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Water Conservation and water Protection Plan in Emilia-Romagna

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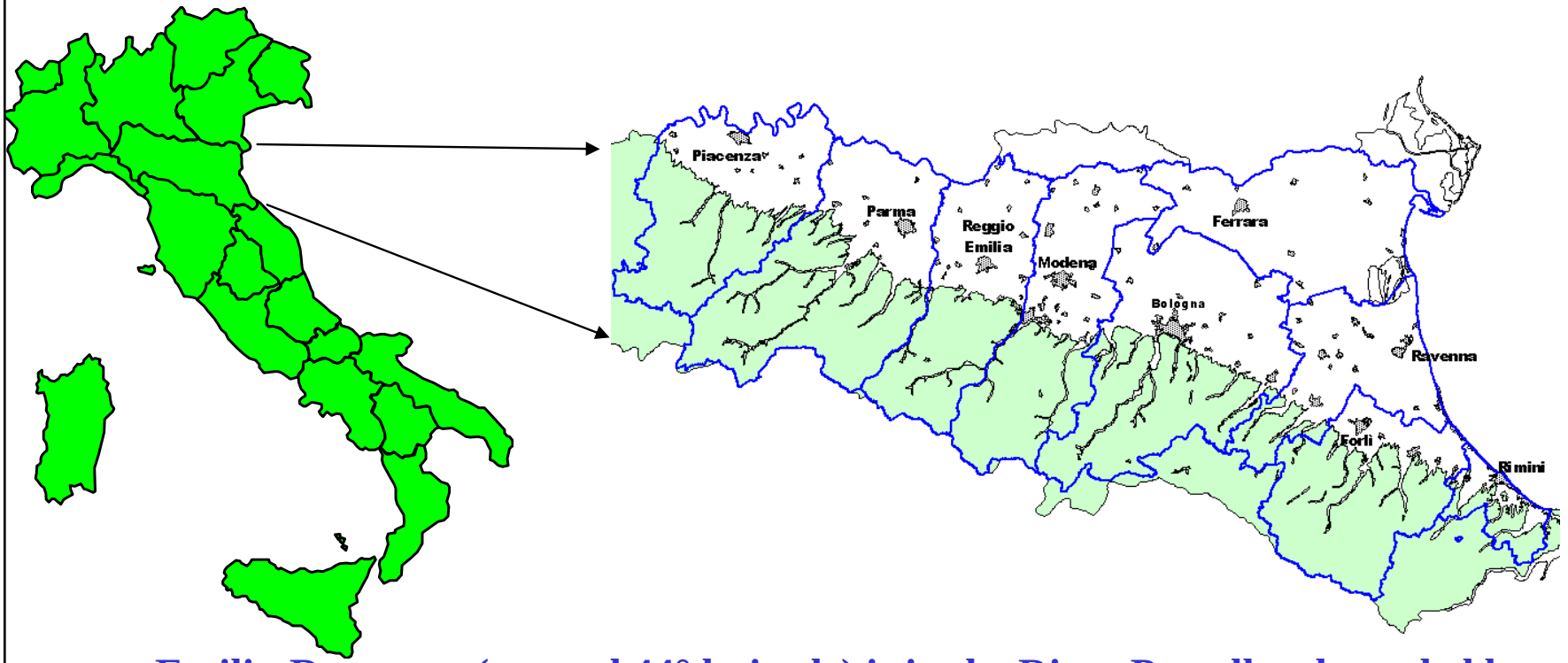
Emilia-Romagna Region - Italy



Emilia-Romagna (around 44° latitude) is in the River Po valley, bounded by Po, Apennine Mountains to the South and the Adriatic Sea to the East.

www.regione.emilia-romagna.it

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Water and Emilia-Romagna Region

- The use of surface water is increasing, coherently with the Management Plan elaborated in the 1984, to face with the serious subsidence problems encountered in Ravenna, Bologna and in almost all Romagna territory.
- Ravenna Law 1980: new groundwater abstraction forbidden and strictly regulated the existing ones

most important new infrastructure:

