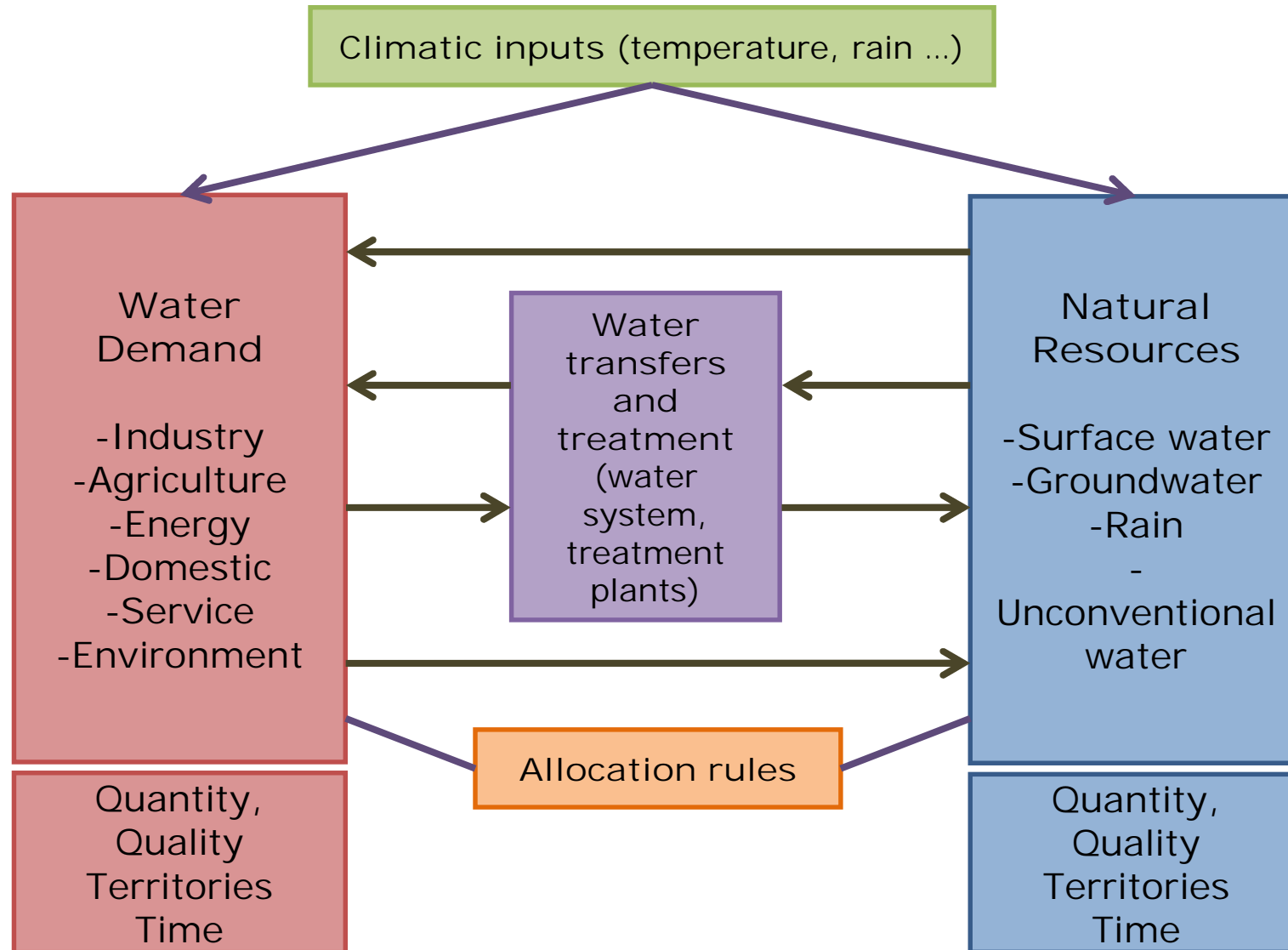


STRATEAU MODELING TOOL DEMANDS / RESOURCES

Nicolas HOUDANT

MODEL PRESENTATION STRATEAU

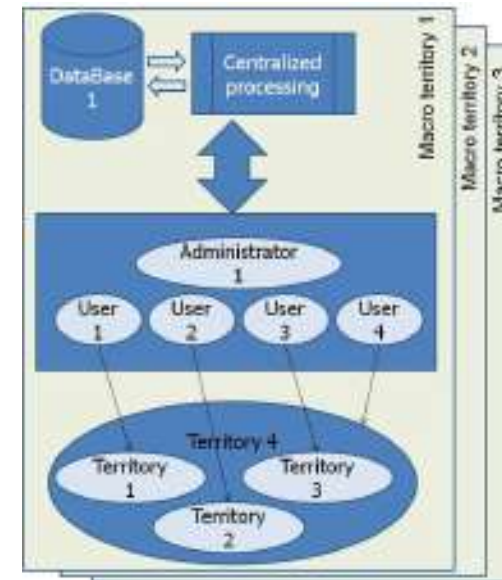
Model presentation
STRATEAU – Global diagram



Model presentation STRATEAU

4

- Centralized database
 - Homogeneity,
 - Coherence and validity
 - Web access and possible data updating
- Multiple « selected » users
 - By territory levels
 - By field of activities
 - By uses
- Outputs with several levels
 - Dashboards
 - Geographic representation (GIS)
 - Free informatic requests



Inputs

- Climatic inputs
 - Weather, temperature, precipitation, ...
- Major inputs
 - Demography
 - Industrial and agricultural productions
 - Surfaces and service sector employment
- Resource inputs
 - Groundwater
 - Surface water

Outputs

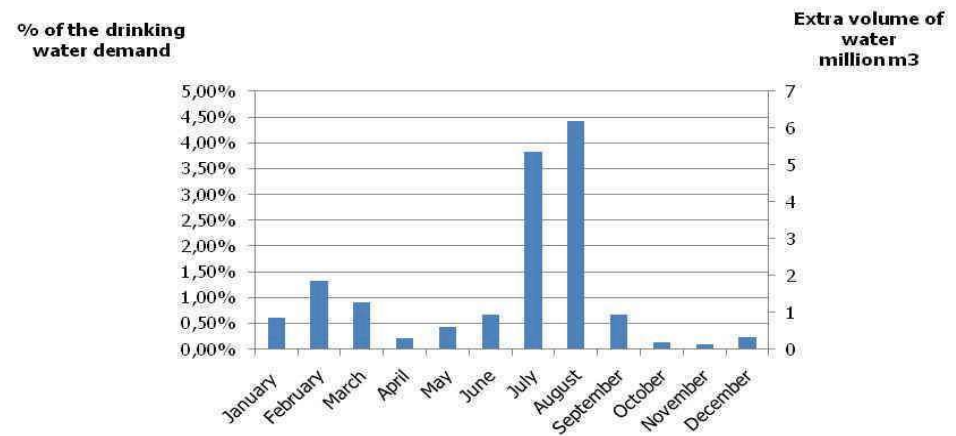
- Demand
 - By sector, field and use
 - Time distribution from monthes to standard days
 - Space distribution until villages
- Ground water and surface water
 - Space distribution
 - To the groundwater entity for the aquifers
 - To the village for the surface waters
 - Monthly distribution

Available outputs

- Strategic
 - Economic structure
 - Agricultural policy
 - Territory management policy
 - Water quality management
- Technologic
 - Efficiency improvement
 - Dissemination of effecient techno
 - Water resources facilities
- Inputs sensitivity
 - Evolution of the land use
 - Demographic trends, tourism
 - Temperature, rainfall changes

