

IRSA

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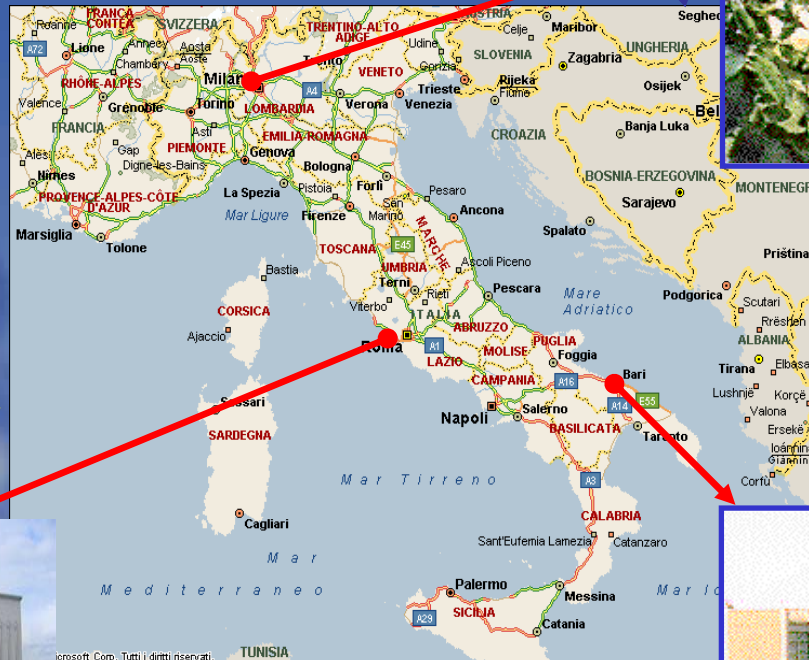


Montelibretti (Rome)

Aquatic Chemistry (pollutant transport and transformations), Water and Wastewater Treatment, Water Resources Management

Brugherio (Milan)

Pollutant effects, Ecotoxicology, Ecological classification



Bari

*Water, Wastewater and Sludge Treatment
Water Resources Management*



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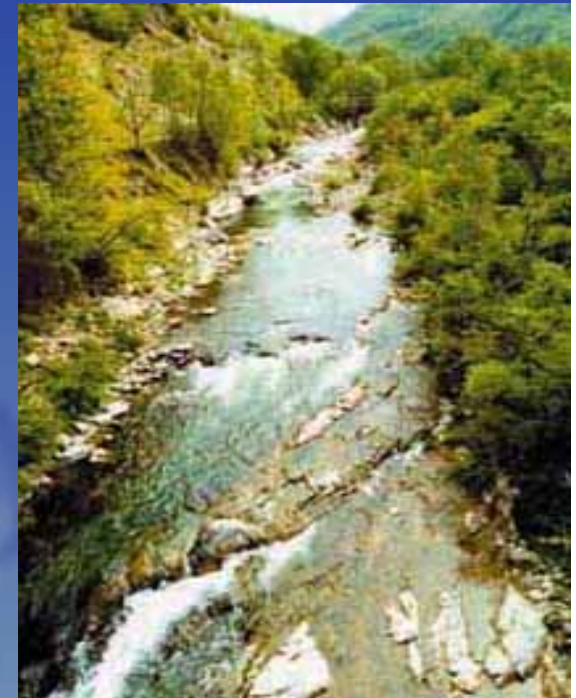
IRSA

The Water Research Institute (IRSA), among the 107 CNR research Institutes, is one of the largest.

In 2003, after the introduction in the scientific structure of the CNR of 11 Departments covering different research macro-areas, IRSA has been associated to the Department of Earth and Environmental Sciences.

IRSA has been established in 1968 and since then it has been involved in finding solutions to problems of water resources management and protection, and in developing processes and technologies for wastewater treatment.