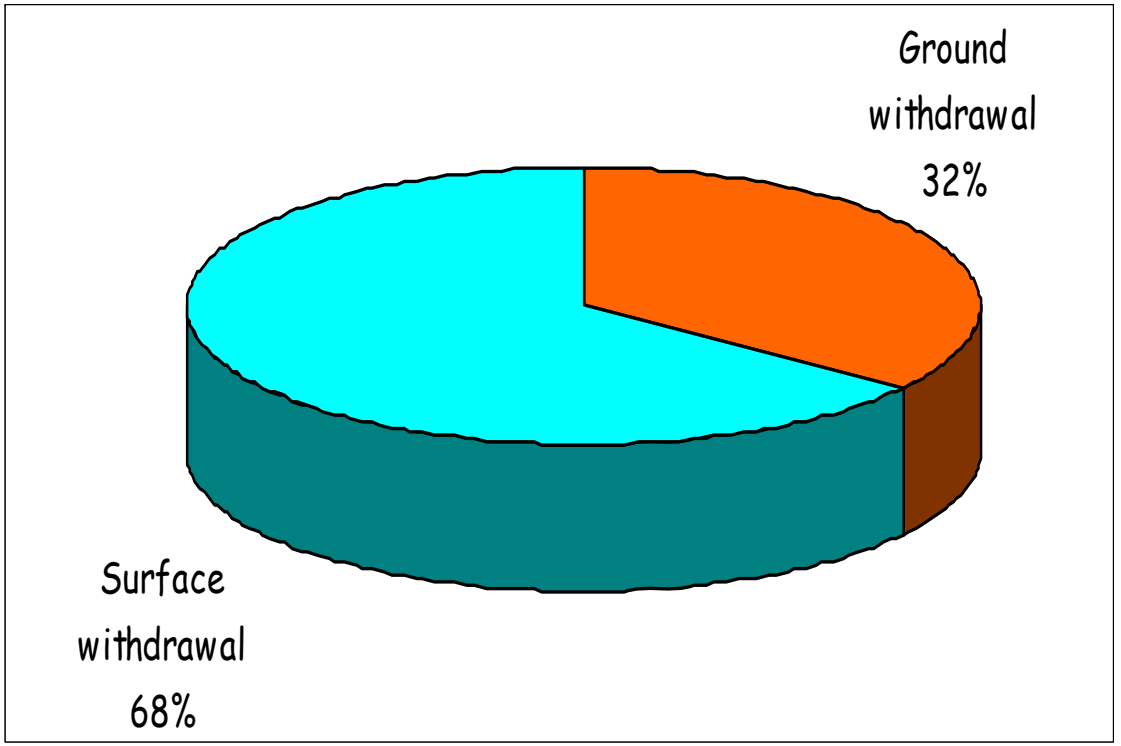
- Ridracoli Dam (33 Mm^3) civil use for Romagna
- CER irrigation canal: 150 km, 60Mc/sec from Po river in summer, 3000 sq.. Km. Irrigation area


CERTIFIED QUALITY SYSTEM
UNI EN ISO 9001
SINCERT
DNV
Romagna Acque

Water withdrawals

- **Surface water withdrawal** = 1,450 Mm^3/y (68% of total withdrawal);
  900 Mm^3/y taken from Po river (agriculture);

- **Ground water withdrawal** = 681 Mm^3/y (32% of total withdrawal).