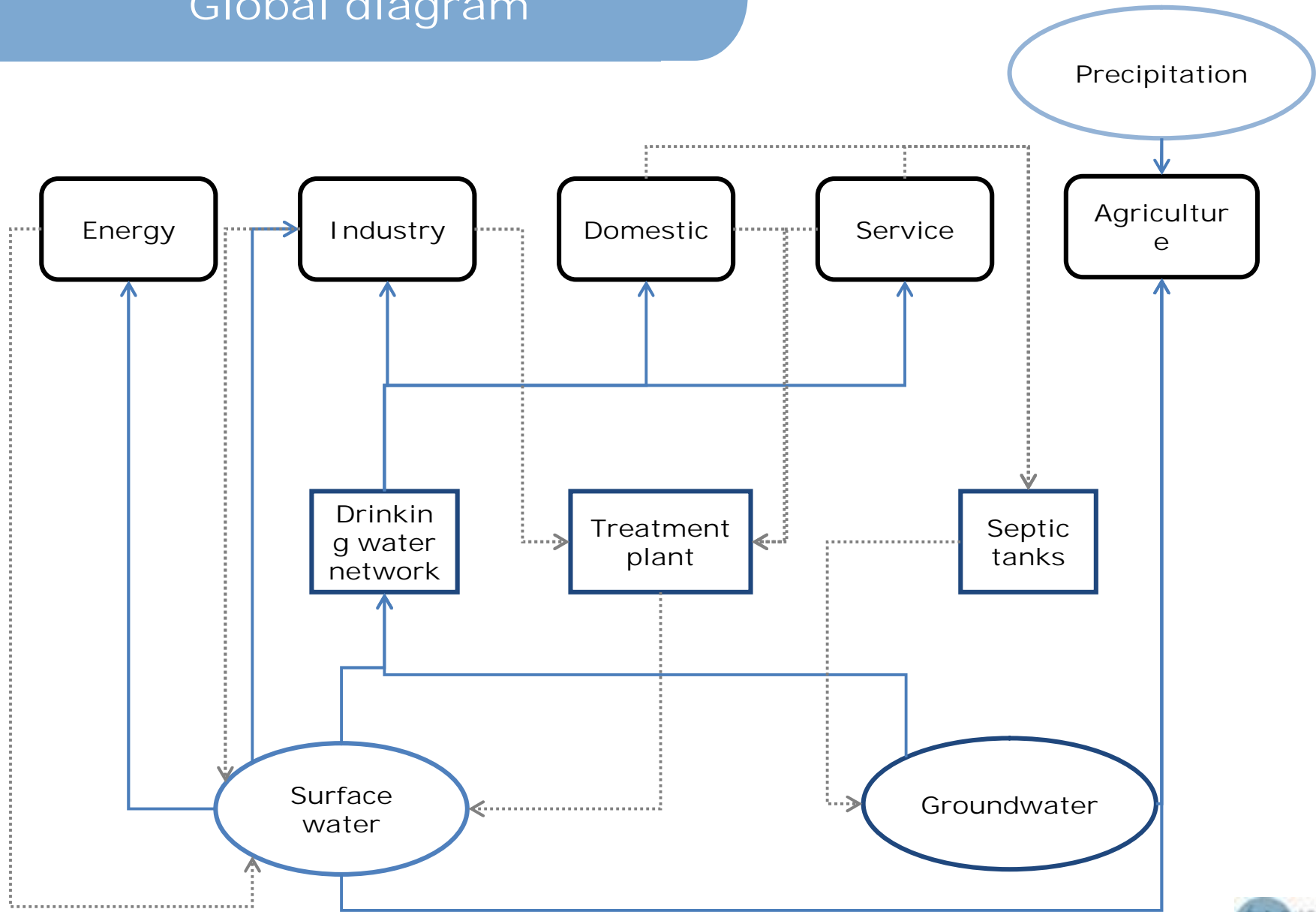


Repartition of the extra demand of water for tourism

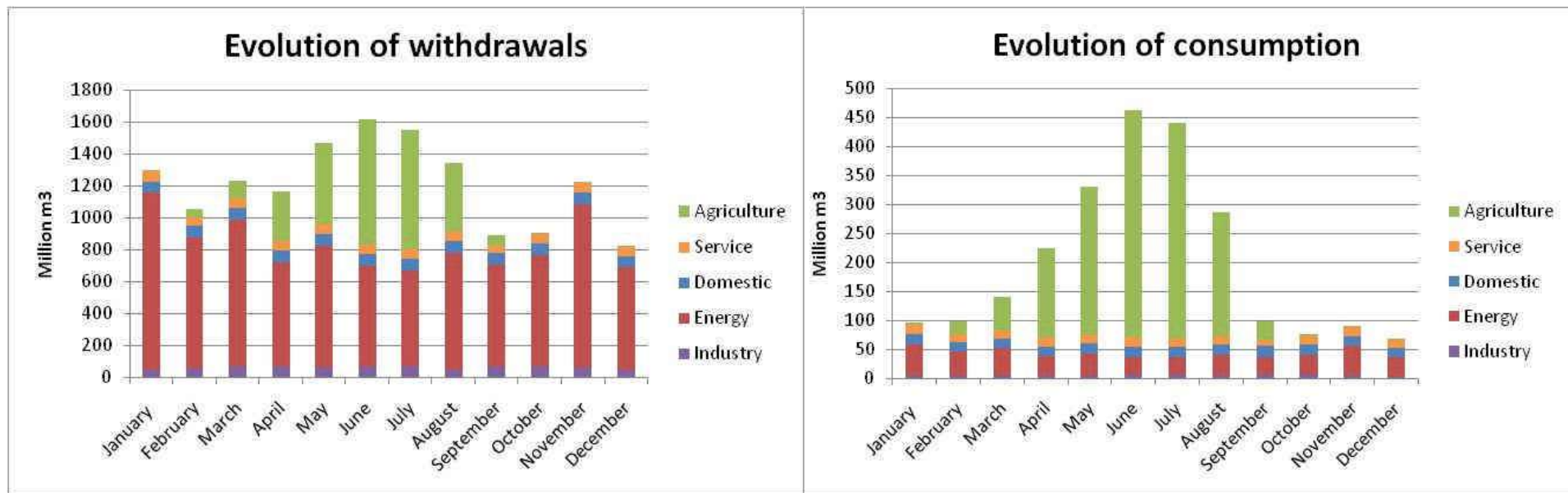


ILLUSTRATIONS

Global diagram

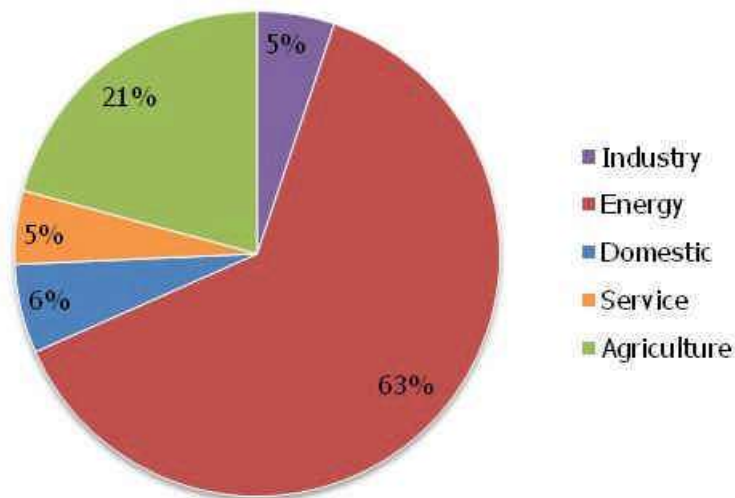


- Monthly distribution through the year 2006

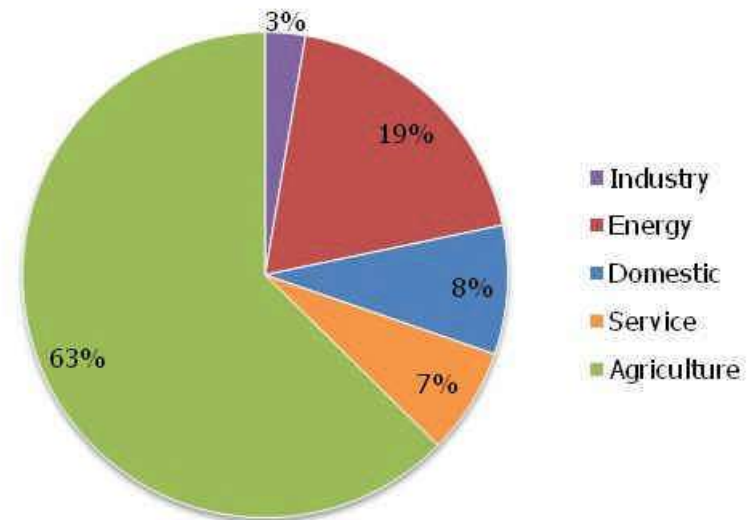


- Part of each sector in total withdrawals and total consumption

**Withdrawals:
14 598 million m³
in 1 year**



**Consumption:
2 423 million m³
in 1 year**



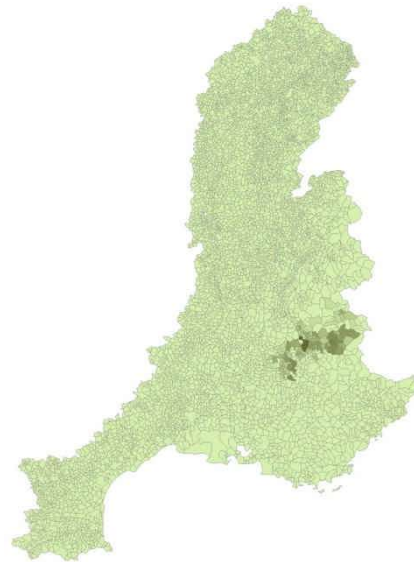
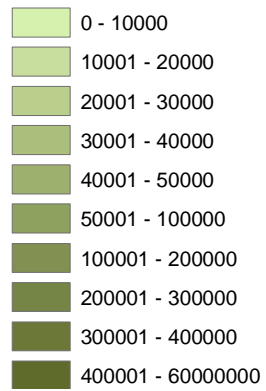
Agricultural water demand

