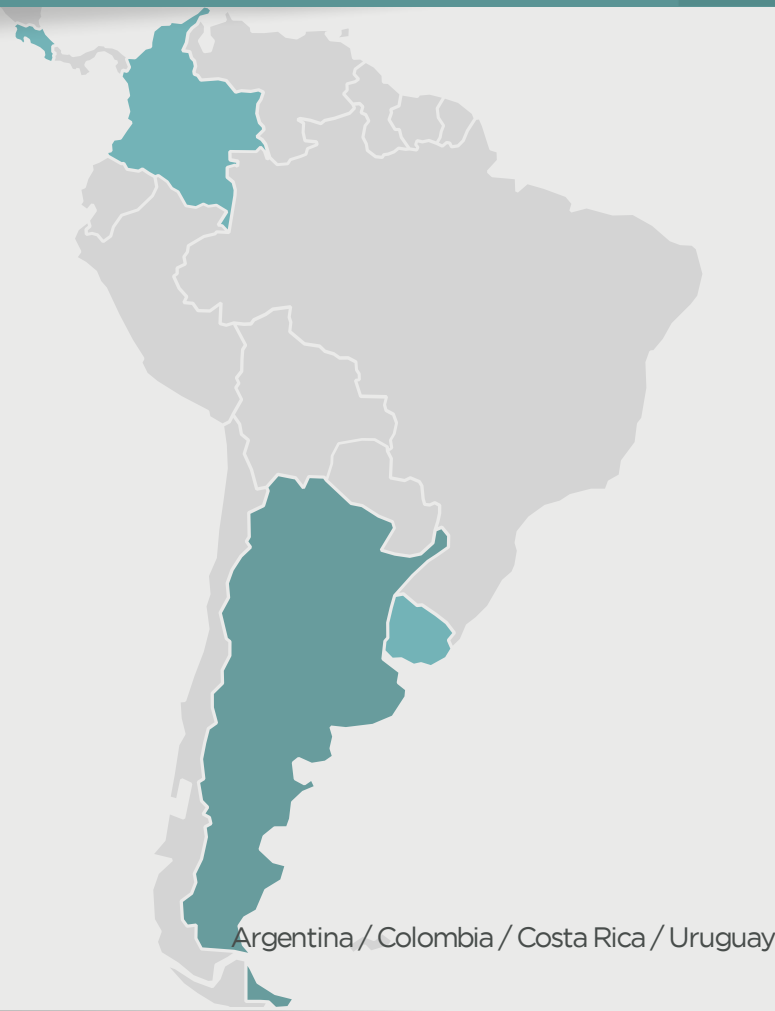


Satellite monitoring of quantity and quality of available biomass in pastoral livestock systems

Pastoral farming contributes 46% of GDP and is key to food and social security in LAC. Tools that improve their efficiency are needed to increase their profitability and sustainability.



3
PhD theses in progress



79
Researchers and technicians involved in biomass sampling



8
Training and field days



1
App for recording and systematizing data



0.56
R2 of predictive models for pastures (preliminary)



Remote sensors allow monitoring large areas and have information in almost real time

The implemented initiative

i) Generate and calibrate real-time prediction models of forage quantity and quality from remote sensors for relevant forage resources in 4 LAC countries with cold, temperate, subtropical and tropical, semi-arid and humid climates,
ii) Validate the models generated in demonstration units

and commercial farms, and
iii) Manage the knowledge generated, training both technicians and producers as well as those responsible for national GHG inventories in order to ensure technology transfer.

Lower the cost of estimating in real time and with adequate precision the quantity and quality of forage in pastoral livestock systems through a satellite tool

The technological solution

A platform comprised of the national agricultural research and innovation institutes and other actors in the sector will be formed which, thanks to their regional presence and the extension, transfer and technological

development activities that they carry out, will be key to achieving the objective and reaching all beneficiaries: family and business producers, livestock advisors, software developers and public officials.

Satellite monitoring project workflow

Knowing the quantity and quality of forage is key to sustainable pastoral farming

We propose to generate local information to estimate them through satellite data for the main forage resources of LAC

Field measurements

6500 forage quantity and quality data



79 researchers and technicians.



Satellite data

Optical and microwave sensors, auxiliary information



Forage quantity and quality prediction

Machine learning
Radiative transfer models
Ecophysiological models

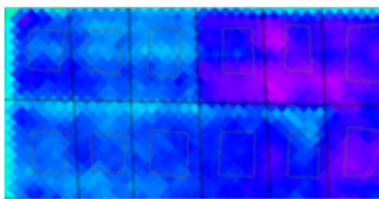
Link with other research groups



Diffusion and transfer

Metadata
Dissemination material
Dissemination and training conferences and workshops
Contact with Ag-tech companies

Validation and implementation in production systems



Forage (kg/ha)
4000
3000
2000
1000
150m

Figure: satellite estimation of available forage for a temperate pasture in the province of Buenos Aires (Argentina)

Link with extension projects and productive environment



MÁS INFO



Results

Three key tools were developed for satellite monitoring of grasslands: a field survey protocol, a mobile app to record biomass and forage quality, and a web platform to visualize data and assist in sampling. These tools enabled the creation of a monitoring network with over 79 participants. The database includes 1,300 matched field and satellite observations. Using 755 records, machine learning models (Random Forest) were tested to estimate biomass from Sentinel-1 and -2 imagery. The general

model had an error of 1100 kg DM/ha (99%) and 650 kg DM/ha (55%) in pastures. Field auxiliary information improves model accuracy. Therefore, two simplification methodologies (spatial and temporal) were designed to facilitate biomass estimation at the system scale. Both are being validated in real-world grazing systems, expanding the database and promoting satellite-based technologies. Over 1,500 people participated in outreach activities.

Main donors



Participating Organizations

