

General description

Identification Data

Name :

Estación Experimental del Zaidín

Address:

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Phones:

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Director:

Nicolás Toro García - director.eez@csic.es

Vicedirectors:

José Manuel Palma Martínez, Maria Trinidad Gallegos Fernández

Manager:

José Luis Sánchez Justicia - gerente.eez@csic.es

Web:

<http://www.eez.csic.es/>

Govern mode:

Own CSIC Centre type A

Brief history

Date of creation :

1955-05-04

Who created it :

Prof. José Ibañez Martín President of the Consejo Superior de Investigaciones Científicas

Who was its first director :

Prof. Enrique Gutierrez Ríos

Goals :

with the aim of carrying out research on soil and plants

Extended description :

The Estación Experimental del Zaidín (EEZ) that belongs to the Spanish Council for Scientific Research (CSIC) Agency is an upward and dynamics research Centre with a long scientific history. Although it was officially established on May 4th 1955 with the aim of carrying out research on soil and plants, its origin is dated back to 1940 when Granada was chosen as an excellent target location to achieve one of the objectives of the CSIC: to expand its scientific activities all over Spain. The creation of several research Sections devoted to specific

scientific objectives was based at that time on the different Chairs occupied by young Professors that recently arrived to the University of Granada (Sciences and Pharmacy Faculties). In 1946 the two first Sections, as devoted to Chemistry-Physics and Agricultural-Chemistry, were created under the leadership of Profs. Dr. Enrique Gutierrez Ríos and Dr. Angel Hoyos de Castro, respectively. These two Sections were dependent on the Patronato Alonso de Herrera and were linked to the Institute of Edaphology and Plant Physiology of the CSIC in Madrid. Two additional Sections were added in 1949, as focussed on Soil Microbiology and Plant Physiology, under the direction of Profs. Dr. Vicente Callao Fabregat and Dr. Luis Recalde Martínez, respectively. In 1951 the first structure, the basis for the future EEZ, was completed with the incorporation of a new section devoted to Analytic Chemistry under the direction of Prof. Dr. Fermín Capitán García. To bring together the different Sections dispersed among distinct Faculties of the University of Granada, in 1950 the CSIC acquired one building, later known as Casa Blanca (White House) and its surrounding ground of about 2250 m² located next to the currently known as Cervantes Avenue. This building started being operative in 1953 and was fully occupied by the Sections mentioned above during 1954. Two years later, the EEZ emblematic building, known as Casa Amarilla (Yellow House), was acquired for both laboratory establishment and administrative purposes. The first Director of the EEZ as Institute of the CSIC was the Prof. Enrique Gutierrez Ríos who remained in his position until 1957. A new Section named Mineralogy of Clays, with Prof. Juan Luis Martín Vivaldi as Section Head, was added to the Research Structure of the EEZ in 1957. Prof. Angel Hoyos de Castro was the Director of the Institute from 1957 to 1961. In 1958 the new Section of Animal Physiology was created under the supervision of Prof. Gregorio Valera Mosquera. This was a very important decision in the future development of the EEZ since animal studies extended the original aims on plant and soil research. In 1961 Dr. Luis Recalde Martínez was appointed Director of the Institute and remained in Head position until 1979. During this period the structure of the EEZ was enlarged with the incorporation of two new Sections, one devoted to Mineralogy of Soils, with Prof. Miguel Delgado Rodriguez as Head, and the second to Agrometeorology, supervised by specialists from other Organisms. A Section of Statistic coordinated by Prof. Dr. Alfonso Guiraum Martínez was also established based on a Service previously created in 1957. The early Sections that were created throughout the history of the EEZ changed with time and new Sections start to function in 1970: Biochemistry, with Prof. Federico Mayor Zaragoza as Section Head, and the Laboratory of Botany, with Prof. Fernando Esteve Chueca as Supervisor. The construction of a new building known as Casa Roja (Red Building) began in the early 1970s, became operational in 1976 and remains nowadays as one of the most important laboratory buildings at the EEZ. Prof. Dr. Manuel Lachica Garrido was the Director of the EEZ from 1979 until 1983 and, based on the directions of the CSIC, the former Section were re-organized into Structural Units. Nine of these Units were established: Physical-Chemistry and Mineral Geochemistry, Edaphology and Botany, Plant Physiology, Agricultural Chemistry, Phytopathology, Microbiology, Plant Biochemistry, Animal Physiology, and Analytical Chemistry. Under the Direction of Prof. Lachica the EEZ celebrated its XXV anniversary in 1980. Prof. Dr. Julio Boza was the following Director of the EEZ from 1983 to 1989. In that period the CSIC began to redefine its research lines and its objectives focusing more on the biological aspects (Animal, Plant and Microbes) than on edaphic studies. Prof. Dr. José Miguel Barea Navarro was Director of the Institute from 1989 to 1998. In this period the internationalization of the research carried out by the institute took place and several research groups of the EEZ managed to obtain grants from the different programmes developed by the UE, and that allowed the strengthening of the scientific structure (personnel, equipment and publications). The nine Structural Units were re-organized into five Departments: Agroecology and Plant Protection; Biochemistry, Molecular and Cellular Biology of Plants; Soil Microbiology and Symbiotic Systems, Animal Nutrition, and Earth Sciences and Environmental Chemistry. Prof. Juan Luis Ramos Martín became Director of the EEZ in 1998 and remained in his position until 2007. In 1999 the Unit of Animal Nutrition moved out from the central location of the EEZ to a new building constructed at Armilla, a little town close to Granada. In 2002 different emblematic buildings were renewed and the construction of a new Casa Blanca replacing the former one started. This new building was inaugurated in May 2005, together with a new

Auditorium. Coinciding with these events, the 50th anniversary of the EEZ was celebrated with the assistance of the CSIC President, Prof. Carlos Martínez and Prof. Federico Mayor Zaragoza, ex-Director of the UNESCO. New greenhouses were also constructed replacing the old ones and other buildings were adapted for new uses as the Library, additional laboratories, plant growth chambers, kitchenette, etc. This period of the EEZ can be considered one of the most unrestrained for both infrastructure and the incorporation of scientific personnel, mainly based in the development of the strategic plan 2005-2009 enforced by the CSIC. In the frame of this strategic plan, the EEZ was again reorganized on March 2007 in the following departments: Biochemistry, Cell and Molecular Biology of Plants; Microbiology of Soil and Symbiotic Systems; Environmental Protection; and Environmental Geochemistry. In addition, the Department (Unit) of Animal Nutrition started its development to become in the future an Institute within the EEZ structure. On the other hand, the Environmental Geochemistry department was planned to move out of the EEZ, and join the Instituto Andaluz de Ciencias de la Tierra to develop a new independent Centre devoted to Earth Sciences Studies. Prof. Dr. Nicolás Toro García is the current director of the EEZ from March 2007. Since then he is in charge of the development of the current Strategic Planning 2005-2009 as well as responsible of the proposal of the next one that will extend from 2010 to 2013. In this new Strategic Planning (2010-2013) the EEZ will be structured on the basis of the Departments of Biochemistry, Cell and Molecular Biology of Plants; Microbiology of Soil and Symbiotic Systems; and Environmental Protection, while the Department of Animal Nutrition will pursue its development as a new Institute with its own strategic plan, but integrated in the structure of the EEZ. At present, new infrastructure is being added to the EEZ, i.e., a laboratory building is being constructed that should be occupied by the department of Microbiology of Soil and Symbiotic Systems in early 2009; a cafeteria is also being built, and the building already occupied in Armilla by the Animal Nutrition Department will be expanded. The research objectives of the EEZ fit well among those considered as priority by National Scientific Research and Technology Programmes, EC programmes, Basic Science Research Programmes, Regional Government Research Plans and Strategic Research Plans of the CSIC.

Structure

Description :

The Estación Experimental del Zaidín (EEZ) is a research Centre of the Spanish Council for Scientific Research (CSIC) Agency. The EEZ science programme focussed on Agricultural Sciences is structured on the basis of the Departments of Biochemistry, Cell and Molecular Biology of Plants; Microbiology of Soil and Symbiotic Systems; and Environmental Protection. The Department of Animal Nutrition will pursue its development as a new Institute and will develop its own Strategic Planning, but will remain integrated in the structure of the EEZ sharing its General Management and Services.

The EEZ has the following Organizational Structure (see Structure Chart in the Centre Multimedia Gallery):

1. The Executive Board (EB) of the EEZ is responsible for major executive and political decisions including those dealing with long-term Strategic Planning.
2. The Centre's Governing Board (CGB) is the main executive body of the EEZ and assists the Director of the Centre in all the scientific and administrative issues. The CGB meets monthly to increase the speed of decision making, implementation and communication.
3. The Scientific Senate (SS) assists the Director of the Centre in major scientific policy and long-term Strategic Planning. The SS holds a general meeting once a year to debate the general situation of the Centre and extraordinarily when is necessary to analyze relevant organizational and scientific issues.

4. The Institute of Animal Nutrition is currently under development. The director of the Institute is responsible for its main scientific research lines and the development of long-term Strategic Planning.

5. The EEZ Science Departments are: Biochemistry, Cell and Molecular Biology of Plants; Microbiology of Soil and Symbiotic Systems; and Environmental Protection. A Head of Department leads each scientific department integrated by research groups of varying size. A Group Leader is responsible for each of the research groups.

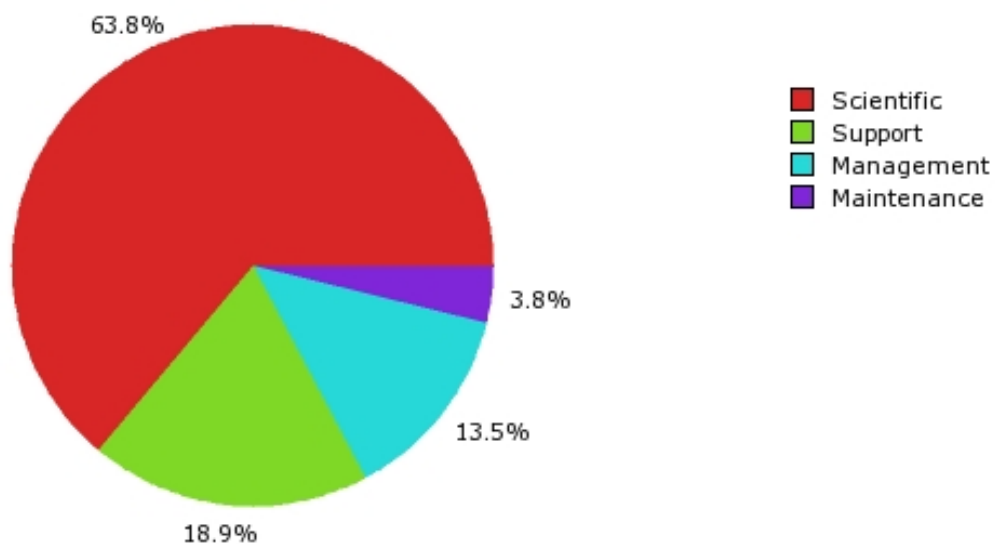
The Group of Mediterranean Pastures and Silvopastoral Systems, headed by Dr. José Luis González Rebollar is currently integrated in the Environmental Geochemistry Department and will have to be incorporated during the Strategic Planning 2010-13 to one of the three departments remaining at the EEZ.

6. The Services will provide support to the research activities carried out at the Centre, both in the EEZ main site and in the proposed Institute of Animal Nutrition. The services are supervised by designed staff-scientists. These services are: Information Technologies, Knowledge Transfer, Science Outreach, Library, Radiochemistry laboratory, Greenhouses and Plant Growth Chambers, Scientific Instrumentation, Microscopy and DNA Sequencing. Two of these services will be implemented in the SP2010-13: Microscopy and DNA Sequencing.

7. The General Management service is headed by the Centre Manager and will be responsible for managing the settlement, delivery and operation of the Centre, both in the EEZ headquarters and in the proposed Institute of Animal Nutrition. The service includes the Maintenance, Repairs and Conversion Work activities and five major financial and administrative areas: Secretariat, Human Resources, Payments, Purchases and Administrative Contracts, and Project Management.

For a more detailed description of the EEZ structure see the corresponding files in the Multimedia Gallery.