January 2006

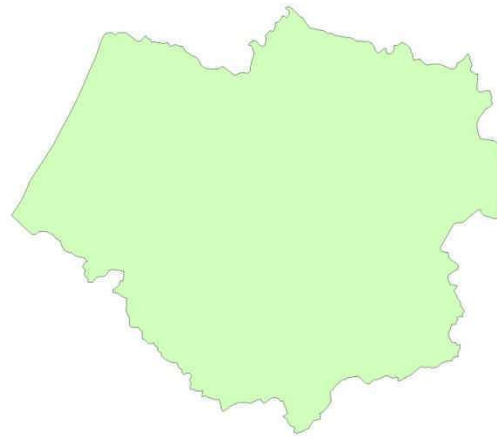
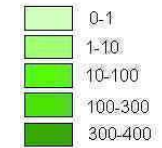
RMC Watershed

Sebou Watershed

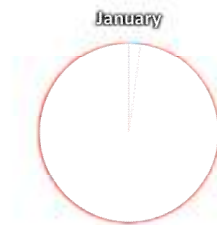
Evolution of agricultural water demand (m3)



Evolution of agricultural water demand (million m3)



- Irrigation
- Precipitation



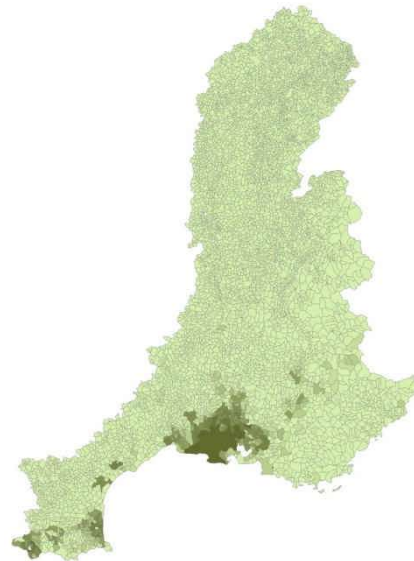
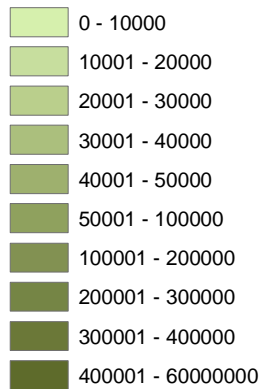
Agricultural water demand

February 2006

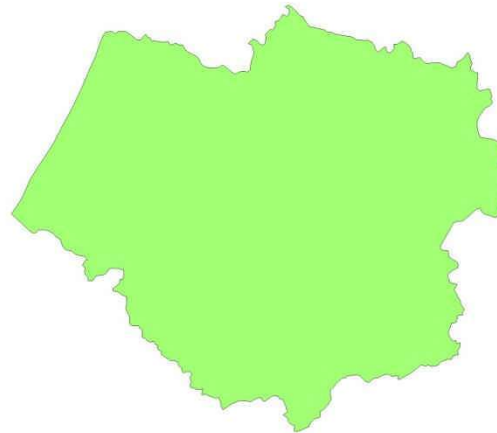
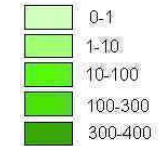
RMC Watershed

Sebou Watershed

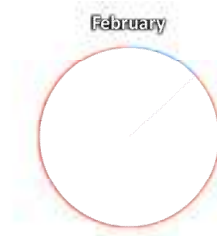
Evolution of agricultural water demand (m3)



Evolution of agricultural water demand (million m3)



- Irrigation
- Precipitation



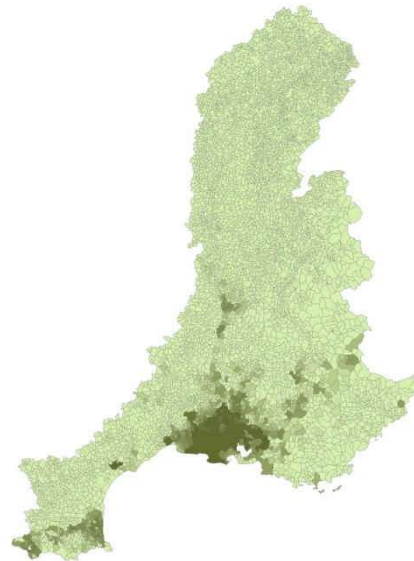
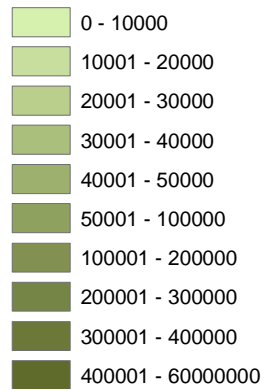
Agricultural water demand

March 2006

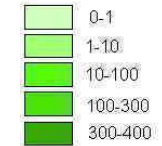
RMC Watershed

Sebou Watershed

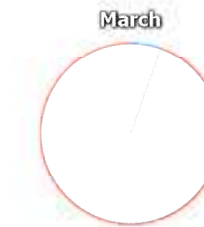
Evolution of agricultural water demand (m3)



Evolution of agricultural water demand (million m3)



■ Irrigation
■ Precipitation



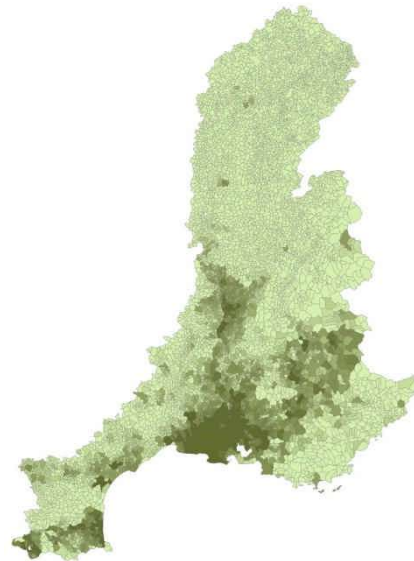
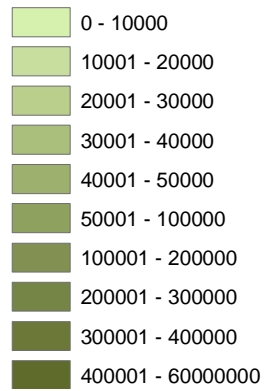
Agricultural water demand

April 2006

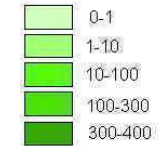
RMC Watershed

Sebou Watershed

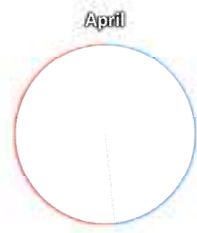
Evolution of agricultural water demand (m3)



Evolution of agricultural water demand (million m3)



