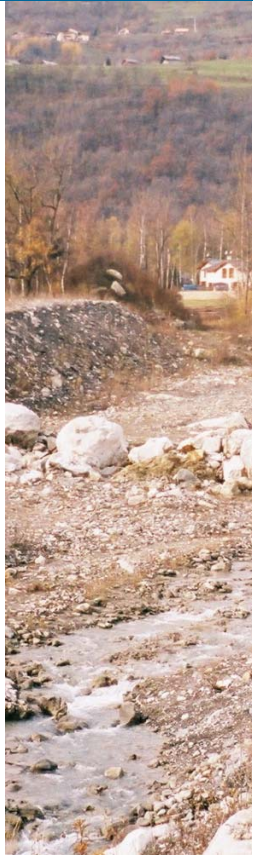


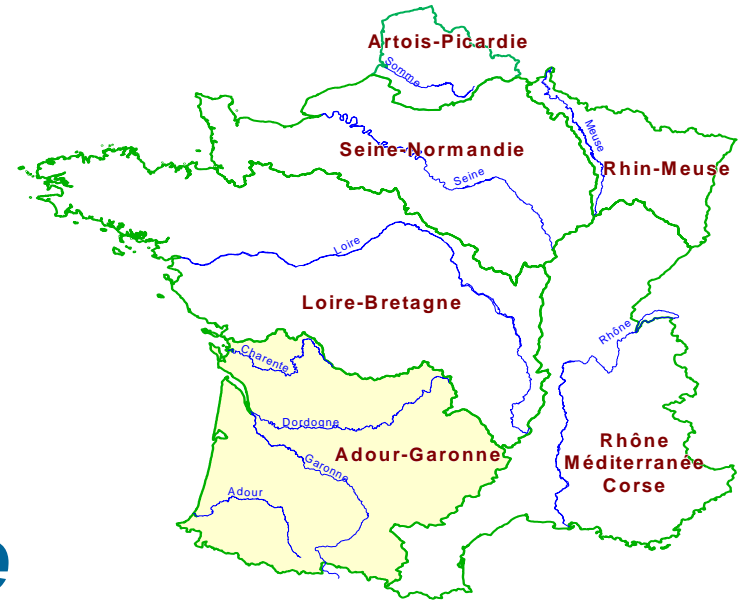
Long term issues in France, case study of Adour Garonne district (L.Gremy and M.Daubas)



Palermo
October 9th 2004

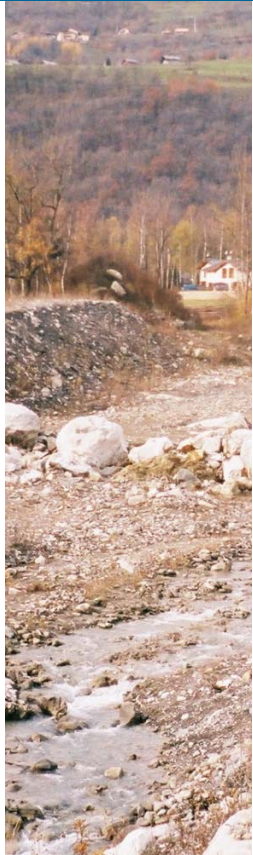


Dry period water management plans in Adour Garonne district:



methodology and first results

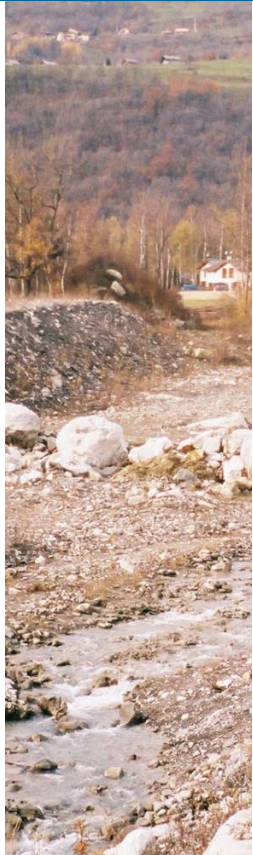




Contents

- **Context**
- **Low flow values concept**
- **Dry water period management plans**
- **Financial incentives and tariffs**
- **Results**

