

2011 SWAT

UNIVERSITY OF CASTILLA LA MANCHA
TOLEDO, SPAIN

Evapotranspiration forecast using SWAT
model and weather forecast model

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Aquapath-soil

Service to support agriculture production



deimos
ENGENHARIA



Project financed by:



European Space Agency

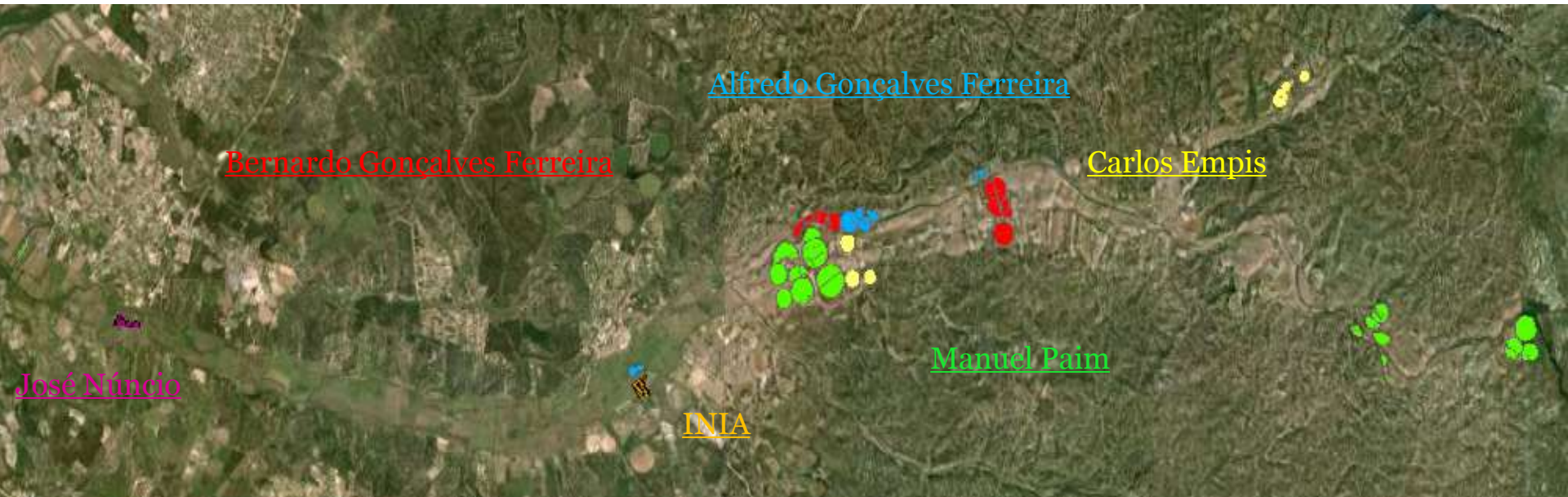


Objective

- Create a service with a daily prediction of irrigation needs based on
 - Weather forecasts
 - Hydrologic models
 - Vegetation models
 - LAI measurements made by satellite

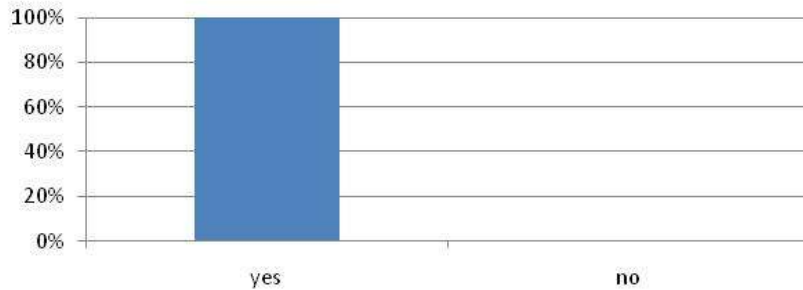
Study area presentation

- Six users were considered
- Each user can have more than one corn field

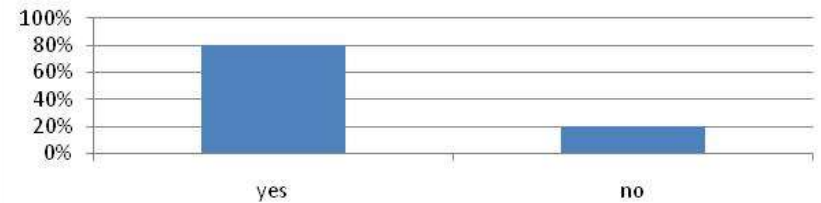


Users feedback

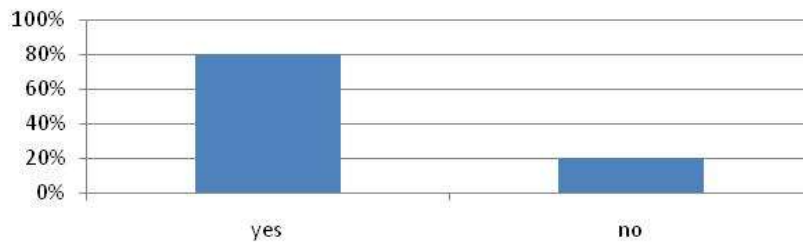
methodology / product more competitive



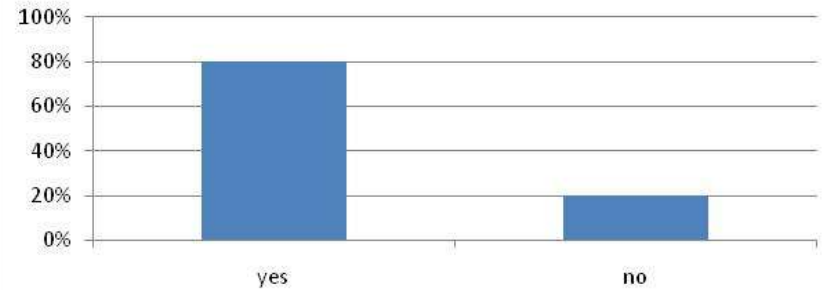
information sets appropriate and compatible with the rest of the tasks ongoing and planned in the organizations