- Irrigation
- Precipitation



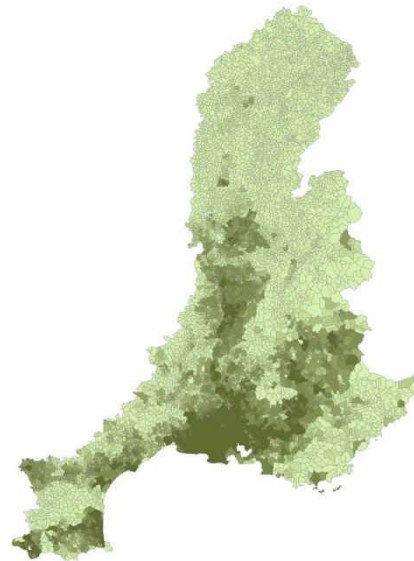
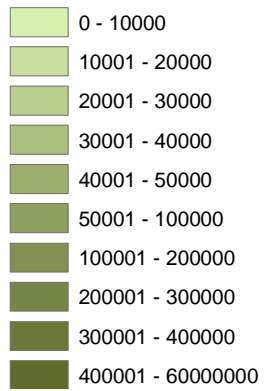
Agricultural water demand

May 2006

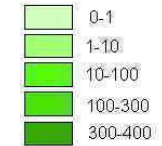
RMC Watershed

Sebou Watershed

Evolution of agricultural water demand (m3)



Evolution of agricultural water demand (million m3)



■ Irrigation
■ Precipitation



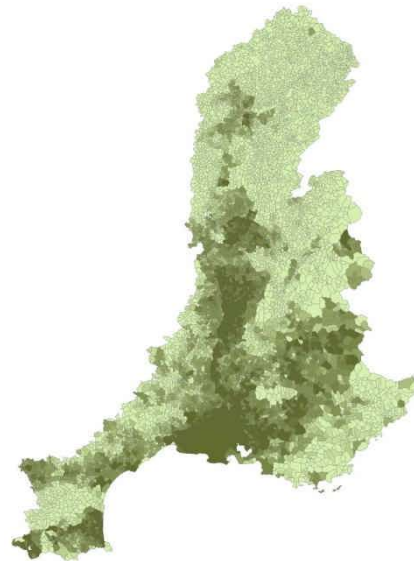
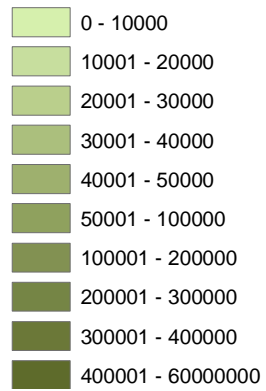
Agricultural water demand

June 2006

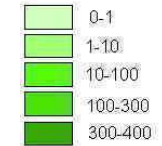
RMC Watershed

Sebou Watershed

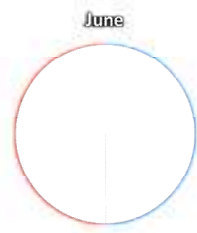
Evolution of agricultural water demand (m3)



Evolution of agricultural water demand (million m3)



■ Irrigation
■ Precipitation



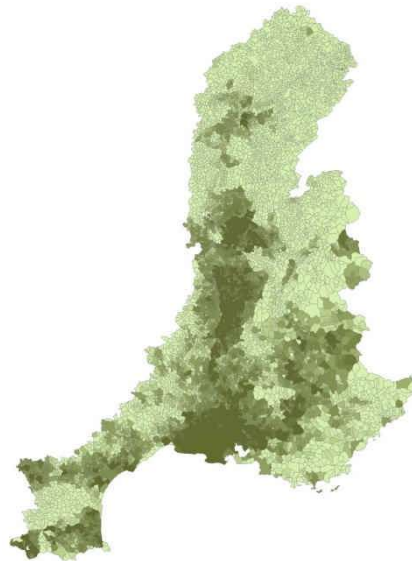
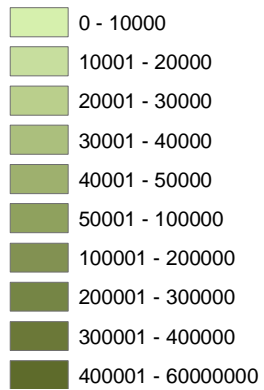
Agricultural water demand

July 2006

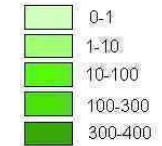
RMC Watershed

Sebou Watershed

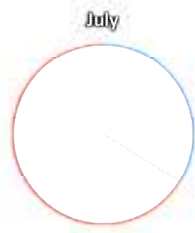
Evolution of agricultural water demand (m3)



Evolution of agricultural water demand (million m3)



- Irrigation
- Precipitation



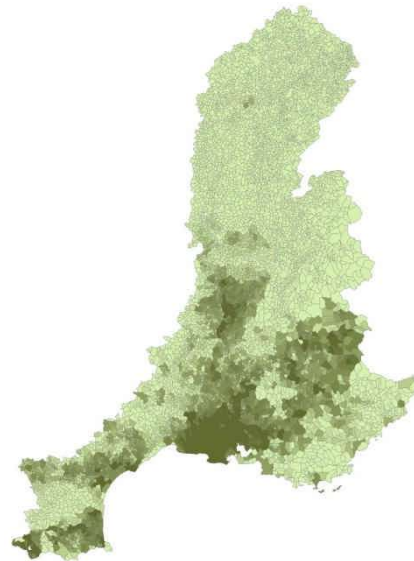
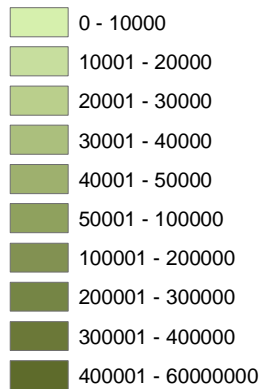
Agricultural water demand

August 2006

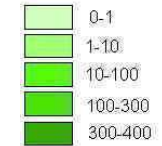
RMC Watershed

Sebou Watershed

Evolution of agricultural water demand (m3)



Evolution of agricultural water demand (million m3)



- Irrigation
- Precipitation



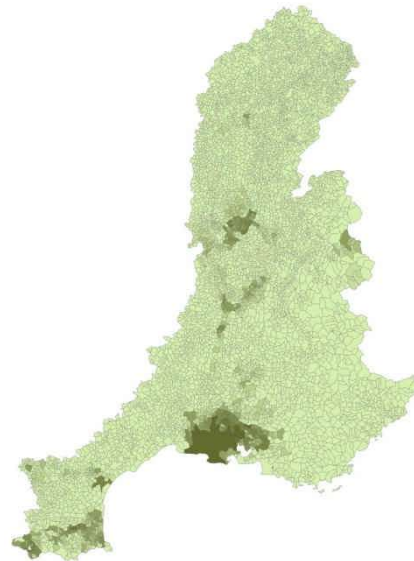
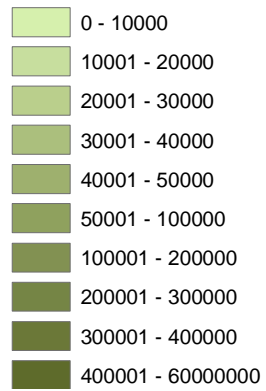
Agricultural water demand

September 2006

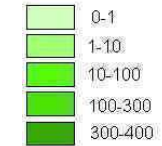
RMC Watershed

Sebou Watershed

Evolution of agricultural water demand (m3)



Evolution of agricultural water demand (million m3)



- Irrigation
- Precipitation



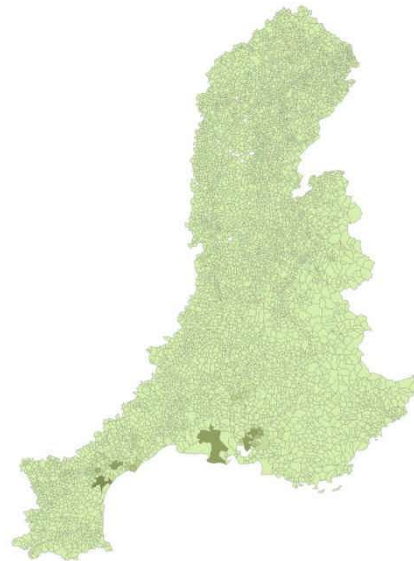
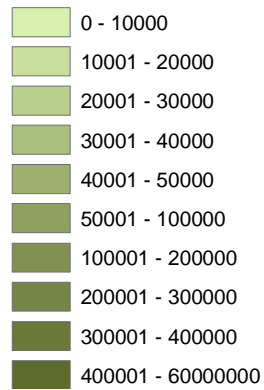
Agricultural water demand