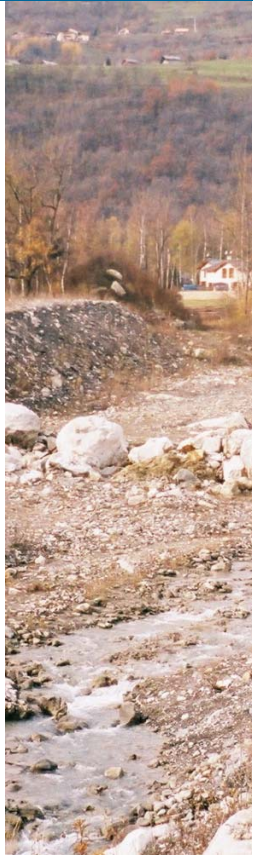




Characteristics of the district

- **Water is not scarce but is not abundant**
- **Natural low flows in rivers are aggravated by abstraction for irrigation (40% of irrigated area of France)**
 - increase of water demand, 80% of total water consumption from June to October
 - global water deficit is around 250 Mm³
- **Negative impacts on water environment, conflicts of interests, frequent application of drought crisis measures with restriction of uses**





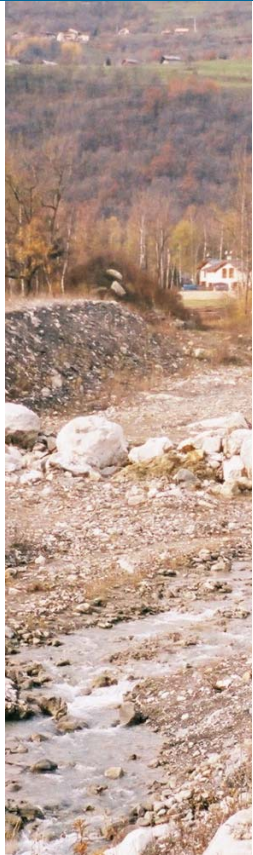
Quantitative management policy

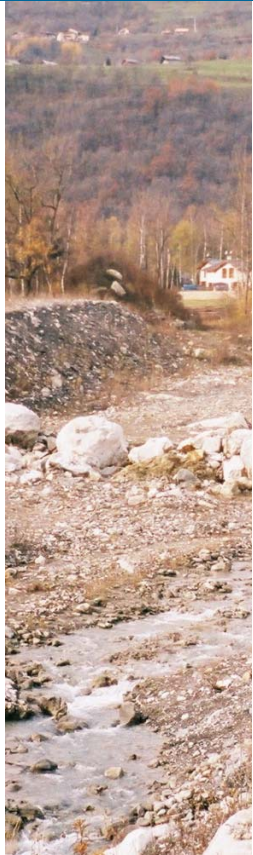
- **Water resources development programme**
 - **1992 Water Act with balanced management objectives**
- ⇒ **Setting up management plans to restore low water flows and reconcile the ecological balance of rivers and uses :**
- ⇒ **development of low flow values concept and dry period water management plans**
 - ⇒ **valorisation of available tools : regulation, planning and financial tools**



Global objectives

- **To maintain acceptable flows with respect to historical time series, uses and quality objectives,**
- **To define abstraction limits in accordance with available resources**
- **To search for additional resources while respecting water environment**
- **To promote cost effective management with a water pricing policy based on abstraction metering**