It is worth to recall that IRSA was founded about 20 years before the Italian Ministry of the Environment and the National Environmental Agency, so it is easy to realize what has been the IRSA role in drawing the public attention on environmental issues and scientific-based water resources management.



IRSA mission

The institutional activity of IRSA is addressed to the enhancement of scientific and technological knowledge aimed to providing

- Parliament and the Administration with all information they need to issue appropriate legislation concerning water;
- management agencies with the best methodologies for water resources use and protection;
- national industries with state of the art, processes and prototypes in order to enhance their competitiveness in the market

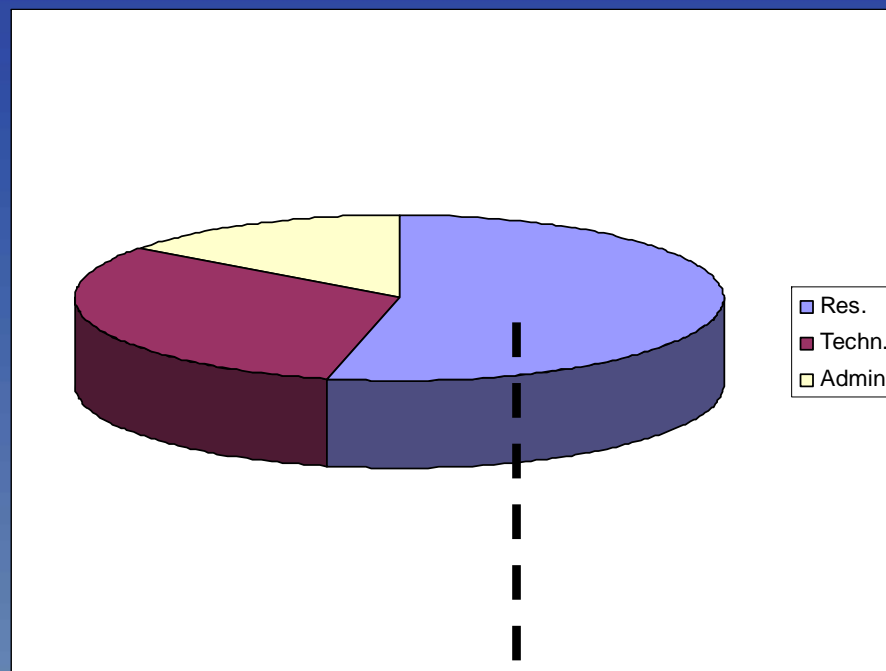


Total permanent staff (87)

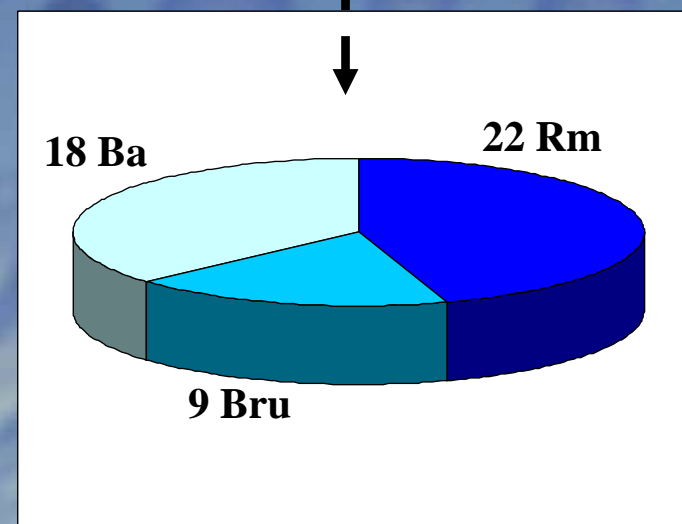
Researchers 49 (59 %)

Technician 28 (32 %)

Administrative 10 (12 %)