October 2006

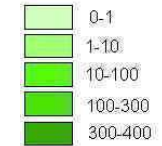
RMC Watershed

Sebou Watershed

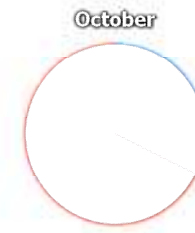
Evolution of agricultural water demand (m3)



Evolution of agricultural water demand (million m3)



■ Irrigation
■ Precipitation



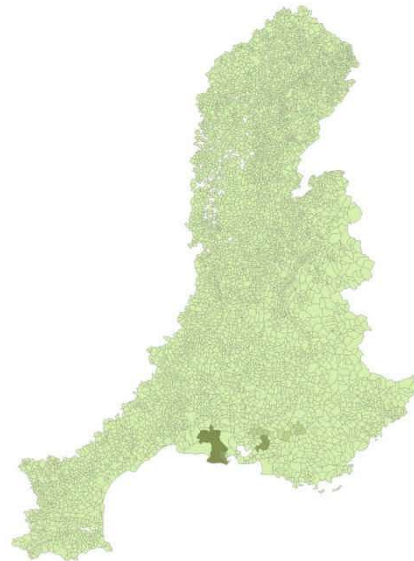
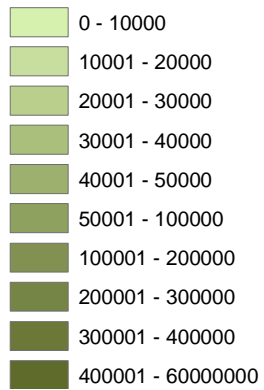
Agricultural water demand

November 2006

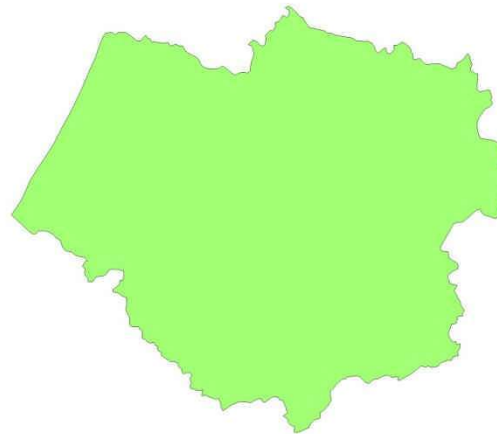
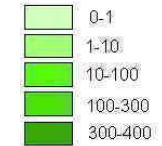
RMC Watershed

Sebou Watershed

Evolution of agricultural water demand (m3)



Evolution of agricultural water demand (million m3)



- Irrigation
- Precipitation



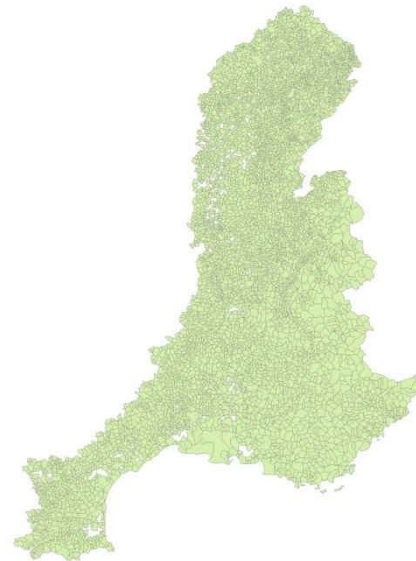
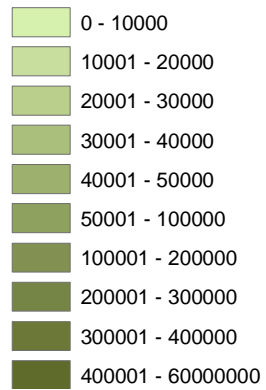
Agricultural water demand

December 2006

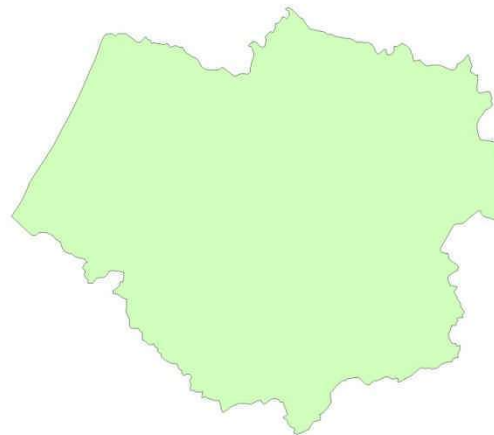
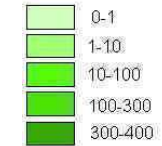
RMC Watershed

Sebou Watershed

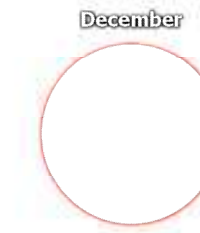
Evolution of agricultural water demand (m3)



Evolution of agricultural water demand (million m3)