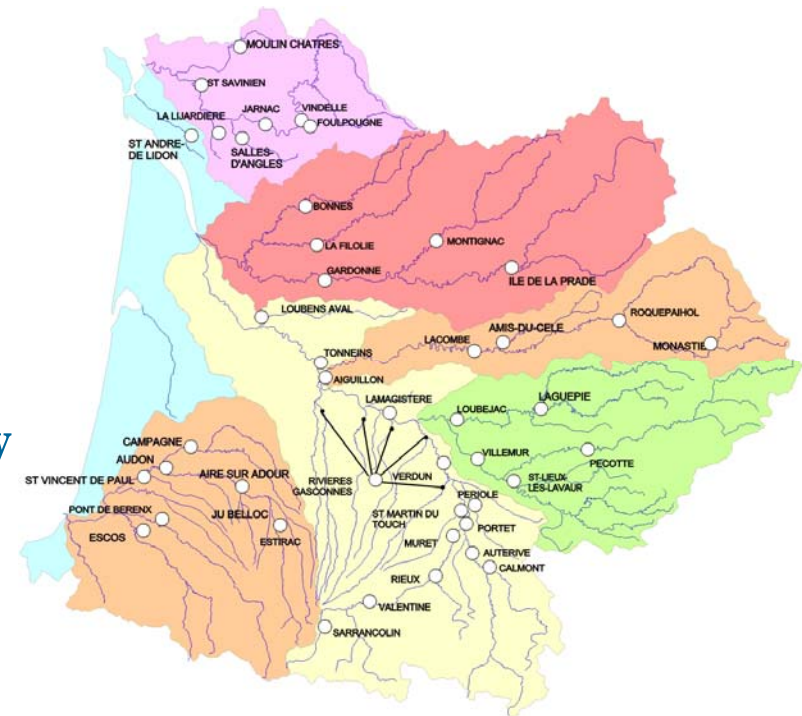


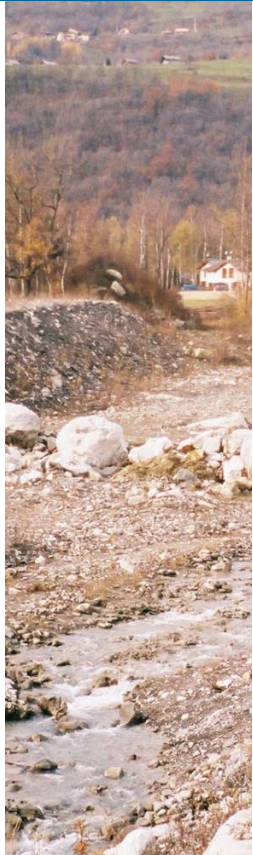


Low flow values concept

Definition at various and strategic points of minimum flows to be respected :

- **Low water target flows :** definite objective to meet and respect each year with tolerance levels
- **Crisis flow :** minimum flow to guarantee all the time with any sort of restrictions

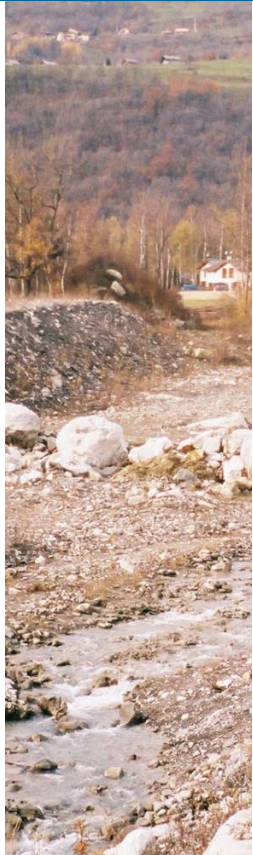




Dry period water management plans : general process

- **Definition of technical, financial and institutional means to respect low water target flows**
- **Elaboration at catchment scale on contractual basis**
- **Led by a competent authority (representative of county/regional council) with involvement of all stakeholders**
- **Officially approved by the local state authorities**





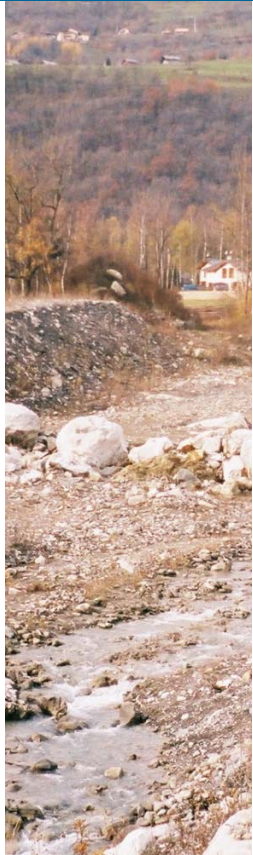
Dry period water management plans : methodology

- **Inventory of water resources, abstractions and consumptions**
- **Evaluation of water stress**
- **Preparation of several management and resources development scenarios**
- **Selection of a basic scenario for application**

Descending order of priority for new resources :

Water saving, optimal use of existing structures, water releases from hydropower dams, local impounding reservoirs, rational operation of groundwaters, new structure projects

