CSA MARINEBIOTECH

Deliverable Report

Project Period: 01.10.2011-31.3.2013

Deliverable number: **D5.13**

Deliverable title: **Final public project report**

Deliverable Nature: Report

Deliverable dissemination level: Public

Due date of deliverable: 31.3.2013

Date deliverable achieved: 31.3.2013

Date of this report: 31.3.2013

Lead beneficiary

BioBridge, Beneficiary 11

Objectives of the CSA MarineBiotech

The CSA MarineBiotech is a Coordinating and Support Action, set up to support countries in Europe to consider the potential of marine biotechnology for scientific, economic and social benefit. Marine biotechnology means:

- the sustainable use of marine biological resources, mainly microbes, seaweeds and invertebrates, for industrial purposes, such as new medicines, increased food production and new food ingredients, new biomaterials and 'green' chemicals and alternative energy sources;
- the application of biotechnology in the marine context, such as in biosensors, monitoring and aquaculture.

In the European context, MarineBiotech aims to stimulate a strategy, so that marine bioresources can contribute to answering the Grand Challenges for Europe on the one hand and enhancement of the knowledge-based Bioeconomy on the other. This will be done by aligning research, development and innovation through the medium of joint project calls within an ERA-NET (European Research Area Network) focused on marine biotechnology.

In more detail, the main goal of the CSA was to prepare the foundation for a potential ERA-NET in the area of Marine Biotechnology, the **ERA-MBT**, which required:

- gaining a better understanding of the Marine Biotechnology landscape in Europe and beyond, by carrying out an analysis of the current landscape (research effort, infrastructures, stakeholders, strategies and programmes, gaps and barriers to cooperation) and preparing three reports and contributions to conferences;
- mobilising key stakeholders, by extending the partnership of funding agencies by means of the MarineBiotech Strategic Forum, and setting up the MarineBiotech Stakeholders Group;
- disseminating information about activities in order to raise the profile and awareness of marine biotechnology, by organising information sessions, workshops and other project activities;
- sketching the contours of future cooperation between funding agencies in the area of Marine Biotechnology, by supporting the extended network of funding agencies and representative governmental organisations in setting the stage for the set-up of appropriate cooperation tools to develop joint programmes and pool resources for collaborative research on a European scale; and
- managing information relevant to marine biotechnology research, technology development and innovation, making this available via a dedicated web-site (including Wiki pages), newsletters, reports and briefing documents.

The CSA MarineBiotech has achieved all of these components of the main goal.

Background to the CSA MarineBiotech

The project

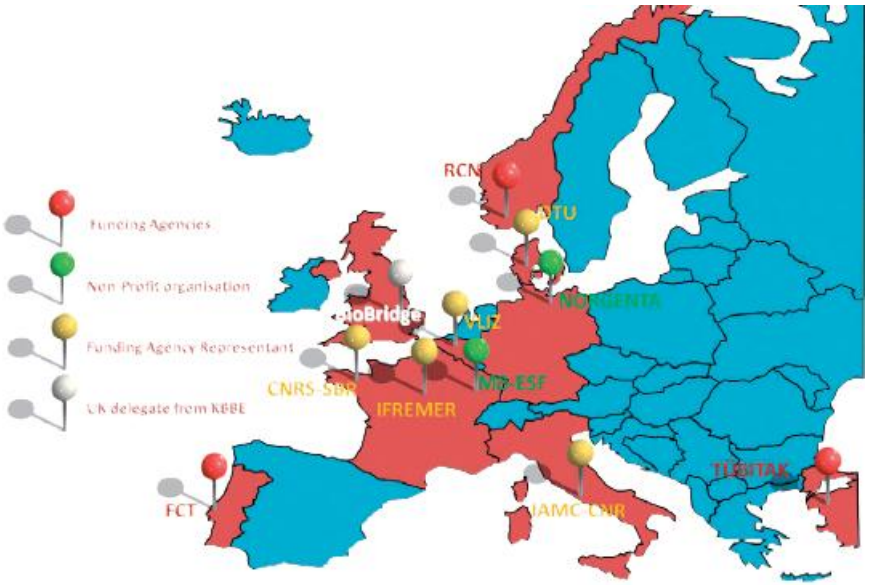
MarineBiotech was project number 289311 in the FP7-KBBE programme. There were 11 partners from 9 European countries. The total cost was €1,186,437, of which the EU has contributed €999,870 (approx. 84%) and the project started October 1st 2011 and finished March 31st 2013. During the course of the project, 2 workshops and 1 public conference were organised by the consortium members, in order to bring together stakeholders (researchers, industry, policymakers, funders), to discuss priorities and actions in the marine biotechnology context.