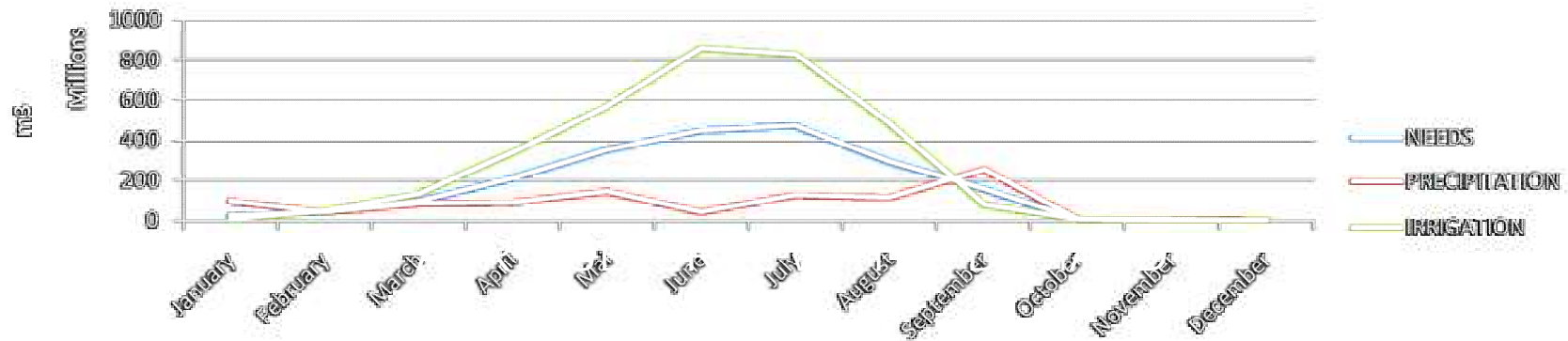


- Irrigation
- Precipitation

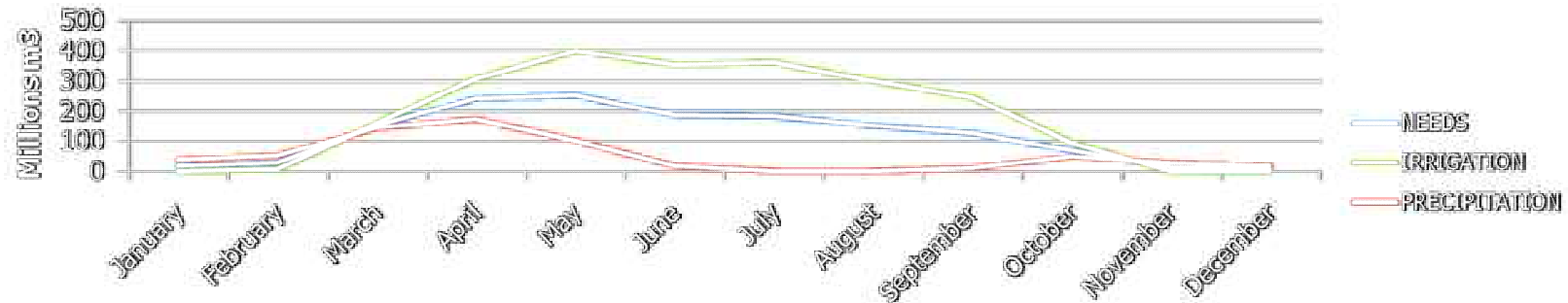


Agricultural water demand

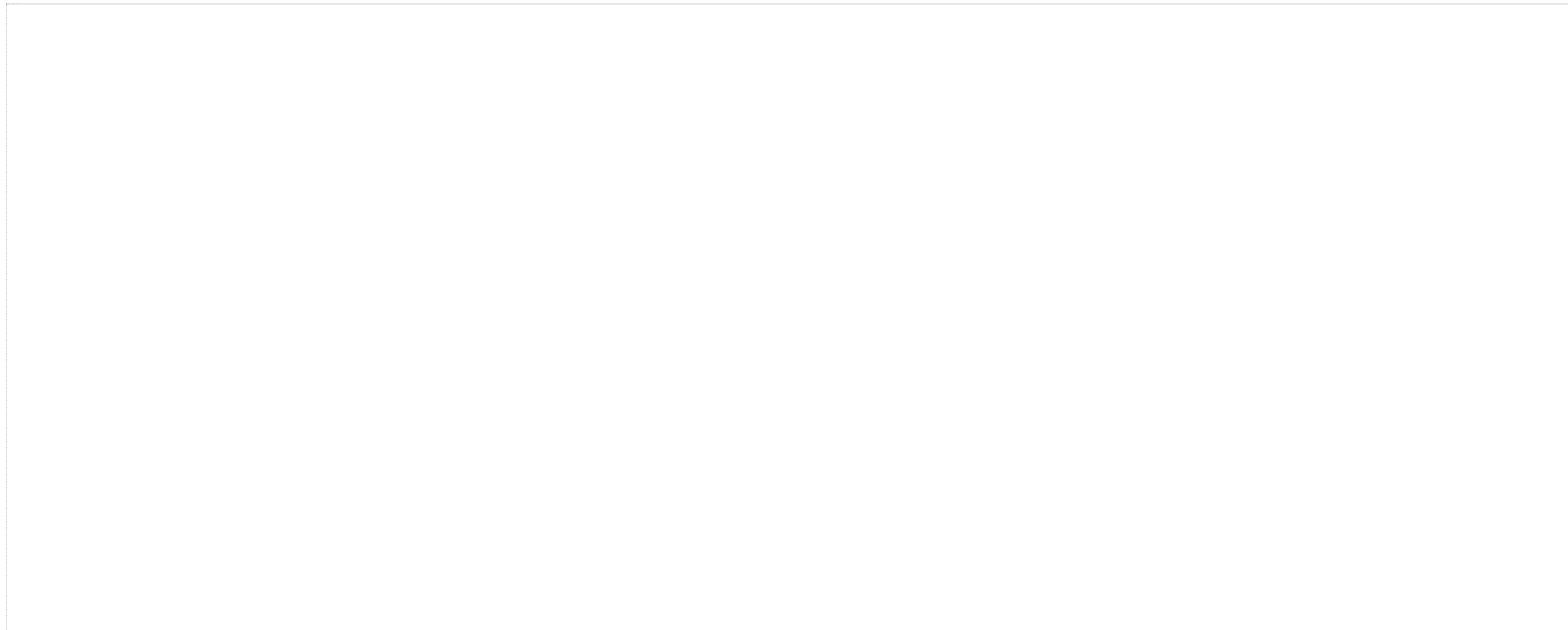
Agricultural demand compare to precipitation and irrigation - RMC watershed



Agricultural demand compare to precipitation and irrigation - Sebou



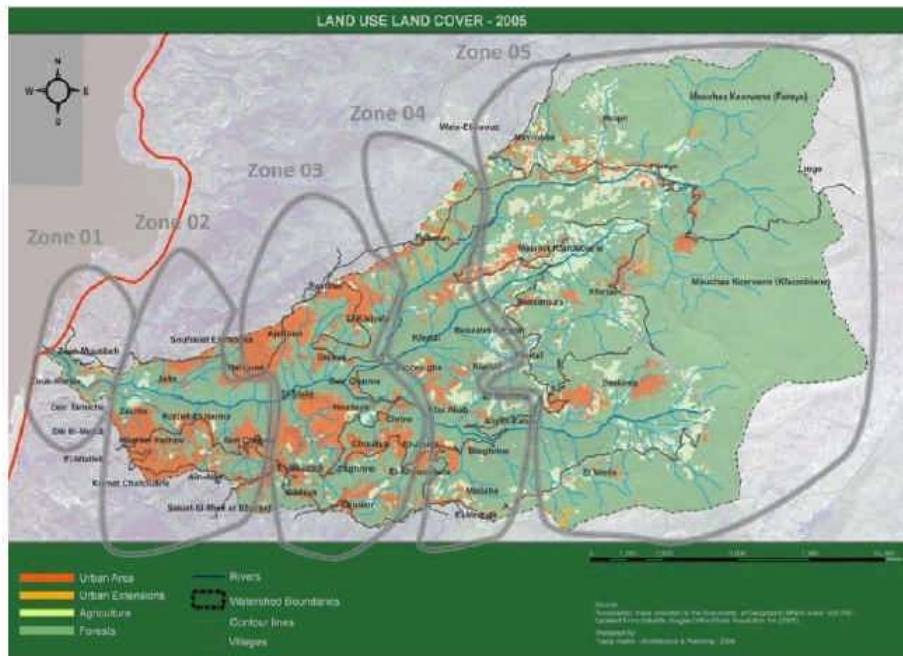
- What : Differential river flow compared to withdrawals and discharges
- Where : on the river AIN in a french city



Nahr El Kalb data - LEBANON

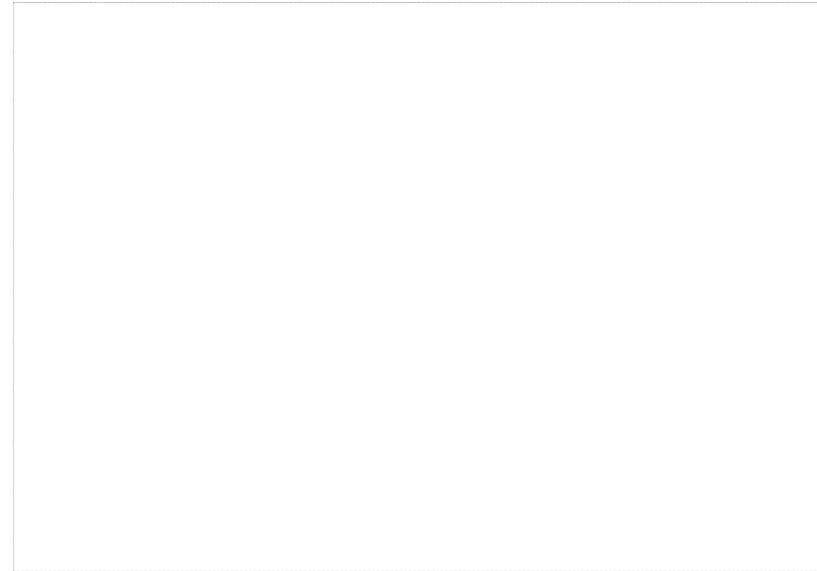
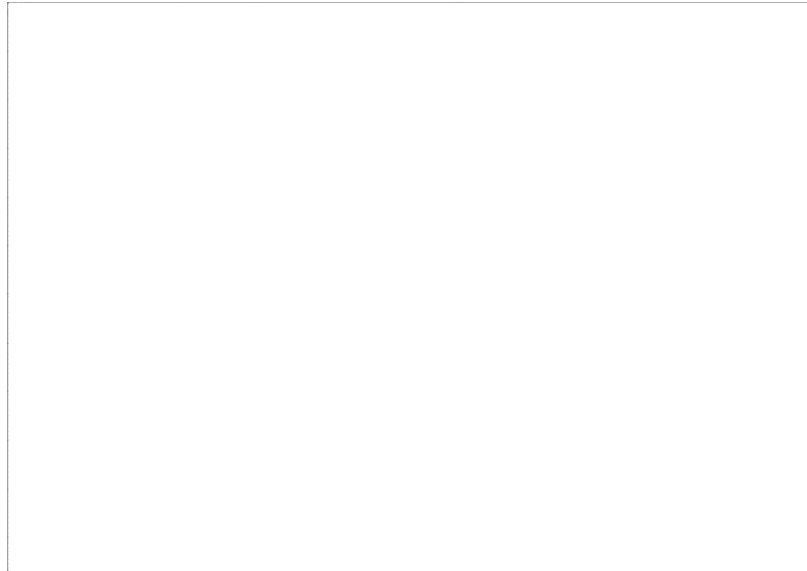
25