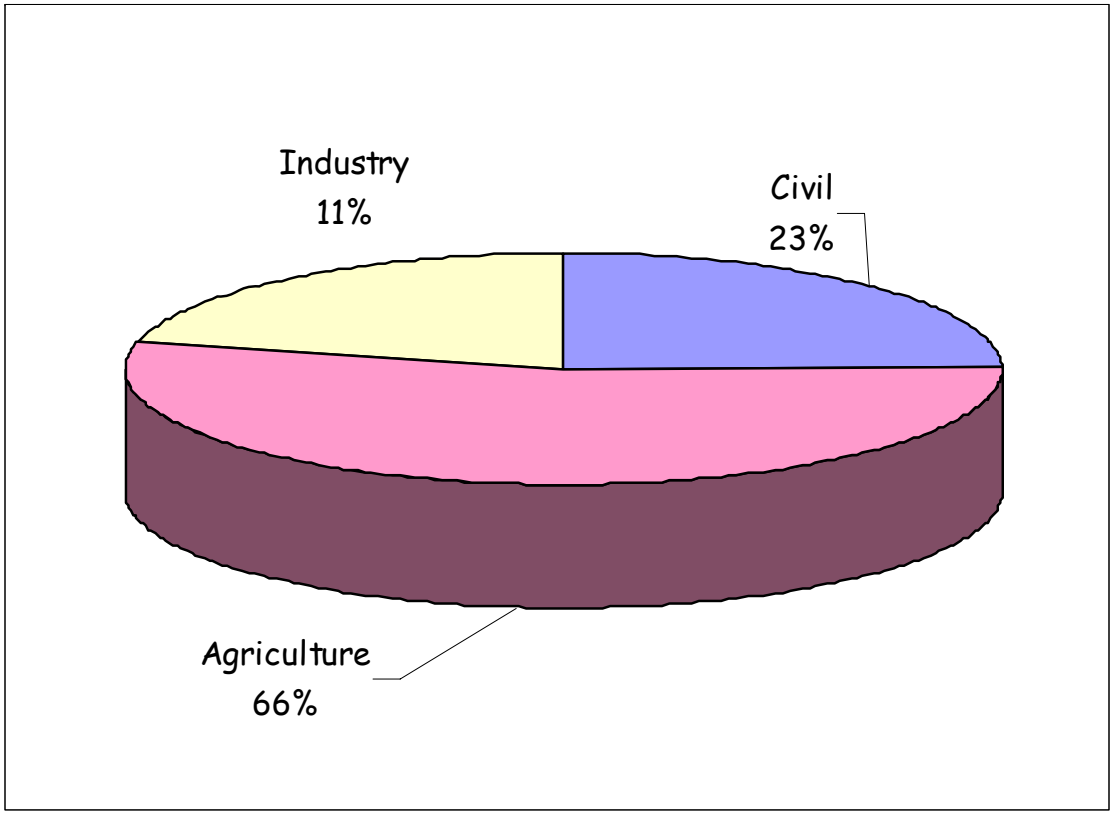


Total withdrawal : 2,131 Mm^3/y

Water sectors withdrawals

Agriculture:1405 Mm³/y
Civil: 488Mm³/y
Industrial: 232 Mm³/y

Average Domestic uses consumption 170 l/c/d



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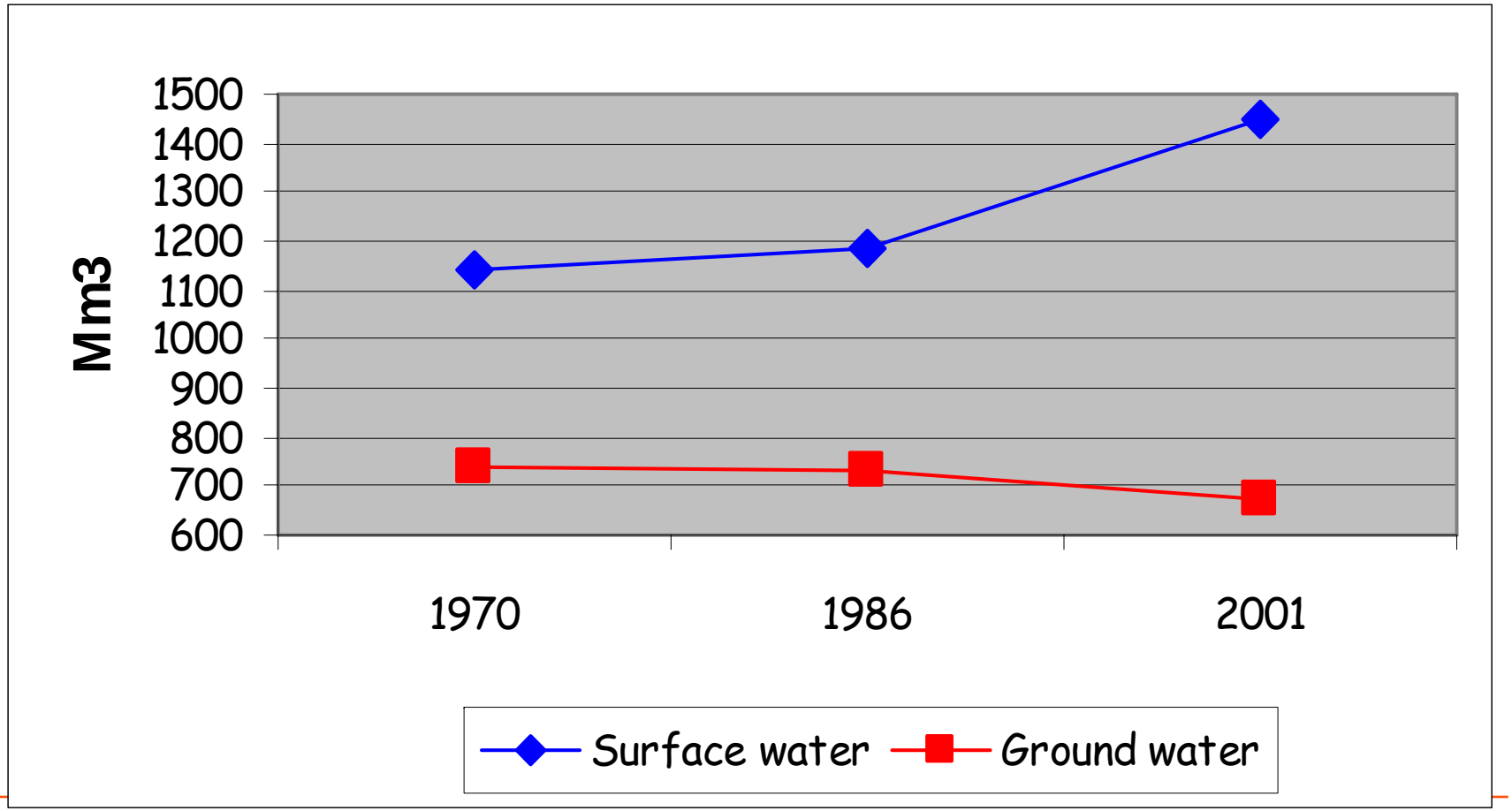
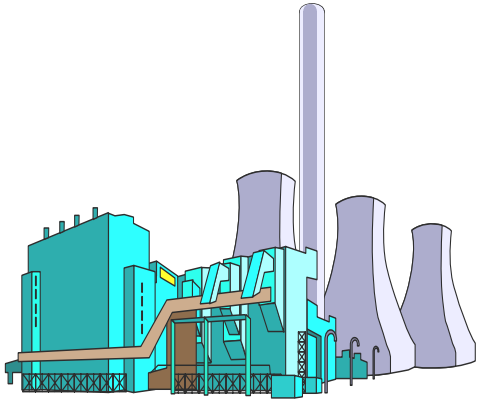
Total withdrawals trend: surface and groundwater



Trends

Increase



Decrease

Stable

Water Protection Plan

D.Lgs.152/99 D.Lgs.258/00

At the end of the year 2003 the regional Government approved the The Water Protection Plan's draft, the planning tool to achieve the aims defined by European Directives and Italian Laws (D.Lgs. 152/99),

through an **integrated approach,**

quantitative aspects

qualitative aspects

The regional strategy

twin track approach

development of new regional policies for water conservation not forgetting the infrastructural development where necessary (f.i. the local connnections with the CER, little basins etc.)

WATER CONSERVATION (WC) AND WATER DEMAND MANAGEMENT (WDM) IN EUROPE

- common declaration (1997) from EEA and UNEP about the water stress in Europe: "**increasing demand for water is leading to a switch in approach from just increasing its supply, to demand side management... In many cases it is cheaper and more effective to improve water use efficiency than it is to increase water supplies**
- The EEA (1999) has undertaken an assessment on the *Sustainable use of water in Europe-Part 2: Demand management* DM
- **European Declaration for a New Water Culture**
  http://moncayo.unizar.es/fnca/europeandeclaration.nsf
  (Madrid 18 February 2005)

WC AND WDM in Europe

- the relationship between water abstraction and water availability has turned into a major stress factor in Europe. Therefore the investigation of sustainable water use is concentrating increasingly on the possibilities of influencing water demand
- Demand management includes initiatives having the objective of reducing the amount of water used (e.g. the introduction of economic instruments and metering), usually accompanied by information and educational programmes to encourage more rational use

Water Protection Plan

http://www.ermesambiente.it/PianoTutelaAcque

planning conferences

50 meetings in the 9 provinces of emilia-romagna

discussion and rewiew of the draft:

minimum flow and uses setting targets

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The regional water stress

Groundwater Deficit(Mm^3/y)