The partners

Participant organisation name	Short name	Type	Country
Research Council of Norway COORDINATOR	RCN	PB	Norway
Flanders Marine Institute	VLIZ	RO	Belgium
Norgenta North German Life Science Agency	Norgenta	NPO	Germany
Technical University of Denmark	DTU	RO	Denmark
Centre National de la Recherche Scientifique, Station Biologique de Roscoff	CNRS	RO	France
French Research Institute for Exploitation of the Sea	IFREMER	RTD	France
Marine Board of the European Science Foundation	MB-ESF	NPO	France
Institute for Coastal Marine Environment	IAMC-CNR	RO	Italy
Fundação para a Ciência e a Tecnologia	FCT	PB	Portugal
Scientific and Technological Research Council of Turkey	TÜBİTAK	PB	Turkey
BioBridge Ltd	BIOBRIDGE	SME	United Kingdom

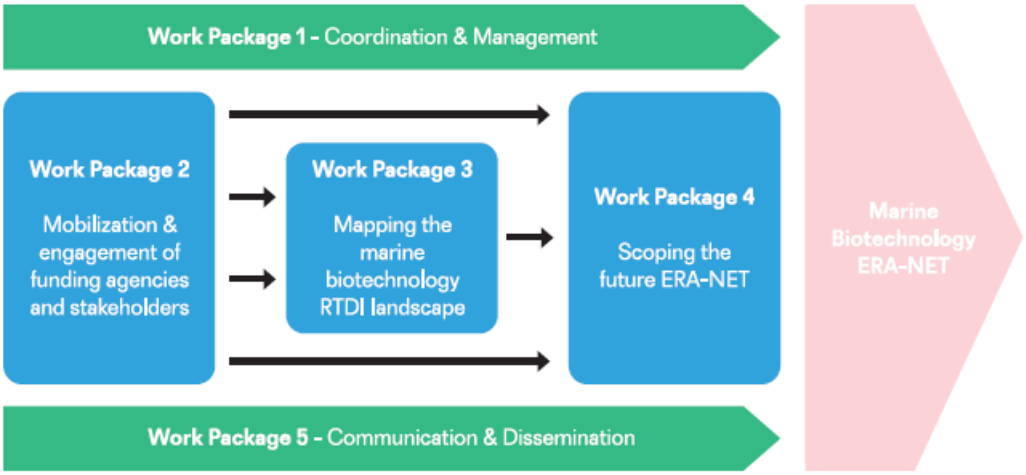
The Project Co-ordinator was Partner 1, the Research Council of Norway, in the person of Dr Steinar Bergseth, and the Project Manager and Secretariat was Partner 11, BioBridge Ltd, in the persons of Mr Meredith Lloyd-Evans and Mrs Sue Addison. Other partners contributed as Work Package leaders and team members, and as members of the Project Management Team or Steering Committee.

The partners covered the breadth and depth of Europe, from Italy to Norway and Turkey to Portugal:



The project structure

In order to achieve the targets, the project was divided into 4 strategic Work Packages (WPs) and one management WP:



The RCN provided WP leadership of WPs 1 and 4, the Portuguese funding agency FCT managed WP2 and led the task concerning expanding the group of funding agencies by means of the MarineBiotech Strategic Forum, alongside Partner 3 Norgenta, who led the task to establish and energise the Stakeholder Group. The European Marine Board (ESF-MB, Partner 7) led WP3 and contributed reports on MBt in Europe, while BioBridge Partner 11 contributed the profile of international activities. WP5 was led by VLIZ Partner 2, which operates a web-site and underlying information management system in the marine science space.

There were 53 deliverables, i.e. planned outputs of the project, spread across all WPs, and 17 milestones from the start-up meeting to the final conference, all of which have been achieved, indeed with more outputs than originally envisaged.

The achievements of the CSA MarineBiotech

The Strategic Forum

This group grew from the 3 founding funding agencies in the CSA MarineBiotech consortium, to a total of 53 funding agencies in 27 countries.

