HYDROLOGICAL RESPONSE OF A MOUNTAINOUS CATCHMENT TO DIFFERENT CLIMATE SCENARIOS

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Objective

Model Sali-Dulce catchment using SWAT as tool

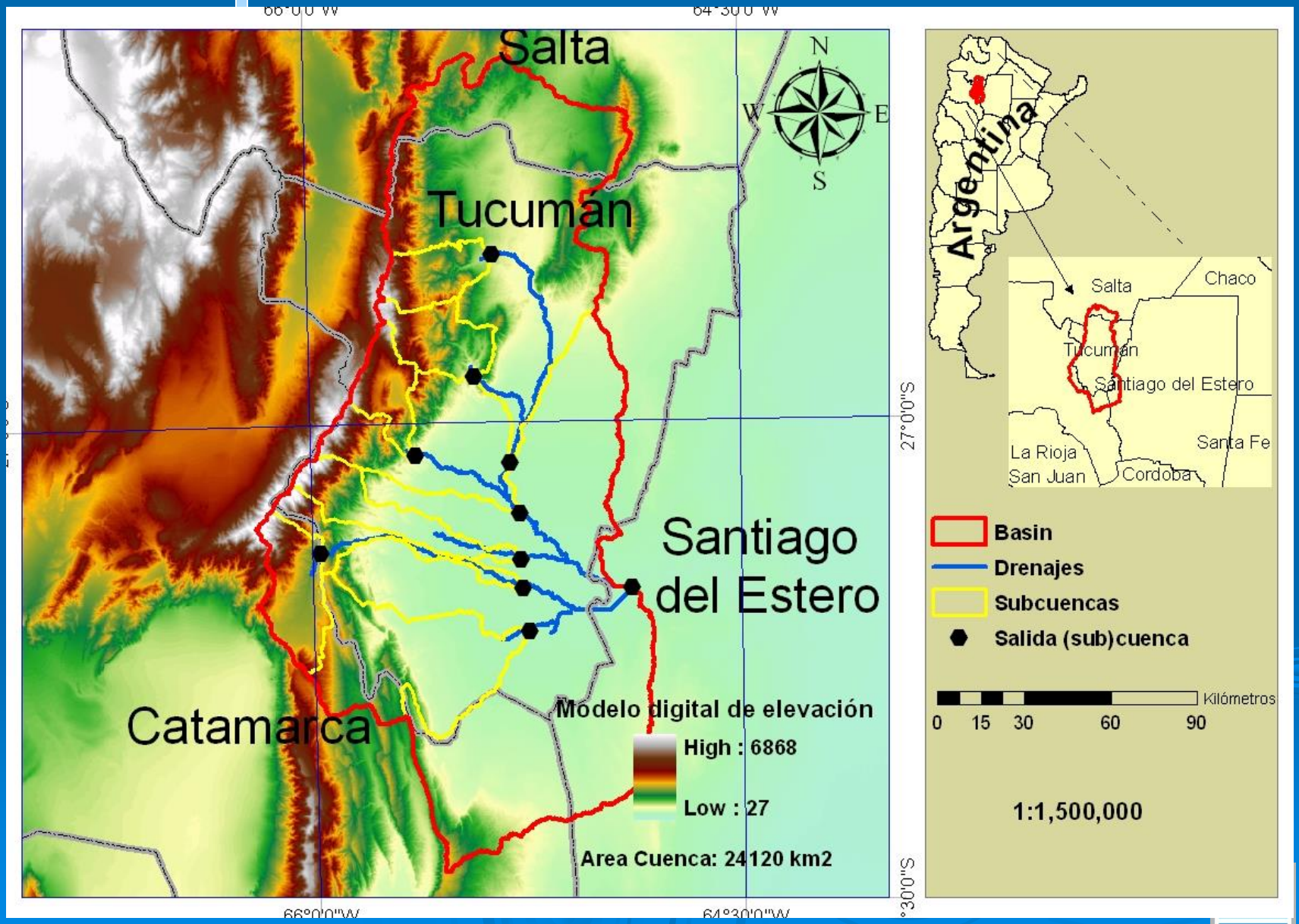
Specific objectives:

- Adaptation of input parameters to local conditions
- Calibration and validation of model
- Generate climate scenarios for water management