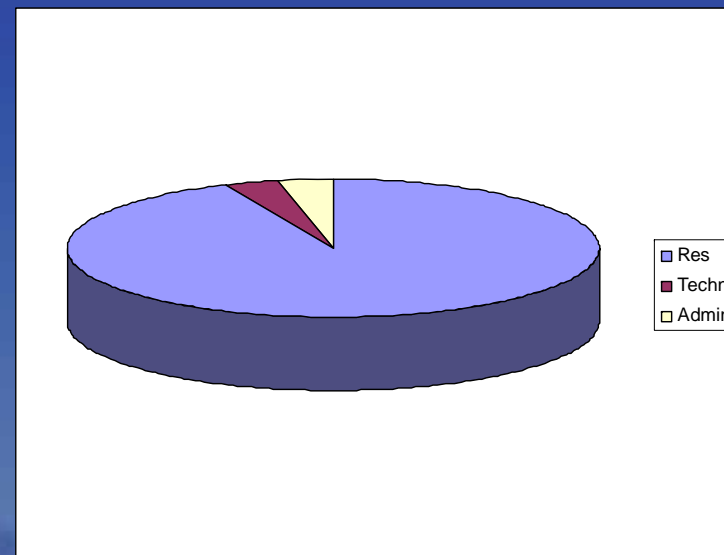


Distribution of researchers among the three units

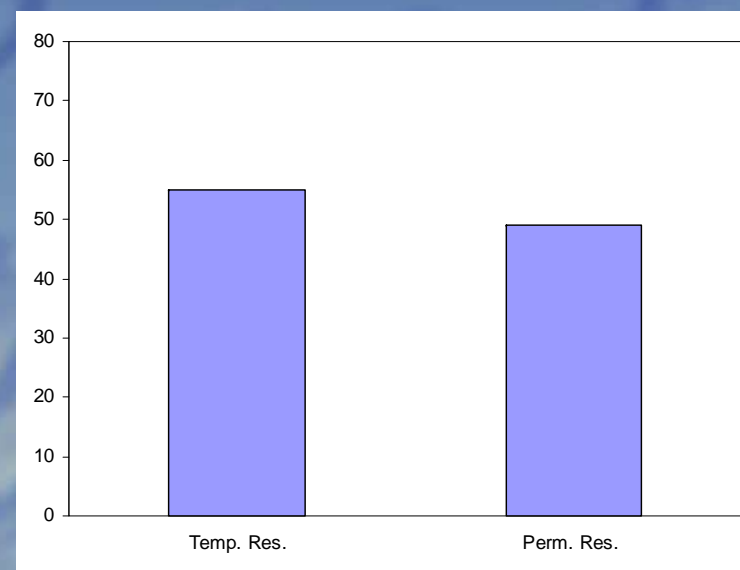
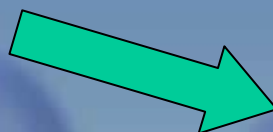


Temporary staff (59)

Researchers 55 (94 %)
Technicians 2 (3 %)
Administrative 2 (3 %)