Staff

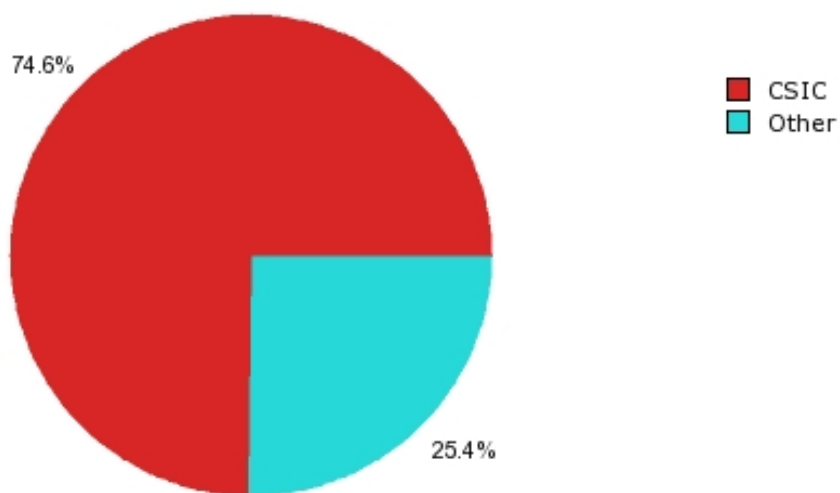


	Male	Female	TOTAL
Scientific	60 (51%)	58 (49%)	118 (100%)
Support	12 (34%)	23 (66%)	35 (100%)
Management	9 (36%)	16 (64%)	25 (100%)
Maintenance	7 (100%)	0 (0%)	7 (100%)
TOTAL	88 (48%)	97 (52%)	185 (100%)

Scientific personnel by type

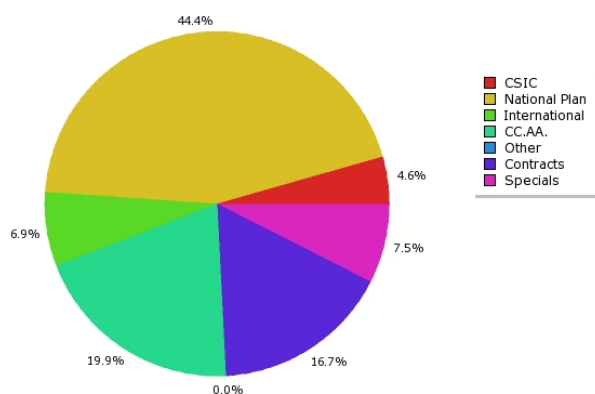
		Male	Female	TOTAL
Scientific Civil Servant	Research Professor	9 - (69%)%	4 (31%)	13 (100%)
	Research Scientist	7 - (47%)%	8 (53%)	15 (100%)
	Tenured Scientist	14 - (61%)%	9 (39%)	23 (100%)
	Full University Professor	0 - %	0	0
	University Professor	0 - %	0	0
	Other	0 - %	0	0
Scientific Hired	Ramón y Cajal	0 - %	0	0
	JAEDOC	5 - (71%)%	2 (29%)	7 (100%)
	Other	5 - (38%)%	8 (62%)	13 (100%)
Scientific Training	JAEPREDOC	6 - (30%)%	14 (70%)	20 (100%)
	Other	14 - (52%)%	13 (48%)	27 (100%)
Scientific personnel		60 - (51%)%	58 (49%)	118 (100%)

Staff by payer organization

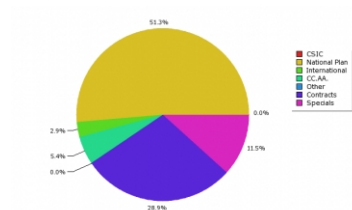


Funding by type

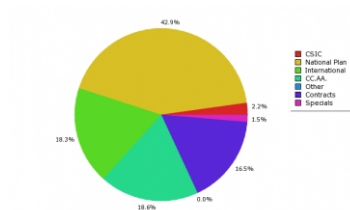
YEAR : 2003,2004,2005,2006,2007



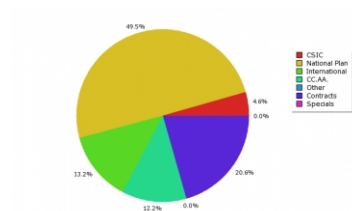
YEAR : 2003



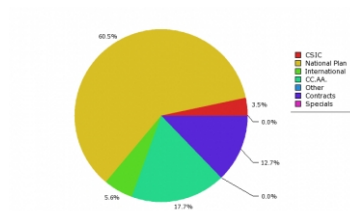
YEAR : 2004



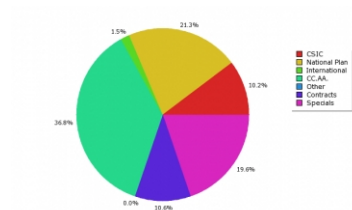
YEAR : 2005



YEAR : 2006



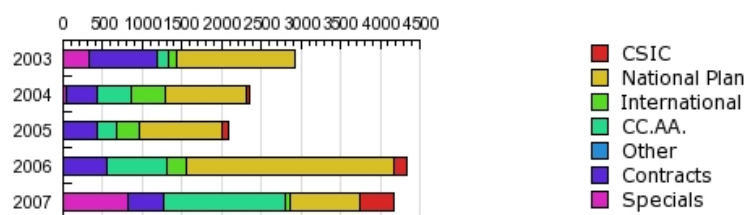
YEAR : 2007



Funding by type

		2003	2004	2005	2006	2007	TOTAL
CSIC		0	52	96	150	426	724
National Plan		1499	1011	1036	2622	890	7058
International		84	432	277	241	61	1095
CCAA		157	440	255	768	1535	3155
Other		0	0	0	0	0	0
Contracts		845	389	431	550	444	2659
Specials	Consolider	0	0	0	0	818	818
	Cenit	0	0	0	0	0	0
	Ciber	0	0	0	0	0	0
	Profit	25	35	0	0	0	60
	Petri	312	0	0	0	0	312
	Large Instalations	0	0	0	0	0	0
	Subtotal	337	35	0	0	818	1190
TOTAL		2922	2360	2096	4331	4173	15881

Funding by type/year

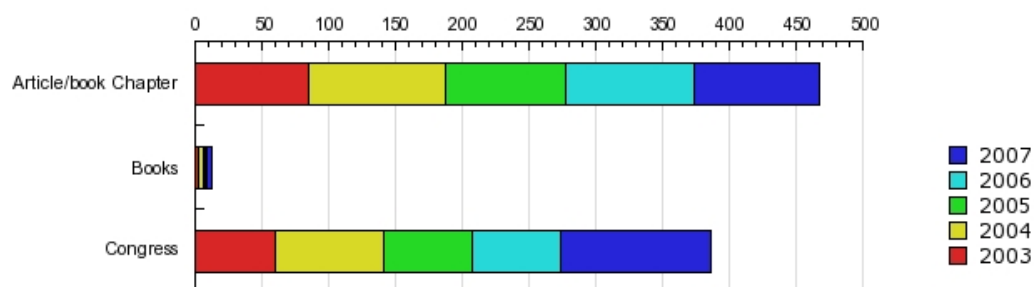


Data in (K€)	2003	2004	2005	2006	2007	TOTAL
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Publications

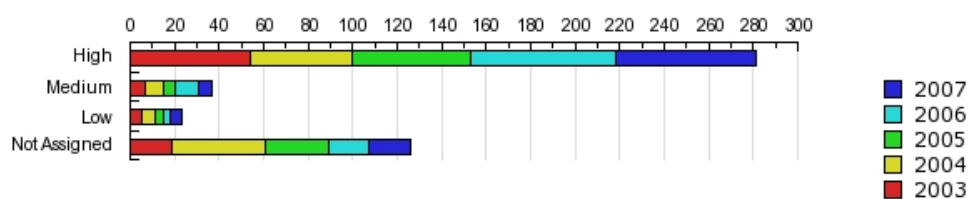
Publications by type

Publications by type						
Type	2003	2004	2005	2006	2007	Total
Article/Book chapter	85	102	90	97	93	467
Books	2	4	2	1	3	12
Congress	60	81	66	67	112	386
TOTAL	147	187	158	165	208	865



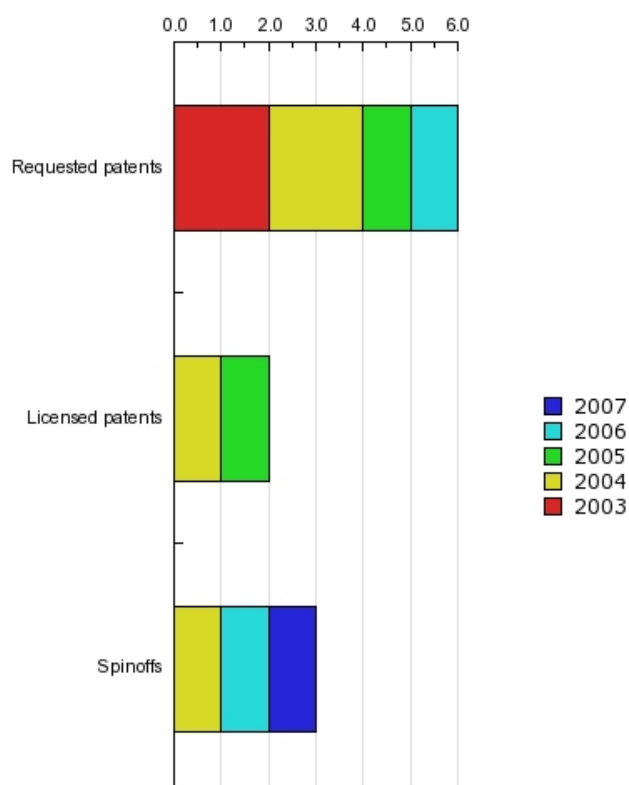
Article / Book chapters by impact

Article / Book chapters by impact						
Type	2003	2004	2005	2006	2007	Total
HIGH	54	46	53	65	63	281
MEDIUM	7	8	5	11	6	37
LOW	5	6	4	3	5	23
Not assigned	19	42	28	18	19	126
TOTAL	85	102	90	97	93	467



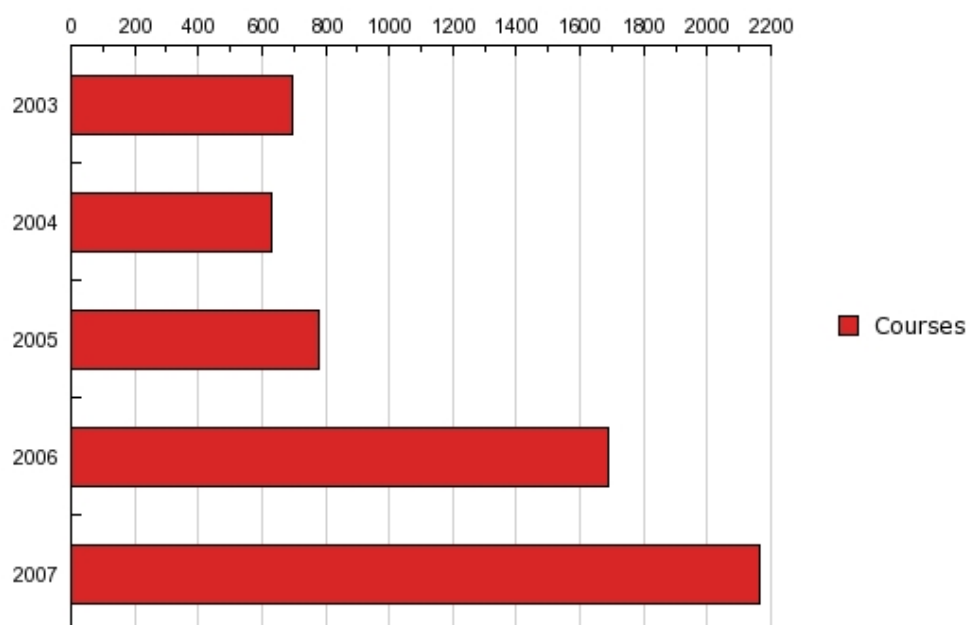
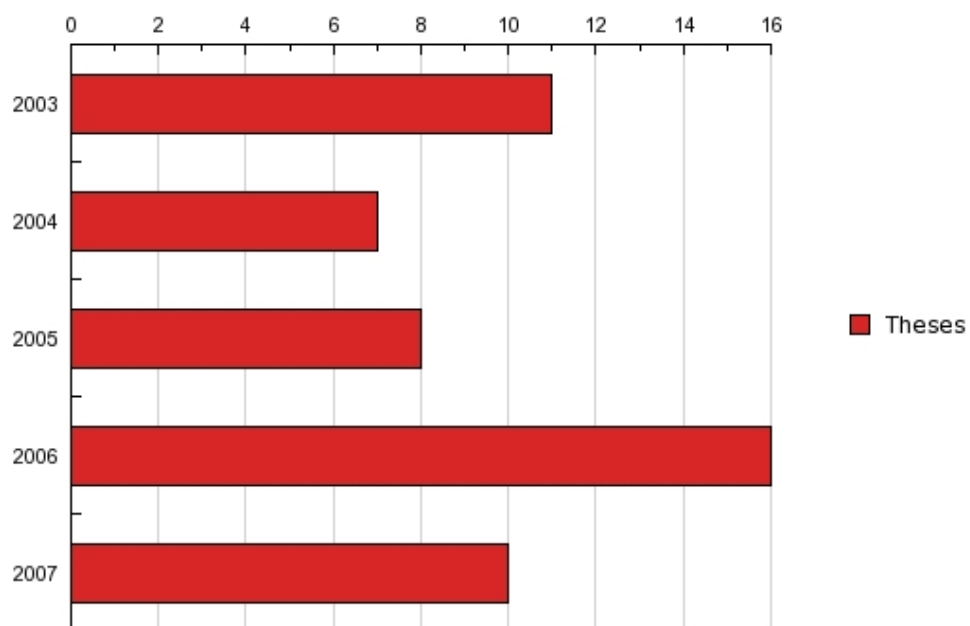
Knowledge Transfer

Licensed patents						
Type	2003	2004	2005	2006	2007	Total
Requested patents	2	2	1	1	0	6
Licensed patents	0	1	1	0	0	2
Spinoffs	0	1	0	1	1	3
TOTAL	2	4	2	2	1	11



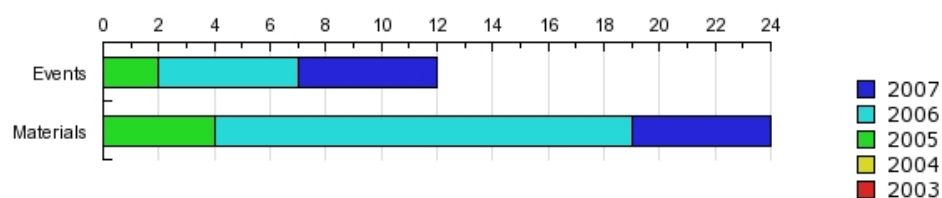
Training by type

Training by type						
Type	2003	2004	2005	2006	2007	Total
Theses	11	7	8	16	10	52
Courses (hours)	698	628	779	1690	2164.5	5959.5
TOTAL	709	635	787	1706	2174.5	6011.5



Science divulgation activities

Science divulgation activities						
Type	2003	2004	2005	2006	2007	Total
Events	0	0	2	5	5	12
Materials	0	0	4	15	5	24
TOTAL	0	0	6	20	10	36



SWOT

Weaknesses

- - Scientific activity conditioned by the organizational structure
 - ? Rigid structure of departments and research groups at the Centre that sometimes limits the potential innovation provided by young researchers and the cooperation among groups to accomplish proximate scientific goals.
 - ? Lack of competitiveness in the selective process for Tenured Scientists, as it usually involves only internal candidates.
 - ? Presence of some small research groups with no progress in their status throughout the last years, what may lead to an excessive diversification of resources and scientific objectives.
- - Low participation in European programmes
 - ? With few exceptions, most of the EEZ groups have had difficulties to capture European funding in the course of the Sixth and Seventh Framework Programme, and this has negatively affected to the EEZ as a whole.
- - Deficient Infrastructure
 - ? The EEZ has suitable facilities for the development of its research activity. However, the main building dedicated to research, the Red House (?Casa Roja?), cannot longer support modern facilities. This building with 3973 m² was opened 34 years ago and needs to be either remodelled or a new building be constructed.
- - Services that are not of general interest
 - ? Some of the actual EEZ services do not seem to have a noteworthy number of internal or external users and they have remained supporting the activities of particular research groups. On the other hand, some other services are demanded by the EEZ researchers to better accomplish their objectives, such as Microscopy and DNA Sequencing. In fact, the absence of these services makes the EEZ researchers to contract external services.
- - Difficulty to recruit PhD students and postdoctoral fellows
 - ? It is difficult to recruit postgraduate students with competitive academic records. Also, PhDs interested in pursuing the scientific career has descended over the last years and they are unmotivated to apply for fellowship and/or grants both in Spanish and foreign laboratories.