Methodology

Input

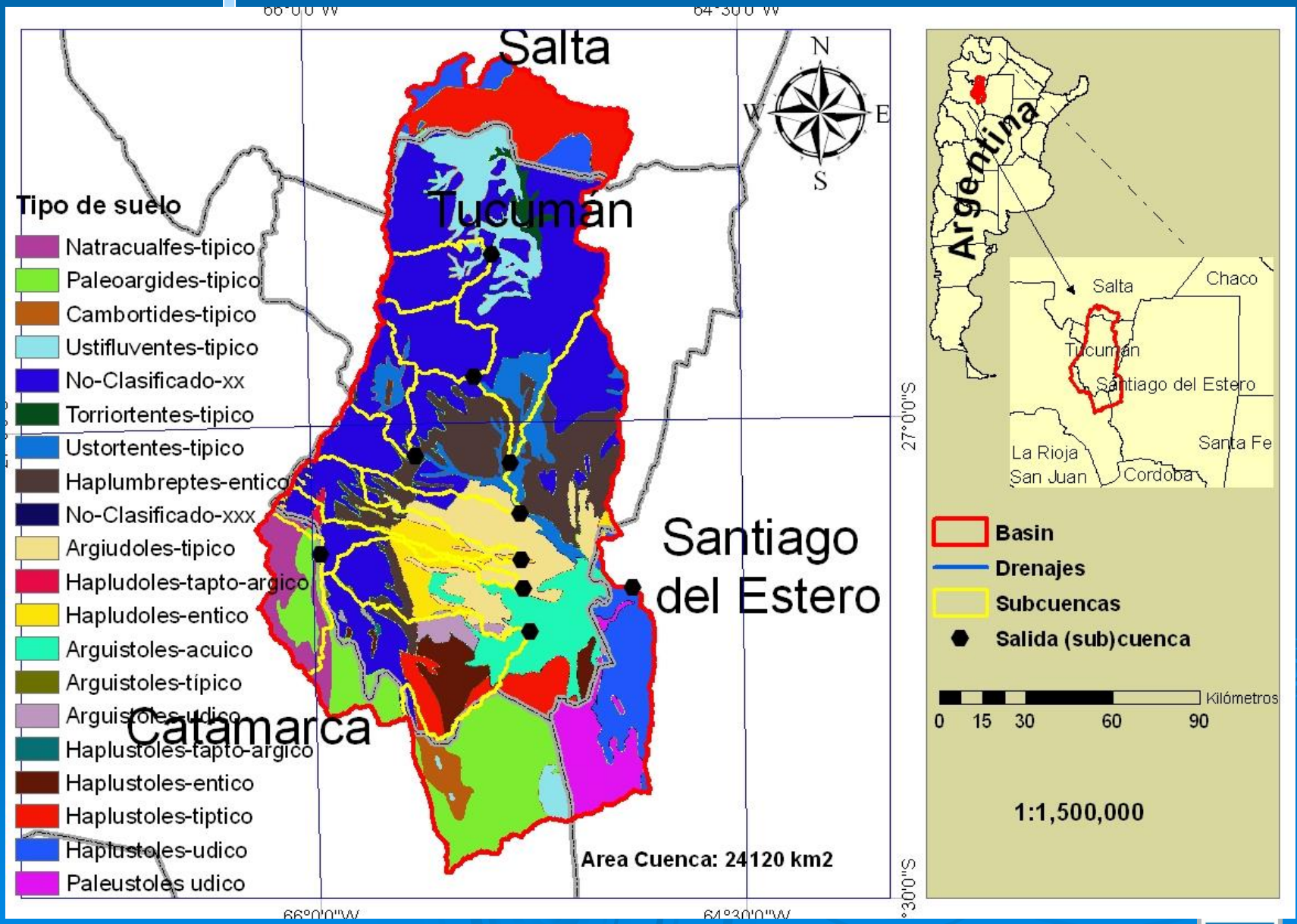
DEM

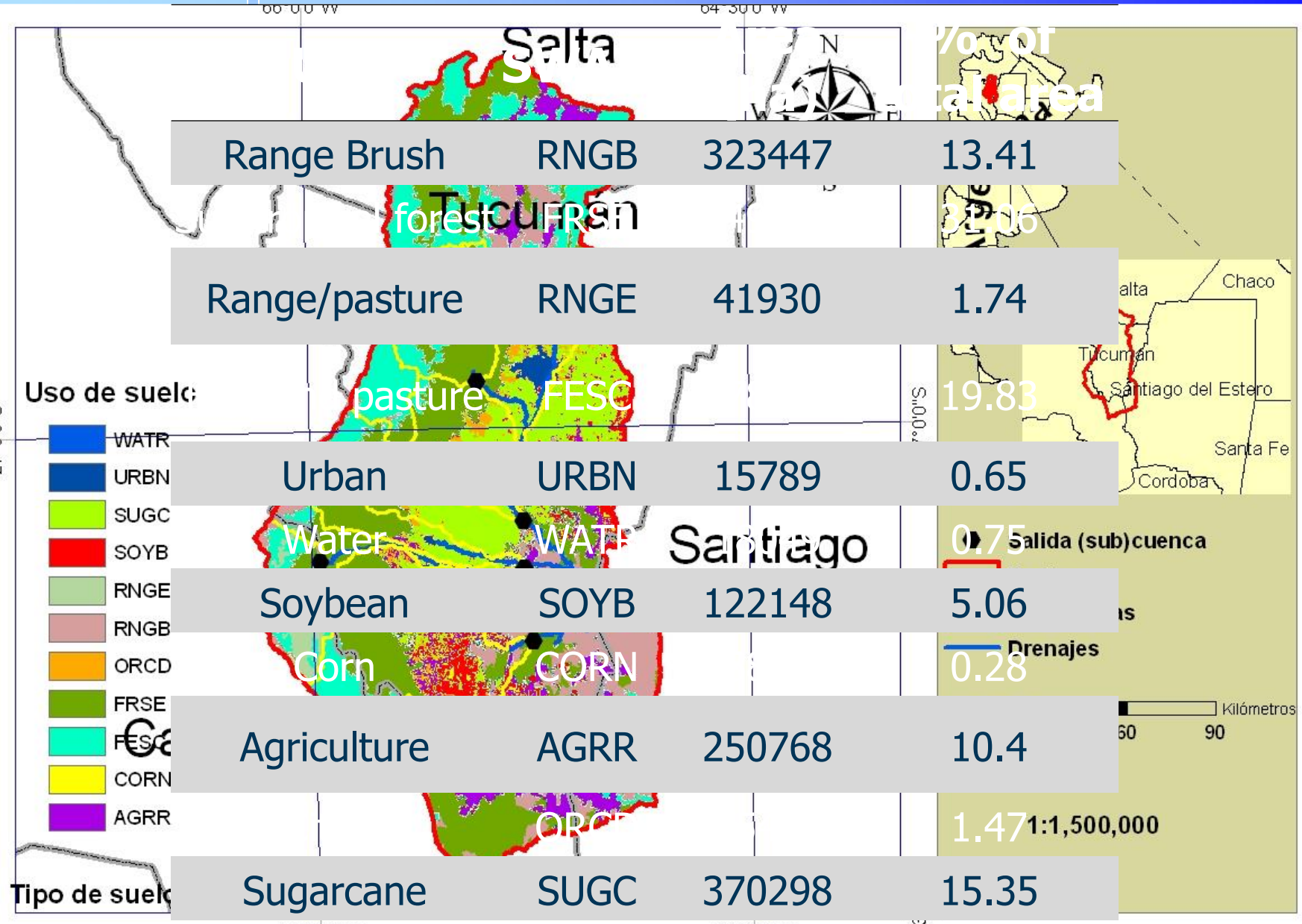


Methodology

Input

SOIL