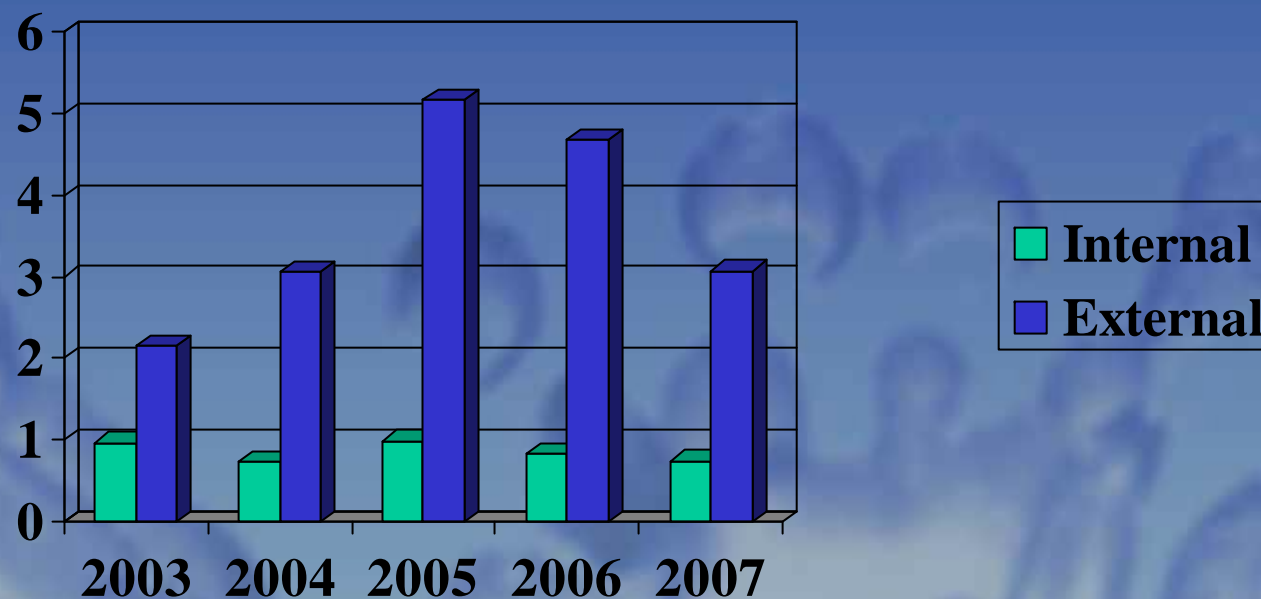


Total researchers
104



IRSA Annual Economic Resources

Euro (Million)



IRSA in Europe - EurAqua

IRSA is the Italian representative in EurAqua, which is the European network of Freshwater Research Organizations (<http://www.euraqua.org>) including partners from 24 EU countries.

The aim of EurAqua is to:

- contribute to the development of European freshwater science and its dissemination on a European scale, thus having a significant input on the development of the scientific basis of European water management;
- integrate European research resources through joint actions and initiatives
- promote the collaboration and efficient transfer of knowledge between scientific institutions and between researchers
- provide expert advice to EU institutions and other stakeholders
- increase the competitiveness of the European water sector on a global scale



IRSA in Europe – MSMG/WssTP

Since 2004, IRSA has been appointed by the Ministry of University and Research to represent Italy within the Members States Mirror Group (MSMG) of the Water Sanitation and Supply Technology Platform (WssTP) of the European Commission (<http://www.wsstp.eu>). The Mirror State Members Group includes governments' representatives from 27 European Countries.

The WssTP aims to develop an effective collaboration between the different communities working in the water sector (industrialists, Research Groups, Policy Makers, Financiers, Water Consumers) for raising awareness of water issues and contributing to the water Millenium Development goals. The WssTP activities produce research strategic visions and evidences based reports identifying future research needs.

The mission and related goals of the WssTP are to strengthen the competitiveness and the potential for:

- a) Favoring technological leadership by the European Water Industry;
- b) Solving European water issues;
- c) Addressing the challenge of an integrated and sustainable management of water resources.



IRSA International Activities

Beside being the Italian representative within EurAqua and MSMG-WssTP, IRSA is also the Italian representative within the International Water Association (IWA) and:

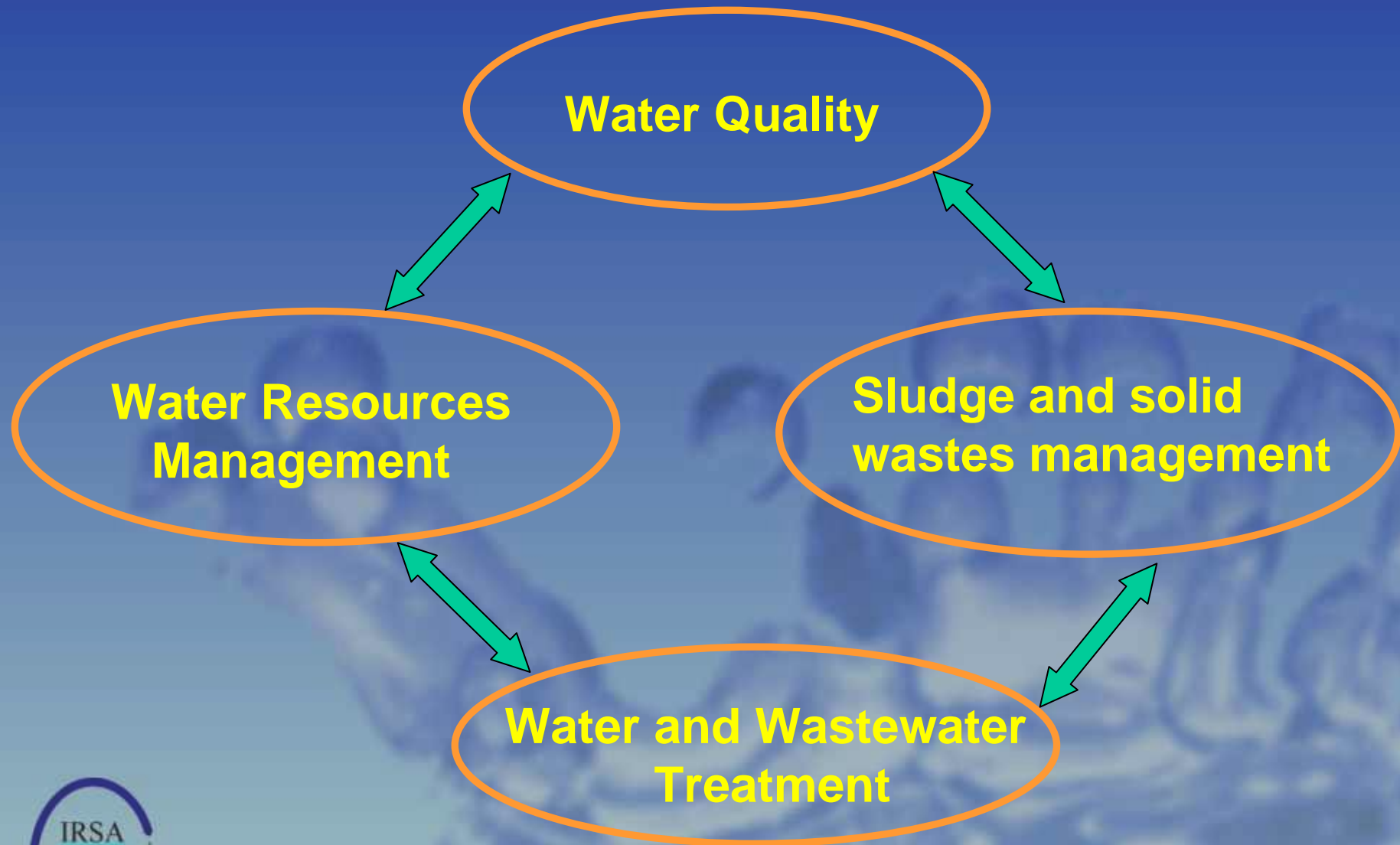
- has been participating in a high number of EU Research projects; some of them are:

climate change (Chess, Circe), implementation of WFD (HarmonIT, HarmonRib, Euroharp, TempQSim, Aqem, Star, Rebecca, Eurolimpacs), land use management (Aquastress, AgriBMP-Water), wastewater treatment and reclamation (Macobs, Dynafilm, Eurodemo, Innowatech, Perbiof)

- participates to bilateral projects for the protection of common waters (Italy-Slovenia-Croatia; Italy-Switzerland), to twinning projects for the transfer of results gathered in the framework of the implementation of the WFD 2000/60/EC to other countries such as Bulgaria, and in other bilateral projects involving other countries (Egypt and Turkey).