Threats

- - Shortage of technical and administrative support staff
 - ? The low number of permanent and hired technical staff in the Centre is a persistent problem that has increased over the years at the EEZ. The ratio between such personnel and scientists has become from 0.51 in 1994 to 0.33 in 2004, and 0.18 in 2008, thus compromising the support for the different research activities carried out at the Centre. Most of the support personnel are temporally hired lacking stability and constitute a considerable drain of funding from the research projects. In addition, current compulsory selective processes for laboratory technicians and other support personnel are rigid and do not always allow the selection of the candidates with the most appropriate professional backgrounds.
 - ? The staff dealing with management in the economic, administrative and maintenance areas of the EEZ is limited by the RPT (relation of working places assigned to the Centre), and cannot be freely hired when needed, which strongly limits the capacity of the Centre to cope with the management of its increasing research activity.
 - ? The personnel ascribed to the General Management lack specialized formation. In addition, they currently handle inadequate computing resources for their activity.

- - Increasing bureaucratization of the scientific activity
 - ? The bureaucratization of research activities is being translated into a loss of effectiveness of human resources, especially for administrative personnel, the heads of the groups and those scientists involved in the coordination of grants, which is increasingly hampering scientific research.
 - ? Processes for personnel recruitment, financial management obtaining and acquisition of infrastructure are excessively strict and time-consuming and sometimes unaffordable.
- - Financial crisis
 - ? The current national and international financial crisis may affect R&D funding compromises by both the Spanish and European research agencies.
- - Difficulty to obtain resources from the European Commission.
 - ? Obtaining resources from the EC in the course of the 6th and 7th Framework Programs has proven to be very difficult for most of the EEZ groups so far, probably due to the excessive focusing of the research topics in the EC programs. This may generate important fluctuations in the funding raised by the research groups of the EEZ.
 - ? The complex application process, the necessity of lobbying strategies, and the complexity of the grant management, discourages scientists to compete for EC grants.
- - Difficulty to recruit young scientists
 - ? There is insufficient support for new scientists to set their own research groups due to the lack of invest and promotion by the Ministry and the CSIC.
- - Little interest of companies to invest in R&D
 - ? In spite of the agricultural potential of Andalusia, there is a limited interest of local, regional, national and foreign companies devoted to biotechnology, agriculture development and environmental management to invest in R&D.
- - Low political weight of the CSIC in the R&D management system of the Andalusia Community
 - ? Although the Andalusia government has demonstrated to have interest in supporting the regional R&D system, the Centre has to face many technical and financial obstacles associated to these grants that mainly affects personal hiring. These problems are due to contradictory policies applied by the State and the Autonomous Community Governments.
- - Division of the centre in two institutes
 - ? To share General Management between the Estación Experimental del Zaidín in Granada with the Institute of Animal Nutrition in Armilla without a specific policy of the CSIC towards increasing human and material resources will weaken the functionality of this service in both headquarters.

Strengths

- - Multidisciplinary and integrative approaches of the research carried out at the EEZ
 - ? One of the main strengths of the EEZ derives from its consolidated research lines with multidisciplinary and integrative approaches supported by different research groups with excellent scientific production and well integrated in their national and international context, excellent reputation in their fields as evidenced by international publications, financial support obtained from regional, national, international institutions and private companies, and well established national and international collaborations.
- - Equipment
 - ? In the last years the EEZ has acquired modern equipment that has either come to replace obsolete one or bring new technological support to the Centre's activities. The Centre has

recently purchased an HPLC/MS/MS, a GC-MS and vacuum evaporation system for the Scientific Instrumentation Service, advanced imaging systems for chemiluminescent, fluorescent and colorimetric samples, and two quantitative PCR apparatuses. A new fluorescence stereomicroscope, an ICP-OES and batch and stacking culture systems will complete the Centre's already existing facilities for studies on the cellular biology of plants and plant-microbe interactions. In addition, the current equipment for the separation, identification, purification, and quantification of very low levels of a variety of organic and inorganic molecules, the analysis and quantification of gene expression and protein synthesis by fluorescent and quimioluminescent techniques, make possible the EEZ to have a considerable initial advantage in the execution of projects involving different 'omics' (genomics, proteomics, metabolomics, etc.). Furthermore, in the last years the Centre has made significant efforts to improve its facilities (growth chambers and greenhouses) for the growth of plants under controlled conditions.

- - Infrastructure

? Recently, some of the Centre's old buildings have been restored and renewed, and two new ones have been constructed. Thus, the EEZ facilities have been improved to carry out research in the specific research lines of the Centre.

- - Internationalization

? The EEZ has created the basis of an extensive network of partnerships with research groups from many different countries. Research groups participate in multilateral projects framed in Spanish, European and South American Networks.

? The international course of Soil Science and Plant Biology (currently subsidized by the AECI and with the sponsorship of UNESCO) takes also place yearly at the EEZ.

? EEZ scientists are members of Editorial Boards of international journals and take part of diverse international scientific committees.

? The EEZ is also involved in the development of its geographical environment providing knowledge, methodologies and information management to the Andalusia region and Countries of the Mediterranean basin, a territory critically threatened by the global change.

- - High training capacity

? The EEZ has a long-established high training capacity as evidenced by the high number of specialized post-graduate courses, master and doctoral thesis and institutional collaborations with different companies and professional schools. In addition, in collaboration with several schools, the EEZ acts as a Training Centre for laboratory technicians.

- - Interaction with the technological and industrial sectors

? There are good interactions with the industrial sector leading to signed contracts and agreements. Several patents are registered periodically by the CSIC thanks to EEZ researchers. In addition, several technological based spin-offs on the research carried out in the Centre have been generated: Mycovitro, Bioiliberis and Allergenome.

- - Links with Universities

? Another strength that should be highlighted derives from the good relationships with different Universities at the national and international level, particularly with the University of Granada. Researchers from the EEZ are involved as lecturers in a large number of postgraduate and master courses. There are also several Associated Units integrated by researchers from the EEZ and researchers from the Universities of Granada, Jaén and Huelva.

- - Scientific Services

? The availability of several functional services, such as a CSIC-network Library, the Scientific Instrumentation, the Greenhouse and Growth Chamber and the Radioactivity Services, among others, facilitates the development of the research activities at the EEZ.

Opportunities

- Strategic actions of the CSIC
? Our research is within the transversal strategic area of Global Climate Change, also defined as one of the strategic actions of the CSIC, which may result in additional resources to the Centre.
- Socio-economic demand for results on research
? Given the growing social awareness in relation to the negative impact of the global climate change and the use of fertilizers and phytosanitary products in agrosystems, there is an increasing demand of quality on plant-derived products, agricultural sustainability and environmental protection, which in turn provides with new opportunities for the different research lines of the EEZ.
- Interaction with the agricultural, technological and industrial sectors
? The new EU regulations on fresh horticultural products free of chemicals and the increased inspections will force farmers in the region to make considerable changes in their current practices for using environmentally-safe methods of controlling pests, diseases and weeds. This generates new opportunities to the EEZ research groups for collaboration with companies of the biotechnology and agriculture sectors and transfer of technology.
- Reorganization of the EEZ in the Strategic Planning 2010-2013
? The reorganization of the current five departments at the EEZ by three independent Strategic Plans, shall determine the EEZ program structured on the basis of the Departments of Biochemistry, Cell and Molecular Biology of Plants, Microbiology of Soil and Symbiotic Systems, and Environmental Protection, and this will result in a more scientifically homogeneous institute allowing the pursuit of more specific objectives.

RA (Relational Analysis)

Competitor groups

- Centro de Edafología y Biología Aplicada del Segura

- **Institute:** Centro de Edafología y Biología Aplicada del Segura
- **Institution:** CSIC
- **Address :** Campus Universitario de Espinardo, E-30100, Murcia, Spain
- **Web:** <http://www.cebas.csic.es>
- **10 Recent articles:**

Cayuela ML, Mondini C, Sánchez-Monedero MA, Roig A (2008) Chemical properties and hydrolytic enzyme activities for the characterisation of two-phase olive mill wastes composting. *Biores. Technol.* 99: 4255-4262.

Díaz-Vivancos P, Clemente-Moreno MJ, Rubio M, Olmos E, García JA, Martínez-Gómez P, Hernández JA (2008) Alteration in the chloroplastic metabolism leads to ROS accumulation in pea plants in response to plum pox virus. *J. Exp. Bot.* 59: 2147-2160.

Tejada M, González JL, Hernández MT, García C (2008) Application of different organic amendments in a gasoline contaminated soil: Effect on soil microbial properties. *Biores. Technol.* 99: 2872-2880.

Clemente R, de la Fuente C, Moral R Bernal, MP (2007) Changes in microbial biomass parameters of a heavy metal-contaminated calcareous soil during a field remediation experiment. *J. Environ. Qual.* 36: 1137-1144.

Labud V, García C, Hernández T (2007) Effect of strong hydrocarbon pollution on the microbial properties of a sandy and clayey soil. *Chemosphere* 66: 1863-1871.

Querejeta JI, Allen MF, Alguacil MM, Roldán A (2007) Plant isotopic composition provides insight into mechanisms underlying growth stimulation by arbuscular mycorrhizal fungi. *Funct. Plant Biol.* 34: 683-691.

Estañ MT, Martínez-Rodríguez MM, Pérez-Alfocea F, Flowers TJ, Bolarín MC (2005) Grafting raises the salt tolerance of tomato through limiting the concentration of sodium and chloride to the shoot. *J. Exp. Bot.* 56: 703-712.

Martínez-Cordero MA, Martínez V, Rubio F (2005) High-affinity K⁺ uptake in pepper plants. *J. Exp. Bot.* 56: 1553-1562.

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- **10 Recent articles:**

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- Institut des Sciences du Végétal (ISV)

- **Institute:** Institut des Sciences du Végétal (ISV)
- **Institution:** Centre National de la Recherche Scientifique, CNRS
- **Address :** Avenue de la Terrasse, Bâtiment 23, 91190 Gif-sur-Yvette, France
- **Web:** <http://www.isv.cnrs-gif.fr/isv/recherche/mc/mc.html>
- **10 Recent articles:**

Boualem A, Laporte P, Jovanovic M, Laffont C, Plet J, Combiér JP, Niebel A, Crespi M, Frugier F (2008) MicroRNA166 controls root and nodule development in Medicago truncatula. Plant J. 54: 876-887.

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- The Zurich-Basel Plant Science Center

- **Institute:** The Zurich-Basel Plant Science Center
- **Institution:** Swiss federal Institute for Technology
- **Address :** Universitätstr. 2 / LFW B 51 ETH-Zentrum 8092 Zürich, Switzerland
- **Web:** <http://www.plantscience.ethz.ch>
- **10 Recent articles:**

Chinchilla D, Zipfel C, Robatzek S, Kemmerling B, Nürnberger T, Jones JD, Felix G, Boller T (2007) A flagellin-induced complex of the receptor FLS2 and BAK1 initiates plant defence. *Nature* 448: 497-500.

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- Plant System Biology

- **Institute:** Plant System Biology
- **Institution:** Flanders Interuniversity for Biotechnology, Ghent University
- **Address :** Technology Park, B-9052 Gent, Belgium
- **Web:** <http://www.psb.ugent.be/>
- **10 Recent articles:**

Den Herder G, De Keyser A, De Rycke R, Rombauts S, Van de Velde W, Clemente MR, Verplancke C, Mergaert P, Kondorosi E, Holsters M, Goormachtig S (2008) Seven in absentia proteins affect plant growth and nodulation in *Medicago truncatula*. *Plant Physiol.* 148: 369-382.

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Pauwels L, Morreel K, De Witte E, Lammertyn F, Van Montagu M, Boerjan W, Inzé D, Goossens A (2008) Mapping methyl jasmonate-mediated transcriptional reprogramming of metabolism and cell cycle progression in cultured Arabidopsis cells. *Proc. Natl. Acad. Sci. USA* 105: 1380-1385.

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- Boyce Thompson Institute for Plant Research

- **Institute:** Boyce Thompson Institute for Plant Research
- **Institution:** Cornell University
- **Address :** Tower Rd, Ithaca, NY 14850 USA
- **Web:** <http://bti.cornell.edu/researchOverview.php>
- **10 Recent articles:**

Jagadeeswaran G, Raina S, Acharya B, Maqbool S, Mosher S, Appel H, Schultz J, Klessig D, Raina R (2007) Arabidopsis GH3-LIKE DEFENSE GENE 1 is required for accumulation of salicylic acid, activation of defense responses and resistance to *Pseudomonas syringae*. Plant J. 51: 234-246.

