National-level climate services for agriculture

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I. **Overview of Uruguay**
   - Country Context
   - International Framework & National Performance

II. **Case Study**
   - Agricultural Information and Decision Support System
Uruguay is a country with an economy strongly based on the agricultural sector.

- Total land area of the country is 17 million ha, around 85% is used for agriculture (77% for pasture and 8% for cultivation) with forestry occupying 9% of the land.
Average temperatures for the entire country are 17.5ºC, with a maximum of 19.0ºC isotherm on Artigas and minimum of 16.0ºC on the Atlantic coast in Rocha.

The average annual relative humidity ranges between 70% and 75%, across the country, the wettest month is July, with an average of 80%, and the driest month is January with an average of 65%.

The average annual rainfall is 1200 mm, though there is evidence that the rainfall patterns have changed, increasing average annual rainfall, particularly in spring.
Uruguay Metereology Institute (INUMET)

- Institutional Organization; Public Service, more autonomy.
- It creates a national data bank of meteorological and climatic information.
- It creates the National Meteorology Council integrated by the Ministry of Housing, Zoning and Environment, Ministry of Livestock, Agriculture and Fisheries, Ministry of Industry and Energy, National Emergency System and the University
The challenge to produce enough food will be greater over the next 50 years than in all human history.

Figure 1. Explanatory notes:
- Based on data from FAOSTAT and UN Population Division, with simple scenario modelling from CSIRO 2009 (BA Keating, unpublished).
- Assumes growth trends in per capita food consumption growth in developing countries (currently 2668 kcal per capita per day) are maintained such that current developed country food consumption levels (3331 kcal per capita per day) are reached by 2050.
- Assumes that diversion of food products (or production resources) to biofuels grows from current levels to 15% by 2050.
- Assumes no food wastage prior to 1920 ramping up to current estimates of food wastage of 30% and these are not reduced going forward.
- A Petacal is $10^{15}$ calories, an Exacal is $10^{18}$ calories.
Economic Cycles

Source: OPYPA
Agriculture investment grows

Procentaje del PBI


Source: OPYPA
Increased competition for land

PIB agropecuario y precio de la tierra

Fuente: OPYPA con base en DIEA y BCU
Major technological changes
Agricultural Exports

- Miel
- Vinos
- Frutas y hortalizas
- Madera y derivados
- Granos y derivados
- Lácteos
- Pieles, cueros y manufacturas
- Lanas
- Carnes y derivados

Millones de US$
Agriculture is responsible for more than 70% of the total value of our exports
Family farmers are 63% of the country’s total producers

"All we hope is to stay in the farm and be able not only to
High rainfall variability

Source: Baethgen y Giménez, 2009
High frequency of droughts
High economic impacts

2008-2009 drought
• Direct losses of the livestock sector caused were estimated at USD 342 million
• Induced impact on the economy as a whole at over USD 1 billion
• It had a higher negative multiplying effect than a crisis in any other economic sector.
The need for adaptation

6 keys for adaptation:

• Protect natural resources (soil, water & biodiversity)
• Agricultural Information and Decision Support System (SNIA)
• Improve the infrastructure of water and pasture
• Financial tools for risk management (insurance)
• Technical assistance and training producers
• Strengthen institutions and promote association of producers
Agricultural Information and Decision Support System
Facilitating critical and timely information on climatic events and their potential impacts...
…which could be used by farmers as early warnings in case of climate threats and for planning and decision making on climate resilient investments and practices.
Climate risk management
(IRI – Inia approach)

1. **Identifying Vulnerabilities and Opportunities related to variability and CC** (production systems, with components of the system)

2. **Understanding, Quantifying, Reducing Uncertainties**
   Learn from the PAST, Monitoring the PRESENT, Give relevant information about the FUTURE

3. **Identifying Technologies that Reduce Vulnerability**
   Diversify, Irrigation, Storage and Efficient Water Use, Genetics, etc..

4. **Identify Institutional Arrangements and Contributions**
   in policies that reduce and / or Transferred Risk
   - Early Warning and Early Response
   - Insurance (including Climate Indices), Credit Recovery, etc..
   - Institutional Arrangements, Policies
Agricultural Information and Decision Support System

This system would include:

• improving and integrating existing climate and natural resources databases
• developing improved seasonal forecasts
• establishing Early Warning Systems
• improving real time monitoring of climate and vegetation
• developing simulation models to assess the impact of adopting different adaptation technologies.
Early warning in livestock

Cattle endowment

Family producers
Early warning in livestock

Cattle endowment

Monitoring and Forecast Water Balance

Family producers

Monitoring and Forecast pastures
Early warning in livestock

Cattle endowment

Monitoring and Forecast
Water Balance

Family producers

Monitoring and Forecast
pastures

Climate forecast
(IRI - 3 months)

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Insurance Instruments

30-year time series of NDVI

Pricing tool

Zoning with more than 60% natural field

Land use map

Breeding cows by grazing area

Sum insured by grazing area

30-year time series of NDVI

Pricing tool

Zoning with more than 60% natural field

Land use map

Breeding cows by grazing area

Sum insured by grazing area
Strengthening the links between science and public policy

- INIA-Academy
- INUMET- Uruguay Metereology Institute (Law 19158)
- IRI (Columbia University)
- Global Alliance
  - SARA(S)² South American Institute for Resilience and Sustainability), based in Uruguay.
  - ANII (National Agency for Research and Innovation) Promoting innovation for adaptation and mitigation to climate change
Thank you!

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