

BIOTECHNOLOGY AND BIODIVERSITY IN THE FRAMEWORK PROGRAMMES FOR RESEARCH

John Claxton

European Commission*, SDME 8/06, B-1049, Brussels, Belgium. John.Claxton@cec.eu.int

Summary

Collaborative research is supported by the European Commission through four-year framework programmes. While biotechnology, prioritised as a tool for development, is highlighted in a number of strategic areas, the conservation and sustainable use of biodiversity is also strategically important for sustainable development and the security of future generations. The research framework programmes serve to exploit the potential of biotechnology research and assist the maintenance of biodiversity.

Keywords

Biodiversity, Biotechnology, Research, Europe, Framework programme

Background to the framework programmes: biotechnology and biodiversity

Collaborative research in the European Union has been supported since 1982 through a series of four-year programmes that fund research and technological development projects which fall within a predefined framework and involve research across several countries. Research is supported, in accordance with the Treaty establishing the European Community, with the aim of supporting European competitiveness and policies¹. The current framework programme is the sixth and runs from 2002 to 2006. The budget for the framework programmes has increased steadily over the years and is expected to reach over €18 billion for the sixth framework programme.

Within the framework programmes the exploitation of biotechnology research has always been important and has become more explicit following the development of the “Lisbon strategy for economic, social and environmental renewal” in 2000². The Lisbon strategy also recognises the importance of biodiversity, calling for a halt to the decline of biodiversity by 2010 and, additionally, recognises the role of the conservation of biodiversity for environmental protection and sustainable development.

Following the Lisbon strategy, and in recognition of the role of biotechnology in developing the future of European citizens, a strategy, and associated action plan, on “Life sciences and biotechnology – a strategy for Europe”, was proposed by the Commission in 2002³. The strategy has been strongly supported by the Member States and the European Parliament. Prioritisation and exploitation does not, however, mean that biotechnologies are used without constraint, and on-going debates on the use of genetic modification and cloning, for example, underline the importance of society in influencing their use.

* The views expressed are solely those of the author and should not be construed as forming an official opinion of the European Commission.

The strategy on the “Life sciences and biotechnology” aims to allow Europe to benefit fully from the potential of biotechnology, to ensure proper governance and to meet broader European responsibilities. These include sustainable development, the use of biotechnology in the context of ethical and societal implications and its application for the benefit all members of society, rich or poor. To carry these out, the strategy lists a 30 point action plan which highlights, among other issues, the need for biotechnologies to be used within the context of societal demands and concerns and for long-term sustainability. In short, biotechnologies should be used, amongst other factors, in the context of the requirement to maintain biodiversity. In particular, the strategy acknowledges that biotechnology is important to realise the full potential of biodiversity, specifically mentioning the need to protect it.

Biodiversity, however, is recognised to be important at a much broader level for today’s and future societies. In this context, research is recognised as having an impact on biodiversity, not only in terms of specifically targeted projects but also in terms of the incidental effects that non-targeted research might have on it (the potential to lose biodiversity as a result of innovations generated by research). The framework programmes for research, thus, need to address biodiversity from both these viewpoints⁴. In the current, sixth, framework programme all research must respect the “principle of biodiversity”. Biodiversity is also specifically defined as a research theme related to global ecosystems⁵ and, in addition, the Joint Research Centre⁶ is mandated to address biodiversity with respect to the conservation of terrestrial resources and landscapes and in the use of genetically modified organisms.

Underlining its environmental importance, biodiversity as a subject is coordinated in the European Commission through the directorate general for the environment which collates comprehensive information on the subject⁷. Biodiversity is also recognised as important for the sustainability of agricultural production under the auspices of the directorate general for agriculture⁸. In addition, European legislation addresses the issue of biodiversity in such diverse areas as marine and coastal regions, rural development and agriculture, forests (both temperate and tropical), alpine regions, organic food production, economic policy and even in tourism. Finally, the European Union also contributes to the implementation of international conventions such as the “Convention on biological diversity”⁹ and the “International undertaking on plant genetic resources for food and agriculture”¹⁰.

