

Assessment of the water availability and water footprint in Argentina (for agricultural uses). The AWARE project

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What is INTA?

The National Institute for Agricultural Technology (INTA) was created on 1956, is a public decentralized body subordinated to the Secretariat of Agriculture, Livestock, Fisheries and Food with operative and financial autarchy.

INTA has as main aim to carry out and foster actions addressing the innovation of agricultural and livestock, agro-food and agro-industrial sectors to contribute to the competitiveness of agro-industrial chains, environmental health and sustainability of productive systems, social equity and territorial development, through research, technological development and extension”.

INTA is present in the 5 ecoregions of Argentina (Northwest, Northeast, Cuyo, Pampas and Patagonia) INTA relies on 15 Regional Centers with 47 Agricultural and Livestock Experimental Stations and over 260 Extension Units that cover the whole country plus 4 Research Centers with 15 Institutes.

Its efforts are focused on innovation as the engine of development and integration capabilities to foster interagency cooperation, generate knowledge and technologies and use them for the agricultural sector through extension systems, information and communication.

Motivation of the AWARE project

- **Management water resources with sustainability criteria demands to know water availability and the amount needed to maintain ecological and productive processes.**
- **The great extension of Argentina together with the great variability of hydrological systems and climates makes that water management requires of reliable quantitative and qualitative data at different spatial scales.**
- **There is a need to calculate water availability as well as how much it is requires to satisfy productive processes.**
- **It is crucial to give decision makers accesibility to data at a regional scales regarding water balance, and the water footprint (blue and green water)**

Objetives

The general objective is to provide a hydrologic information system at the national level to facilitate management and planification.

Specific objectives:

- a) Applying SWAT to know water resources availability in terms of its spatial and temporal variability.**
- b) Assessment of the water footprint in order to know how important is pressure on water resources**
- c) Publishing of the results and integration in a public web**
- d) Utilization of the project results to carry on working at a more detailed spatial scales.**