product provided will support the work that your organization carries out

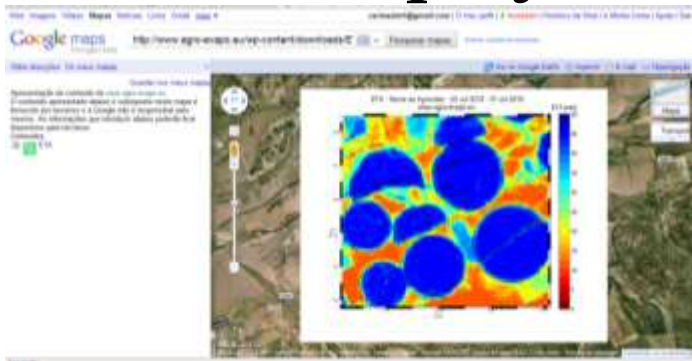


no significant shortcomings stopping the service to be used

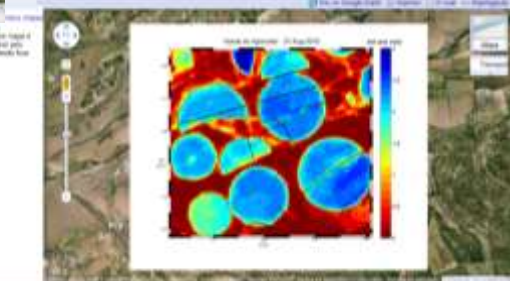
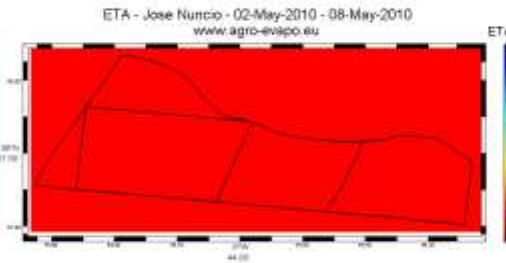


Products/Service delivery

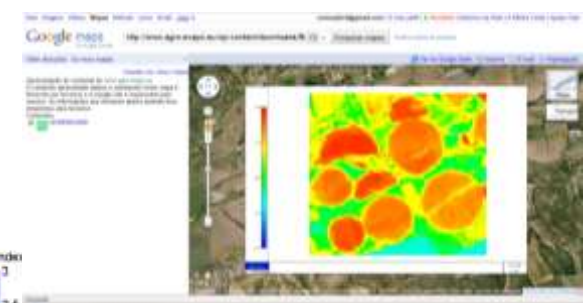
- SMS
- Website project



ETA maps

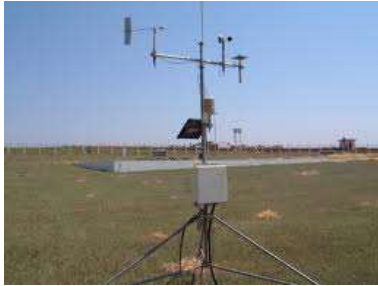


LAI maps



Biomass maps

SMS Service



Download of meteorological values (measurements and forecast)

T, Pcp
HR,
Wnd,
SR

Simulation with **SWAT-MOHID**

Results saved in data base

SMS information

Meteorological information
(previous week and forecast to the next week)

Actual Evapotranspiration
(previous week and forecast to the next week)