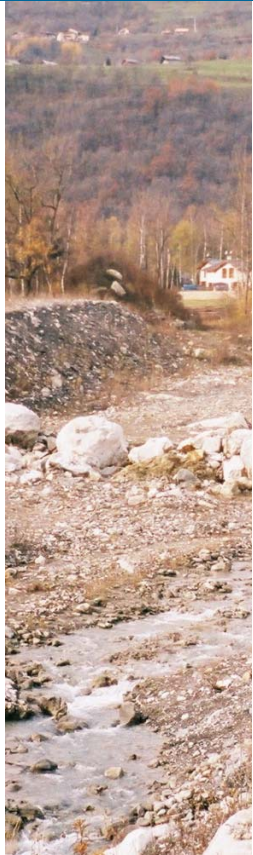




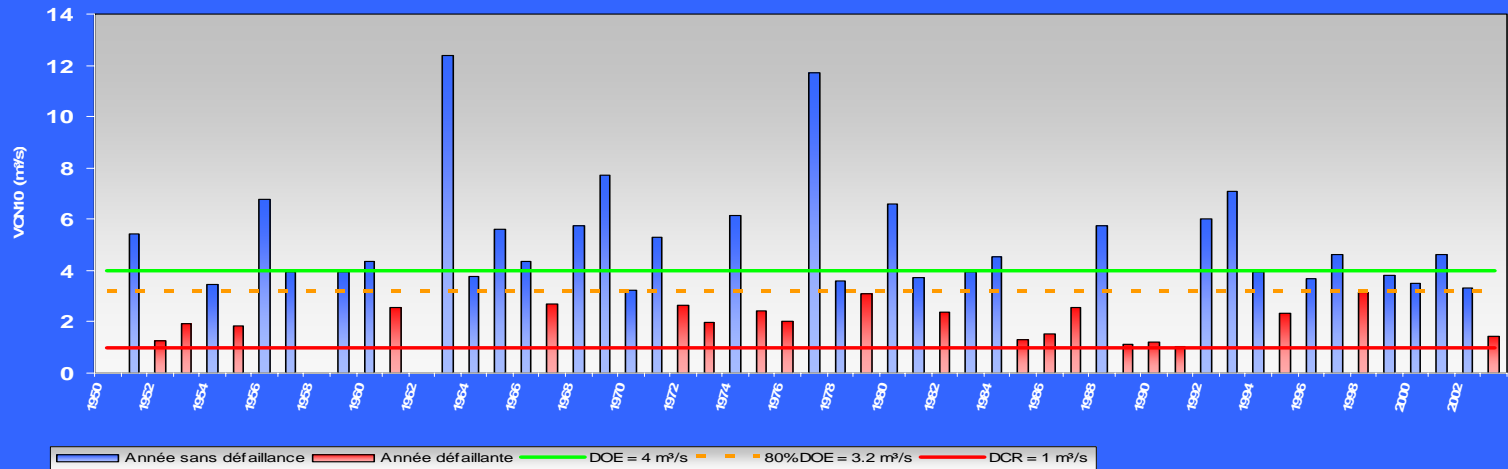
Water stress assessment

- **Calculation of natural flow chronics**
 - *Natural availability and variability of the water resource*
 - **Simulation of future flow chronics**
 - *Statistical impacts of uses on natural water resources*
 - **Calculation of gross water stress : volumes for the strict maintenance of low water target flows / natural and future flow chronics**
 - *5 and 10 year frequency water deficiencies*
- ⇒ **Comparison with water resources available**
- ⇒ **Simulation of various water demands and water resources mobilization and impacts on river flows and financial costs**