Importance of the project in water management

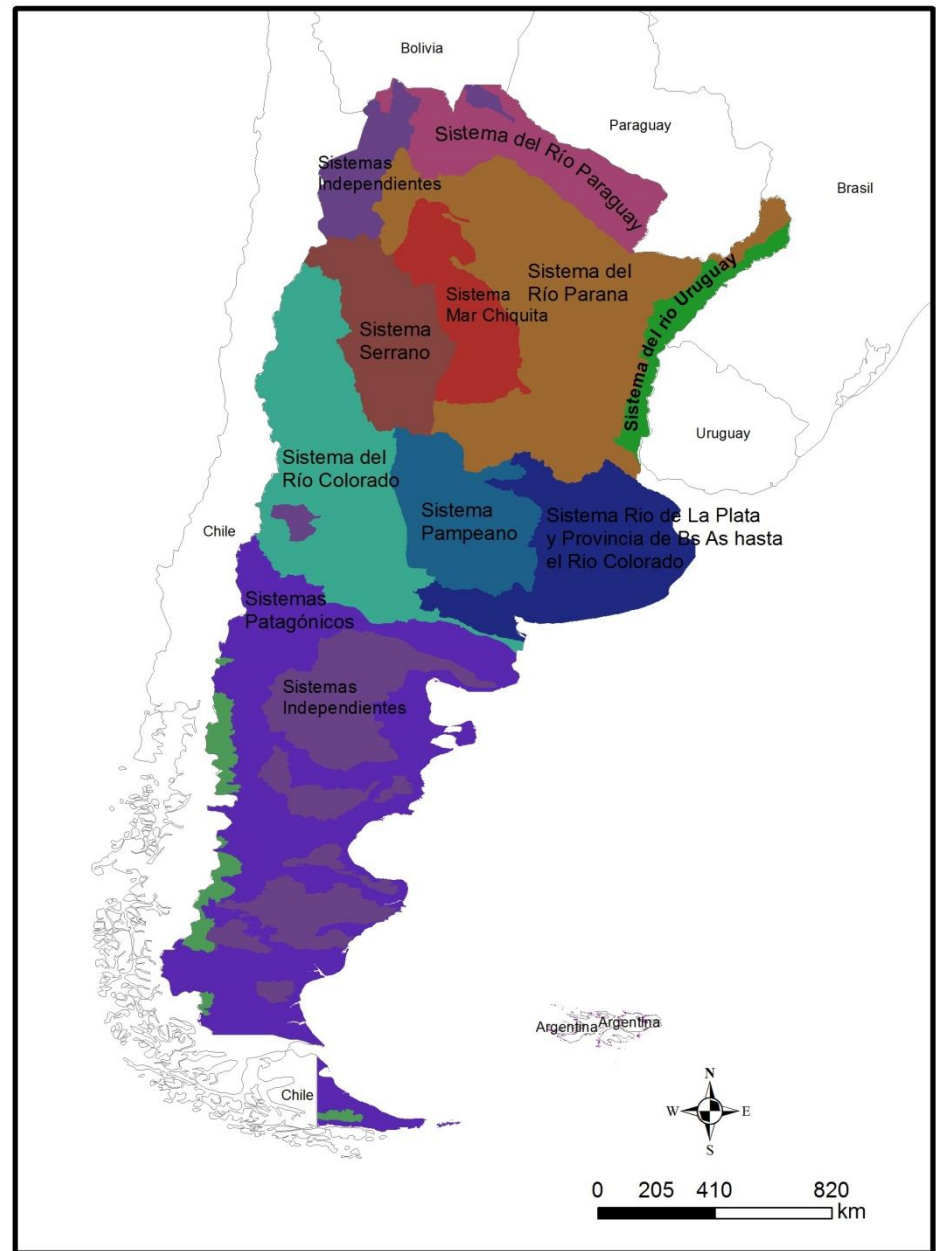
- **The project is focused on studying what is the availability of the water resource in Argentina, as water provides the support to economic growth and the means to a sustainable socio-economic growth.** It also generates a direct impact on environment life quality, contributing to improve socio-economic conditions of the most disadvantages social sectors.
- **In terms of the social impact, the project is focused on understanding, modeling and improving the knowledge concerning water resources availability,** which is one of the supports of modern societies.
- **The project intends to be a contribution to improve water management, so that society can fulfill its responsibility intergenerational contributing to sustainable development.**
- **Dissemination through a specific web of the project findings will enable to establish synergies with technicians and academic.**

Study area

The project includes the entire Argentine mainland

It covers an area of 2.791.810 km², being the work spatial scale (1:1.000.000).

It consist of 12 sets of hydrological systems, defining a total of 123 watersheds.



Methodology

SWAT will be used to simulate spatial and temporal water availability in Argentina.

Modeling will be accomplished in each hydrologic system, using to this purpose a total of 123 subbasins.

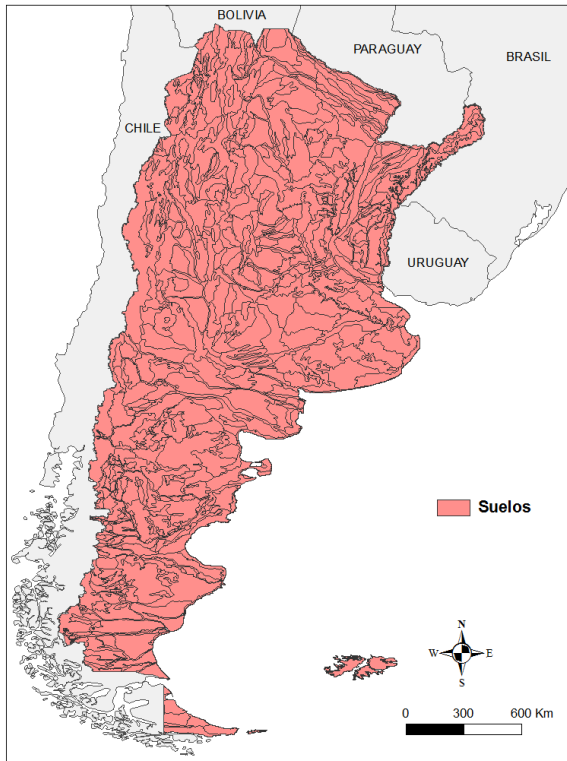
The simulation will include the last 33 years (1980-2013). A monthly time step will be used.