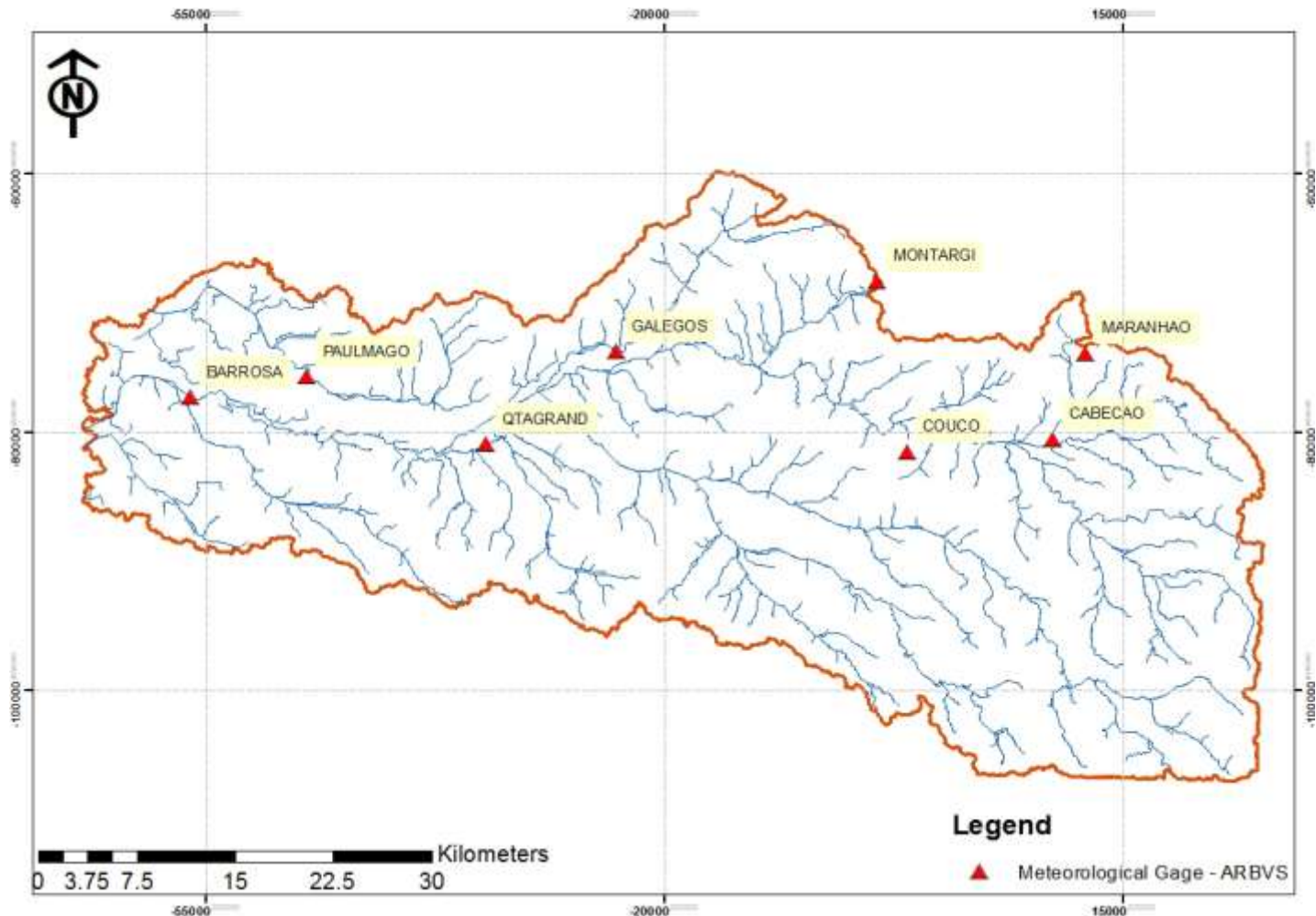
Send SMS



Automatic SMS send to the user

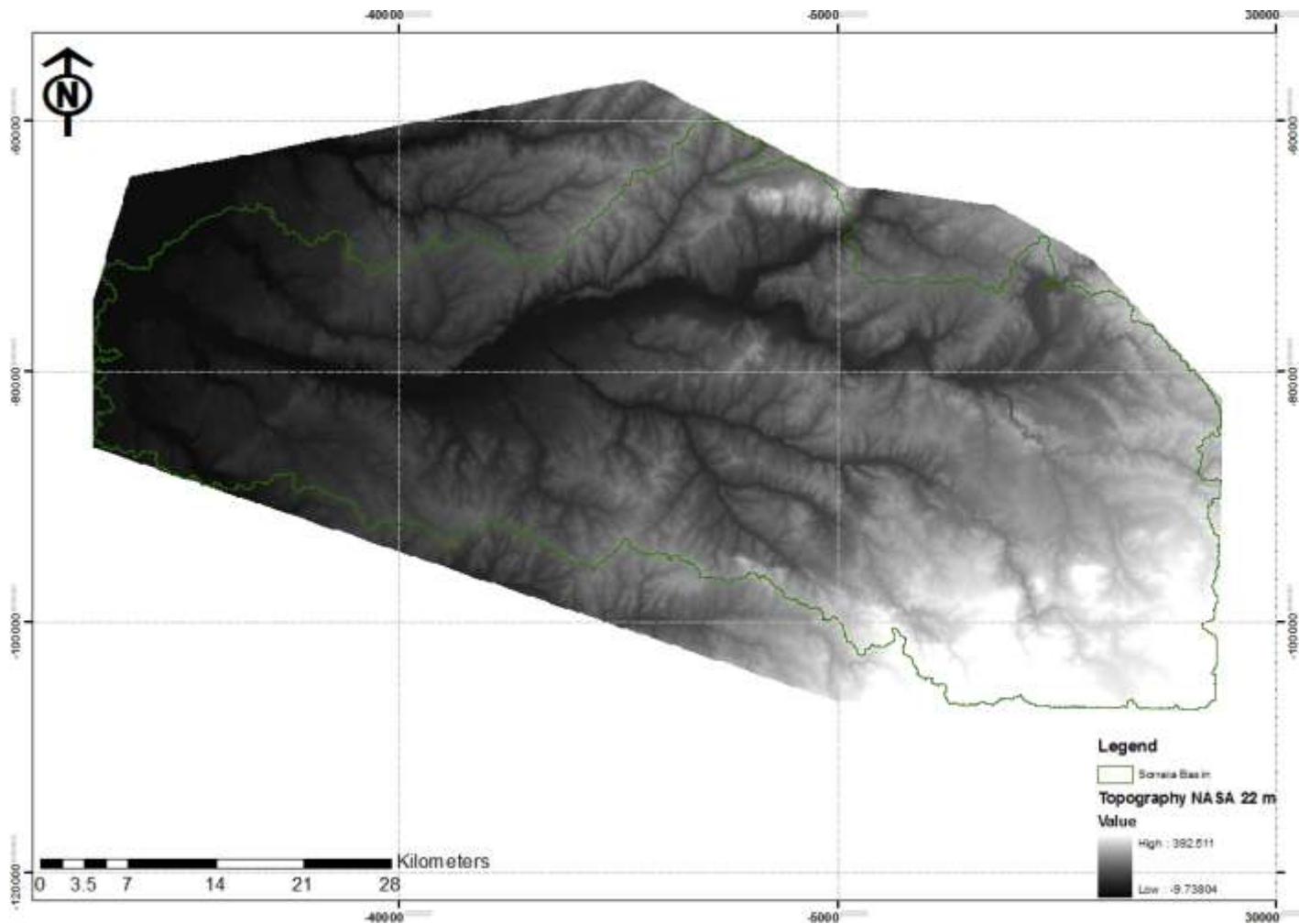
Model input

- **Meteorology** local daily values of pcp, temp, HR, wind, radiation.