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Javot H, Pumplin N, Harrison MJ (2007) Phosphate in the arbuscular mycorrhizal symbiosis: transport properties and regulatory roles. Plant Cell Environ. 30: 310-322.

Klessig DF, Kumar D, Forouhar F, Tong L, Yang Y, Pichersky E, Montelione GT, Chen Y, Park SW, Vlot AC, Shulaev V (2007) Salicylic acid-binding protein (SABP) 2 and systemic acquired resistance. Biol. Plant-Microbe Interac. 5: 176-181.

Laloi C, Stachowiak M, Pers-Kamczyc E, Warzych E, Murgia I, Apel K (2007) Cross-talk between singlet oxygen- and hydrogen peroxide-dependent signaling of stress responses in *Arabidopsis thaliana*. Proc. Natl. Acad. Sci. USA 104: 672-677.

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Park SW, Kaiyomo E, Kumar D, Mosher SL, Klessig DF (2007) Methyl salicylate is a critical mobile signal for plant systemic acquired resistance. Science 318: 113-116.

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- Department of Plant and Microbial Biology, College of Natural Resources

- **Institute:** Department of Plant and Microbial Biology, College of Natural Resources
- **Institution:** University of California, Berkeley
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- **Web:** http://www.cnr.berkeley.edu/site/plant_micro_bio.php
- **10 Recent articles:**

Chatterjee S, Almeida RP, Lindow S (2008) Living in two worlds: the plant and insect lifestyles of *Xylella fastidiosa*. *Annu. Rev. Phytopathol.* 46: 243-271.

Chatterjee S, Newman KL, Lindow SE (2008) Cell-to-cell signaling in *Xylella fastidiosa* suppresses movement and xylem vessel colonization in grape. *Mol. Plant Microbe Interact.* 21: 1309-1315.

Deangelis KM, Lindow SE, Firestone MK (2008) Bacterial quorum sensing and nitrogen cycling in rhizosphere soil. *FEMS Microbiol. Ecol.* [Epub ahead of print]

Groll M, Schellenberg B, Bachmann AS, Archer CR, Huber R, Powell TK, Lindow SE, Kaiser M, Dudler R (2008) A plant pathogen virulence factor inhibits the eukaryotic proteasome by a novel mechanism. *Nature* 452: 755-758.

Schürmann P, Buchanan BB (2008) The ferredoxin/thioredoxin system of oxygenic photosynthesis. *Antioxid. Redox Signal.* 10: 1235-1274.

Wichmann G, Sun J, Dementhon K, Glass NL, Lindow SE (2008) A novel gene, *phcA* from *Pseudomonas syringae* induces programmed cell death in the filamentous fungus *Neurospora crassa*. *Mol. Microbiol.* 68: 672-689.

Buchanan BB (2007) Thioredoxin: an unexpected meeting place. *Photosynth. Res.* 92: 145-148.

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Lee SC, Lan WZ, Kim BG, Li L, Cheong YH, Pandey GK, Lu G, Buchanan BB, Luan S (2007) A protein phosphorylation/dephosphorylation network regulates a plant potassium channel. *Proc. Natl. Acad. Sci. USA* 104: 15959-15964.

Balmer Y, Vensel WH, Hurkman WJ, Buchanan BB (2006) Thioredoxin target proteins in chloroplast thylakoid membranes. *Antioxid. Redox Signal.* 8: 1829-1834.

Selective Advantages

- The EEZ is currently the largest Research Centre of the CSIC Agency within the Area of Agricultural Sciences; hence the EEZ represents a leading Centre of the institution able to tackle the challenges of the Area with an innovative character.
- The EEZ is a Centre of reference in Europe that carries cutting edge research, especially in the fields of biodegradation, symbiotic interactions between plants and microorganisms, antioxidants, free radicals and oxidative stress in plants.
- The multidisciplinary character of the EEZ's research integrating different areas of knowledge place the Centre at an excellent position to significantly contribute to the development of sustainable agriculture and environmental protection.
- The integration of the EEZ's research activity in the local and regional scenario contributes to draw attention to the centre of the corresponding national and regional government departments and productive sectors in the Mediterranean region.
- The microbial culture collections of Plant-Growth-Promoting-Microorganisms, *Pseudomonas* and Arbuscular Mycorrhizal fungi are of great value to the different activities at EEZ, and are also available for the use by external academic and industrial groups.

Critical Analysis of Research Lines

- Signalling, Stress and Development in Plants
- **Status:** Consolidated
- **Justification:** This line deals with fundamental and applied aspects of plant biology under physiological, abiotic and biotic stress conditions. For this purpose, different plant species of agronomical interest like pea, tomato, pepper, olive, barley and strawberry are used, as well as two model species (tobacco and *Arabidopsis thaliana*). The approaches used include biochemical, molecular, in vitro and in planta functional analysis, proteomic, crystallographic, immunological, and imaging techniques. The general objective of this line is to increase the knowledge of basic intracellular mechanisms that will allow obtaining plant varieties more tolerant to different abiotic stresses (heavy-metals, salinity, xenobiotics, cold, high light, etc) and to biotic stress (by virus and the bacterium *Pseudomonas syringae*), as well as plants more efficient in carbon assimilation. A complementary objective of the line is to determine the genes and molecular processes that control the reproduction in plants in order to improve their crop quality and yield. Collectively, these activities provide a foundation for the identification of the mechanisms that regulate gene expression under different situations, what will allow the control of plant metabolism. A technology-based spin-off company, Allergenome was created in 2004 by researchers supporting the line. Allergenome is devoted to the diagnosis of hypersensitivity to allergens from the olive tree pollen and its use.

This is a consolidated research line integrated by four particular sub-lines named Antioxidants and Cell Signalling by ROS and RNS, Plant Reproductive Biology, Redox Regulation and Chloroplast Metabolism under Adverse Environmental Factors, and Ion Homeostasis and Membrane Transporters. The line is supported by 5 different research groups with a total of 15 qualified staff-scientists with international reputation in their fields. The line has been recently reinforced with 2 scientist position and the incorporation of 3 more is expected reaching 18 staff-researchers at the beginning of the SP2010-13. Throughout the new Strategic Planning, additional positions should be open to new researchers that could either support the line or

incorporate new expertise.

As occurs with the other research lines, the support personnel ascribed to the line is quite low (18.9% laboratory technicians) and lacks internal management support. Hence, the line should be reinforced with this type of personnel. Scientists working in this research line have a strong expertise in training students as demonstrated by the number of PhD theses defended (16) in the period 2003-2007. However, currently this line has a low ratio of PhD students and hired scientists, including postdoctoral fellows, per staff-scientist (0.6 and 0.4, respectively), which may compromise the potential of the line. Thus, it should be reinforced with these types of personnel.

Main KPIs (Key Parameter Indicators) of the line such as funding, publications (articles & book chapters), and requested patents are relatively low (14.04%, 19.65% and 14.28%, respectively) when compared to the other research lines. On the other hand, in the last years of the SP2006-2009, the publication parameter shows similar numbers to those of other lines. Nevertheless, efforts to improve these KPIs, especially funding, should be made during the Strategic Planning, so that this line may reach an equivalent position to the other main lines at the EEZ.

An important weakness of this line derives from the building where most of this line's personnel are working. Most of their laboratories are located in an old and non-functional building that must be urgently renewed or newly constructed. In this respect, this line is in clear disadvantage with the colleagues of the remaining research lines of the EEZ which are either working in a recently constructed building or will be moving to a new building at the beginning of 2009.

- Biology and Biotechnology of Plant-Microbe Interactions
- **Status:** Consolidated
- **Justification:** This line deals with fundamental and applied aspects of the plant-microbe interactions. The general objective of this line of research is to gain basic and applied knowledge on the ecology, physiology, molecular biology, genomics and biotechnology of rhizobacteria, arbuscular mycorrhiza and rhizospheric fungi to understand physiological and molecular mechanisms underlying microbe-plant interactions, allowing their application in processes of biofertilization, biodegradation and biocontrol to improve the sustainability of agrosystems and environmental quality. Collectively, this line provides key information to increase our knowledge on soil microbial (fungi and bacteria) features and mechanisms of interaction with plants and uncover new microbial traits beneficial for nutrition, health and development of plants. A technology-based spin-off company Mycovitro, participated by the CSIC was created in 2006 by one of the researchers supporting the line. Mycovitro is devoted to the production, formulation and commercialization of biofertilizers based on arbuscular mycorrhizal fungi.

This line of research is totally consolidated in the EEZ and is supported by four sub-lines: Biofertilization and Biodegradation by Rhizospheric Fungi; Ecology, Molecular Biology and Biotechnology of Mycorrhizas; Molecular Plant-Bacteria-Environment Interactions and Structure, Dynamics and Function of Rhizobacterial Genomes. It is noteworthy that the line contributes to the genetic resources of the centre with important wide collections of plant-growth-promoting-microorganisms and that of arbuscular mycorrhizal fungi. This line represents the highest concentration of experts in beneficial plant-microbe interactions working together in the same institute/institution in Spain. This research line is supported by 21 staff-scientists, with 6 positions incorporated from 2005 and may reach 23-24 by the beginning of the SP2010-13. Therefore, it is the line with the higher number of staff scientists at the EEZ. Nevertheless, there is a notable imbalance regarding the personnel (scientific staff) ascribed to the different sub-lines. For this line of research, additional positions should be open to

researchers that may incorporate new expertise in the field of the plant-microbes interactions.

This line has a strong shortage of technical personnel (14.8%) even lower than the other research lines, but management support staff (1.9%) is allocated to one sub-line. Thus, the line should be reinforced for this type of personnel. The line exhibits an elevated training capacity, as evidenced by the high number of specialized post-graduate courses and doctoral thesis defended (22) in the period analyzed (2003-2007). Currently, the number of PhD students per staff-scientists shows a good ratio (1). However, the ratio for hired scientists, including postdoctoral fellows, is extremely low (0.14). Hence this line should be clearly reinforced with this type of personnel in order to maintain the competitive trait.

This research line displays good main KPIs for funding, publications (articles & book chapters), and requested patents (32.62%, 42.30% and 50%, respectively).

In general the line has enough equipment to carry out research and, since the scientists will move by the beginning of 2009 to a new building, the line is currently being reinforced with new infrastructure.

- Bioremediation and Biological Protection of Agricultural Systems
- **Status:** Consolidated
- **Justification:** This line deals with different aspects of the soil and plant protection in agrosystems. Research is primarily focussed on mechanisms of bacteria-mediated environmental recovery and improvement of plant health including its biotechnological exploitation, the utilization of low-cost technologies to reuse wastes, the protection of soils through organic and inorganic amendments; the rational exploitation of the microbial biodiversity and the biological fight against pests in agroecosystems. This line combines consolidated research aspects with more recent approaches such as the use of metagenomics and system biology, the study of the influence of bacteria on the plant secondary metabolism, the persistence mechanisms of pathogenic *Pseudomonas* as potential targets for plant protection, and the development of vermicomposting processes. Collectively, these activities contribute to soil and crop protection and the promotion of sustainable development of agricultural systems by means of ecological alternatives. A technology-based spin-off company, Bioiliberis, was created in 2007 by researchers supporting the line. Bioiliberis is devoted particularly to the biological elimination of pollutants in soils, water and air.

This line is supported by 14 staff-scientists and includes two sub-lines, the first is Bioremediation, Rhizoremediation, and Molecular Biology of *Pseudomonas* of Interest in Plant Protection, and the second is Biotransformation of Organic Wastes and Protection of Soil and Agricultural Crops. The line is supported by three research groups with different expertise in pollutant biodegradation and protection of soil and agricultural crops with a leader position at national and international level. The group supporting the first sub-line is the largest research group at EEZ (9 staff-scientists) and is internationally recognized as a reference in the biology of *Pseudomonas* and Bioremediation. This sub-line contributes to the genetic resources of the Centre with a collection of mutants in the ORFs of the *P. putida* KT2440. The second sub-line is supported by the other two groups with a total of 5 staff-scientists. This line has incorporated from 2005, 6 staff-scientists. One or two additional incorporations to the line are expected so that a total of 15-16 permanent positions will be reached by the beginning of the SP2010-13. This line should incorporate new researchers with added-value expertise in the field of environmental protection.

This line also exhibits shortage of support personnel (16.3%) as occurs with the other research lines, and thus it should be reinforced. The line has the higher internal management support at EEZ (6.1%), but it is allocated to only one of the sub-lines. The line has high training capacity, as evidenced by the elevated number of specialized post-graduate courses and doctoral thesis

(14) supervised in the last five years. Currently, this line has the higher ratio of both PhD students (1.14) and hired scientist, including postdoctoral fellows (0.57), per staff-scientist, which is a good indicator of the potential of this line at the EEZ.

This research line shows good KPIs such as funding, publications (articles & book chapters), and requested patents (47.97%, 32.47% and 35.71%, respectively).

The line is very well equipped with scientific infrastructure and researchers are located in a new building inaugurated in 2005. However, the continuous development of the largest research group leads to a shortage of laboratory space, being difficult for younger researchers within the group to progress in the same building.

- Mediterranean Pastures and Sylvopastoral Systems
- **Status:** Consolidated
- **Justification:** This particular line carries out a pioneer research on forest and rangeland that focuses on natural pasture resources of southeastern Spain. This line started at the EEZ in 1986 and since then a number of studies, projects, contracts, institutional agreements, and PhD theses have contributed to a better knowledge of these natural resources, transfer of training to the managers and helped to enhance the value of many previously neglected natural areas and agro-ecosystems of southeastern Spain. This line provides key information for multifunctional management of Mediterranean forestlands, naturalness promotion in abandoned agricultural and reforested lands, silviculture for wildfire prevention, restoration of degraded lands, management of protected areas and, generically, consulting by spin-offs and start-ups research lines adjusted to Mediterranean forestry issues and needs.