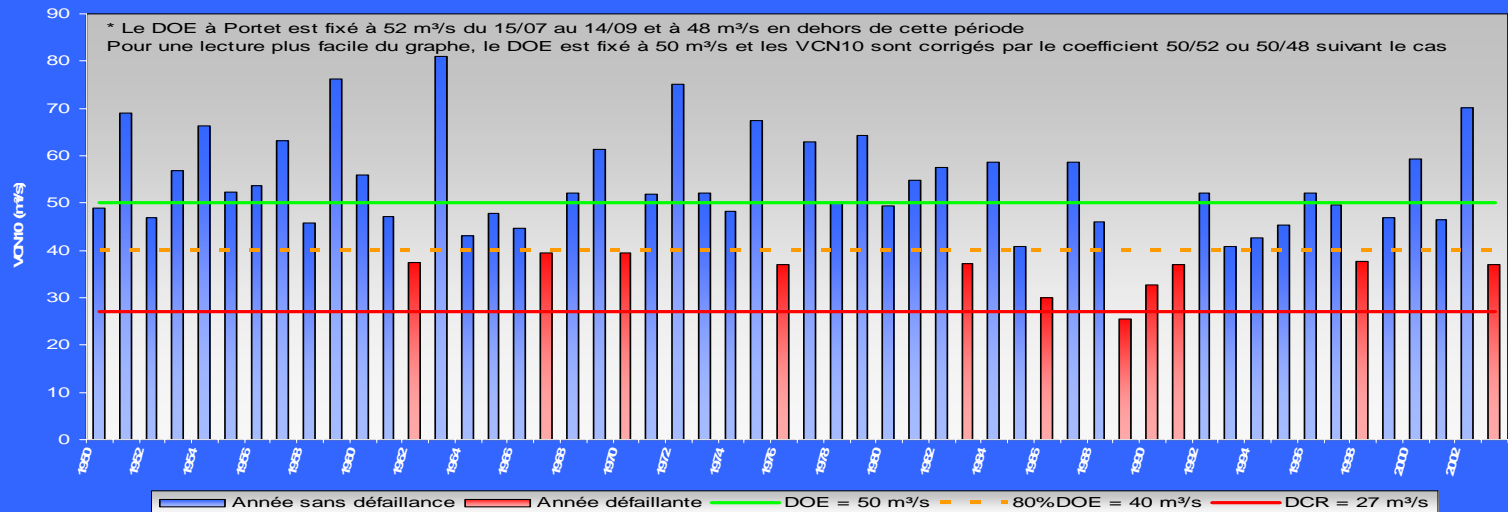


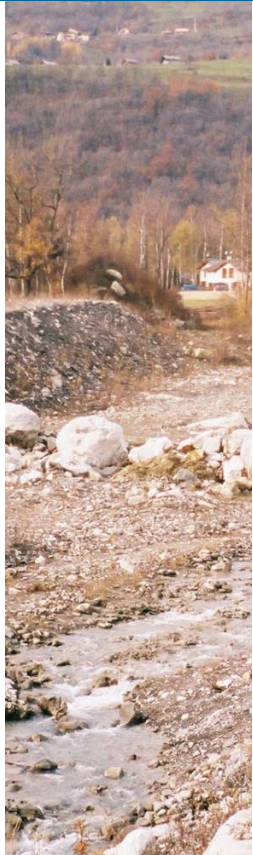


Débits d'étiage (VCN10) du 1^{er} juin au 31 octobre comparés au DOE du SDAGE
L'Aveyron à Loubéjac - 5170 km²



Débits d'étiage (VCN10) du 1^{er} juin au 31 octobre comparés au DOE du SDAGE
La Garonne à Portet* - 9980 km²






Dry period water management plans : main content

- **Abstraction limit volumes and allocation between uses and subcatchments areas**
 - **Translation in annual authorizations given to farmers by local state administration**
- **Schedule of progressive achievements of low water target flows in accordance with management measures and new water resources implementation**
- **Institutional methods of community management of abstraction and resources ; responsibilities of each stakeholder**
- **Gradual reduction of use during crisis period**
- **Water pricing in artificial recharged rivers**



Financial tools (1) : Irrigation Tax

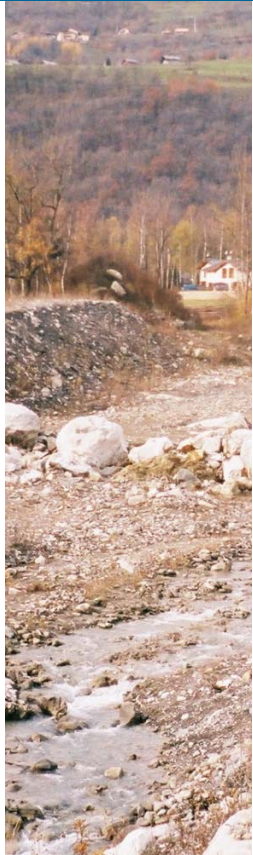

$$\text{Tax} = \text{quantity of annual water abstraction} \times \text{area coefficient} \times \text{ratio}$$

- Ratio is fixed each year by the water agency (management council)
- Base's ratio = 4.23 €/ 1000 m³ to 6.20 €/ 1000 m³

according to :

- the resource (local reservoir, river or artificially recharged river)
- metering equipment (= water quantity measured)



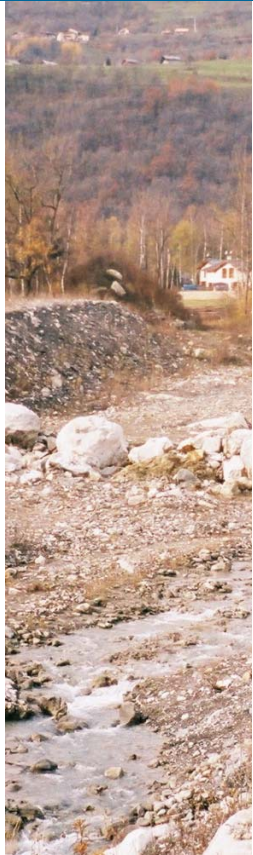


Financial tools (2): Irrigation Tax

$$\text{Tax} = \text{quantity of annual water abstraction} \times \text{area coefficient} \times \text{ratio}$$