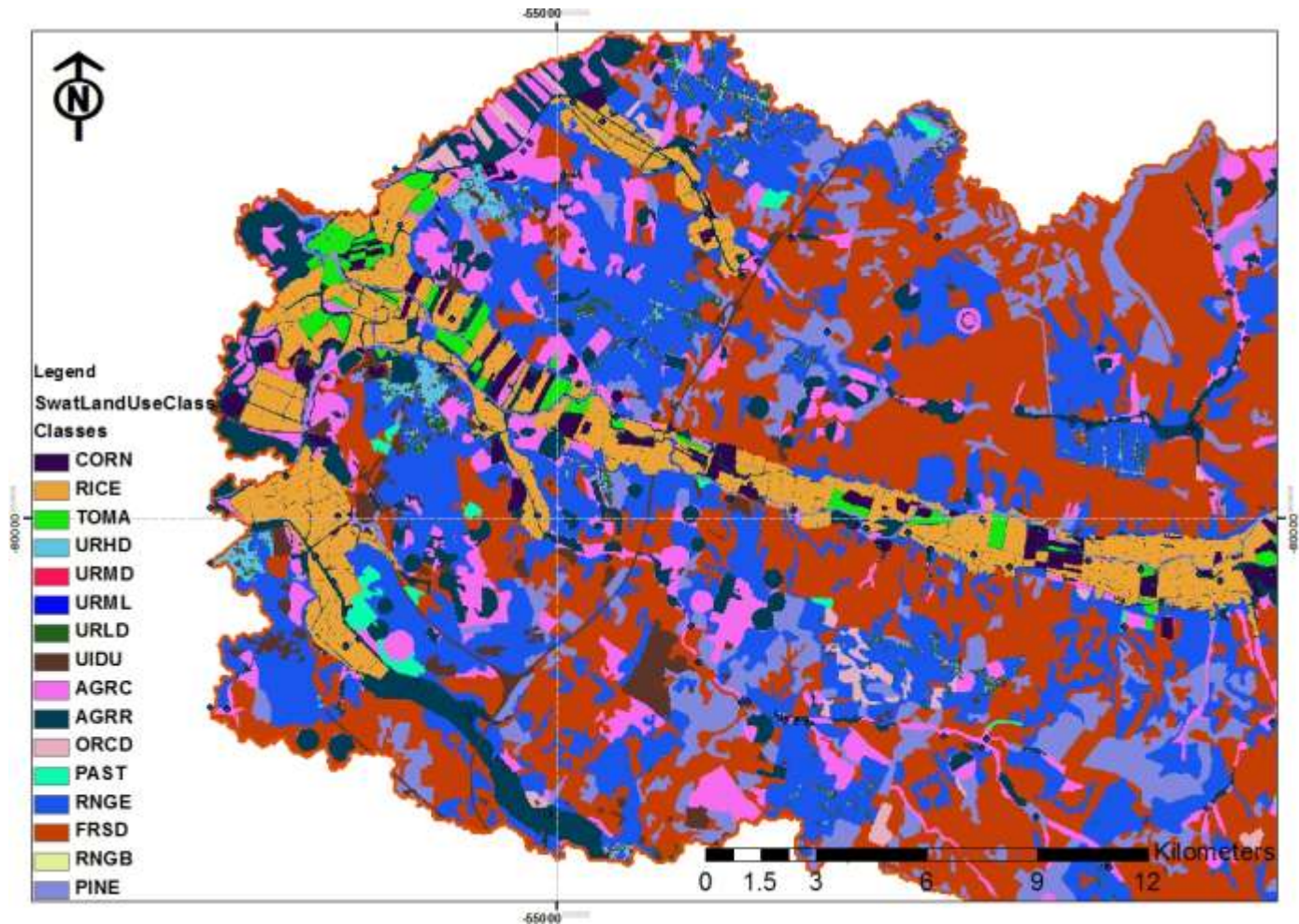
Model input

- Topography – SRTM – 22 m



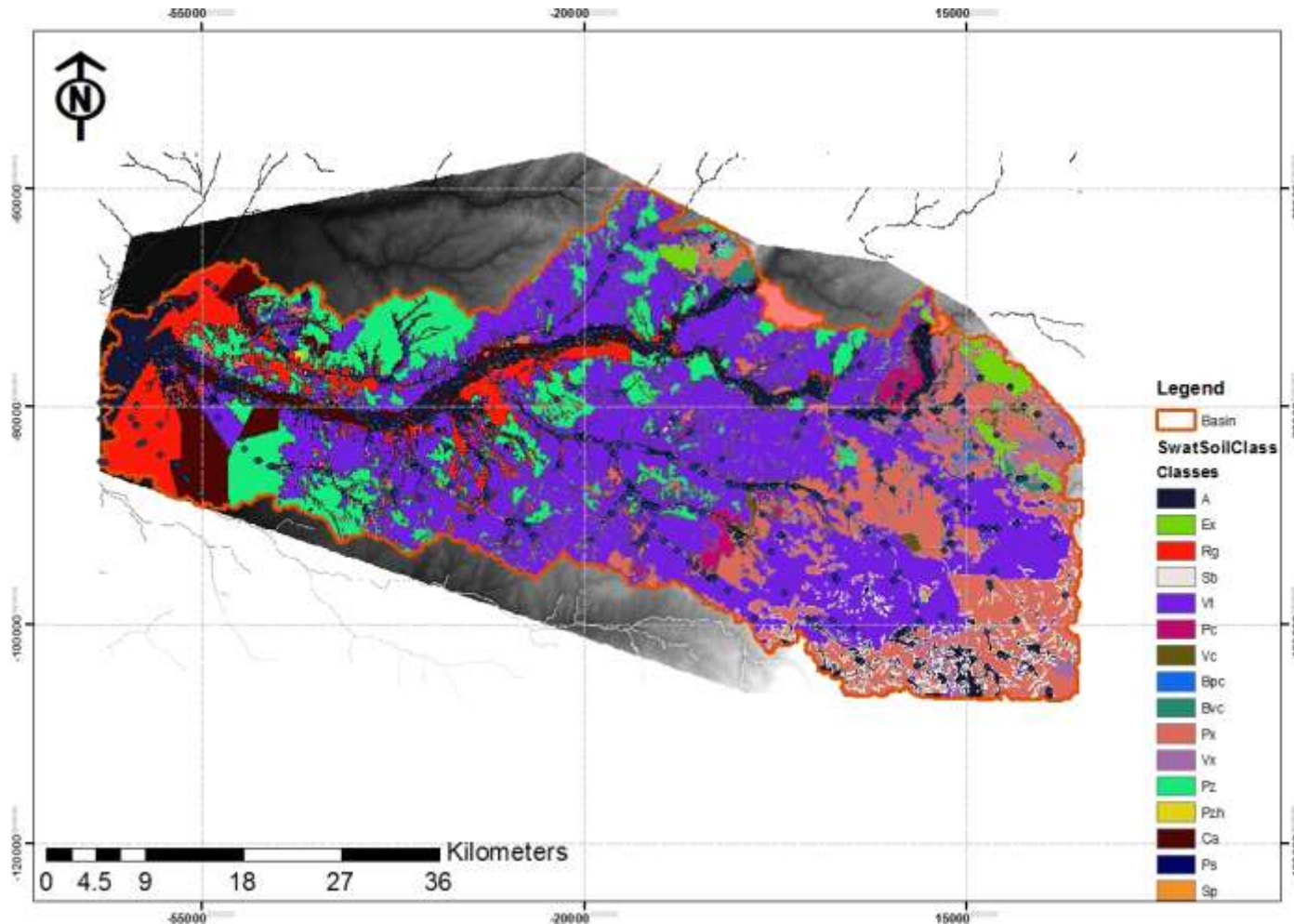
Model input

