to different sowing dates : and comparison with focus/survey results

Determine which sowing windows are better for recommended varieties ? which residual risks are associated with those sowing windows ?

Possibility to find indicators for insurance systems ?

+ quid for future climate (climatic scenarii)

Transfer to actors :

Transfer modeling tools to NARS and extension institutes (SAED, Office Niger, ISRA, IER). AfricaRice





Preliminary results









Results of focus groups : Senegal River Valley (11 FG)

1. Due to several constraints (inputs, credit, machines) <u>many farmers are sowing later</u> i.e. out of recommended sowing windows :

wet season : up to 15 Sept when recommendations are 15 Jun-15 Aug

- If dry season : up to end of April when recommendations are 15 Feb-15 March
- → And that works (mainly short cycle varieties) !

Some farmers plant now regularly at the beginning of Sept ... Without fear Since few years ie 5-6 years

2. Rainfalls increased since few years (5-10 ..), excepted 2011

3. Since 2000 yields are decreasing; except in 2008 dry season with 7t/ha (exceptiona year).

To explain this <u>farmers are well aware about climate "change" (evolution)</u>; some farmers explain reductions in yields due to temperatures evolutions <u>cold period has shifted of almost about 1 month</u> (Dec. rather than end of Oct.) « *In 2011/2012 cold period stayed until…April 2012*»









Results of focus groups : Senegal River Valley (11 FG)

4. And dry period is "bizarre" : "alternated periods of cold and hot days" ; "off-season rainfall" « before 2000 wet and dry season were well distinct »

5. But in 2011 later sowing date (Sept) did not get good yield ! :
« Cold period arrived earlier than in the precedent years, i.e. as before »
And also rainfalls were quite low and stopped early ...

Questions ?

- Is there a relationship between rainy season amount and following temperature pattern? (cold period start delayed when important (and late?) rainy season?)

- What about sowing windows recommendations ?

6. Additional constraints: birds, soil being poor, « tifa » inside irrigation drains, new weeds, seeds quality, fertilizers efficiency, markets









Results of focus groups : Niger River Valley in Mali (10 FG)

- 1. Transplanting replaced direct seedling since 1990's
- 2. Dry season 2012, nursery reach 3 months (Vs 1 month) because of cold period until April;
- <u>« rainy season period was well known and well distributed, now we have all the rainfall in a short period \rightarrow flood »</u>
- « wet season yields > dry season yields »
- « since double cropping yields are decreasing »







Relationship Tw and Tair fct (LAI)

Dry season 2012 in Fanaye : => calibration-validation phenological model, Tw = fct(T air and LAI)



Effect of shading on Water Temp Net difference between Air Tmax and Water Tmax Water Tmax at 10 cm > Water Tmax at 2.5 cm AfricaRice







Did apparent changes in crop phenology in the Senegal river valley is due to genetic drift in the varieties or to climate change ? (Cas sahel108)



30 polymorphic markers from 50 SSR panel Gramene (chr 1 to 12)

To actually corelate the phenotypic data with the genome of the sahel series





Phenological observations on the field are under treatment assess if those sahel108 varieties have the same time of flowering. AfricaRice www.Afri

www.AfricaRice.org



AfricaRice

Weather station installation







escape Temperature and rainfall in different zones in SRV (August 2012)















MERCI THANK YOU