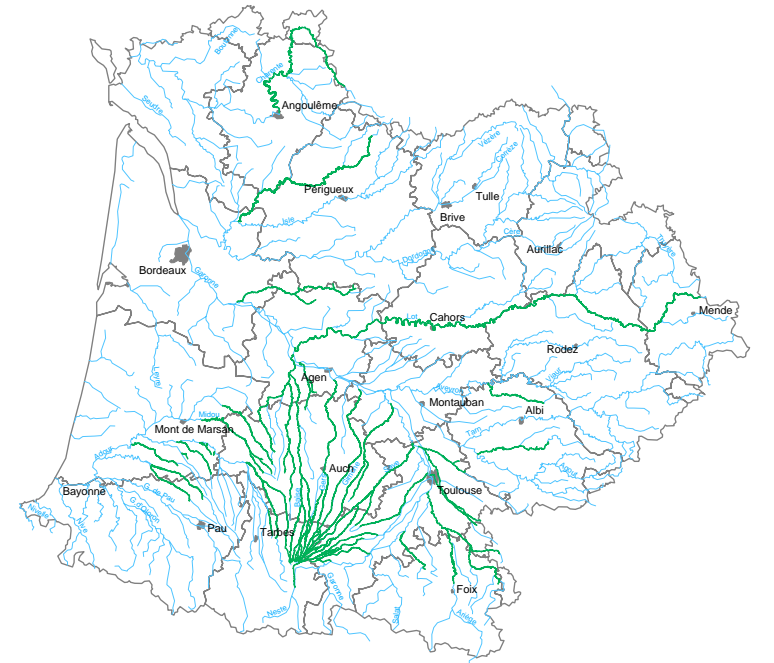
- **Area coefficient varies according to the status of the resource concerned (high water shortage / balanced area)**
 - **Quantity of annual water abstraction = irrigated surface x 3000 m³/ha for farmers with no metering equipment**
- ⇒ **Incentive to the development of metering equipments and to the achievement of a balance between use and water environment**





Financial tools (3): Water pricing

- Some rivers artificially recharged
- Definition of a price scale to pay all or part of maintenance/running costs
- Calculated with two criteria :
 - A fixed part = around 25 €/ha
 - A variable part proportionate to the water consumption = around 0.005 €/ m³

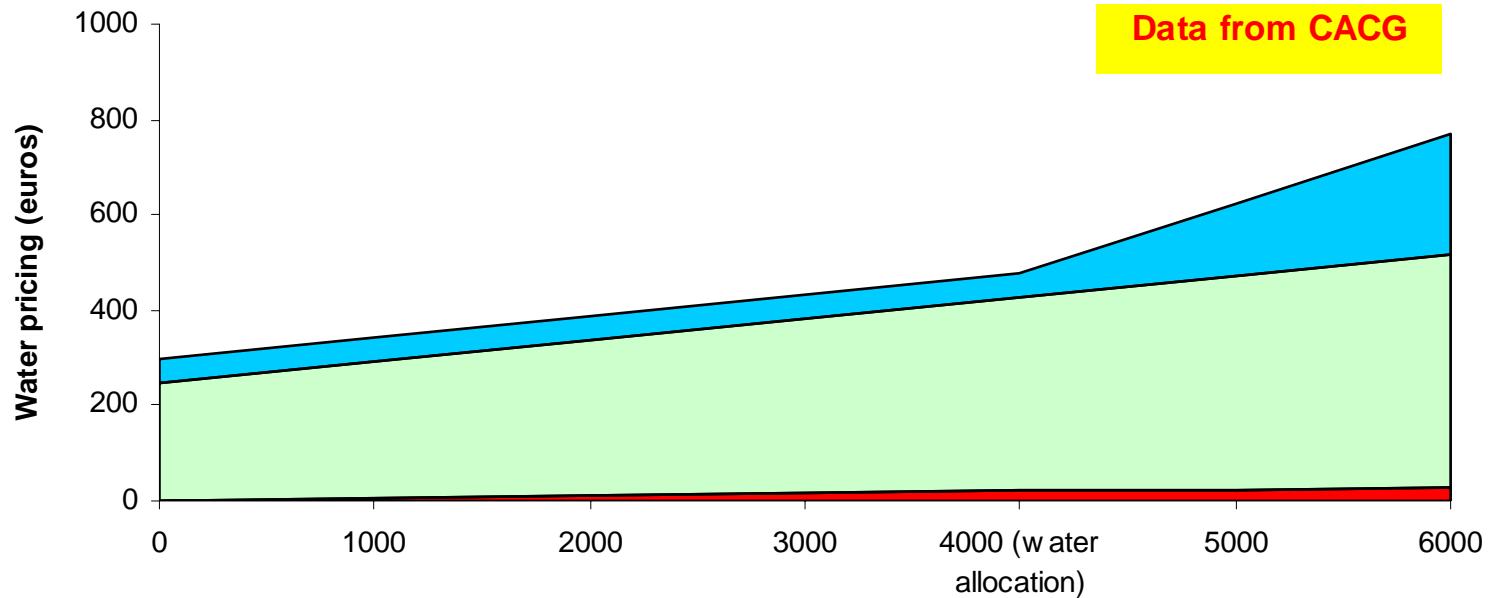
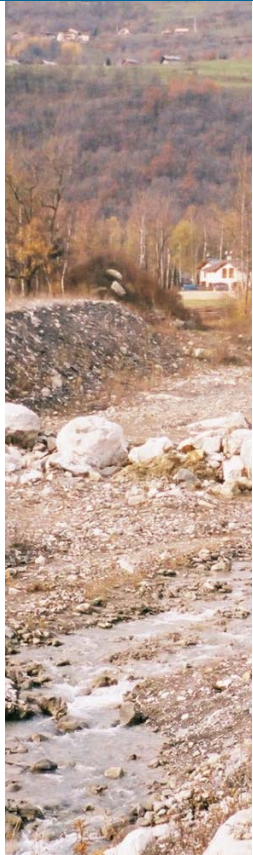