- **Land use:** data from land use of 2006 with detailed farmers map



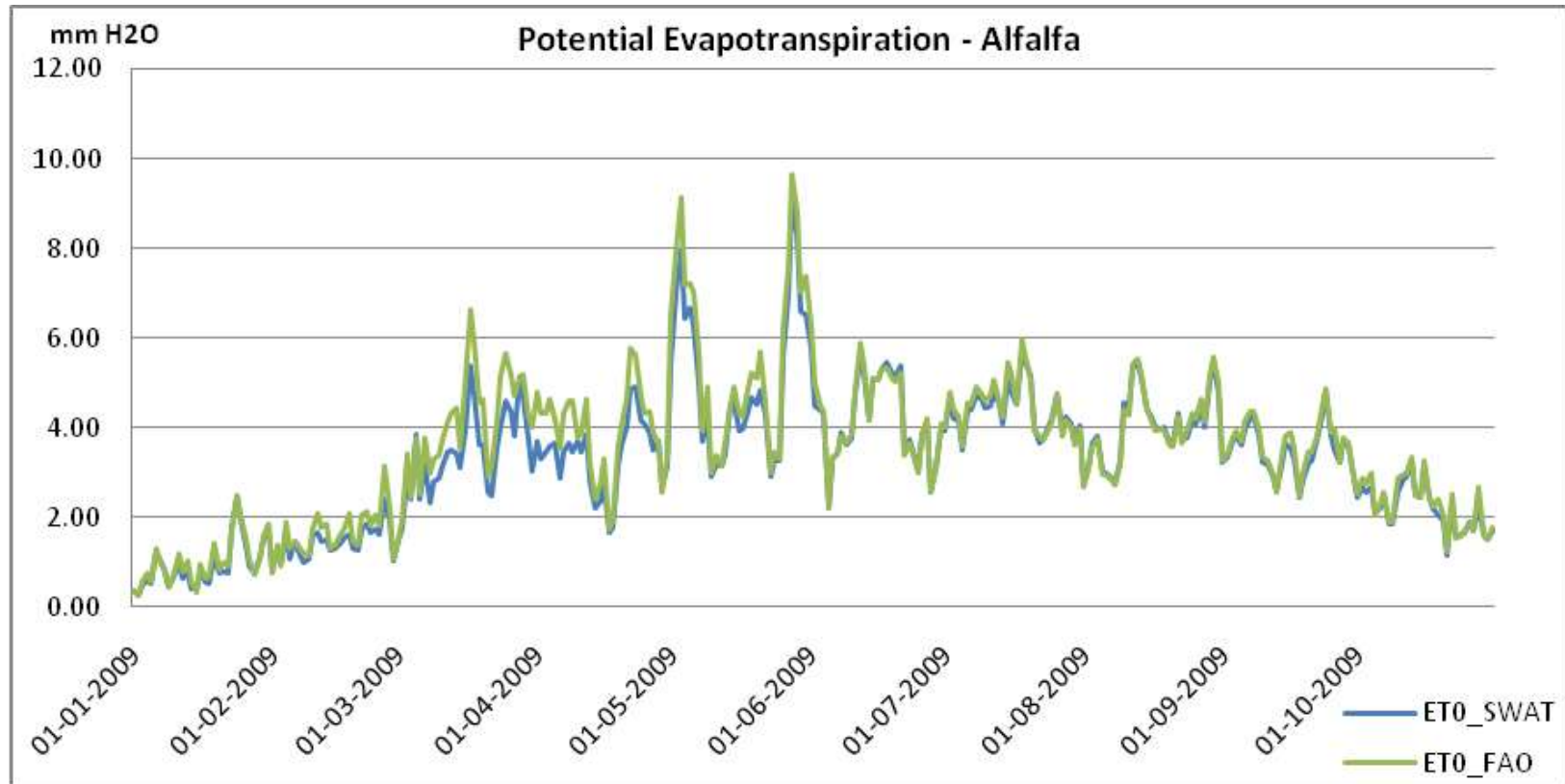
Model input

- Portuguese soil map (1 : 25 000)