The structure of the sixth framework programme

The sixth framework programme is centred around three blocks of activities related to the development of a European Research Area (ERA). These are: “Focussing and Integrating European Research”, “Structuring the ERA” and “Strengthening the Foundations of the ERA”. By far the largest area, in terms of financial contribution, is the first, with a budget of €13.5 billion out of the €16.5 billion initially earmarked for non-nuclear research. The majority of funding within this first block relates to seven thematic priorities, of which two, “Food quality and safety” and “Sustainable development, global change and ecosystems”, could be seen as having direct, though not exclusive, relevance to biodiversity.

In addition, the sixth Framework programme has been characterised by a shift from smaller projects to one of larger undertakings, large both in terms of breadth of work as well as amount of financing. Despite the increase in funding between the fifth and sixth framework programmes, this shift to larger projects inevitably leads to a smaller number being funded.

Support for research on biodiversity

With such importance attached to the issue of biodiversity it might seem surprising, therefore, that a simple search of research projects funded in the sixth framework programme identifies only relatively few projects that include “biodiversity” as a keyword. In fact, on the Cordis website search engines¹¹, this keyword selects only 8 (1%) of 836 projects so far funded in the sixth framework programme, compared to 351 (2%) of 16 957 projects funded under the fifth framework programme, which ran from 1998 to 2002. Less surprisingly, searching for “biotechnology” produces a figure of 6% in the fifth framework programme rising to one of 19% in the sixth. Of course such a search is overly simplistic as not only are many projects from the sixth framework programme not yet listed but also the search is limited to a subset of project information. Several projects funded within the sixth framework programme that are not identified through the search, actually have significant biodiversity components. Indeed the nature of many sixth framework programme projects, which are significantly larger and more complex than those in the fifth framework programme, means that biodiversity becomes part of larger projects whose key identifiers may not be biodiversity itself and which are not, therefore, selected by the search engines. Considering the interrelatedness of biodiversity to multiple strands of research, integrating biodiversity as part of larger projects should be to the subject’s advantage.

In the fifth framework programme, projects addressed biodiversity in the environment, the potential impact of climate change, conservation, plants for medicines and the broad area of farming, including animals, fisheries, crops and forestry. Within these fields there are several projects of relevance of this meeting, such as the “Econogene” project on “Sustainable conservation of animal genetic resources in marginal rural areas”. Many of these projects have now finished or are soon to finish and the results widely disseminated.

Within the sixth framework programme, however, projects are only just beginning. In addition to support for projects on monitoring biodiversity in forest, marine and urban environments, there is work to support the formulation of legislation on use of GMOs that takes into account the need to maintain biodiversity. There are, however, projects that address biodiversity issues but which are not identified in the searches mentioned above. A major limitation on grain legume production in Europe is the unreliability of yield and there is a need to improve the protein content and composition of the grain. The integrated project “New strategies to improve grain legumes for food and feed” (Grain legumes)¹² exploits natural diversity to address these and other relevant agronomic and quality traits in grain legumes. Another integrated project currently under negotiation will exploit biodiversity in potato and wheat to breed new varieties with improved resistance to a range of fungal diseases. Large amounts of pesticides are presently used in Europe to control these diseases in order to decrease their impact on yield and product quality. The project aims at reducing this reliance of European potato and wheat production on plant protection chemicals.

In the context of projects that tackle within them potentially negative impacts on biodiversity, the network of excellence, the “European Animal Disease Genomics Network of Excellence for Animal Health and Food Safety” (Eadgene)¹³, while principally addressing the genomics of interactions between host and pathogen, also undertakes discussion within a science-society dialogue of the potential impact of any subsequent selection on biodiversity. Similarly, the Code of Good Practice for Farm Animal Breeding Organisations” (Codefabar)¹⁴, a specific support action, addresses the issue of genetic diversity in the context of

farm animal breeding. In addition to a recognition of the need to maintain biodiversity, the project also commissioned an ethical review to discuss current ethical concerns, which included substantial input on biodiversity in animal breeding.