Main Research Areas at IRSA



Water Quality

The aim is to improve our knowledge on the functioning of ecosystems at different spatial and temporal scales, including the interaction between humans and the environment and the sustainable management of natural resources. Major topics are the characterization of the environmental pollution in surface and ground water and the analysis of the effects of pollutants on the ecosystem. Specific actions include:

- pollutant sources, set up and validation of analytical methods for water pollution control and ecological classification of water bodies, environmental quality standard
- modes of transport of pollutants and their circulation-transformation processes, evaluation of pollutant trend, emerging pollutants
- effects of pollutants on the structural and functional characteristics of the ecosystems (e.g. the endocrine disrupting compounds), the role of microbial ecology in the cycling of carbon



90% of barbel males in the Po River shows more or less marked female characteristics



Water Resources Management

Some topics of interest are:

- ▶ sustainability of groundwater resources
- ▶ development of tools for water resources planning and management
- ▶ groundwater quality management and protection
- ▶ water management in semiarid areas/ under droughts conditions
- ▶ modelling of contamination from non-point sources



Water and Wastewater Treatment

The research effort is devoted to study, develop and characterize new processes for treating:

- **Water Resources**

removal of POP_s (e.g., endocrine disruptors, herbicides, pesticides, dyes, pharmaceuticals) from surface as well as ground water resources

- **Municipal Wastewater**

MWWTP retrofitting for facing the impact of growing population and increasing loads, Minimizing sludge production, Odor Removal, WW Reuse

- **Industrial Wastewater**

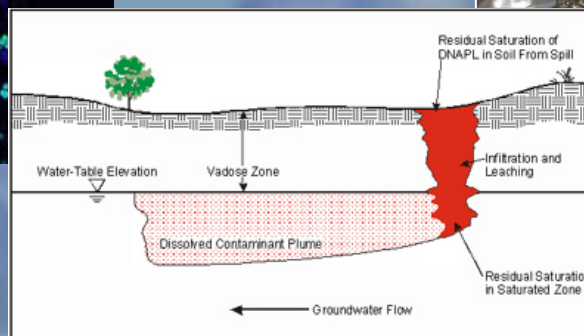
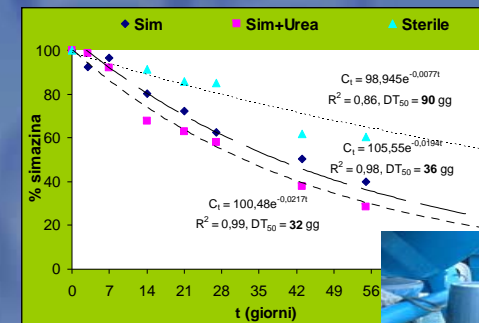
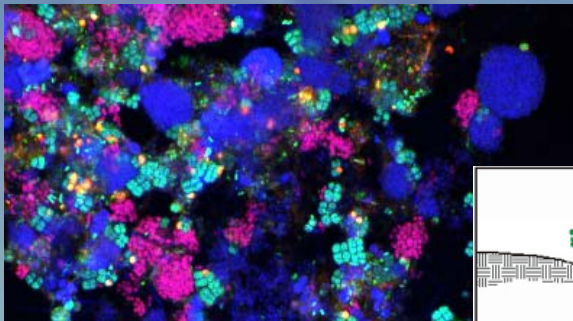
Treatment of recalcitrant wastewater (e.g. tannery WW, landfill leachates, etc.)