Provinces	Deficit (overdraft)
Piacenza	-3
Parma	-7
Reggio-Emilia	-1
Modena	-2
Bologna (**)	-9
Ferrara	-0
Ravenna	-2
Forlì-Cesena	-0
Rimini	-1
Whole regional territory	-25

The estimated overall deficit due to the application of he environmental flow is around 50 Mm^3 (apparent and real leakage from the aqueducts 123 Mm^3)

total water stress

25+55=80Mmc/y

The Water Conservation Program

- The strategy is **firstly based on the development of new regional policies for WC and DM**, not forgetting the infrastructural development where necessary
- The Water Conservation Program is an integral part of the regional Water Protection Plan, includes also guidelines for a Drought contingency Program
- The Program is based on different levers of a water sustainable management:
  - Regulatory and Legislative tools
  - Economical tools
  - Actions

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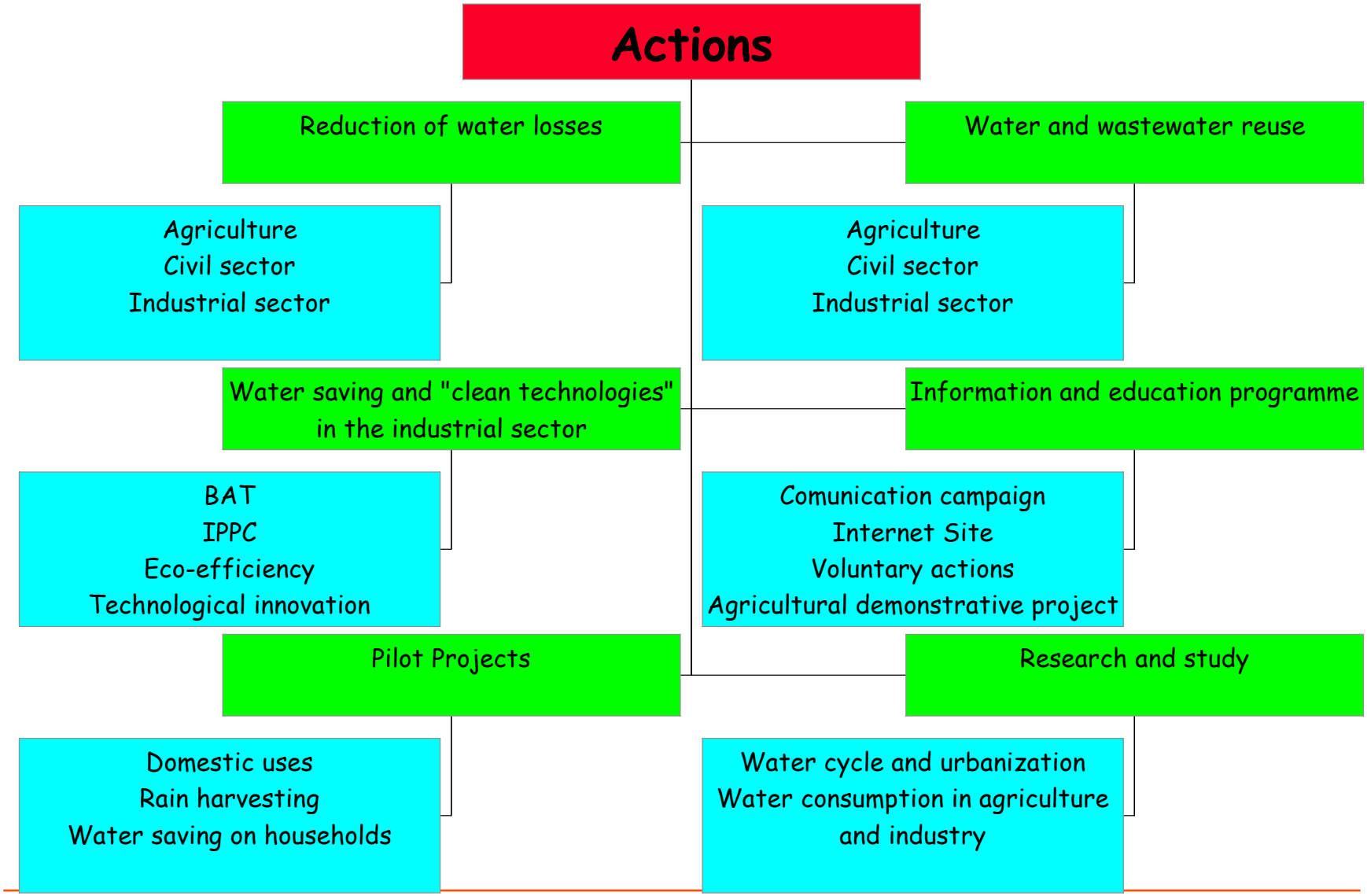
The Water Conservation Plan of Emilia-Romagna



