INSTITUTE FOR APPLIED RESEARCH IN SUSTAINABLE ECONOMIC DEVELOPMENT – IPADES

FAPESP, AN EXAMPLE TO BE FOLLOWED

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Fundação de Amparo à Pesquisa do Estado de São Paulo-FAPESP celebrates in 2012, 50 years of support to scientific and technological development of the State of São Paulo and Brazil. In fact, by its founding vision paulista starts well before. The academic community and Constituent Assembly 1946 State were able to integrate to include in the Constitution of 1947, research support device. In 5/23/1962 the effort of materialized views 16 years ago, by act of the governor Carvalho Pinto: FAPESP was born.

In 2011 20,600 support requests were received, of which several were 12,356 approved for areas of knowledge, as shown in the table below.

Field of Knowledge	Requests Granted
Health	3.813
Humanities and Social Sciences	2.174
Engineerings	1.476
Biological Sciences	1.364
Agronomy	1.285
Chemistry	513
Physics	422
Computer Science and Engineering	309
Mathematics and Statistics	298
Geology	268
Architecture	198
Economy	145
Astronomy and Space Science	57
Interdisciplinary	34
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Source: FAPESP, 2012.

With the sequencing of *Xylella fastidiosa*, in 2000, causing the citrus variegated chlorosis (CVC) FAPESP did Brazil gain an expertise until then dominated only by 14 other research groups in the United States, Europe and Japan. This unpublished work was the cover of the magazine Nature, July 13, 2000 edition, so if expressed: *"the results will allow the start of a detailed comparison between plant and animal*"

pathogens ... the new information should provide the basis for an accelerated, and experimental investigation of the interactions between rational X. fastidiosa and their hosts, which should lead to new findings in the approaches to the control of CVC".

The project in partnership with the Development Fund of Citrus (Fundecitros) had three initial objectives: a) doing science at the frontier of knowledge, bringing to fruition a project of molecular biology; b) form highly qualified researchers, on a large scale and in a short time span, extending the competence of the São Paulo and Brazilian research in molecular biology; c) mobilizing the scientific community to study significant socioeconomic problems that it could help to solve, as the disturbing CVC, at that time.

In came the Sugarcane genome project, completed in 2002, responsible for the mapping of 238 thousand fragments of functional genes of sugar cane, paving the way for the use of molecular markers in crop improvement. A partnership with the private sector, this time with the Cooperativa dos Produtores de Açúcar e Álcool do Estado de São Paulo (Copersucar) and its research arm, the Sugar Cane Technology Center (CTC).

Fundamentally, the Sugar Cane Genome initiated the effort to deepen the knowledge about the metabolism of sugar, so you get faster and more productive varieties resistant to drought or soils with low fertility. Current techniques, breeding a new variety takes ten years of work, of the first tests for approval for use in the field.

In September 2003, an article in the scientific journal Genome Research presented the main fruit of the program: "a thorough description of the genetic makeup of sugar cane, the longest cultivated plant on a large scale in Brazil". The article showed that the sugarcane genome consists of genes, of whom 33,620 possible about two thousand seem to be associated with the production of sugar.

FAPESP has played good coordination in supporting research involving multiple institutions. The project, *Crossing Strategies, Management Practices and to Sustained Intensification of Biotech Production of Beef,* held from 1998 to 2002, gathered two dozen researchers of four institutions: Embrapa Pecuária Sudeste, based in San Carlos; Escola Superior de Agricultura Luiz de Queiroz (Esalq), University of São Paulo (USP), in Piracicaba; Faculdade de Ciências Agrárias e Vetrinárias (FCAV) of Paulista University (Unesp), in Jaboticabal; and units of Sertãozinho and Nova Odessa, Instituto de Zootecnia (IZ), Secretaria de Agricultura e Abastecimento de São Paulo.

Before this project, several Brazilian researchers had already dealt with this issue, but usually focused only on isolated phases of the production system. The novelty of the work is that it involved at the same time various aspects, such as breeding, reproduction, nutrition, health, pasture and molecular genetics. To do this, the studies were divided into eight sub-projects.

Three major initiatives of FAPESP establish a new approach in terms of scientific organization: the FAPESP Program of Research on Global Climate Change (PFPMCG), the FAPESP Program of Research in Bioenergy (BIOEN), and the BIOTA-FAPESP, acronyms in Portuguese. These themes related to climate, energy and biodiversity involve key issues for the construction of a sustainable society.

The different lines of research BIOEN has, with focus on development of new cultivars for bioenergy production, new technologies for processing of biomass fuel production, systems development, and environmental impacts and biorefinery engines. The goal is to make a serious investment in renewable energy research, stimulating international cooperation with interdisciplinary and transdisciplinary approach problems in focus.

In Brazil, 20% of the fuels used were replaced by bioethanol from sugar cane. This is the main reason why 47% of the country's renewable energy matrix is. The projection for 2013 is that the country produces more than 570 million tons of sugar cane and 23.9 billion liters of bioethanol. Has the cogeneration of energy from the burning of crushed sugar cane that contributes with 4.7% of the country's electricity.

This context generates a very large demand for biofuel production in Brazil. The sugar cane ethanol – which has energy efficiency recognized by leading regulatory agencies – only uses 2% of areas available for agricultural use and currently there are 60 million hectares with potential to expand production without touching the forests. The East side of the State of Pará and Maranhão offer eight anthropogenic disturbance area eight million hectares suitable for the cultivation of sugar cane for ethanol production, according to studies conducted by Esalq. With such demand, it is essential to invest in research.

As for the PFPMCG, one of the main priorities is to build until 2013 a Brazilian model of the climate system with focus on key regional issues such as the impacts of climate change on the Amazon, Cerrado and South Atlantic.

One of the priorities for the PFPMCG is to study the consequences of global climate change on the functioning of ecosystems, with emphasis on biodiversity, in cycles of carbon, nitrogen, water bodies, in atmospheric radiation balance, trace gases and aerosols, in land use changes.

Other research is the impact of global climate change on agriculture, energy production and human health. There is also a focus on responses to social and economic vulnerability, including adaptation initiatives.

The BIOTA-FAPESP created a georeferenced database with 102 thousand records of 1,100 species, identifying 34 types of native vegetation in the State of São Paulo in Brazil. The integrated system uses free software. In 2002, the BIOTA-FAPESP launched a project aimed at discovery of Brazilian biodiversity molecules that can be used as models in the industry.

Among the main products of the program is the production of a series of maps of biodiversity that have been applied in public policies for the conservation and restoration of biodiversity. The State of São Paulo has 19 legal instruments – between the laws, decrees and resolutions – which have been drawn up on the basis of results of the program.

The FAPESP's example should be followed by other Brazilian States, not only as political agenda and administrative, but with the commitment and the understanding that society of the 21st century is the knowledge society; knowledge that seeks sustainable development. This occurring the country will have enormous perspectives to be among the first not only in the scientific field; but, above all, to give permanent breakthrough in their sustainable development, especially for those regions with low levels of unsustainable development. The knowledge generated by research will cause these regions are best in the country and the world.

Establish a foundation to support research work is indispensable to the policy States. The macroeconomic, social and environmental scenarios, both nationally and globally, pointed inexorably towards innovation and scientific and technological development as the major axis of the resumption of economic growth and social development of countries and the planet.