The development of this research line has led to numerous collaboration agreements signed with the Regional Government as well as with public and private companies involved in forest and environmental management, which represent the 5.2% of the EEZ funding and 7.4% of its publications. Although these numbers are relatively low when compared to the other research lines, it is remarkable that this considerable productivity is coming from a small group headed by a single staff-scientist. In addition, its research activities usually have an important component of science outreach to the society and its appearances in the news enhance the visibility of the EEZ research activities. In contrast to the other broad research lines at the EEZ, this line is focused on forest management in the southeast Spanish area and similar environments. In spite of its strong local focalization, the group has established international collaborations based on its responsibilities in the INTERREG IIIC SUR PASTOMED programme focused on Mediterranean pastoralism, but also cooperates with research groups from Argentina, Chile, France and Italy. The research proposed in the line should be scientifically considered consolidated, but the fact of being distantly related to the other research lines and supported by only a small group headed by a single scientist, places the line in a critical position at the EEZ. It should be noted, that the research group is currently integrated in the Department of Earth Sciences, which will move out to the future Earth Science Institute. Hence, the integration of this group within the future scientific structure of the EEZ is unclear.

Critical Analysis of Services

- Science Outreach
- **Status:** Emergent
- **Justification:** The EEZ is successfully developing a science outreach programme, activity which has notably increased in the last four years. This activity includes the organization of the

Science and Technology Weeks (awarded twice in national contests, 2006 and 2007), publication of popular science articles, exhibitions, conferences, seminars, guided visits, etc. Thus far, this activity has fallen over the personnel of the EEZ, mainly scientists, what has implied an important consuming time, besides their usual scientific tasks. However, as indicated above, most activities have succeeded and the public audience to the EEZ science outreach activities has been accounted by dozens of thousands people. This is an index of the interest of the public opinion for science. The EEZ science outreach should be boosted to expand its activity and to be a CSIC reference of the scientific knowledge and the applied research. In order to accomplish the science popularization without giving up the dedication of the EEZ researchers to their tasks, the recruitment of a specialist exclusively devoted to this proposal would be necessary.

- Scientific Instrumentation Service (SIS)
- **Status:** Emergent
- **Justification:** The Scientific Instrumentation Service (SIS) started its activity in 2007 with one staff-technician, but soon after a second was added recruited from the extinct Isotope Stable Laboratory Service. The presence of these two highly qualified technicians is one of the most important strengths of SIS that has allowed in a very short time to offer successfully distinct type of analyses based on HPLC-MS and GC-MS techniques, thus contributing to all the research lines in the Centre. The service has offered different seminars to researchers and their needs have been deeply explored. As a result of these activities different low used equipments ascribes to the research groups were integrated into the Service, being repaired and improved. Nevertheless, the SIS does not have the ideal conditions yet due to its provisional localization and inadequate space facilities, which should be resolved at the short term. On the hand, the incorporation of new equipments requested by the researchers will require and additional effort to set up.

- DNA Sequencing
- **Status:** Emergent
- **Justification:** The DNA sequencing is a new service that is proposed for the Strategic Planning 2010-2013. This service will give support to all the research lines at EEZ including those from the Institute of Animal Nutrition and therefore is a service of general interest. Many research groups at EEZ need regularly to sequence DNA to check plasmid constructs and for gene identification. Due to the absence of a DNA sequencing service in the Centre, sequencing is carried out in other Centres or even by private companies. It is estimated that the activity related to DNA sequencing represents a cost for the EEZ of around 30.000 ? (euro) per year, costs that could be even double (60.000 ?/year) if we consider that some of these expenses, specifically sequencing carried out in other CSIC Centres are not accepted by financial institutions, which result in the compulsory returning of those payments to those Institutions and consequently the lost of part of the projects financial grants. In addition to support the activities of the different research lines; the raise of DNA sequencing service at EEZ has an extraordinary strategic value since it could be the base to incorporate in the future new technologies once it is consolidated, i.e. large-scale genome sequencing.

- Greenhouses and Growth Chambers
- **Status:** Emergent
- **Justification:** The Greenhouses and Growth Chambers Service is of general interest for the EEZ, and it has been thoroughly used since its creation in 2005. At that time, new facilities were built to accommodate many of the experiments of the EEZ researchers who needed to grow plants under controlled conditions. The service includes ten independent greenhouses and three growth chambers, what provides a great versatility to the service. This is one of the services that an institute devoted to Agricultural Sciences must house, and as such has been

understood by the EEZ that is continuously renewing and improving its facilities. Nevertheless, the increasing demand of this service by the EEZ researchers makes necessary to expand it in the near future.

- Confocal and Transmission Electron Microscopy (CTEM)
 - **Status:** Emergent
 - **Justification:** The CTEM will provide support to all the research lines at EEZ, hence it is a service of general interest. The future CTEM service will be shaped around the large equipment of microscopy already available in the institute, which is not currently managed as such structured service. The future CTEM will start with enough equipment to perform basic applications of microscopy. Improvement of several of the instruments available (confocal unit, old equipment?) is advisable. The CTEM service will represent a valuable tool to make feasible to the researchers of the institute the use of these facilities. Consequently the main conclusion is that the CTEM service should be incorporated into the strategic plan of the Institute.

- Knowledge Transfer
 - **Status:** Emergent
 - **Justification:** The KT service is very recent at EEZ where it has been functioning for only one year. This facility provides services not only to EEZ researchers, but also to other that are working at different Centres included within the Agricultural Sciences Area in the CSIC. This service is considered to have a strategic value for EEZ research activities in the next strategic planning to improve the capability of transferring technology to the productive sectors.

- General Management
 - **Status:** Consolidated
 - **Justification:** The General Management service needs human resources and specific software applications that permit an easy access to the different information generated in the service. This limitation is even more pronounced in the area of Project Management, which lacks a software informatics tool that allow the integral follow up of projects management (approval, available financial resources, validation of expenses, etc.). Similar problems apply to the Area of Purchases and Administrative Contracts that although has the informatics application called SICOM (Integrative Module for the Administration of Research Institutes and Centres) this is clearly insufficient to manage the volume of information that this Area generates at EEZ. Furthermore, the connection between both areas is really flawed mainly what concerns the validation of the corresponding project charges.

- Library
 - **Status:** Consolidated
 - **Justification:** The library of the EEZ is part of the CSIC library network consisting of 86 libraries linked to the different centres and institutes that make up the CSIC. Although the resources of the EEZ library have a marked multidisciplinary character, this library belongs, together with another 10 libraries, to the group specialising in agricultural sciences. Since 2000, it has been located in a new building comprising a reading room, computer room, working space and archive rooms.

The key mission of the library is to provide support to research being conducted at the EEZ and the services provided to the centre's researchers include a reading room and online access, book loans, requesting documents not found in the EEZ library, and off-campus online access. The services provided to these external users are more limited, i.e. reading room and internet access to bibliographic information. Also, the interlibrary loan service deals with bibliographic exchanges with other CSIC network libraries and university libraries.

The dramatic rate of change in the design and development of new IT and communication technologies in the scientific world (databases, library websites, publishers' websites, etc.) generates the rapid onset of professional lag, the limited use of the reading room due to online access to information from the user's office desktop and the obsolescence of computers and other technological devices. Also, and mainly due to poor internal marketing, the EEZ personnel are not fully aware of the services offered by the library.

- Radiochemistry Laboratory

- **Status:** Consolidated

- **Justification:** The Radiochemistry Laboratory allows the EEZ users the storage and use of non-encapsulated radioactive material for research purposes: DNA labelling, hybridization of DNA and RNA, tests on the incorporation of radioisotopes into cells and microorganisms, electrophoresis, gel drying, etc. Particularly, users can measure the activity of solid and liquid samples in a scintillation counter and visualize and quantify radioactive gels with a phosphorimager. The isotopes authorized in the Radiochemistry Laboratory are: ^3H , ^{14}C , ^{32}P , ^{33}P , ^{35}S , and ^{125}I .

The Radiochemistry Laboratory is of general interest for the EEZ, and includes two different facilities: one in the Profesor Albareda site, which has been thoroughly used since its creation more than 20 years ago, and another one in the Armilla site, which was inaugurated in 2004. The two facilities are extensively used because the high sensitivity of radiochemical methods makes them an essential part of numerous experimental procedures in molecular biology and physiology.

- Information Technologies

- **Status:** Consolidated

- **Justification:** The Computer Science is a fundamental part of the infrastructure that supports research groups and other general services. Within a few years, working tools based on computing and communications infrastructure have become critical to the smooth functioning of the centre, which translates into an exponential increase in demand of all staff. Today, the CSIC has not yet solved the problem posed by the recruitment of specialized personnel to strengthen the Service.

- Stable Isotopes Laboratory

- **Status:** Regression

- **Justification:** The GC-IRMS is a quite complex and expensive technique. Moreover, the predicted internal and external demand for a GC-IRMS service has not arisen and the workload Unit has been minimal. The current forecasts for demand within the EEZ or by external users are extremely low, which suggests that the Service will not be able to sustain itself. On the contrary, it will require more investment on expensive equipment in order to broaden the isotopic analysis (i.e. to carry out elemental analysis and to determine isotopes in water and carbonates) and attract more users. Recently, the GC-IRMS equipment of the Service has come to be under the supervision of the Biogeochemistry of Stable Isotopes research group and they will leave the EEZ to the new Institute of Earth Sciences.

- Pseudomonas Reference Culture Collection Service

- **Status:** Regression

- **Justification:** The Pseudomonas Reference Culture Collection (PRCC) has been supporting the activities of a particular Research Group (Degradation of Toxic Organic Compounds) at the EEZ

since 1998. Hence, it can not be considered a service of general interest, since it does not satisfy a need shared by the different research lines at the Centre. Moreover, the equipment and staff necessary to maintain the PRCC and its activities are fully integrated within this group with no clear distinction between their research activities and the service. As a consequence, the status of the personnel ascribed to the PRCC is clearly distinct: the other technicians working at the scientific services are under strict rules to ensure that the facility is not hampered by conflict of interest. On the other hand, the demand for the PRCC strains seems to be rather internal or within collaborative research projects in which the research group participates but the Service is not hired. Furthermore, the implementation of 100.00 € fee to supply strains established in 2005 does not seem to be worthwhile as shown by the low external economical activity of this service. Technically, the PRCC is out of the general Service structure of the EEZ and it should be considered a Microbial Collection rather than a Service.

General Objectives

General Objectives, Goals?

The mission of the EEZ is to become a centre of excellence on plant sciences, microbiology and environmental protection

? carrying out fundamental and strategic research aimed at the understanding and exploitation of plants, microbes and their relationships, with especial emphasis on crop yield, quality, valuable products and the improvement of the environment.

? training high quality PhD students and post-doctoral scientists in the different research lines of the Centre.

? making our findings available to the society, disseminating knowledge, technology and know-how to meet the needs of end-users.

Scientific objectives

Collectively the research carried out at EEZ will contribute to the development of a more sustainable and environmentally-friendly agriculture. The improvement of crop production and fruit quality as well as the increase of stress tolerance in plants of agronomical interest will be achieved by different means, including interactions with beneficial microorganisms and improved plant species, following diverse strategies based on genetics, genomics and molecular biology approaches. Our research will be also focussed on the protection of soils and agricultural crops through the use of low-cost bioremediation technologies and the promotion of integrated alternatives for the sustainable management of agricultural systems as well as Mediterranean forestlands.

Knowledge Transfer objectives

To maintain and improve the cooperation with agricultural and biotechnological companies, special attention will be given to a direct knowledge transfer by promoting sustainable agriculture together with registration (patenting) of novel procedures derived from fundamental studies, as well as to strengthen the already created, technology-based, spin-offs from EEZ researches, participated by the CSIC.

Training objectives

The EEZ will maintain and increase the training of diverse personnel including high quality technicians, undergraduate students, PhD students and post-doctoral scientists.

Outreach objectives

The centre will disseminate the potential and the social, economic and ecological importance of the EEZ research activities to policy-makers, farmers and the general public.

Internationalisation objectives

The EEZ will maintain and strengthen collaborations and interactions with foreign laboratories and Universities, particularly from Europe, America and China, increasing our participation and generation of international consortia.

Common services objectives

A strategy of fully interconnected services will be carried out to ease the EEZ scientists to accomplish their scientific goals. Thus, the scientific and administrative services of the centre will be strengthened.

Gender equality objectives

The CSIC is an equal opportunity employer with no discrimination between genders.

Quality programmes objectives

An integrated programme on Health and Safety including a security protocol for emergencies and evacuation events will be designed and implemented.

General Strategy

Summary

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The proposed scientific programme framework is based on the Centre's work, the expertise of the EEZ scientists and a careful assessment of the international, national, regional and domestic context. Our research is within the transversal strategic area of Global Climate Change, also defined as one of the strategic actions of the CSIC. Thus, the research at the EEZ will contribute to the development of a more sustainable and environmentally-friendly agriculture, the improvement of crop production and quality, the protection of soils and agricultural crops and the transformation of the territory by protecting it from natural damages.

To achieve the general and specific objectives of the Strategic Planning 2010-2013, the EEZ will pursue the following strategy:

- The Centre will concentrate joint efforts of the different research groups to achieve multidisciplinary and cutting-edge research focussed on specific topics sharing common and broad scientific objectives leading to a scientific programme framework based on three well supported research lines and a fourth one that is singular at EEZ, but embedded in our local region and its environmental threads looking all for scientific excellence.

? The well established tools to study the molecular biology, biochemistry, physiology and ecology of different plant species and microbes will keep on being one of the bases of the proposed methodology. Additionally, the achievement of new objectives will rely on the utilization of plant and microbial genomic resources, post-genomic tools (high throughput sequencing technologies, gene expression and regulation analysis with microarrays, use of knockout plants, interfering RNA and the development of new insertional mutagenesis protocols based on group II introns, etc.), advanced molecular and biochemical techniques (i.e. protein structural characterization, fluorescence and confocal laser scanning microscopy, in vivo immunolocalization, transport assays, laser microdissection, molecular detection by HPLC-MS and GC-MS, methods for transient transformation, whole mount in situ hybridization, etc.) as well as the adaptation and development of other high throughput technologies (new proteomic approaches, 2D fluorescence difference gel electrophoresis (DIGE), metagenomic approaches to search for new enzymatic activities, biodiversity studies). This new experimental approaches and methodologies will open new perspectives and possibilities for the study of the biology of different plant species and microbes and for their biotechnological applications.