To assess the performance of the model SWAT-CUP4 will be used, using the evaluation method: Sequential Uncertainty Fitting.

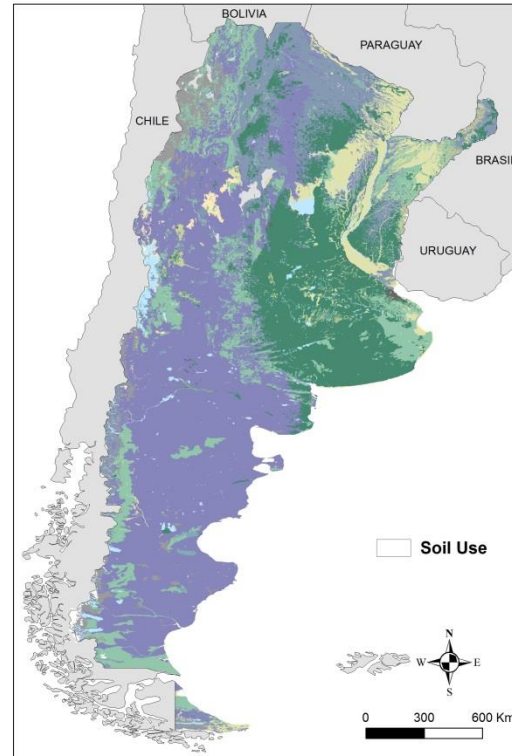
The following tasks will be accomplished:

1. Gathering of data and adaptation to the format required by SWAT;
2. Automatic delineation of watersheds and drainage network;
3. Delineation of hydrologic response units HRUs;
4. Calibration and validation of the model;
5. Assessment of the water footprint using international tables
6. Dissemination of the findings (i.e. conferences, papers)

