Climate Smart Agriculture - Reducing uncertainty on what, and when to grow rice in Colombia

Camilo Barrios
Crop modeler at CIAT - CCAFS
c.barrios@cgiar.org

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We are victims of Climate variability!

Relationship between annual climate anomalies and rice yield in Colombia.
How the climate variables have affected rice crop during the latest years?

In the last six years the Colombian rice sector has not been exempt to low yield problems.

- High level of spikelet sterility.
- Low solar radiation, increasing temperatures, low rainfall and irregular distribution.
- New pests and diseases.
- High production costs
- Decreased yields more than 50%

(Hernández L. 2012)
Site-Specific Management approach for reducing yield gaps

Clima + Suelo + Manejo agronómico = Producción Rdto/ha

%? + %? + %? = 100 % (brecha)
Identify limiting factors by phenological stages:

Commercial data + daily weather data + machine learning

Analysis based on phenological stages: Saldaña F733 (FEDEARROZ)
Period 2007 – 2012
Key message!

The accumulated solar radiation in the grain filling stage is the limiting factor for F733 variety, in Saldaña - Tolima (Using neural Network analysis)

The change!

Adjust planting dates to get a better environmental supply

What to do?

Identify the periods across the year when there are the best solar radiation demand
Respuesta diferencial entre materiales

Análisis basado en etapas fenológicas Saldaña (FEDEARROZ) – Periodo 2007 – 2012

Para FEDEARROZ 733, el clima explica aproximadamente el 35% del rendimiento

Factores diferentes! Las variedades responden de manera diferente al clima!

Para Cimarrón Barinas, el clima explica aproximadamente el 55% del rendimiento

Repuesta al clima de cada material en cada región = insumos para Fito mejoradores + ayuda a la elección para los agricultores
Generating agroclimatic seasonal forecast for rice productive regions in Colombia

What it consist?

Establish agro-climatic forecasts using seasonal climate prediction models and crop models (mechanistic models).

Future climate conditions enter in the crop model.

Crop model calibrated and evaluated

Crop growth projection

Crop yield forecasts
Generación de pronósticos agro-meteorológicos: caso arroz en Colombia

En qué consiste?

Establecer pronósticos agroclimáticos a partir del uso de modelos de predicción climática periódica y modelos de cultivos (modelos mecanísticos).
Agroclimatic forecast
Case: Monteria - Cordoba

What do farmers need to know?

Identify the most appropriate planting date (with best environmental supply) for rice crop in the period May - Dec 2014.

Actions to implement

Implement seasonal weather forecasts + historical events of "El Niño“+ mechanistic crop models

Projected crop performance to future climate conditions
**Agroclimatic forecast**

Monteria (May – Dic)

- **Decreased monthly rainfall**
- **Increased monthly temperatures and solar radiation**

Select the best planting date, as a preventive measure.

If the crop sowings are delayed, yields will decrease.

By this measure:
- Great economic losses to 170 rice farmers was avoided.
- 1,800 hectares of rice were saved to being destroyed by the intense summer.
"This weather so strange, I don't know which variety to plant"

In addition to know when sow, **You can also know the best cultivar to sow!**

With sowings until early June, the yield difference between varieties will not exceed 500 kg/ha.

If farmers decide to sow after June 15, the best choice will be the variety Fedearroz 733.

According to this recommendation, pilot plots were established to validate the agroclimatic forecasts.

**Field results:**

- Fedearroz 733: 6860 kg/ha PS
- Fedearroz 60: 4600 kg/ha PS
Generating new knowledge at the service of farmers

Knowledge transfer to technical staff of rice producers’ association in Colombia.

Knowledge transfer to farmers
Adapta%on	
  
  to	
  
  Progressive	
  
  Climate	
  
  Change

>>

Spotlight	
  
  on:

The	
  
  Climate	
  
  Analogue	
  
  Tool

Thanks.