? The different lines of the EEZ have been historically well funded by national and international agencies. Nonetheless, the incorporation of new scientists to the research staff will warrant more opportunities to lead new funded projects. The strategy of joining forces within the different sublines and with other sublines for certain grant calls while maintaining independent approaches in others will be a way to explore new avenues of research that should result successful obtaining funds. Moreover, joint efforts will have to be made to be present in European consortia, a key strategic point. Contacts will be activated as soon as calls are made public or their content is known and possibilities for lobbying strategies will be explored in order to build consortia.

? This strategy implies that the Executive Board will work closely with researchers, to identify opportunities for collaboration in training, research subjects and funding, knowledge transfer and spin-off generation based on the EEZ expertise and know-how. This will include participation in major national and international consortia, as well as contracts and agreements with universities, foreign laboratories and interested private companies.

? The executive board will assess the Operational Framework with mid-term evaluations of the progress of the Scientific programme and Services implementation that will serve management's need to debate, choose, and articulate the organizational structure, and key scientific processes best suited to supporting the achievement of the goals and objectives of the Strategic Planning. These assessments will help align the Centre's resources with its needs and pursued objectives.

- The implementation of new methodologies and experimental approaches undoubtedly demands expertise, human resources and funding. The qualification of the personnel recently incorporated as scientific staff and the creation of new research services within the Centre will provide the expertise and technical support necessary for the optimization of some of the novel methodologies. However, the development of other methods such as those involving cell biology, plant pathology, structural biology or genome-wide computational analyses requires both collaborations with specialized laboratories and the recruitment of new scientists trained specifically in these technologies. In addition, the consolidation of the lines also requires the incorporation of new permanent technical assistants.

? The Centre will incorporate external reviewers to judge all those processes for the selection of scientific personnel that falls on the Centre. This will help to improve quality and excellence to our research activities, avoiding endogamy tendencies.

- The EEZ will develop policies to recruit postgraduate students and to make the scientific career attractive. The diversification of the working models available at the EEZ will offer new opportunities for training Ph.D. students. Therefore, the number of Ph.D. students currently appointed to the different projects supporting the lines should be increased. Recruitment of competitive postgraduate students will be facilitated through the reinforcement of the interactions with universities and teaching institutions in Spain and abroad, the involvement of the investigators in postgraduate programmes and the dissemination of research with social and economical impact.

? Collaborative activities in official Master and Postgraduate University programmes, organizing high quality training courses and scientific seminars will be focus of our objectives as well as the continuation of the annual International Course on Soil Science and Plant Biology will continue.

- To tight relationships with public and private institutions and outreach our activity to diverse social spheres, special emphasis will be given to strength the Science Outreach and Knowledge Transfer Services. The research carried out at the EEZ and, in particular the concept of sustainable environmental practices, will be made more visible to society and politicians by increasing the dissemination activities.

? The results derived from our research will be disseminated through publications in international peer-review journals and communications to National and International Congresses and Symposia.

? Results that can be transferred to the productive sector will be communicated to the Technology Transfer Office of the CSIC to obtain maximal diffusion amongst the potentially interested socio-economic agents.

? Research results will be spread through the presence in exhibitions and mass media.

- The general services will be reorganized with the aim of assisting all the research lines of the Centre and pursuing a more efficient use of the Centre's facilities and infrastructure. Two new services are proposed, the DNA Sequencing and the Confocal and Transmission Electron Microscopy (CTEM). Other services initiated during the Strategic Planning 2006-2009 and proven to be of general interest and important for the EEZ research activities such as Science Outreach, Scientific Instrumentation Service (SIS), Greenhouses and Growth Chambers and Knowledge Transfer will continue for the next SP and will be consolidated. All theses Services together with Library, Radiochemistry Laboratory, Information Technologies and General Management, will support and reinforce our research activities.

- A security programme for evacuation of the personnel in case of emergency will be implemented. Similarly, instructions about infrastructure, general uses, procedures and rules within the EEZ will be provided to all personnel, and more specifically upon entering by the first time to the Centre. Procedures for disposal of residues and wastes derived from the research activities and handling of radioactive compounds will be both established and enhanced. Corrections about security work in our laboratories will be carried out based on the reports generated by the security services of the CSIC.

Strategy Analysis

The planned Strategy is based on the different elements of the SWOT and AR and the profit of the Selective Advantages of our Centre. The strategy analysis will be focussed on key issues like scientific activity, human resources, equipment, infrastructure, general services, collaborations, training, science outreach, knowledge transfers, and general management.

◇ Scientific activity

The multidisciplinary nature of the research at the EEZ, which allows tackling projects both specific

to each Centre's research line and interdisciplinary ones of major and strategic dimension makes possible to cope with broad-based scientific topics on environmental and agricultural issues. On the other hand, the reorganization of the institute based on four homogeneous scientific programmes will allow pursuing more specialized objectives. Actions to counteract the effects of the rigid organizational structure of the centre will be taken:

? The interrelation among sub-lines will be stimulated with collaborative projects to board up same objectives from different perspectives joining forces within the different sublines and with other sublines for certain grant calls.

? Target actions will be carry out in order to facilitate a successful broadening in the research activities of the groups, i.e. identifying new collaborations, more suitable scientific financial programmes, change of objectives, etc.

? Small groups will join their efforts sharing common objectives.

? The recruitment of external scientists involved in these strategic targets will be facilitated.

◇ Human resources

? Human resources managed by the Centre during the Strategic Planning will be driven to the research lines based on key parameter indicators, such as funding and scientific production, with special emphasis in their quality. Tenured Scientist positions will be also open to external candidates; particularly the added-value of the new researcher expertise to the lines will be taken into account.

? Young researchers will be provided with an office upon their appointment and, once they get funding, will receive laboratory space so that they could function independently.

◇ Equipment

? A policy to avoid unnecessary duplications of scientific equipments will be implemented for the acquisition of the Centre large infrastructure. Scientific equipments that may be shared by the different research lines will be favoured as well as those that may enhance the activities of the general services. Whenever is possible the large equipments assigned to the lines will be placed in laboratories of a general use that should be established in all the research buildings.

? A committee will be created to analyze the centre, services and different research line necessities of equipment and will establish an acquisition priority according to the highest demand.

? Current equipments with low use within the research groups will be collected and allocated to the appropriate services.

◇ Infrastructure

? To reinforce the infrastructure of the Centre, we propose the construction of a new building to replace the non-functional Red House. A technical document about the current situation of the different facilities in the Red House building together with a viability planning to modernize such infrastructure without affecting the research activities is included (see file attached in the general strategy); other annexes and technical documents will be provided to CSIC authorities for their evaluation. The construction of this new building will provide the correct environment to research groups and Services currently allocated in the former construction at the same time that will allow the expansion of the Centre.

◇ General services

? The availability of functional services facilitates the development of the research activities at the EEZ. For that reason, Services should be of general interest giving support to all the research lines, so that the human, infrastructure and equipment resources are more efficiently managed. The staff ascribed to these services will have a similar status and conduct their activities under the same strict rules to avoid conflict of interest.

? The Services already functioning at the EEZ will be either consolidated or potentiated due to their

general interest. Furthermore, two new services will be created: the DNA Sequencing and the Confocal and Transmission Electron Microscopy (CTEM), according to the increasing demand of many of the EEZ research lines. On the contrary, the extinction of existing ones in the current SP2006-09 (Stable Isotopes and Pseudomonas Reference Culture Collection Service Services) will be resolved in the next SP2010-13.

? The full electronic management concerning all the services will be pursued. This will promote a feed-back policy and will allow a higher involvement of scientists in the Centre development.

◇ Collaborations

The extensive network of partnerships with research groups from many different countries and the development of international courses should facilitate the participation in EC and other international projects. Moreover, the rooted research in the local region will increase our links with the Andalusia Community Government and enhance the visibility of our research in our social environment. The invitation to renowned scientists to deliver seminars in our centre, and the integration of foreign researchers into the staff scientific community through diverse strategies will broad our international projection.

◇ Training

? The EEZ will maintain and increase collaborative activities in official master and postgraduate university programmes, organizing high quality training courses and scientific seminars. Also, the annual International Course on Soil Science and Plant Biology will continue. Likewise, EEZ researchers will carry on the training of high quality technicians, undergraduate students, PhD students and post-doctoral scientists.

◇ Science outreach

? The centre will disseminate the potential and the social, economic and ecological importance of the EEZ research activities to policy-makers, farmers and the general public by means of conferences, seminars, participation in social events, increased collaboration with newspapers and magazines, the generation of booklets and edited text books and the exploitation of modern information technologies at internet. Also, the outreach of Science and its potentiality to the young students of primary, secondary and graduate schools will be also pursued.

? Foreign doctoral and post-doctoral scientists will be also attracted through national and international programmes. Science outreach strategies will be implemented to publicize the activity of the EEZ in international forums. International platforms such as the AECI (Spanish Foreign Office), Bilateral Programmes, the EU Programmes, among others, will be used to recruit foreign people for positions and fellowships.

◇ Knowledge Transfer

The Knowledge Transfer and Science Outreach Services will be strengthened with the aim of favouring the interactions of the EEZ with the technological and industrial fields.

? We will use the growing social awareness in relation to the negative impact of the global climate change to exploit the interest on our research focussed on agricultural sustainability and environmental protection.

? Interactions with the industrial sector should be increased that in turn would help to facilitate the transfer of technology and know-how to the productive sector.

◇ General Management

? A policy of continuous formation for the personnel ascribed to the General Management Service will increase their skill and expertise.

? Hardware and software resources needed to carry out a more efficient management will be also implemented.

? By using our own resources we will make an effort to change from a reactive to a pro-active situation and to cope with the difficulties derived from the division of the institute in the EEZ main headquarter and the Institute of Animal Nutrition.

? In addition, the incorporation to the General Management Service of new specialized staff personnel will be pursued to face the increasing bureaucratization of the research. This will release scientists devoting their time in non-research subjects.

Outreach

A Science Outreach Service will be implemented at the EEZ that should be consolidated in the Strategic Planning 2010-2013.

Internationalisation

We will maintain and strengthening collaborations and interactions with foreign laboratories and Universities increasing our participation and generation of international consortia. Foreign Doctoral and Post-doctoral students should also be attracted as well as candidates for Tenure Staff positions.

Quality Control Programmes

A Health and Safety program will be implemented at the EEZ (for a detailed description see quality programmes at the Centre indicators chapter)

Gender Equality

The CSIC is an equal opportunity employer with no discrimination between genders

Knowledge Transfer

A Transfer Knowledge Service will be implemented at the EEZ that should be consolidated in the Strategic Planning 2010-2013.

Strategy on Research Lines

Global actions

- Signalling, Stress and Development in Plants
- **Action to execute:** Bolster **Priority:** 1
- **Justification:** This is a consolidated research line, but KPIs such as funding, publications (articles & book chapters), and requested patents are below those from the other research lines. Thus, efforts to improve these KPIs during the SP2010-13, especially funding, should be made. It is expected that the 5 new scientists incorporated throughout the SP2006-09 will

contribute to achieve those objectives. Additional positions should be open to researchers providing new expertise and enhanced KPIs. In order to be strengthened, the line also needs to incorporate laboratory technicians, PhD students and postdoctoral fellows. The allocation of the researchers of this line to a new building with similar facilities to the others is an essential issue to be achieved in order to better accomplish the objectives and reach KPIs comparable to other lines. The availability of some equipment and the services included in this SP2010-2013 will contribute to better improve this research line.

- Biology and Biotechnology of Plant-Microbe Interactions
- **Action to execute:** Bolster **Priority:** 1
- **Justification:** This is a consolidated and strong line at the EEZ measured by human resources and KPIs such as, funding, publications (articles & book chapters), and requested patents. In addition, the incorporation of 7 young researchers throughout the SP2006-09 has contributed to consolidate the research line, hence it is expected that it will continue progressing over the SP2010-13. An added-value for this line would be to incorporate new expertise in the field through external researchers and to recruit more postdoctoral fellows, so that the potential of this line at internal and external levels could be both maintained and even boosted. Furthermore, this line needs the incorporation of technical staff to achieve its objectives. The availability of some equipment and the services included in this SP2010-2013 will contribute to better improve this research line.

- Bioremediation and Biological Protection of Agricultural Systems
- **Action to execute:** Bolster **Priority:** 1
- **Justification:** This is a consolidated line with good KPIs on funding, publications (articles & book chapters), and requested patents, being remarkable the funds raised in the last years. The incorporation of 7-8 researchers during the SP2006-2009 will clearly reinforce the line and ensure its progress. Nevertheless, there are great imbalances between the two sub-lines that integrate the line that needs special attention when considering the future incorporation of additional human resources. Particular consideration should be also given to the evolution of emergent research particularly that devoted to plant protection, which is carried out by young researchers, who may need particular actions on laboratory space and human resources to ensure their progress. This line should incorporate new researchers with added-value expertise in the field of environmental protection. Especial emphasis should be also given to the incorporation of support technical-staff and postdoctoral fellows. The availability of some equipment and the services included in this SP2010-2013 will contribute to better improve this research line.

- Mediterranean Pastures and Sylvopastoral Systems
- **Action to execute:** maintain **Priority:** 3
- **Justification:**
 - This has been a pioneer research line since it was created, back in 1985, by the officer in charge of the EEZ at that time.
 - It is a very competitive research line: its high fund-raising capacity unveils its ability to respond to many Mediterranean forest research needs in the global change context.
 - The EEZ research group behind this line is a reference group in the matter and, therefore, widely recognised as such in the scientific and academic sphere, as well as in national and international networks.
 - The group has trained and specialized personnel, with a contrasted researching and teaching capacity, and wide experience in project leading and PhD supervision.