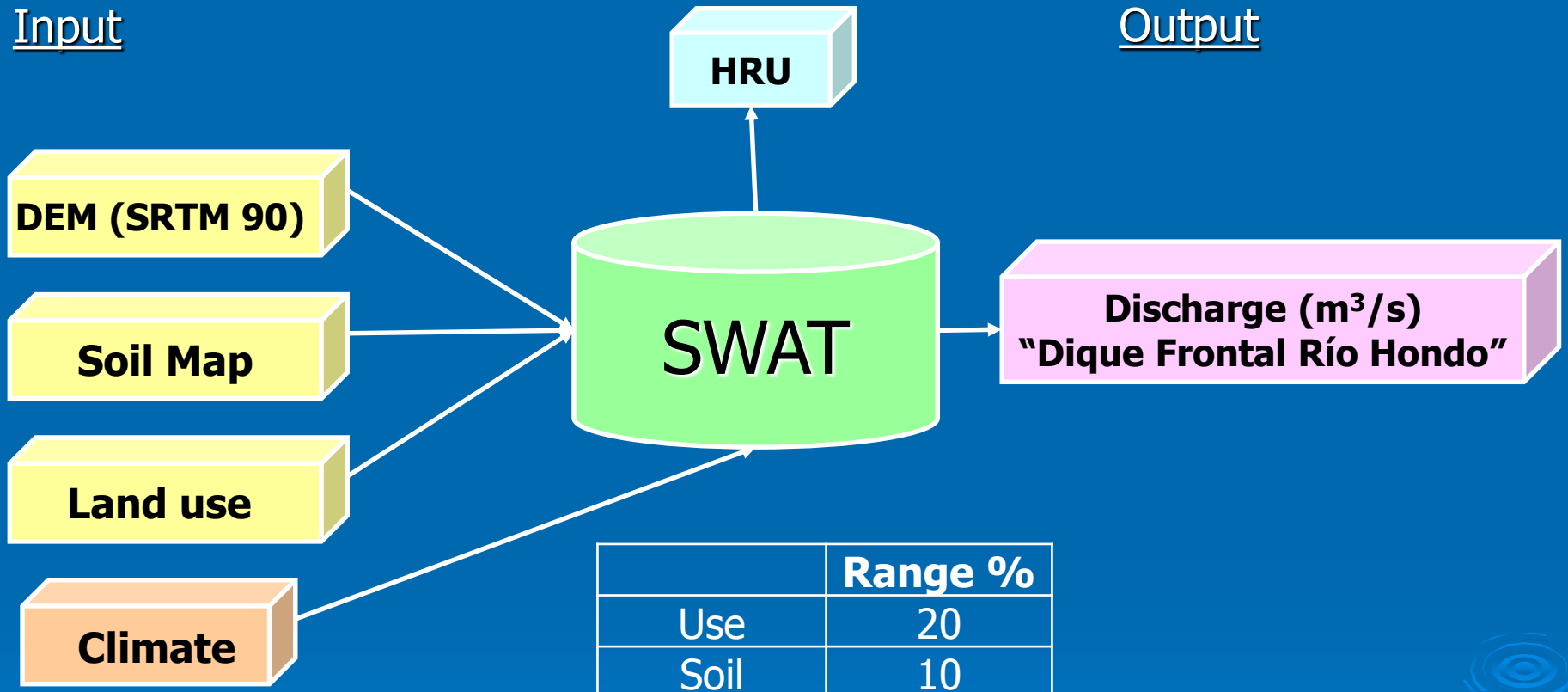
			% of total area
Range Brush	RNGB	323447	13.41
forest	FRSE		31.06
Range/pasture	RNGE	41930	1.74
pasture	FESC		19.83
Urban	URBN	15789	0.65
Water	WATR		0.75
Soybean	SOYB	122148	5.06
Corn	CORN		0.28
Agriculture	AGRR	250768	10.4
	ORCD		1.47
Sugarcane	SUGC	370298	15.35
		2412000	100