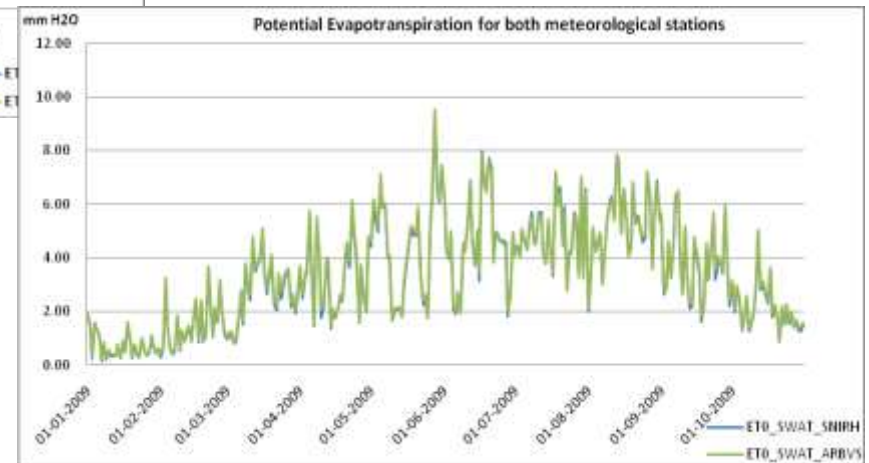
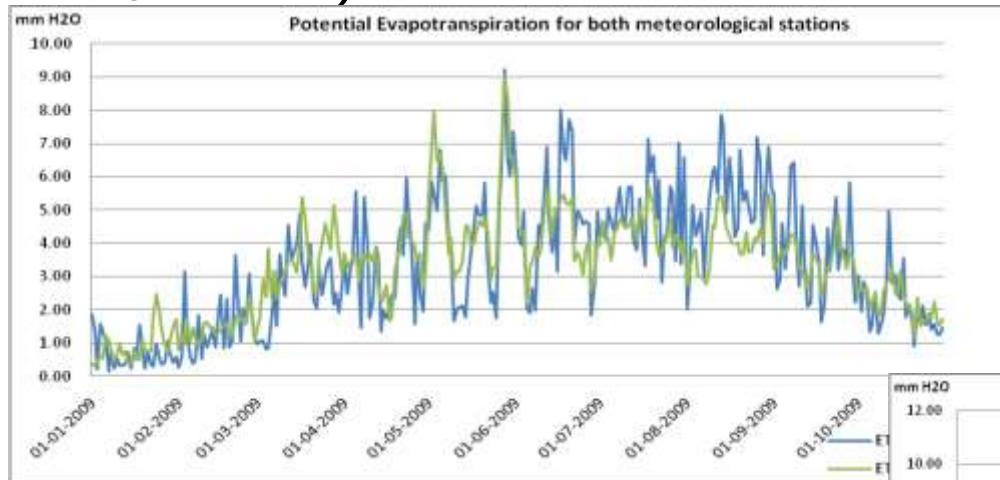
Evaluation of ET₀ (Alfalfa)

- SWAT ET₀ results compared with standard FAO56



Different meteorological stations

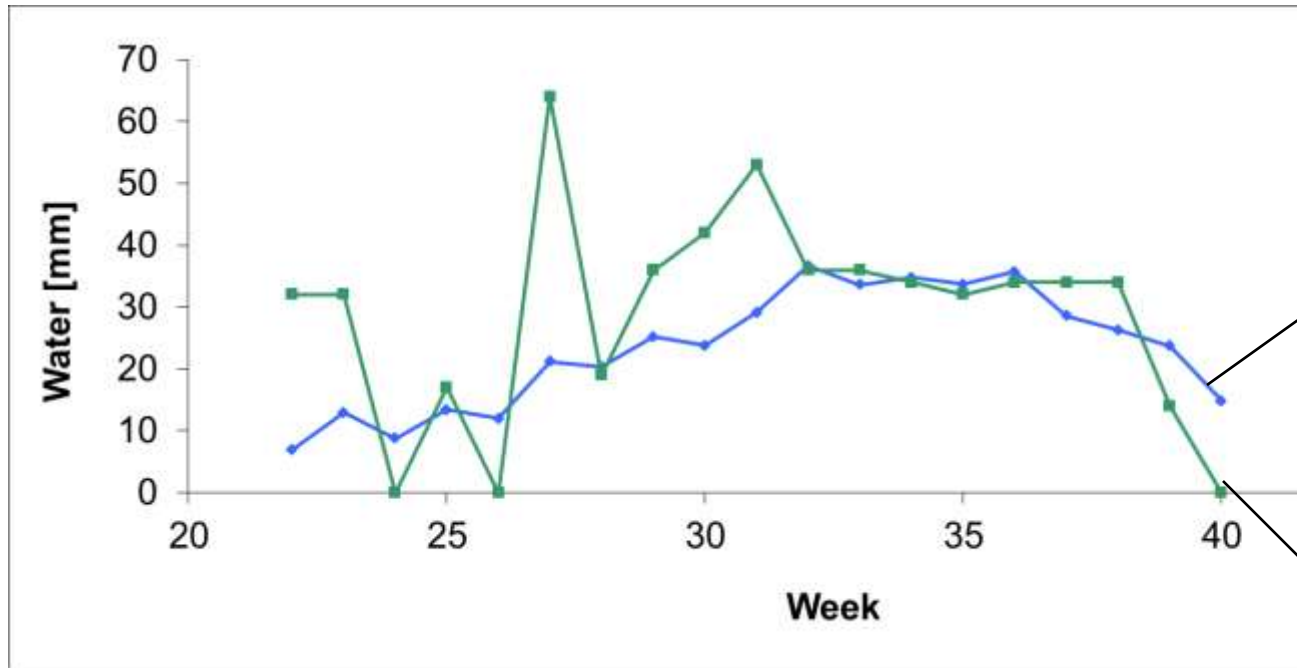
- Impact of using different meteorological stations on ETo (Paul de Magos – ARBVS and Baragem de Magos – SNIRH)



Evaluation of forecast

Week	Initial Date	Next Week (model forecasts)	Previous Week (user estimations)	Difference	% of Difference
1	19-07-2010	30	38	-3	-8%
2	26-07-2010	41	60	13	22%
3	02-08-2010	47	50	-2	-4%
4	09-08-2010	52	51	8	16%
5	16-08-2010	43	32	-1	-3%
6	23-08-2010	33	31	1	3%
7	30-08-2010	30	36	-2	-6%
8	06-09-2010	38	24	-5	-21%
9	13-09-2010	29	25	-1	-4%
10	20-09-2010	26	15	-6	-40%
11	27-09-2010	21	14	-4	-29%
12	04-10-2010	18	8	3	38%
13	11-10-2010	5	6	-	-