The research proposed in the line, although consolidated, is currently in a critical position at the EEZ due to the lack of scientific staff and the next retirement of the head of the group. This line

has good KPIs such as funding and publications (articles & book chapters) records, but the quality of the latter should be improved. This line is distinctly differentiated in this Strategic Plan as a consequence of the splitting from the EEZ of the Department of Earth Sciences, where it belonged and where all its scientific activity has been developed until today. Therefore, the integration of these activities in the future EEZ structure remains to be elucidated.

Staff actions

- Signalling, Stress and Development in Plants

- **TS:** 0 **HSO:** 0 **IST:** 0 **RA:** 0 **PosD:** 0 **PreD:** 0 **Senior:** 0 **Tec:** 0
Priority: 1

- **Justification:** For all research lines human resources are not previously distributed and will be assigned along the strategic Planning according to the resources given by the CSIC and the Centre strategic actions.

In order to achieve the objectives of the line for the SP2010-13, Tenured and JAE-Seniors scientists should be incorporated to support objectives on topics focused on cell signaling, control in the reproduction of plants, redox regulation and plant resistance to abiotic stresses. In addition, positions could be offered to incorporate new expertise that may be relevant for the line in subjects such as gene regulation, transcriptomics and proteomics in plant systems, biotic stress, crop improvement under adverse conditions, and biotechnology of plant antioxidants. This line needs to be reinforced with technical personnel using the OEP as well as the JAE-Tec program. This line is clearly deficient in postdoctoral fellows and PhD students; hence it should be reinforced through the JAE-Doc, JAE-Pre and other national and regional programs. PhD students should be, at least, in the ratio of 1.5 to staff-scientists

- Biology and Biotechnology of Plant-Microbe Interactions

- **TS:** 0 **HSO:** 0 **IST:** 0 **RA:** 0 **PosD:** 0 **PreD:** 0 **Senior:** 0 **Tec:** 0
Priority: 1

- **Justification:** In order to be able to accomplish the current objectives of the line for the SP2010-13, Tenured scientists and JAE-seniors should be incorporated on topics focused on the applied and biotechnological aspects of the plant-microbes interactions, and the induction of plant resistance to pathogens and stresses by beneficial microorganisms. In addition, positions should be offered to incorporate new expertise in relevant topics currently emerging in the line such as metagenomics,, full genome microbial analyses, new molecular tools to generate mutants and computational biology. This line needs to be reinforced with technical personnel using the OEP as well as the JAE-Tec program. This line is clearly deficient in postdoctoral fellows; hence it should be reinforced with the JAE-Doc and other programs. PhD students should be, at least, in the ratio of 1.5 to staff-scientists and they will be recruited using the JAE-Pre and other national and regional programs.

- Bioremediation and Biological Protection of Agricultural Systems

- **TS:** 0 **HSO:** 0 **IST:** 0 **RA:** 0 **PosD:** 0 **PreD:** 0 **Senior:** 0 **Tec:** 0
Priority: 1

- **Justification:** In order to be able to accomplish the current objectives of the line for the SP2010-13, Tenured and JAE-Senior scientists should be incorporated with expertise on bioremediation, biotransformation of organic wastes and soil protection. Particularly, new expertise should be incorporated to the metagenomics and plant protection topics as well as to the field of vermicomposting processes and sustainable agrosystems. This line needs to be reinforced with technical personnel using the OEP as well as the JAE-Tec program. This line should be reinforced with postdoctoral fellows from the JAE-Doc and other national and regional programs. PhD students should be, at least, in the ratio of 1.5 to staff-scientists and they will be recruited using the JAE-Pre and other programs.

- Mediterranean Pastures and Sylvopastoral Systems
- **TS:** 0 **HSO:** 0 **IST:** 0 **RA:** 0 **PosD:** 0 **PreD:** 0 **Senior:** 0 **Tec:** 0
 Priority: 3
- **Justification:** For this line, it is necessary to analyse its future before we consider any human resources assignment.

Equipment actions

- Signalling, Stress and Development in Plants
- **Action to execute:** Increase **Priority:** 1
- **Justification:** The strategy designed with regard to the equipment requested by all the research lines has taken into account the following statements:
 1. Equipment that could be ascribed to the different services of the Centre will be only requested by the corresponding service.
 2. Equipment that is already present in the services will not be applied for in the next SP2010-2013.
 3. In general equipment that could be easily purchased within regular projects will not be demanded in the SP2010-13.
 4. Equipment that could be shared by different research lines will be favoured in this SP2010-13.

- Biology and Biotechnology of Plant-Microbe Interactions
- **Action to execute:** Increase **Priority:** 1
- **Justification:** See above

- Bioremediation and Biological Protection of Agricultural Systems
- **Action to execute:** Increase **Priority:** 1
- **Justification:** See above

- Mediterranean Pastures and Sylvopastoral Systems
- **Action to execute:** maintain **Priority:** 3
- **Justification:** See above

Strategy on Services

Global actions

- Science Outreach
- **Action to execute:** Consolidate **Priority:** 1
- **Justification:** The improvement of the strategy to outreach the EEZ research to the society depends on the incorporation of some human resources during the Strategic Planning 2010-13. One graduate in journalism, biology or chemistry will be assigned to this service in 2010, so she/he will depict the specific programme and implement the future actions for the service. This programme will cover, besides the activities already carried out by the EEZ (organization of the Science and Technology Weeks, seminars, exhibitions, conferences, round tables, guided visits to the EEZ, popular science articles, participation in forums and Science Fairs), new formulas to accessing the public: the issue of a short movie aimed at showing the scientific activity carried out at the EEZ, edition of a printed brochure, Science at schools, a permanent exhibition of lyophilized fungi and fish, and the EEZ Day, among others. In this strategy, the collaboration with other national SOSs will be promoted to gain popularization of the EEZ beyond our region.

- Scientific Instrumentation Service (SIS)
- **Action to execute:** Consolidate **Priority:** 1
- **Justification:** In the SP2010-13 the Scientific Instrumentation Service (SIS) should be consolidated. The SIS will incorporate new equipments according to the demands of the EEZ scientists, mainly those allowing the elemental (C, N, P, H) and metal analyses from both, plant and animal samples, the later ones coming from the Institute of Animal Nutrition. Moreover, the SIS will move to a new location in the Red House, thus the service will have the space and infrastructure necessary to accomplish the proposed objectives. In addition, the SIS technicians will optimize and add new protocols for the wide range and diverse type of analyses already requested by the different research lines. Moreover, they will also develop specific training courses which will be offered to the scientific and technical community within the CSIC. The service should be reinforced with additional human resources to improve the analytical capacity of the SIS.

- DNA Sequencing
- **Action to execute:** Add **Priority:** 1
- **Justification:** The main effort of the DNA Sequencing service will be directed to offer a reliable DNA sequence analysis directly to the client, and a competitive price to internal users with regard to external services from other companies. Thus, at least initially, an important effort of the funding and administration bodies of the CSIC is needed in order to provide both human and infrastructure resources to the service. Moreover, initial specific training to the staff-personnel ascribed to the service will be required. To reach the proposed objectives at the short term, the Centre will provide an Intermediate Specialist Technician (a position currently available at the RPT of the EEZ) in 2009, and set up the ABI3100 equipment existing at the EEZ. Thus, it is expected that at the beginning of the SP2010-13, the DNA sequencing facility will be suited to initiate its activity.

- Greenhouses and Growth Chambers
- **Action to execute:** Bolster **Priority:** 1
- **Justification:** A new set of greenhouses like those working at the EEZ nowadays will satisfy the future demand for this service. The integration of new growth chambers is one of the aims of the present SP2006-09 and will be also the target for the next. Another important objective for the next SP2010-13 refers to personnel, since the technical responsible of this service will retire

in the following years.

- Confocal and Transmission Electron Microscopy (CTEM)
 - **Action to execute:** Add **Priority: 1**
 - **Justification:** The acquisition of a fully equipped confocal fluorescence microscope will provide a broader scientific scope to the centre research activity. The existing mechanisms for handling, managing, maintaining and upgrading microscopes available in the institute must be improved and regulated in a service basis. This will increase the accessibility of the researchers to these instruments. In addition, the service will provide basic sample preparation and advice about the possibilities of the microscopes and the use of different techniques, therefore contributing to the development of multidisciplinary approaches to the study of biological samples. The global strategy regarding this CTEM service will also include as a priority the incorporation of technical staff to the service.

- Knowledge Transfer
 - **Action to execute:** Consolidate **Priority: 1**
 - **Justification:** The Service will change its activity from a reactive to a pro-active management. The dynamization of the scientific staff will provide a higher number of potential users of the KT service, and eventually a higher number of scientists involved in knowledge transfer activities. The final aim will be an increased portfolio of technologies available at the EEZ that can be marketed. An active action will be also applied in order to attract industries and companies interested in our research and results.

- General Management
 - **Action to execute:** Bolster **Priority: 1**
 - **Justification:** The incorporation of new human resources to the different Areas of the General Management will clearly improve the Service, the achievements of the objectives and its efficient performance. Likewise, the service will be upgraded including new tasks such as digitalization of documents as well as developing informative and integrated data bases. Thus, the Service will be able to provide reliance and fast information of the day-to-day administrative situation at the EEZ. Establish and maintaining these integrative data bases in such a way that all followers, researchers and administrative managers could have access online, will certainly improve the management of the research projects. The Service is also expected to implement the corresponding purchasing activities on line; in this manner all the procedures could be performed and visualized electronically by both administrators and researchers.

- Library
 - **Action to execute:** maintain **Priority: 1**
 - **Justification:** The more stable and traditional role of the EEZ library is the upkeep and conservation of the collections acquired.

However, the many resources available as being part of the CSIC Library Network will prevent the EEZ library from being regarded simply as a "conservation space"; instead, it will be regarded as an up-to-date scientific and modern information service that plays a key role in the research-knowledge production-dissemination chain. In this regard, it will be encouraged the acquisition of electronic material (books and journals).

The traditional services of the library will continue alongside the use of current electronic technology and the user education that will involve two aspects of information literacy: promoting information about the library services and enhancing training in the management of electronic information resources. The library space should be used and redistributed envisaging

the library building something like the CRAI (Resource Centre for the Learning and Research) universities. There is an adjacent room which can be used for electronic access and training of the EEZ users once equipped.

To achieve all these objectives, a policy on librarian training, updating and promotion will be developed in order to motivate and facilitate the access to specific continuing education to the library personnel.

- Radiochemistry Laboratory
- **Action to execute:** maintain **Priority: 1**
- **Justification:** The aim on this Strategic Planning is to provide a functional laboratory with sufficient space and equipment to meet current demand and, at the same time, equip it with protective measures in order to ensure the minimal exposure to radiation of users. Given the increasing demand and the diversification of the techniques used, this laboratory needs to be reformed and the obsolete equipment replaced. Nevertheless, due to the reorganization that will take place in the Red House, the Radiochemistry Laboratory may have to change its location between 2010 and 2013.

- Information Technologies
- **Action to execute:** Bolster **Priority: 1**
- **Justification:** The evolution of technology and e-management requires a strong ITS, able to cope with the increasing demand of the centre. To make this possible, resources to maintain and improve the infrastructure, but mostly specialized personnel for this service are needed.

- Stable Isotopes Laboratory
- **Action to execute:** Discontinue **Priority: 3**
- **Justification:** Based on the strong weaknesses of the Stable Isotopes Laboratory, the Vice-president for Scientific and Technological Research of the CSIC (VICYT) along with the Director of the EEZ have recently resolved that the GC-IRMS equipment of the service is under the supervision of the Biogeochemistry of Stable Isotopes Research Group. Since this group belongs to the Department of Environmental Geochemistry, that will join the units of IACT and LEC to form the new Institute of Earth Sciences, this service will not be at the EEZ for the 2010-2013 Strategic Planning.

- Pseudomonas Reference Culture Collection Service
- **Action to execute:** Discontinue **Priority: 3**
- **Justification:** This service will not remain in the 2010-2013 Strategic Planning, disappearing from the service structure of the EEZ. The Pseudomonas collection will remain under the responsibility of the Degradation of Toxic Compounds Research Group. In the EEZ there are other wide collections on Plant-Growth Promoting Microorganisms and Arbuscular Mycorrhiza that will be supervised by different groups within the Biology and Biotechnology of Plant-Microbe Interactions research line. All these collections will make up the Microbial Genetic Resources (MGR) of the EEZ. The biological material included in the EEZ Collections will contribute to the activities of the corresponding research groups and will be available for the interested users upon entering into a Material Transfer Agreement (MTA), which will be signed between the CSIC (authorised signatories) and the applicant party. The rights and duties of the parties will be established in the above mentioned MTA, as well as other specific conditions for the use of the material.

Staff actions

- Science Outreach
- **TS: 0 HSO: 1 IST: 0 RA: 0 PosD: 0 PreD: 0 Senior: 0 Tec: 1**
Priority: 1
- **Justification:**Currently, no technical staff is ascribed to the service, but a JAE-Tec is expected to be incorporated at the beginning of 2009. Nevertheless, a Higher Scientific Officer (journalist, environmentalist, biologist or chemist) should be incorporated in 2010 to consolidate the service. Also, a JAE-Tec will be incorporated to be trained in these specific activities and reinforce the service.

- Scientific Instrumentation Service (SIS)
- **TS: 0 HSO: 0 IST: 0 RA: 0 PosD: 0 PreD: 0 Senior: 0 Tec: 2**
Priority: 1
- **Justification:**One of the aims of the service is to set up new protocols for the different requests of the users. Also, the incorporation of new instruments for elemental and metal analyses will increase the analytical capacity of the SIS. Therefore, the incorporation of new technicians (2 JAE-Tec) will be needed in order to set up and perform these analyses and reinforce the service.