Climate change

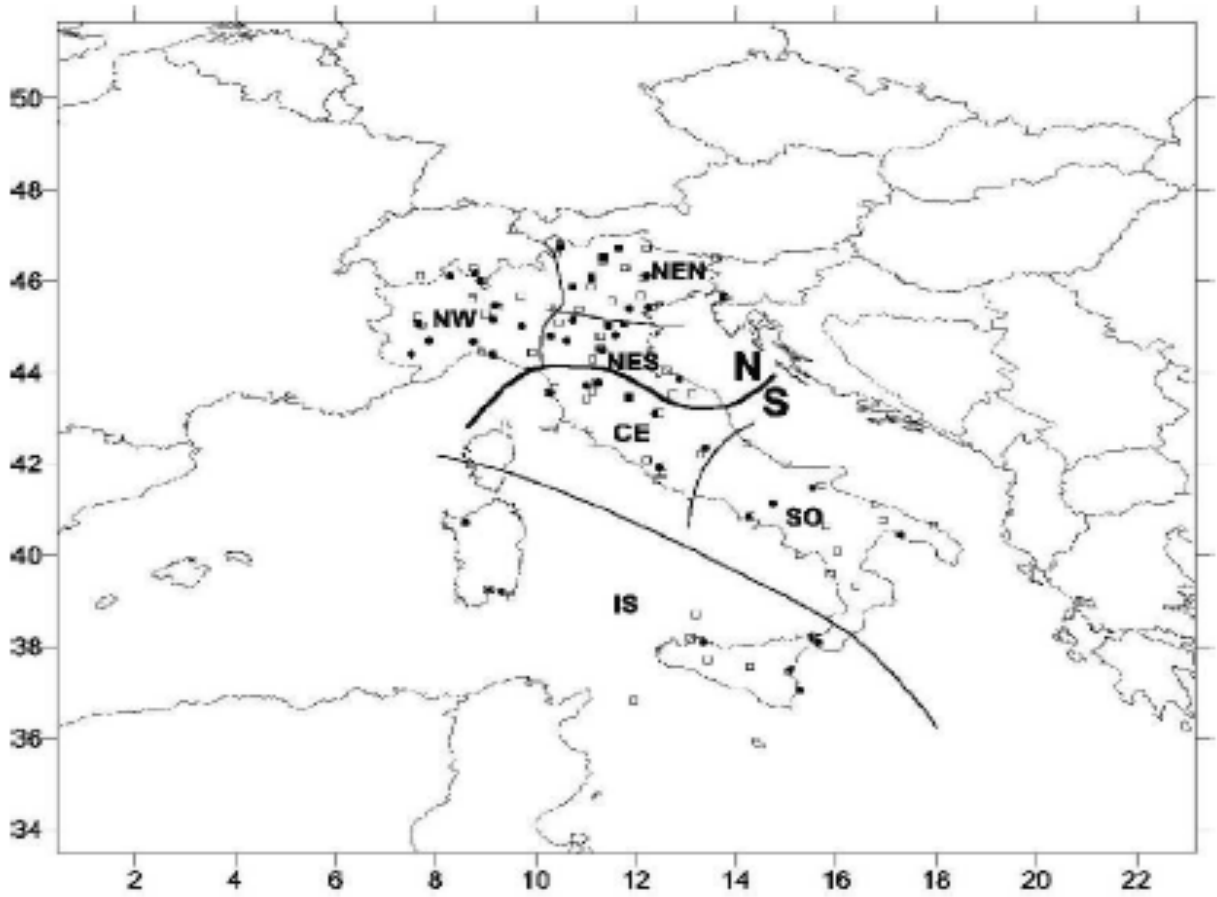
- The IPCC Third Assessment Report (TAR) suggests that, due to the increase in concentration of green-house gasses, the increase in mean surface temperature implies an increase in the intensity of the hydrological cycle