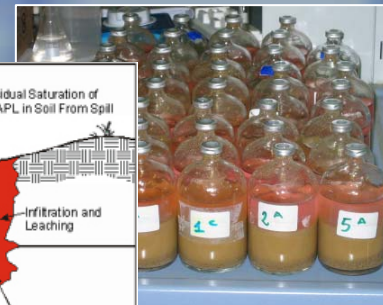
Environmental Microbiology and Ecology

The research activity is mainly aimed at investigating the structure and the role of microbial communities in the frame of the following topics:

- Climate change and pollution impact on structure and function of microbial communities
- Biological wastewater treatment
- Soil and groundwater bioremediation



Source: EPA, 1992



Sludge and waste management

Some topics of interest for IRSA:

- Studies on innovative processes for sustaining sewage sludge use in agriculture

Assessment of sludge disposal options with the aim to increase energy recovery

Assessment of the best operating mode of waste incineration by lab experiments

Definition of new approaches for waste classification with specific regard to the attribution of hazard characteristics



Strength points of IRSA

Tight bonds with the peculiarities of the Italian territory through the three units in Rome, Bari and Brugherio with positive feedbacks in terms of scientific ideas and funded projects.

Multidisciplinary character of the Institute where expertises in the field of chemistry, hydrogeology, environmental sciences, engineering, mathematics, physics have been used to interact to face with environmental issues, strong interaction among Rome, Bari and Brugherio

At national level, one of the reference scientific Institutes for the Ministry of the Environment and the National and Regional Environmental Agencies for water-related problems and strong collaborations with many Italian Universities.

Active involvement in European programmes and activities, and also strong scientific relationships with other countries and in particular with USA and Australia.

Active involvement in remote-areas related activities with special emphasis on hydrological aspects and pollution of water resources (Nepal, China, Tibet, Pakistan)

The moving in the research area in Montelibretti was a hard task but we have been able to have only a two months break in the activities. Now researchers enjoy their new laboratories and also have the opportunity for a better exchange of ideas with other numerous institutes present in the area and this gives promise for the future.



IRSA participation in recent EC projects 1/2

INNOWATECH (Innovative and integrated technologies for the treatment of industrial wastewater)

NEPTUNE (New sustainable concepts and processes for optimization and upgrading municipal wastewater and sludge treatment)

AQUASTRESS (Mitigation of Water Stress through new Approaches to Integrating Management, Technical, Economic and Institutional Instruments)

RECLAIM WATER (Water reclamation technologies for safe artificial groundwater recharge)

MBR-TRAIN (Process optimization and fouling control in membrane bioreactors for wastewater and drinking water treatment)

PERBIOF (A new technology for treating municipal and/or industrial wastewater with low environmental impact)

METTTESS (More Efficient Transnational Technology Transfer in the Environmental Sector)

EURODEMO (European Coordination Action for Demonstration of Efficient Soil and Groundwater Remediation)

AQEM (The development and testing of an integrated assessment system for the ecological quality of streams and rivers throughout Europe using benthic macroinvertebrates)



IRSA participation in recent EC projects 2/2

STAR (Standardization of river classification)

BEEP (Biosensor for effective environmental protection)

EASYRING (Environmental agent susceptibility assessment utilising existing and novel biomarkers as a rapid non-invasive testing methods)

TEMPQSIM (Evaluation and improvement of water quality models for application to temporary waters in Southern European catchments)

EUROLIMPACS (European project to evaluate impacts of global change on freshwater ecosystems)

REBECCA (Relationships between ecological and chemical status of surface waters)

SESAME (Southern European Seas: Assessing and Modelling Ecosystem changes)

CIRCE (Climate Change and Impact ResearCh: the Mediterranean Environment)

HARMONIT (IT Frameworks)

HARMONIRIB (Harmonised Techniques and Representative River Basin Data for Assessment and Use of Uncertainty Information in Integrated Water Management)

EUROHARP (Towards European Harmonised Procedures for Quantification of Nutrient Losses from Diffuse Sources)

NEWATER (New approaches to adaptive water management under Uncertainty)