- When data is not available yet, there are many ways to get them
- A student programm is already planned in order to collect data on Nahr El Kalb watershed (UMJAE)



SCENARI I

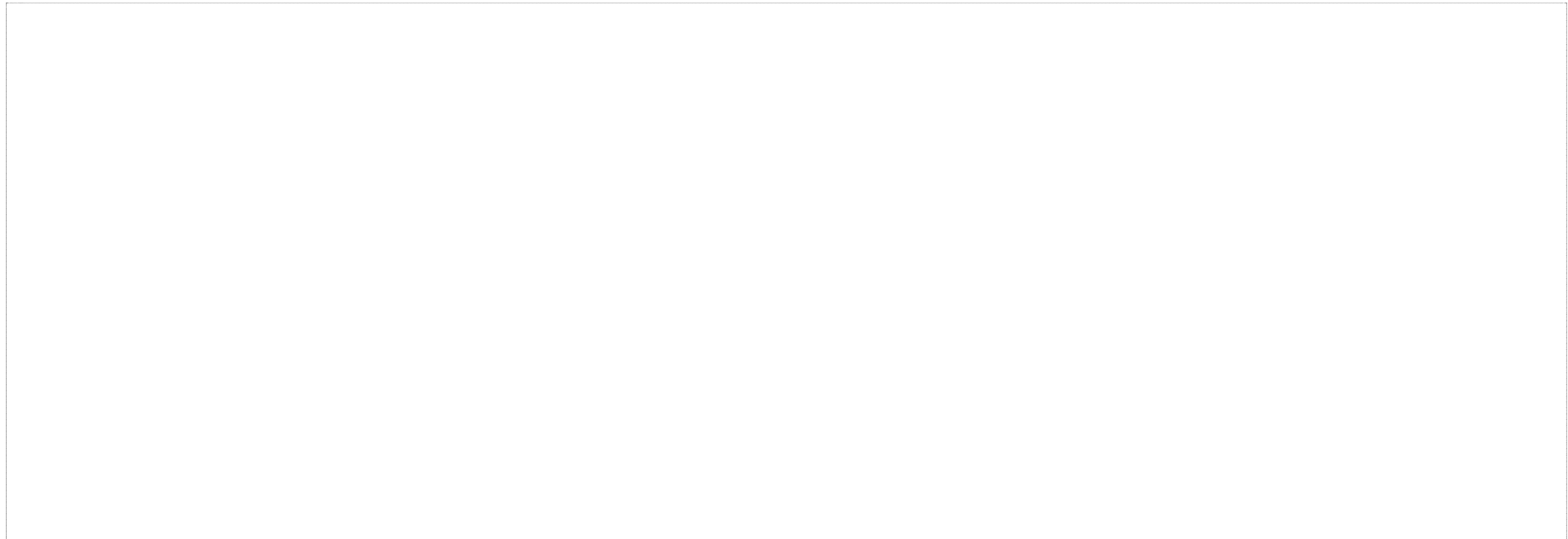
- Base scenario : 100% normal water withdrawal technology
- Technology scenario : 80% economic water withdrawal technology



- 36% reduction of water withdrawals
- Equivalent to the domestic water withdrawals of 4.8 million people during 1 year

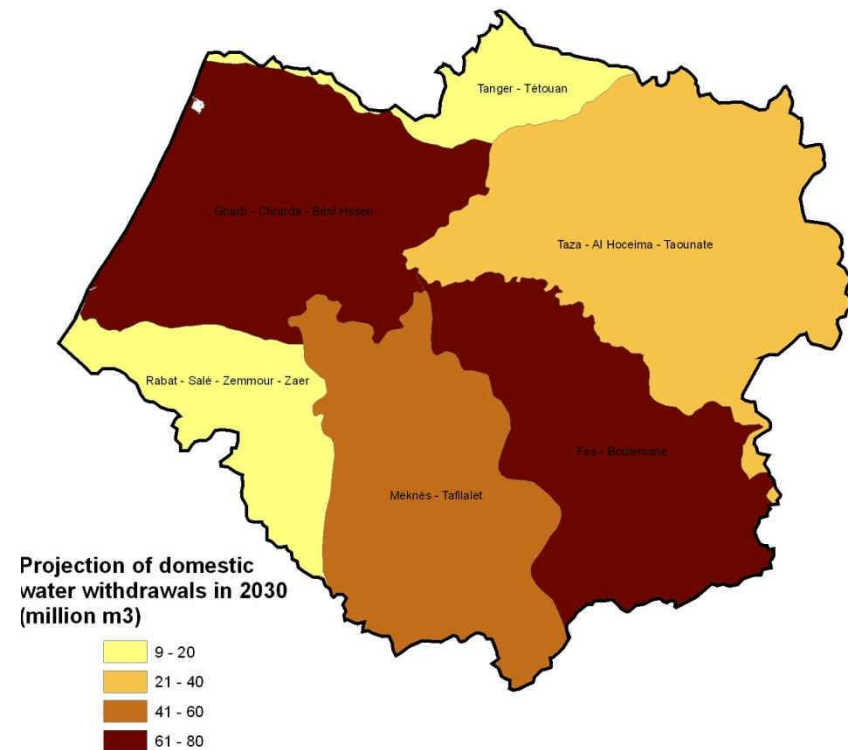
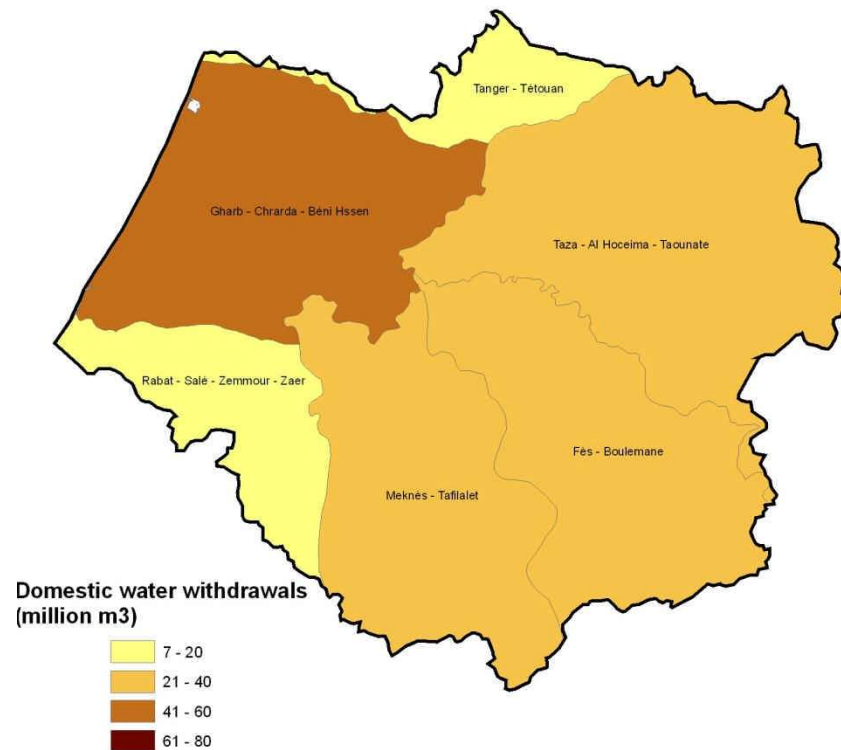
Technology scenario on irrigation efficiency

- Base scenario : 100% aspersion technic
- Technology scenario : 100% micro-irrigation