- For the Mediterranean area the projection (IPCC) in Scenarios such as A2 shows winter precipitation unvaried and decreasing in summer time, for the scenario B2, which has lower fossil fuel emissions as well as lower SO 2 emissions, projections shows no change in winter and inconsistent sign in summer

The climate change in Italy

- In Italy there are only some studies of interest and one finalised at the Third Italian Communication to the UNFCCC. For the past the communication confirm the TAR, with differences from North and South of Italy.
- Strong problems for Italy are at South water stress and desertification meanwhile at North could be a stronger "run-off" and the consequent floods, soil erosion etc.

The climate change in Italy



The climate change in Italy

a recent study (Brunetti *et al*., 2004b): using a new data set of **45 daily precipitation series**, covering quite uniformly Italian territory for the period 1880–2002. The principal results are:

- **Total Precipitation shows no trend in northern regions** and a significantly negative trend in South
- a negative significant trend in the number of wet days all over Italy, and a **positive trend in precipitation intensity**, which is **significant only in the northern regions**.

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The climate change in Italy

- the Regional Meteorological Office analysed summer and winter precipitation over Emilia-Romagna (Cacciamani *et al.*, 2001). The data used are the **monthly precipitation from 40 stations covering a period from 1922 to 1995**.
- **An increasing trend of the summer precipitation over the 1922-1995 interval (considering 17 stations) was found in the northern, central and eastern part of the region .**

Emilia romagna coping strategy

As EA suggest Climate change can have an effect on:

- **demand for water;**
- **availability of water.**

In Emilia-Romagna the increase of temperature from 2000 to 2016 means a modest increase in the domestic water demand (few millions of cubic meter).

Emilia romagna coping strategy

- The irrigation season in region is the summer. The demand for irrigation depends from a lot of factors: temperature, precipitation, wind etc.
- **for summer there is a weak trend for an increase in precipitation and quite no increase in temperature. The increase in CO2 concentration means also a more efficient use of water from the most of the agriculture plants**.
- For these reasons, **without a regional modelling of climate change**, **the Plan decided, as for the industrial demand, to suppose a neutral situation**.

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Emilia romagna coping strategy

- On the availability of water our strategy, as the EA for a longer period, assumes that for the next 12 years the public systems (also for agriculture) **maintain their actual supply, based on the last eleven years average, which was a strongly drought period**, **this assumption looks like conservative**.
- This approach is builded also on the time to revise the Planning **as in the WFD the Plan is revised every six years** and on the process of program assessment, which will be defined with the plan implementation. Climate changes seem to be consistent with more climatic extremes. The Plan take care asking for a Drought contingency Program at the regional and local levels