Biodiversity in terms of sustainable development is the subject of a cluster of projects “The biodiversity project cluster” (Biota)¹⁵. Under the sixth framework programme, a network of excellence “A long-term biodiversity, ecosystem and awareness research network” (Alter-net)¹⁶ will support biodiversity research in natural eco-systems, terrestrial and aquatic, and will address the socio-economic implications and public attitudes to the loss of biodiversity. An integrated project “Assessing large-scale environmental risks with tested methods” (Alarm)¹⁷ will develop risk assessment of biodiversity loss in relation to factors such as climate change, chemicals in the environment etc in both terrestrial and aquatic ecosystems. It will also relate these risks to socio-economic pressures that affect biodiversity, looking for ways to mitigate the impact of such pressures. The project “Tracking surrogates for intraspecific biodiversity: towards efficient selection strategies for the conservation of natural genetic resources using comparative mapping and modelling approaches” (Intrabiodiv)¹⁸ seeks to measure the correlation between intraspecific diversity and species richness or habitat variation in plants in mountainous areas and has close links to the Econogene project on small ruminants.

The future: the seventh framework programme

The seventh framework programme is currently under the initial stages of preparation. A strategy paper “Science and Technology, the key to Europe’s future - guidelines for future European Union policy to support research” was published by the European Commission in July 2004¹⁹. This paper defined six major objectives for future support:

- creation of centres of excellence through collaboration;
- technological initiatives;
- basic research;
- making Europe attractive for the best researchers;
- developing research infrastructures; and,
- improving coordination of national programmes.

Following publication, there have been several consultations on the document, including open, web-accessed consultations. Based on the input from this consultation process a Commission proposal for the seventh framework is expected to be published in April this year, with the final framework formulated by the end of the 2005.

Within the seventh framework programme there is expected, amongst other areas, to be an emphasis on research that will generate knowledge supporting the development of industries and economic sectors which produce, manage and otherwise exploit biological resources (including related services, supply or consumer industries, such as agriculture, food, fisheries and forestry) – a concept that has come to be termed the “knowledge based bio-economy”. Support is expected to concentrate on sustainable production and management of biological resources (such as genomics, biodiversity, animal health and welfare and rural development); the “fork-to-farm” food chain, and sustainable production of non-food products and processes from agricultural and forestry systems.

THE ROLE OF BIOTECHNOLOGY
Villa Gualino, Turin, Italy – 5-7 March, 2005

Although it is too early to know the exact content of the programme, it is clear that the requirement of projects to respect the principle of biodiversity will remain, while specific research in the area is likely to evolve in similar areas to that currently supported. Similarly, in line with the Lisbon strategy, and the Life sciences and biotechnology strategy, the ethically acceptable use of biotechnology will be an integrated part of the overall programme.

REFERENCE LIST

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- ² See http://europa.eu.int/comm/lisbon_strategy/index_en.html
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- ⁴ See http://europa.eu.int/comm/research/environment/themes/article_1348_en.htm
- ⁵ See the Council decisions establishing the framework programme, 2002/834/EC; 2002/835/EC and 2002/836/EC
- ⁶ See in particular the JRC “Institute for the Environment and Sustainability” <http://ies.jrc.cec.eu.int/Home.161.0.html>
- ⁷ See <http://europa.eu.int/comm/environment/nature/home.htm>
- ⁸ See http://europa.eu.int/comm/agriculture/foodqual/sustain_en.htm.
- ⁹ See <http://www.biodiv.org/welcome.aspx>
- ¹⁰ See <http://www.fao.org/ag/cgrfa/IU.htm>
- ¹¹ See <http://www.cordis.lu/fp6/projects.htm> for the sixth framework programme and <http://www.cordis.lu/fp5/projects.htm> for the fifth framework programme
- ¹² See <http://www.eugrainlegumes.org/>
- ¹³ See <http://www.eadgene.org> and <http://www.eadgene.info>
- ¹⁴ See <http://www.sefabar.info/code-efabar/>
- ¹⁵ See <http://www.edinburgh.ceh.ac.uk/biota/>
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- ¹⁸ See <http://intrabiodiv.vitamib.com/>
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