Methodology

SWAT model

Input

Output

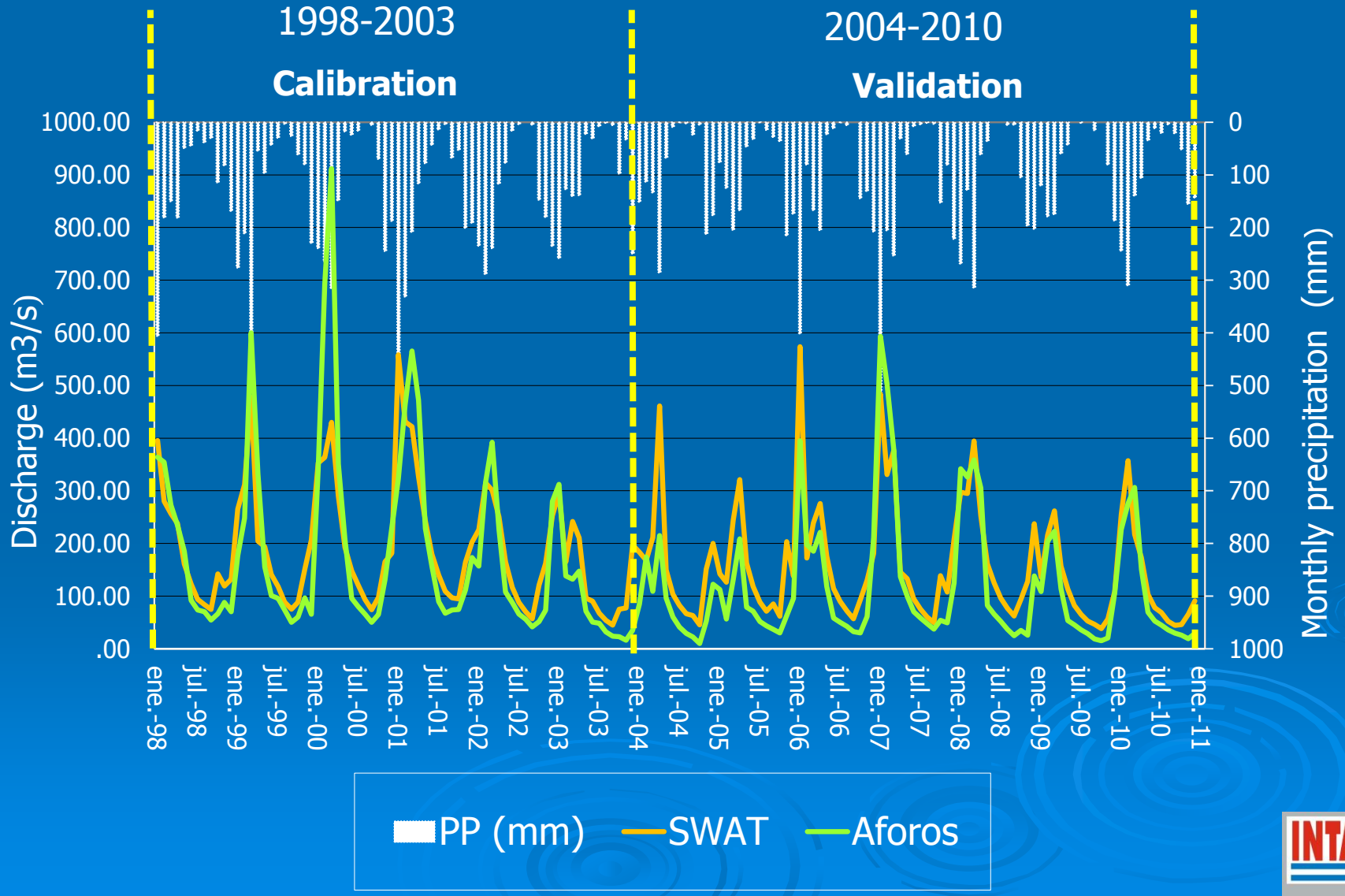


	Range %
Use	20
Soil	10
Slope	20

Proyection: Gauss Kruger
Sphere: Internacional 1909
Datum: WGS 84
Faja: 4 (central meridian -63º)

Soil and Water Assessment Tool
(Arnold et al., 1998)