- Recharged rivers
- Principal rivers
- Administrative area



Agence de l'Eau
Adour Garonne

Financial tools (4): Water pricing



■ Water Agency's tax

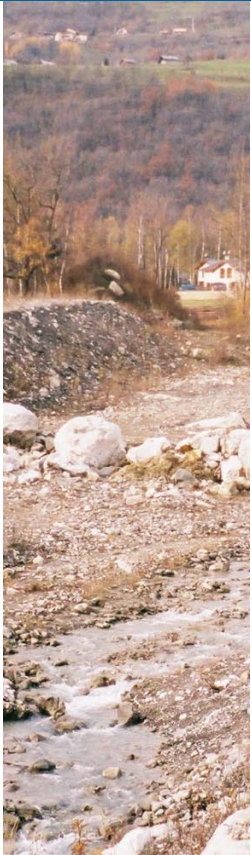
□ pressurized water service

■ water river service



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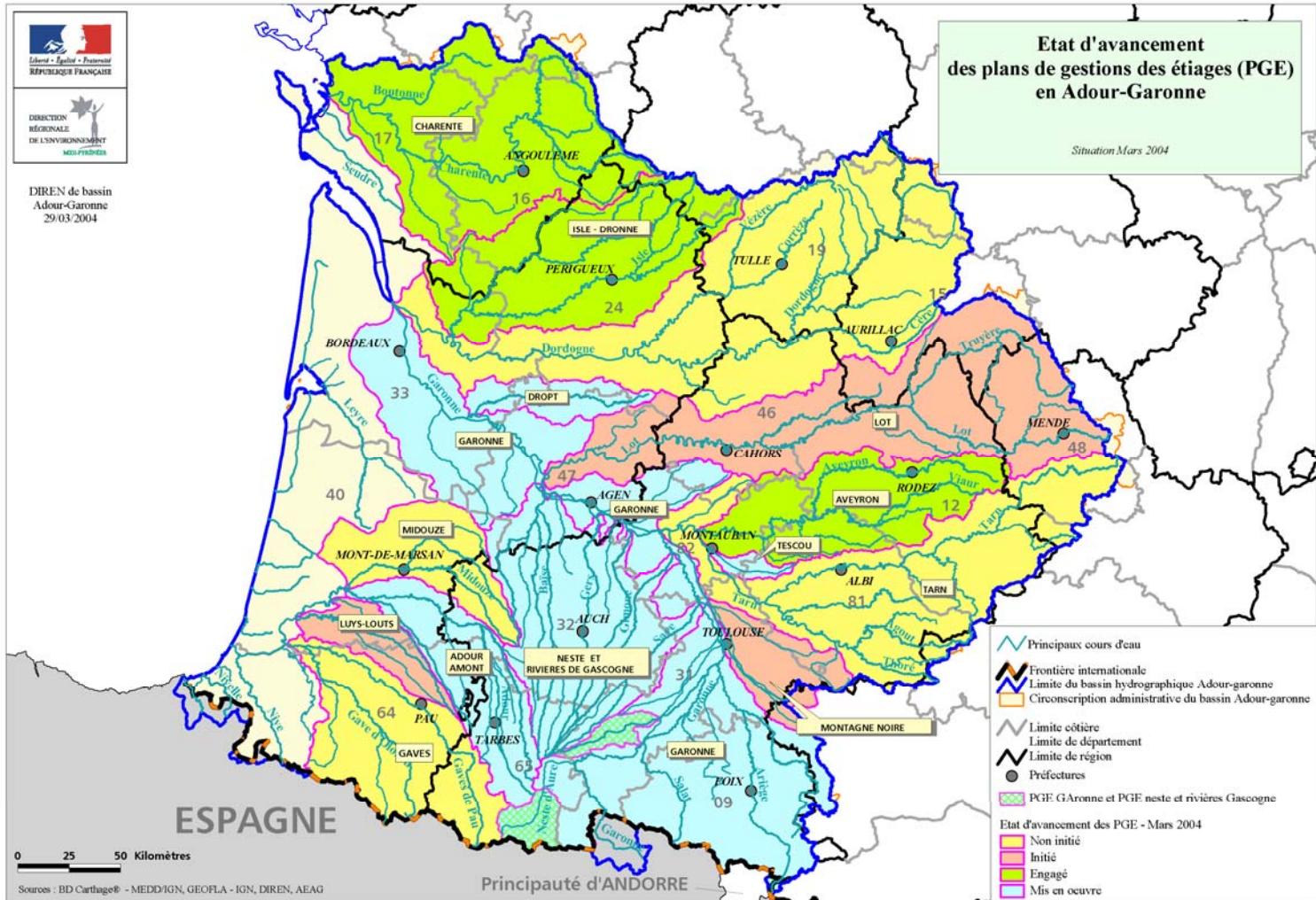
Financial tools (5): conclusion