Demographic scenario Sebou Watershed Morocco

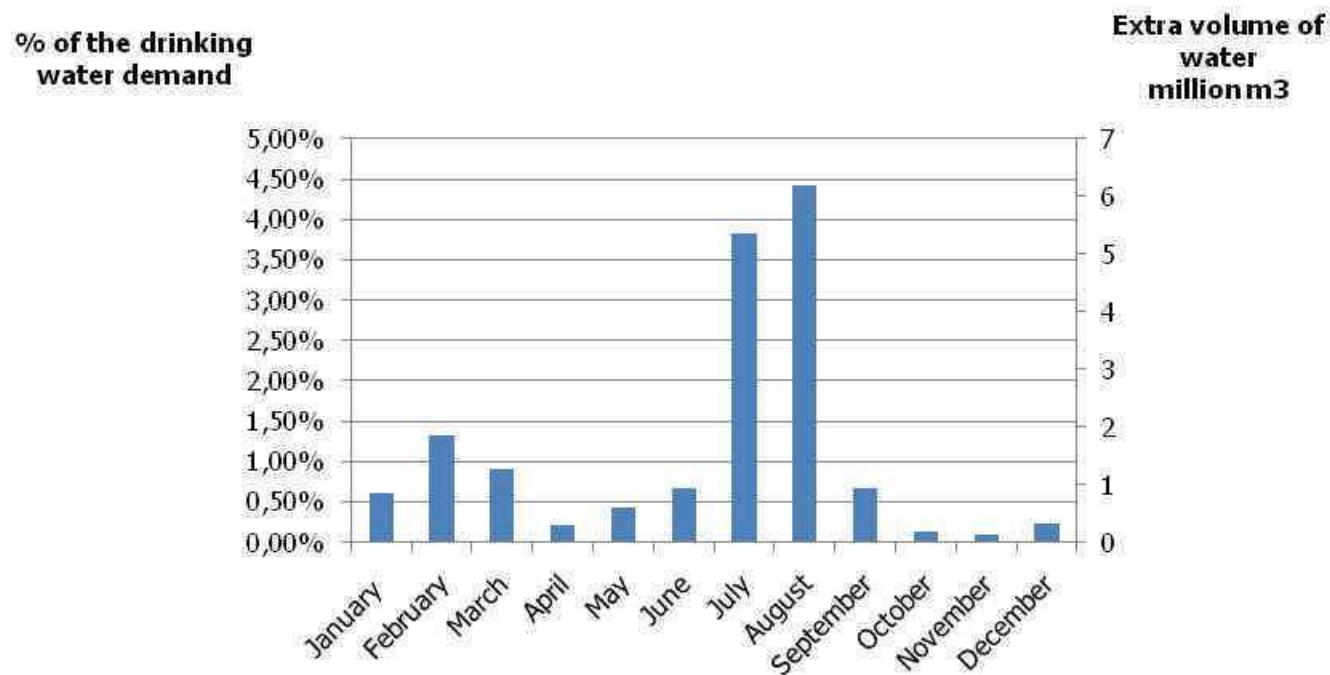
- Base scenario : 3 071 594 urban people and 3 282 264 rural people
- Demographic scenario : 2030 = 4 945 266 urban people (+61%) and 4 070 007 rural people (+24%) – EPDAIRBS (BRL Ingénierie- CG)



- Equivalent to the domestic water withdrawal of two new towns like Fès

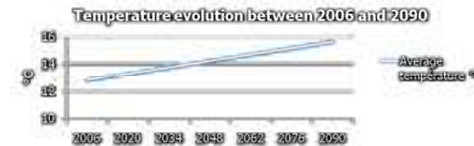
- A 15% increase of tourism : An 18 million m³ increase of the water demand

Repartition of the extra demand of water for tourism



Impact of climate change on agricultural demand

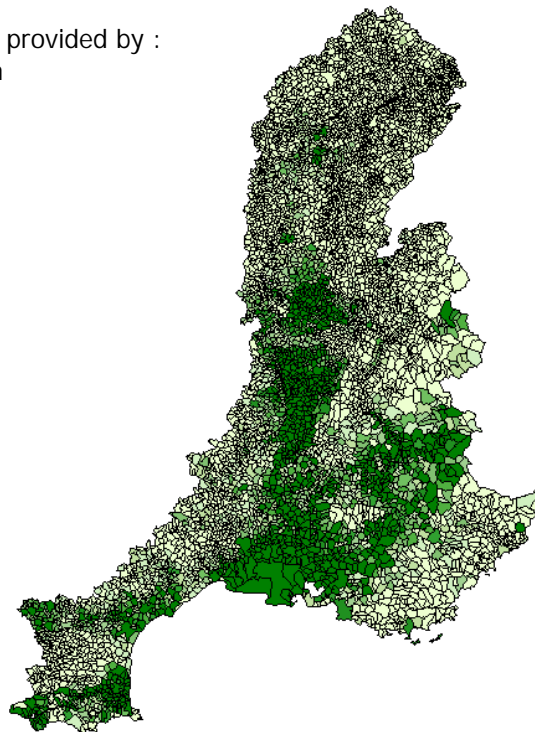
- Scenario A1b (IPCC) :
 - Temperature : + 2.8°C on average
 - Precipitations:
 - + 4% between December and February
 - - 15% between June and August



Watershed : Rhône Méditerranée

Needs of crops are provided by :

- 64% Precipitation
- 36% Irrigation



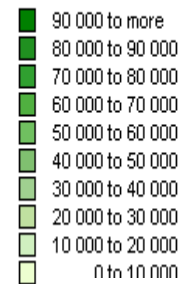
Such a scenario: +12,5% in RM and 9.6% in Sebou

Watershed : Sebou

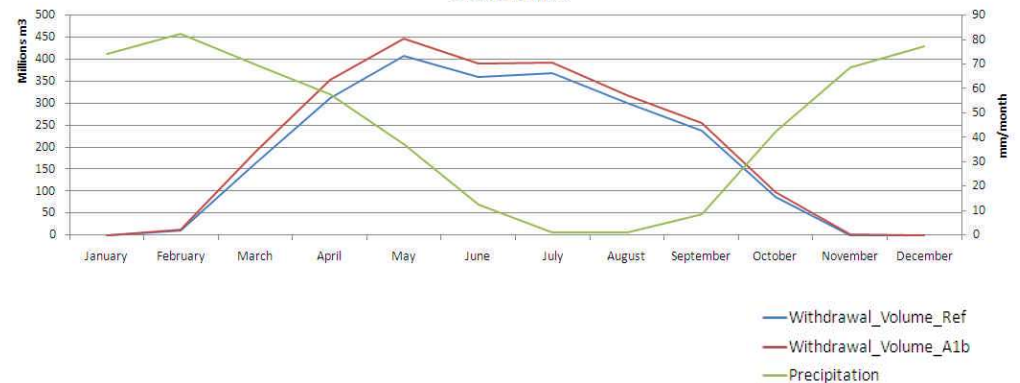
Needs of crops are provided by :

- 39% Precipitation
- 61% Irrigation

Volume difference between actual and A1b in m3

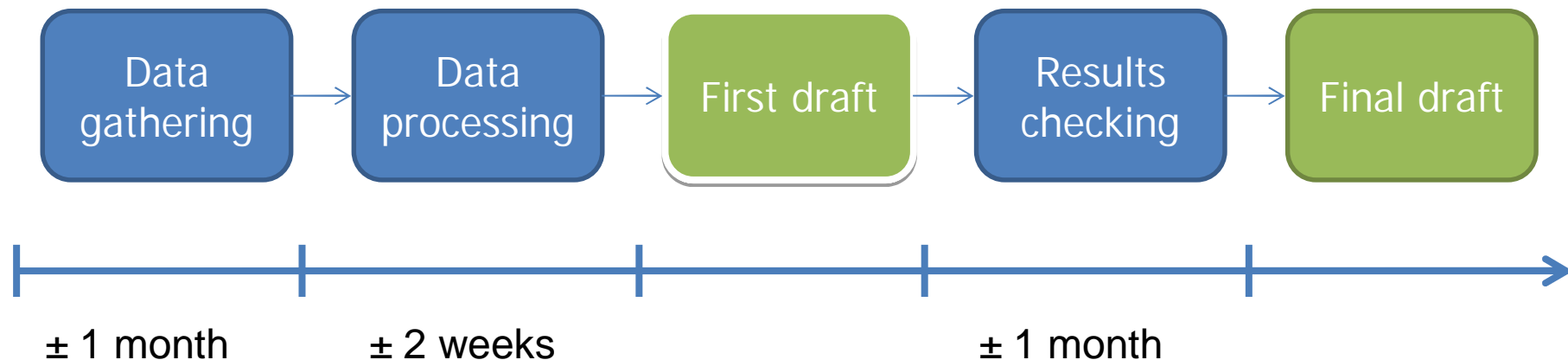


Irrigation withdrawal between A1b climatic scenario and actual situation Sebou watershed



CONCLUSION

- Availability : 15 of April
- How to get it : UpM website
- Implementation steps



(depending on the data available and the level of precision)