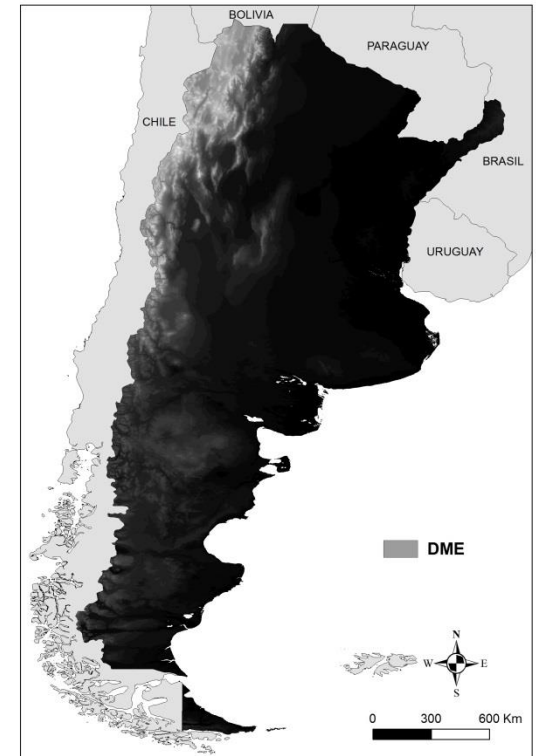
Data available



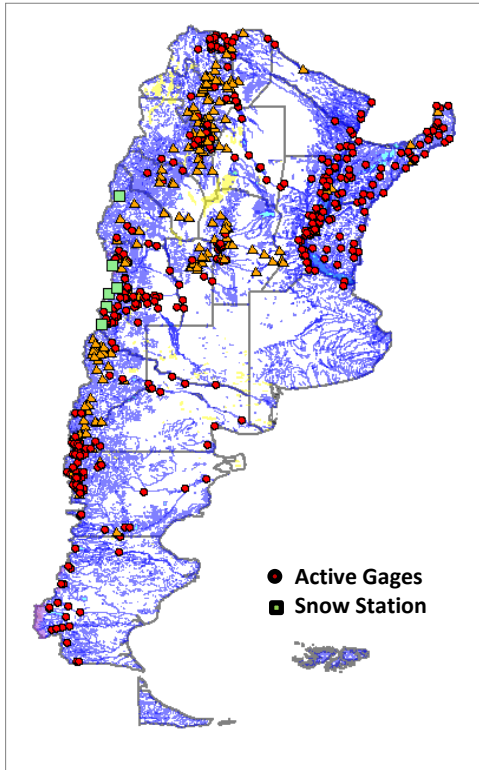
Soil map of Argentina.
Scale 1:2.500.000 sobre imagen satital.
Database: <http://geointa.inta.gov.ar/>
INTA (2002).



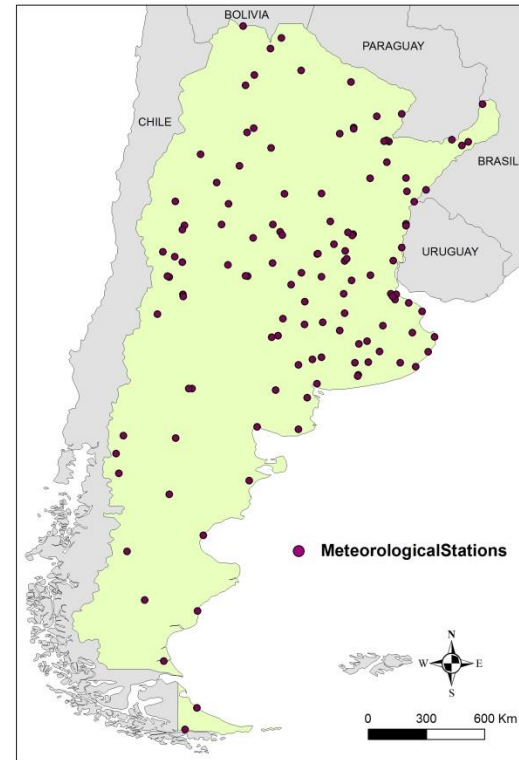
Land use map of Argentina. Year 2006-2007.
Scale 1:500.000.
System LCCS-FAO.
Database: <http://geointa.inta.gov.ar/>
INTA (2010).



Hole-filled SRTM for the globe Version 4.
Available from the CGIAR-CSI SRTM 90m.
Database: <http://srtm.csi.cgiar.org>.
Jarvis, A., H.I. Reuter, A. Nelson, E. Guevara (2008)



National Hydrologic network - Publicaciones Hidrometeorológicas 2010
Subsecretaría de Recursos Hídricos, 2011.



National Meteorologic network– INTA-SMN
(National Meteorologic Service).
Database: <http://siga2.inta.gov.ar/>

Expected results

The findings derived from the AWARE project will allow to determine the water balance for each basin, which will be combined with the water footprint obtained from the land use map and data of agricultural-livestock production.

All information will be managed in a database to be organized in a web interface that can be combined with other available maps (political, population, soils, ..).

The hydrological simulation will allow to know what is the current availability of water resources in Argentina and its productive use through a hydrological information system and using a temporal scale sufficient to take into account climate variability.

The application of the methodology for calculating the water footprint will enable to identify deficient areas and / or subjected to high pressure in different regions.

The availability of this data will help to a better and more precise planification of water resources based on sustainability criteria

Furthermore the results derived from the AWARE project can be used in other researchs focused on climate change and food security, among others.