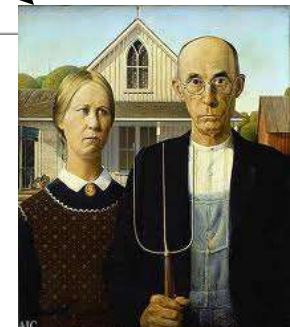
Irrigation vs Prediction



Prediction = 456 mm



Irrigation = 549 mm



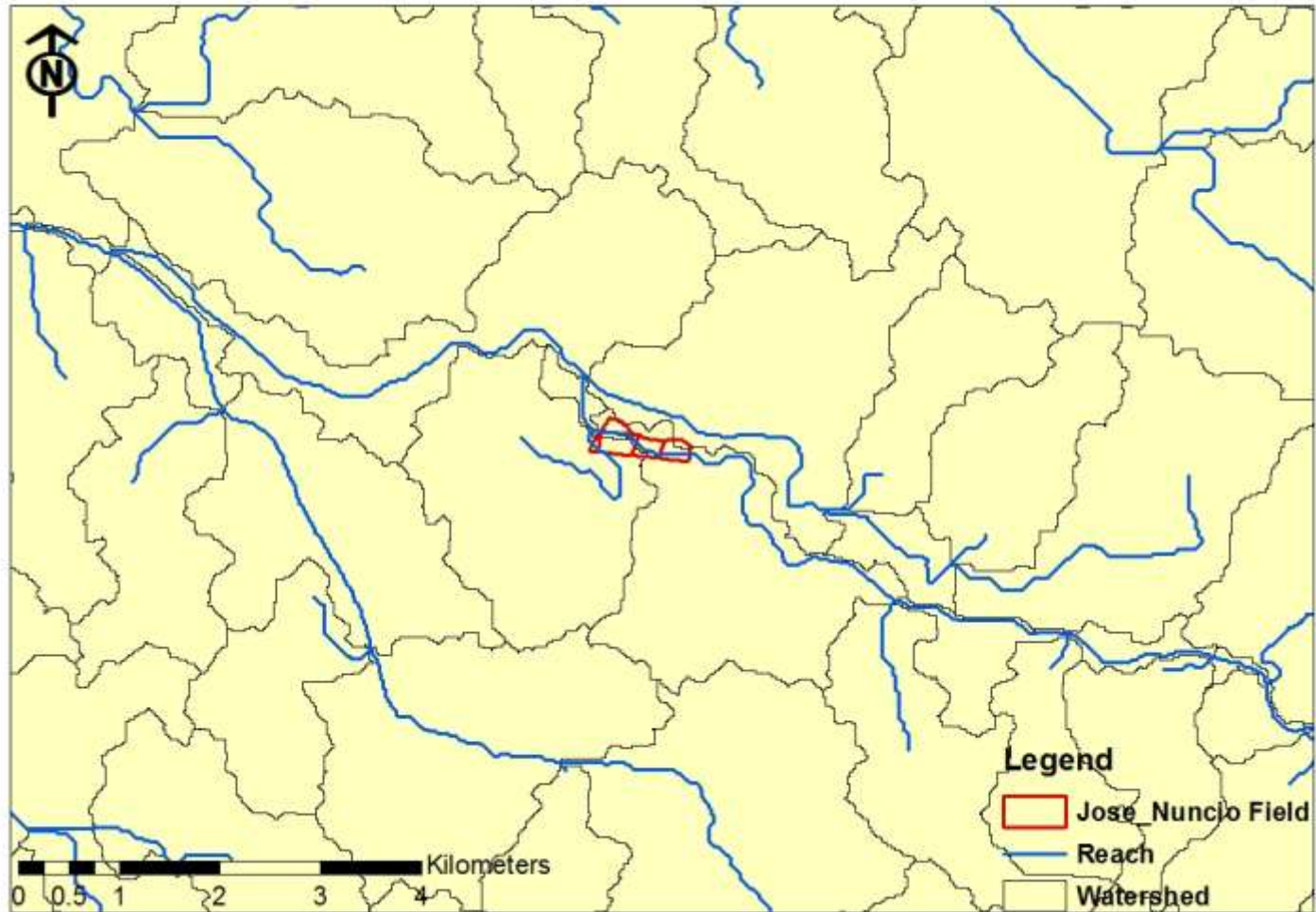
Conclusions



- Service to send SMS with the SWAT results was implemented and we got good feedback from users
- Estimations of actual evapotranspiration allow a reduction of 20% in irrigation water
- ETo from SWAT shows small difference from FAO56 equation