Calibration and validation graph



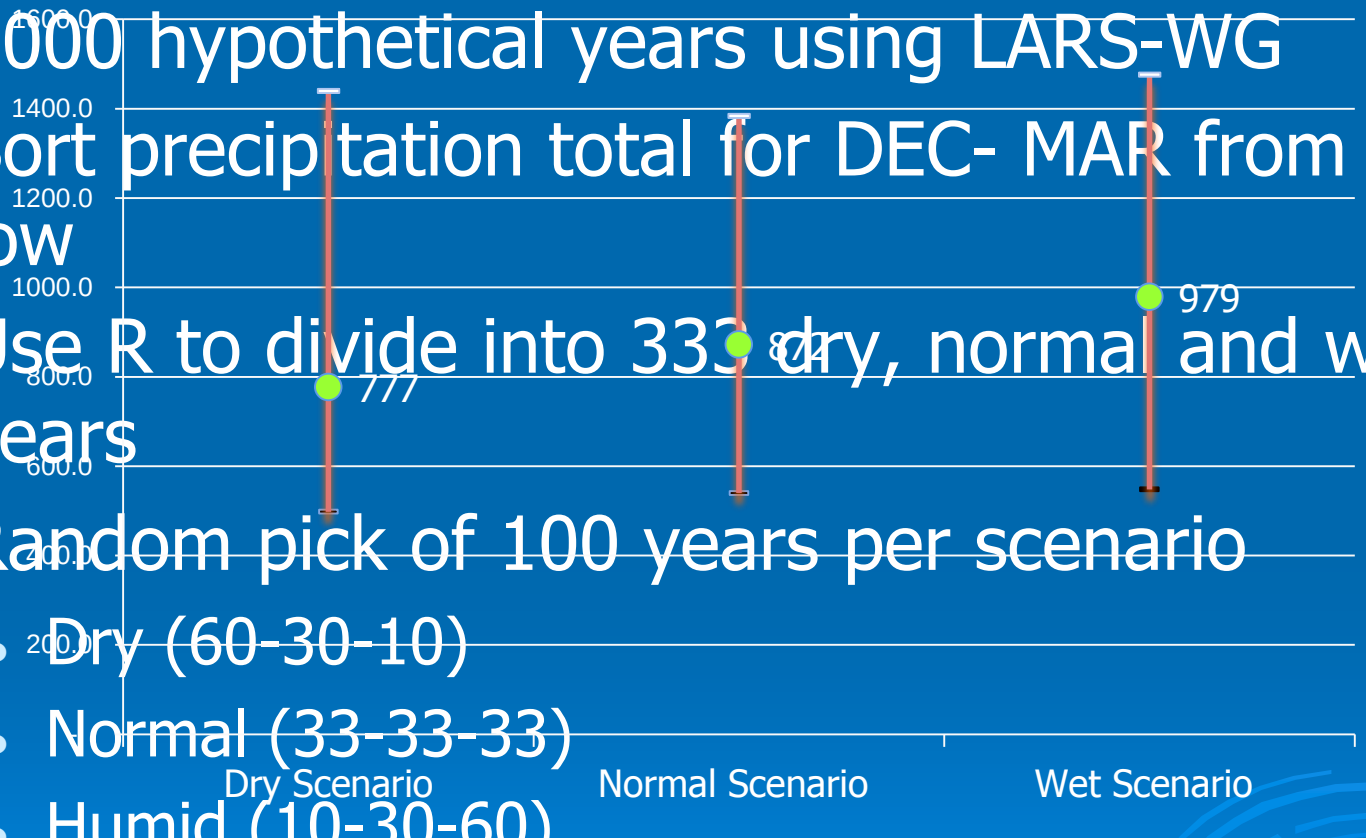
Calibration and validation results for Rio Hondo Dam

Parameter	Description	Scale
AWC_SOL	Available water capacity of the soil layer	1
BLAI	Max leaf area index	5
GWQMN	Threshold depth of water in the shallow aquifer required for return flow to occur	3
CN2	SCS runoff curve number	2
RCHRG_DP	Deep aquifer percolation fraction	4