- DNA Sequencing
- **TS: 0 HSO: 0 IST: 0 RA: 0 PosD: 0 PreD: 0 Senior: 0 Tec: 2**
Priority: 1
- **Justification:**Currently, no technical staff is ascribed to the service, but an Intermediate Specialist Technician from the currently assigned working positions to the Centre (RPT) is expected to be incorporated by the end of 2008 so that the service will start its activities soon. Additional support training personnel (JAE-Tec) should be incorporated to reinforce the service.

- Greenhouses and Growth Chambers
- **TS: 0 HSO: 0 IST: 1 RA: 0 PosD: 0 PreD: 0 Senior: 0 Tec: 0**
Priority: 1
- **Justification:**The technical responsible of the service will retire soon; hence, this position will need to be covered. In addition the service should be reinforced with the incorporation of technical staff that could help to support the activities of the research groups.

- Confocal and Transmission Electron Microscopy (CTEM)
- **TS: 0 HSO: 0 IST: 0 RA: 0 PosD: 0 PreD: 0 Senior: 0 Tec: 2**
Priority: 1
- **Justification:**Currently, no technical staff is ascribed to the service, but a Higher Scientific Officer from the currently assigned working positions to the Centre (RPT) will be directed to this service in 2009 so that the service can start its activities. Two additional JAE-Tec should be incorporated to reinforce the service.

- Knowledge Transfer
- **TS: 0 HSO: 0 IST: 0 RA: 0 PosD: 0 PreD: 0 Senior: 0 Tec: 0**
Priority: 3
- **Justification:**Additional personnel are not needed.

- General Management
- **TS: 0 HSO: 0 IST: 1 RA: 2 PosD: 0 PreD: 0 Senior: 0 Tec: 4**
Priority: 1

- **Justification:** Three CSIC staff-technicians specialized in the financial and administrative areas as well as 4 JAE Tec should be incorporated to the general Management service to achieve its objectives and cope with the administration of the EEZ, which is increasingly complex due to the steady growth in the amount of financial and human resources to be managed and the division of the EEZ into two institutes. It should be also noted that three current staff will retire soon; hence these position will also need to be covered.

- Library
- **TS:** 0 **HSO:** 0 **IST:** 0 **RA:** 0 **PosD:** 0 **PreD:** 0 **Senior:** 0 **Tec:** 0
Priority: 3
- **Justification:** Additional personnel are not needed.

- Radiochemistry Laboratory
- **TS:** 0 **HSO:** 0 **IST:** 0 **RA:** 0 **PosD:** 0 **PreD:** 0 **Senior:** 0 **Tec:** 0
Priority: 3
- **Justification:** Additional personnel are not needed.

- Information Technologies
- **TS:** 0 **HSO:** 0 **IST:** 0 **RA:** 1 **PosD:** 0 **PreD:** 0 **Senior:** 0 **Tec:** 4
Priority: 1
- **Justification:** The continuous expansion of the Centre has led to an elevated number of users and increased requests of the Information Technology Service, so its personnel cannot meet the demand. Hence, it should be reinforced with additional support personnel: a Research Assistant and several JAE-Tec.

- Stable Isotopes Laboratory
- **TS:** 0 **HSO:** 0 **IST:** 0 **RA:** 0 **PosD:** 0 **PreD:** 0 **Senior:** 0 **Tec:** 0
Priority: 3
- **Justification:** It will not continue in the next strategic planning

- Pseudomonas Reference Culture Collection Service
- **TS:** 0 **HSO:** 0 **IST:** 0 **RA:** 0 **PosD:** 0 **PreD:** 0 **Senior:** 0 **Tec:** 0
Priority: 3
- **Justification:** It will not continue in the next strategic planning

Equipment actions

- Science Outreach
- **Action to execute:** Increase **Priority:** 1
- **Justification:** This service will need an office so that the technical staff can develop their activities appropriately, but also the minimal equipment for functioning such as computers and office furniture. Besides, and in order to improve the permanent exhibition of fungi and fish, a freeze-dryer will be acquired.
- Scientific Instrumentation Service (SIS)
- **Action to execute:** Increase **Priority:** 1
- **Justification:** New equipment should be incorporated to carry out additional type of analyses requested by researchers. This includes an ICP Optical Emission Spectrometer (mineral analyses), one C, H, N elemental analyzer, as well as other basic equipment i.e., a flame proof

safety cabinet to store chemicals, a Milli-Q water system and an UPS.

- DNA Sequencing
 - **Action to execute:** maintain **Priority:** 1
 - **Justification:** Basic equipment for the service laboratory should be acquired (freezer, PCR machine, centrifuge, etc.) and the current DNA Sequencer apparatus will be upgraded.

- Greenhouses and Growth Chambers
 - **Action to execute:** Increase **Priority:** 1
 - **Justification:** The service should be reinforced with two additional growth chambers and building-up of supplementary greenhouses.

- Confocal and Transmission Electron Microscopy (CTEM)
 - **Action to execute:** Increase **Priority:** 1
 - **Justification:** It is considered that the upgrade of the current confocal microscopy is not either economically or functionally worthwhile. Therefore, a new confocal microscopy that includes true spectral technology, fully motorised stage, objectives, pinholes, etc., up to five detection channel, included transmitted light is needed. Broad range of objectives PL APO, large working distance and numerical aperture, DIC and dark field optics, enhanced sensitivity, cooled photomultipliers, best red emission detection, AOTF-controlled laser power, multiple laser lanes will be also available in this new equipment. In addition, the service needs a ultramicrotome, glass-knife maker and other small equipments.

- Knowledge Transfer
 - **Action to execute:** maintain **Priority:** 3
 - **Justification:** It is currently fully equiped

- General Management
 - **Action to execute:** Increase **Priority:** 1
 - **Justification:** The service needs specific management softwares, additional computers and the renewal of the current ones, servers to support the integrated management, PDA for the maintenance workers and investments for the implementation of the health and safety quality program.

- Library
 - **Action to execute:** maintain **Priority:** 1
 - **Justification:** This service needs the renewal of their regular equipments such as computers, scanners, copy machine, etc. and the acquisition of new shelves.

- Radiochemistry Laboratory
 - **Action to execute:** Increase **Priority:** 1
 - **Justification:** The service needs to acquire the equipment necessary to meet the current demand and update the obsolete equipment. It needs some basic small equipment: centrifuges, thermocyclers, dry baths, orbital water baths, electrophoresis systems for radiolabeled proteins and DNA samples, gels-dryers, refrigerators, etc. In addition, a new hybridization oven, a phosphorimager and a gamma counter should be incorporated.

- Information Technologies
 - **Action to execute:** Increase **Priority:** 1
 - **Justification:** The service will implement the IP telephony at the EEZ in 2009 and therefore, the maintenance of the voice and data network must be contracted. The service exhibit several deficiencies that must be corrected: it lacks of a centralized storage system (SAN) and needs a centralized backup unit. Also, the central servers, acquired in 2008, will need to be replaced in order to update them.

- Stable Isotopes Laboratory
 - **Action to execute:** Reduce **Priority:** 3
 - **Justification:** The current equipment will move out from the EEZ to the new Earth Science Institute.

- Pseudomonas Reference Culture Collection Service
 - **Action to execute:** Reduce **Priority:** 3
 - **Justification:** Equipment currently in the service will be under the supervision of the Degradation of Toxic Compounds Research Group.

Progress Indicators (Quantitative objectives)

Progress Indicators (Quantitative objectives)

		Indicator	2010	2011	2012	2013
Funding(k€)	Research projects		2600	2700	2800	2900
	I+D Contract		445	50	50	55
Article / Book chapters (number)	HIGH Percentil 75		61	64	69	72
	MEDIUM Percentil 50-75		25	21	21	26
	LOW Percentil <50		2	4	4	3
Congress(number)	HIGH Percentil 75		27	26	26	32
	MEDIUM Percentil 50-75		23	24	23	23
	LOW Percentil <50		1	0	1	0
Full books(number)	HIGH Percentil 75		0	1	2	0
	MEDIUM Percentil 50-75		1	1	0	1
	LOW Percentil <50		0	0	0	0
Knowledge Transfer(number)	Requested priority patents		1	3	1	2
	Licensed priority patents		0	1	0	0
	Spin-Offs		0	0	0	0
		Indicator	2010	2011	2012	2013
Training (number)	Theses		16	13	18	13
	Courses & masters (hours)		674	679	674	679
Outreach(number)	Events		11	9	9	10
	Material		7	8	9	10
Internationalisation (number)	Foreign staff		5	8	4	7
	Colaborations		15	13	15	11
	Co-authoring scientific articles		18	21	19	21
	Services in English?		23.50	33	46.50	58
Services	Self financing		0.33	0.07	0.27	0.07
	Relative efficiency respect to		0.99	0.93	0.87	0.88
	Electronic management implementation		36	56.50	73.50	89
Quality programme	Integrated program		Y	Y	Y	Y
	ISO certification					

Assigned resources (Total)

Human resources

Personnel(number)	2010	2011	2012	2013	Total
Tenured Scientist	1	2	1	2	6
Higher Scientific Officer	1	2	2	1	6
Intermediate Specialist Technician	0	2	2	2	6
Research assistant	0	0	0	0	0
JAE-Senior	0	0	0	0	0
JAE-Doc	2	3	4	4	13
JAE-Pre	3	4	3	4	14
JAE-Tec	4	4	4	6	18
AGE Technician (Informatics)	0	1	0	0	1
Aux. Technician (Archives, Libraries and Museums)	0	0	0	0	0

Financial resources

Action	2010	2011	2012	2013	Total
EQUIPA(k€)	150	150	150	150	600

Assigned resources (Scientific)

Human resources

Personnel(number)	2010	2011	2012	2013	Total
Tenured Scientist	1	2	1	2	6
Higher Scientific Officer	1	2	2	1	6
Intermediate Specialist Technician	0	2	2	2	6
Research assistant					0
JAE-Senior					0
JAE-Doc	2	3	4	4	13
JAE-Pre	3	4	3	4	14
JAE-Tec	4	3	3	4	14

Financial resources

Action	2010	2011	2012	2013	Total
EQUIPA(k€)	150	150	150	150	600

- Justification: INFORME CRITERIOS EVALUACION PARA ASIGNACIÓN RECURSOS AREA 4

Los criterios seguidos han sido:

-Tamaño del Centro (10%)

-Indicadores señalados en la Tabla (fondos competitivos e ISisHigh/inv/año, precio de artículo y resultados en transferencia, si bien esta ultima no se pudo sopesar bien por información errónea y desordenada en el output para algunos centros) 40%

-Evaluación y recomendación de paneles.40%-30%

-Aceptación sugerencias comisión en cambios de programa e indicadores 10%

-Apuestas del área: Centros bolster propios, nuevos centros mixtos, disciplina ganadería, conservación de la distribución territorial, muy importante en Ciencias Agrarias para permanecer ligada al Sistema Productivo.

En nuestros paneles se consideró Bolster>Consolidate>Mantein, tal proponia en el impreso de evaluación. En el caso de Redesign, se ha tenido en cuenta la evaluación de las líneas y el seguimiento en el rediseño de las sugerencias del panel y comisión de área.

Assigned resources(Management)

Human resources

Personnel(number)	2010	2011	2012	2013	Total
Tenured Scientist	0	0	0	0	0
Higher Scientific Officer	0	0	0	0	0
Intermediate Specialist Technician	0	0	0	0	0
Research assistant	0	0	0	0	0
JAE-Senior	0	0	0	0	0
JAE-Doc	0	0	0	0	0
JAE-Pre	0	0	0	0	0
JAE-Tec	0	1	1	2	4
AGE Technician (Informatics)	0	1	0	0	1
Aux. Technician (Archives, Libraries and Museums)	0	0	0	0	0

Financial resources

Action	2010	2011	2012	2013	Total
EQUIPA(k€)	0	0	0	0	0

- **Justification:** Recursos no científicos:
2 JAe-Tecs perfil gestión (2011 y 2013)
2 JAe-Tecs perfil informática (2012 y 2013)
1 Técnico Auxiliar de informática (2011)

Criterios generales de asignación de recursos no científicos.

Uno de los aspectos a destacar es que en el presente Plan de Actuación se dispone, para su asignación a las unidades, centros e institutos, de unos recursos concretos y limitados: la previsión de plazas libres de Oferta de Empleo Público en las Escalas de Titulados Superiores del CSIC y de TITEs de OPIs (especialidad de gestión de I+D y similares), las de algunos Cuerpos Especiales de la Administración General del Estado (en el ámbito de bibliotecas, informática y museos), junto con las plazas de contratos JAE -Técnicos para el período 2010-2013.

No se incluyen, por tanto, plazas de las Escalas de Ayudantes y Auxiliares de Investigación de OPIs, por no existir la citada especialidad en las plazas libres; ni de funcionarios de Cuerpos Generales o de personal laboral fijo, por no haber existido Oferta de Empleo Público en los últimos años; no obstante, de conseguirse este tipo de plazas a lo largo de la vigencia del Plan, se procedería, lógicamente, a su distribución con los mismos criterios.

Tampoco se han considerado las peticiones de consolidación de empleo temporal, ya que los procesos de consolidación se desarrollan al margen de la Oferta de Empleo Público.

Asimismo, no se asignan modificaciones de las Relaciones de Puestos de Trabajo, que se llevarán a cabo por la Agencia CSIC en el marco del contrato de gestión que se apruebe para el período de vigencia del Plan de Actuación, ya que dicho marco está todavía en proceso de negociación.

Los recursos se han asignado teniendo en cuenta la dimensión del centro o instituto y de su plantilla actual, así como su evolución prevista, y, en su caso la previsión de entrada en

funcionamiento de nuevos edificios.

Por otra parte, en este Plan de Actuación no se asignan recursos económicos para obras y equipamientos no científicos, que seguirán distribuyéndose, como hasta la fecha, a través de las convocatorias anuales del Programa de Apoyo a la Infraestructura (PAI).

Por tanto debe destacarse que la no asignación de los recursos anteriormente citados se debe a no estar prevista la misma en el presente Plan de Actuación, y no a una denegación de las peticiones, que se estudiarán y atenderán, en la medida de lo posible, por los procedimientos establecidos para ello.