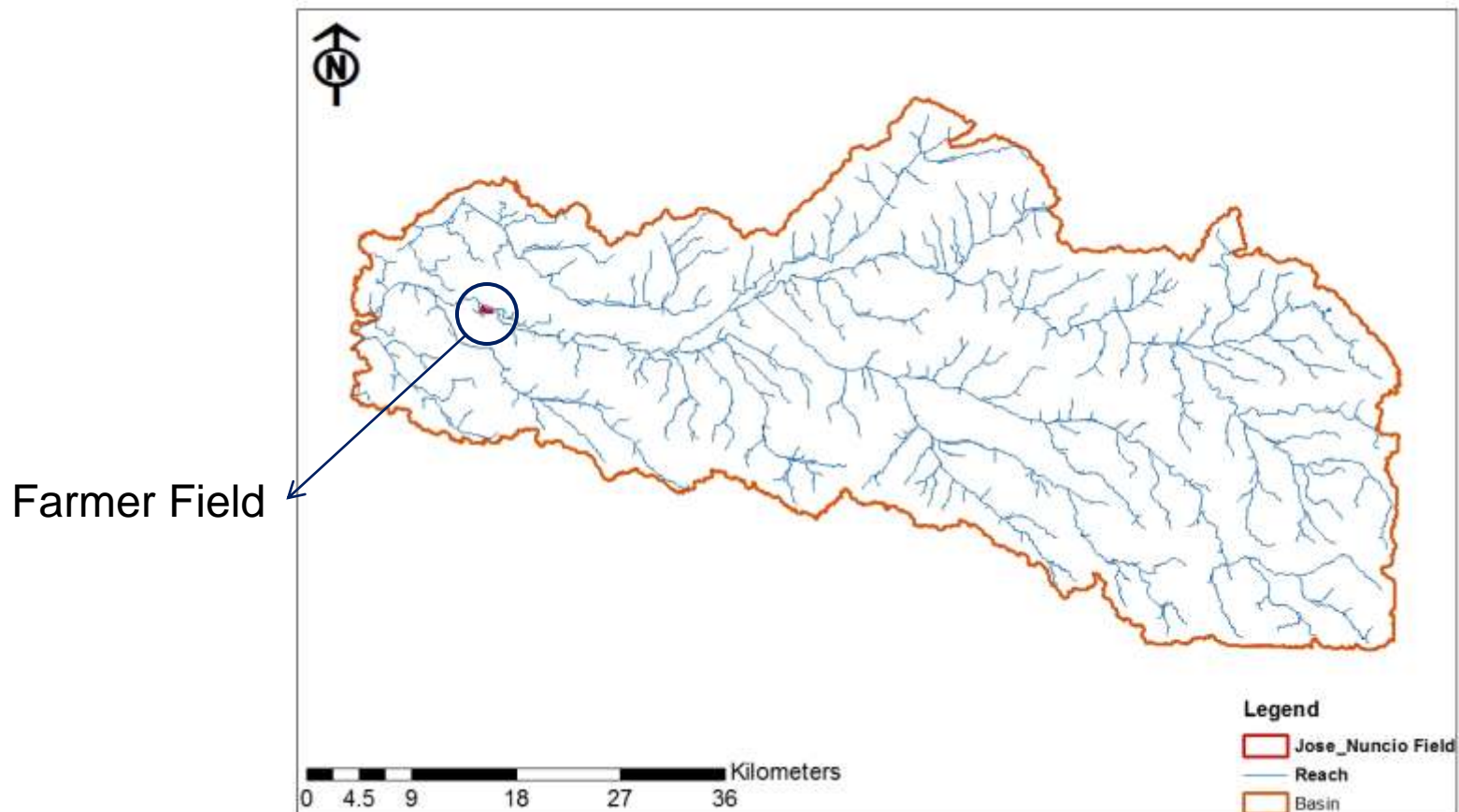
Sub basin example

- José Nuncio Farmer field – test user



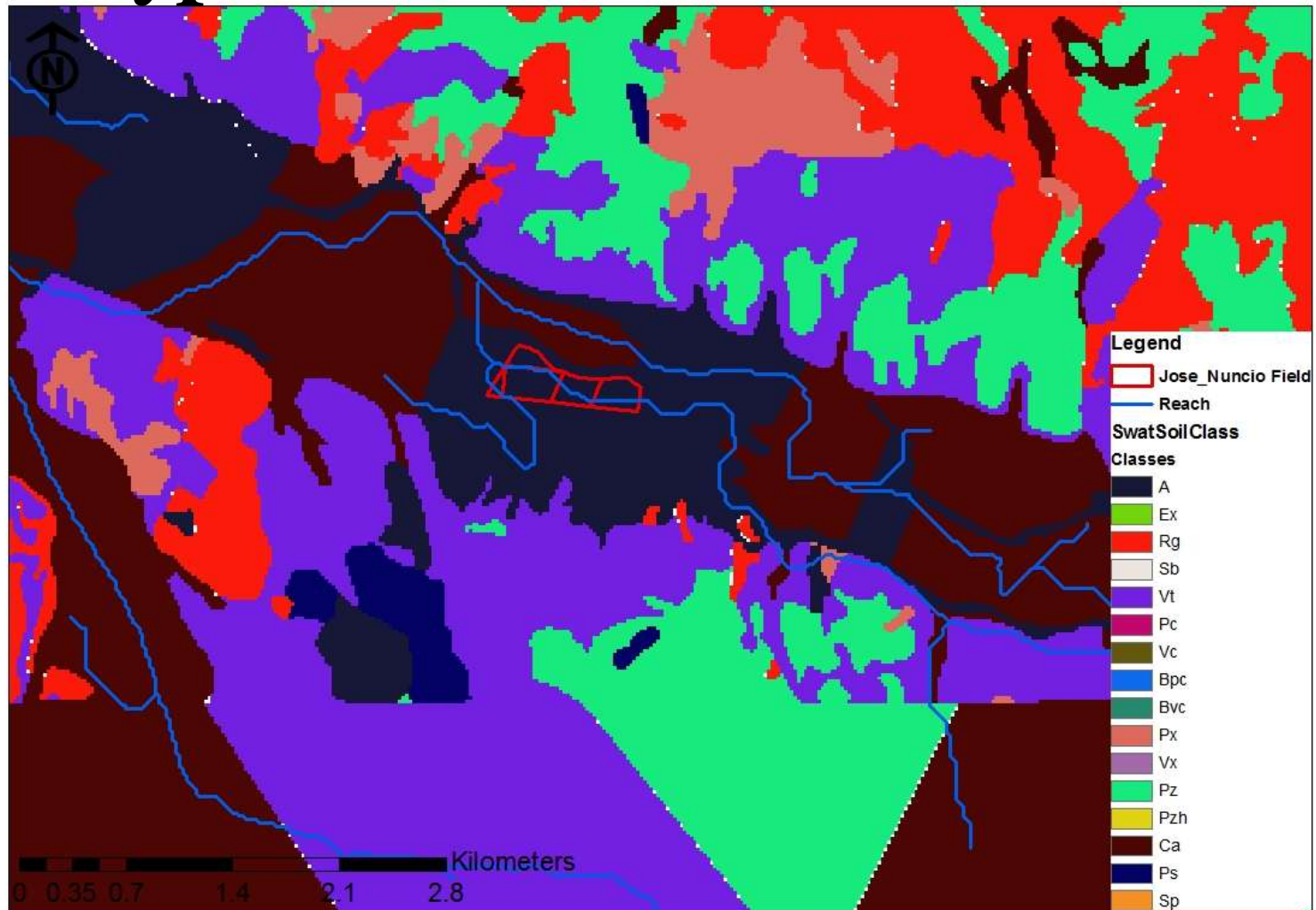
Sub basin example

- Location of José Nuncio field – farmer in Sorraia Valley



Sub basin example

- **Soil Type : A** – Aluviosols with median texture



Sub basin example

- Land use: Corn