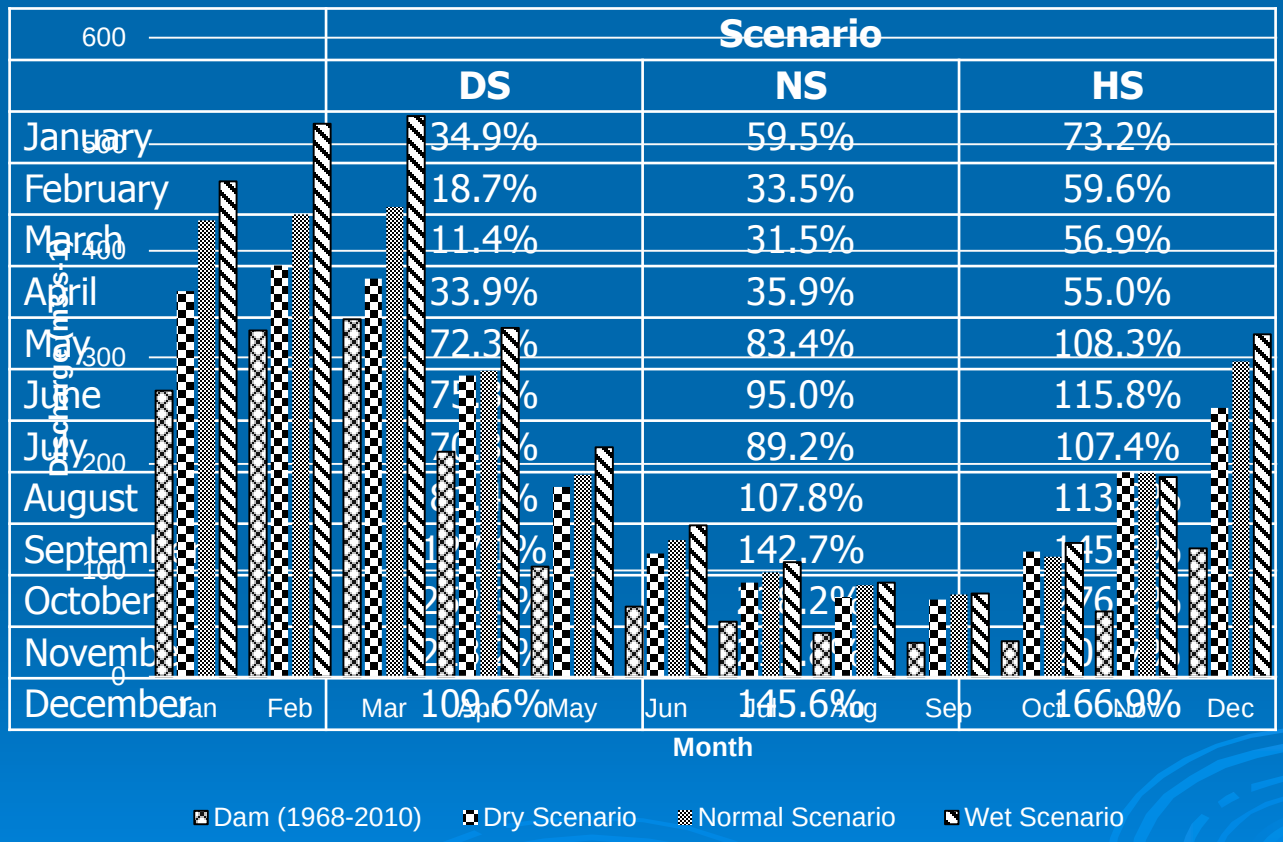
	Calibration	Validation
	1998-2003	**2004-2010**
Average measured discharge Río Hondo ($m^3.s^{-1}$)	179.0	116.4
Average modelled discharge($m^3.s^{-1}$)	189.3	156.3
Nash y Sutcliffe coefficient (NS)	0.69	0.74
R^2	0.74	0.79
RMSE ($m^3.s^{-1}$)	94.3	67.1

Climate Scenarios

- 1000 hypothetical years using LARS-WG
- Sort precipitation total for DEC- MAR from high low
- Use R to divide into 333 dry, normal and wet years
- Random pick of 100 years per scenario
  - Dry (60-30-10)
  - Normal (33-33-33)
  - Humid (10-30-60)



Future climate scenarios



	Scenario		
	DS	NS	HS
January	34.9%	59.5%	73.2%
February	18.7%	33.5%	59.6%
March	11.4%	31.5%	56.9%
April	33.9%	35.9%	55.0%
May	72.3%	83.4%	108.3%
June	75%	95.0%	115.8%
July	70%	89.2%	107.4%
August	%	107.8%	113%
Septem	%	142.7%	145%
October	2%	2%	76%
Novemb	2%		
December	109.6%	145.6%	166.9%

Conclusions and Discussion

- Local inputs for SWAT
- Reasonable adjustment
- Discharge increase for every scenario
- Better adjustment of inputs increase of observation points
- Multidisciplinary water management

Thank you for your attention

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