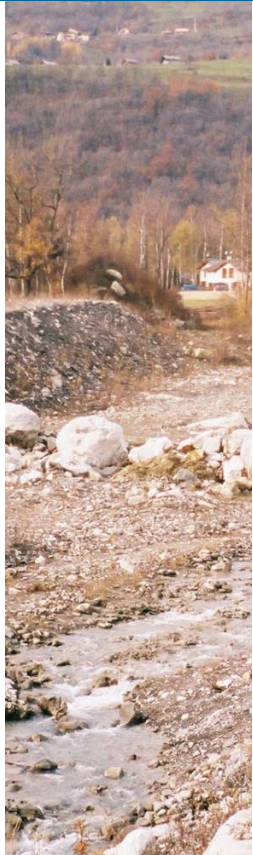


- In 2002, 30 000 farmers paid water abstraction taxes for a total amount of 2.83 M€ (662 Mm³)
- Tax represents 1 to 3% of the total irrigation costs
- The total irrigation costs in Adour Garonne district ~ 107 M€ a year
- Water management plans contribute to full cost recovery principle required by the European Water Framework Directive



Dry period water management plans : state of play

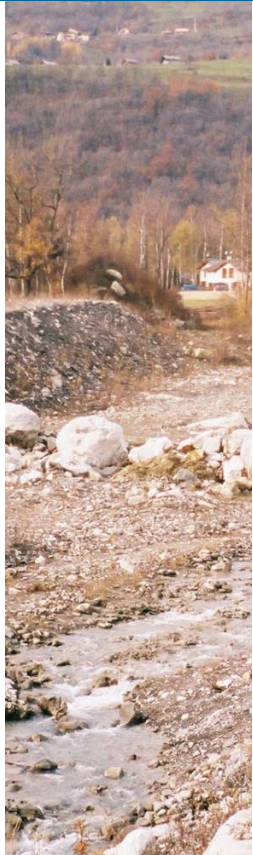




Dry period water management plans : results (1)

- **Solid knowledge about catchments : status, trends, pressures, impacts (hydrological functioning of rivers, groundwaters, connection, challenges)**
- **Improvement of monitoring networks, of data collection and management**
- **Definition of complementary target flows and target piezometric levels**
- **Development of specific information and management systems**

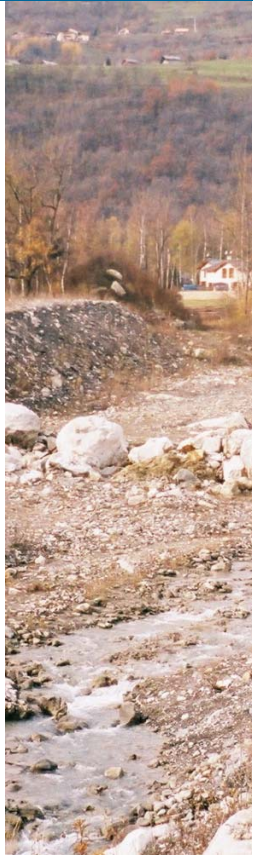




Dry period water management plans : results (2)

- **Stabilization and reduction of abstraction for irrigation**
- **Involvement of local authorities in water management policy**
- **Raising the awareness of users and evolution towards a responsible management of water resources**
- **Better management of crises and better maintenance of minimum low flows in rivers**





Conclusion

- **Adour-Garonne district nearly provided with management and planning tools promoting sustainable water use based on long term protection of available water resources**
 - **Contribution to meet the objectives required by the Water Framework Directive**
- ⇒ **Integration in the district management plan and programme of measures to be set up in 2008**