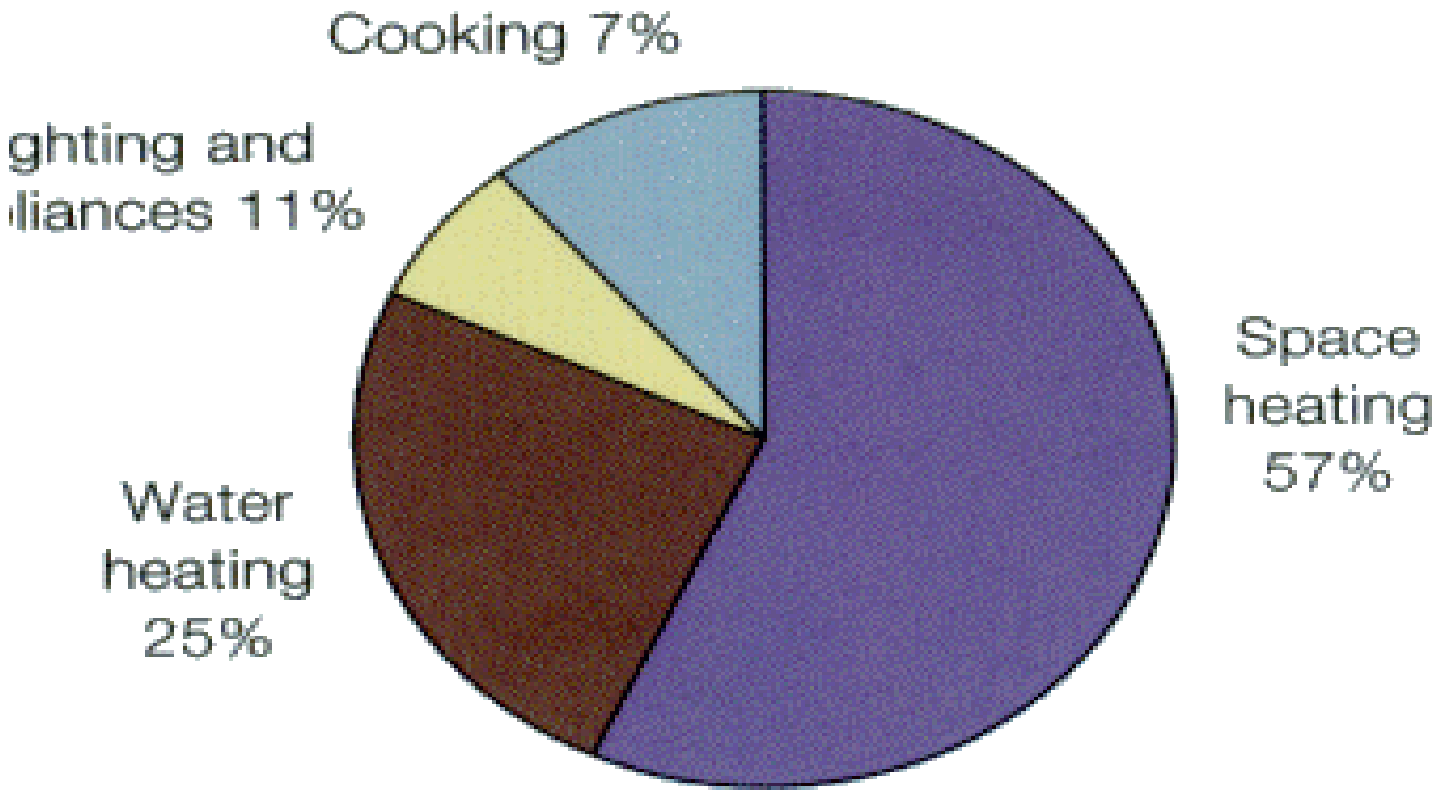
Future Research and Pilot Project

- Discussing the draft Plan a few suggested that C.C. could influence negatively **the groundwater recharge**. In the past there was a certain decrease caused from the strong urbanisation.
- **However the extreme events increment could instead increase the recharge, as generally it happens in floods**. About these aspects the Region should finance applied research, starting from the mathematical model developed by the plan.
- **The Region should yet invest in research and Pilot studies and project in the aquifer artificial recharge and in bankside storage schemes which can make use of available winter flows**

Water and energy savings

- In its 2000 Green Paper on security of energy supply, the **European Commission set out a strategy to improve energy efficiency**.
- The Commission reports that the total **final** energy consumption in the EU in 1997 was about 930 Mtoe. A simplified breakdown of this demand shows the importance of buildings in this context: **40.7 %** of total energy demand is used in the residential and tertiary sectors, most of it for building-related energy services.
- Space heating is by far the largest energy end-use of households in Member States (57%), followed by **water heating (25 %)**

Energy end-use of households in EU



Water and energy savings

- We are currently estimating prudentially that the planned water savings will bring an energy saving **directly** for the domestic water heating an pumping around the 12%, which means the 3% of all the energy needed in the residential sector(in Regione Emilia-Romagna 2,7Mtoe/year), for **81.000 toe**, which is about 1/6 of our Kyoto commitment in the residential sector.
- Moreover other relevant energy savings can com with thw water savings in the industrial sector, wich uses generally groundwater (90%)

conclusions

- the EEA statement put in evidence that in Europe seems more useful stress the WDM than the supply side
- The next step will be to define a good balance amid WDM and supply management; the WFD economic analysis is really relevant (consider also the opportunity and environmental costs)
- from a lot of water conservation experiences seems that it is crucial to develop together both technological and educational actions: in this way the results can consolidate and remain
- Finally the relation between water conservation and energy can help very strongly to the Kyoto goals; on this matter the results are so interesting to suggest some works for the CIS groups