Country	Funding agency
Belgium	Belgian Federal Public Planning Service Science Policy
	National Fund for Scientific Research
	Department for Economy, Science and Innovation - Flanders
	The Research Foundation - Flanders
	Agency for Innovation in Science and Technology
	Flanders Marine Institute
Bulgaria	Ministry of Education, Youth and Science
Croatia	Ministry of Science, Education and Sport
Denmark	Danish Agency for Science, Innovation and Higher Education
	DTU Fodevareinstituttet
Estonia	Estonian Academy of Sciences
Finland	Academy of Finland
	The Finnish Funding Agency for Technology and Innovation
France	L`Agence National de la recherche
	Institut français de recherche pour l'exploitation de la mer
	Centre Nationale de la Recherche Scientifique
Georgia	Shota Rustaveli National Science Foundation
Germany	Federal Ministry of Education and Research
	German Research Foundation
	Agency for Renewable Resources
	Deutsche Bundesstiftung Umwelt
	Federal Ministry of economics and Technology
Greece	General Secretariat for Research and Technology
Iceland	The Icelandic Centre for Research
Ireland	Marine Institute
Israel	Ministry of Agriculture and Rural development
Italy	Ministry of Education, University and Research
Veneto region	Regione del Veneto – Project Unit Research and Innovation
Sicilian region	Regione Sicilia - Dipartimento regionale delle attività produttive
Latvia	LATVIJAS ZINATNU AKADEMIJA (Academy of Sciences)
	Investment and Development Agency of Latvia
Malta	Malta Council for Science and Technology
Netherlands	Netherlands Organisation for Scientific Research
	Department for Earth and Life Sciences -

Country	Funding agency
New Caledonia	Agence de Développement Economique de la Nouvelle-Calédonie
Norway	Innovation Norway
	The Research Council of Norway
Poland	National Centre for Research and Development
	National Science Centre
	Institute of Oceanology of the Polish Academy of Sciences
Portugal	Fundação para a Ciência e a Tecnologia
Romania	Executive Agency for Higher Education, Research, Development and Innovation Funding
Slovenia	Ministry of Education, Science, Culture and Sport
Spain	Ministerio de Economía y Competitividad
Sweden	Swedish innovation agency
	The Swedish Research Council
	The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning
Ukraine	Kyiv State Center for Scientific, Technical and Economic Information
UK	Technology Strategy Board
	Biotechnology and Biological Sciences Research Council
	Natural Environment Research Council
	Department for Environment, food and rural affairs
	Research Councils UK

The MarineBiotech Strategic Forum then gave rise to the working group on the proposal for an ERA-NET in marine biotechnology, supported by WP4.

The Stakeholder Group

The Stakeholder Group, see following table, consists of academics, industry, policy-makers and others, and was inaugurated in January 2012 at the offices of the European Biotechnology Industry Association, EuropaBio, in Brussels. By the end of the project, this group had grown to almost 70 organisations and companies, European and international in scope. Of these, about 35% are research-orientated, 38% are industry-orientated, and the remainder are involved in policy, outreach to professionals, provision of infrastructure, or creation and support of networks.

The SG as achieved by the CSA MarineBiotech will be the starting resource to form the Strategic Advisory Board for the forthcoming ERA-NET in marine biotechnology.

country	organization	webpage	research	industries	policy makers	outreach professionals	infrastructures	network
Belgium	FlandersBio	flandersbio.be				■		
	VIB	www.vib.be/en/Pages/default.aspx	■					
Denmark	Dansk Biotek	www.danskbiotek.dk		■				
Baltic region	ScanBalt	www.scanbalt.org						■
Finland	SYKE	www.environment.fi	■					
	CIM	www.cimfunds.com/news.html		■			■	
France	Adebiotech	www.adebiotech.org	■	■				
	AllEnvi	www.allenvi.fr	■					■
	IASP/Atlanpole	www.atlanpole.fr						■
	OOB/EMBRC	www.embrc.eu	■					
	Pôle Mer Bretagne	www.pole-mer-bretagne.com						■
	GreenStars	-	■					■
Germany	BioCon Valley	www.bcv.org						■
	DECHEMA	www.dechema.de						■
	GEOMAR/Helmholtz Association	www.geomar.de	■					
			■					
	KDM German Marine Research Consortium	www.deutsche-meeresforschung.de/en						■
	MPI for Marine Microbiology	www.mpg.de www.mpi-bremen.de	■					
	Fraunhofer RI for Marine Biotechnology	www.fraunhofer.de/www.emb.fraunhofer.de/en.html	■					
Greece	IBRB, the National Hellenic Research Foundation	ctwww.eie.gr/index-en.html	■					
Iceland	Matís	www.matis.is/english/home		■				
Italy	BIONAT ITALIA S.r.l	www.bionatitalia.it		■				
	Stazione Zoologica Anton Dohrn	www.szn.it	■					
Luxembourg	LBMCC	www.lbmcc.lu	■					
Mediterranean region	CIESM	www.ciesm.org						■
Netherlands	Algae ARC	www.algaeparc.nl	■					
Norway	The Norwegian Bioindustry Association	www.biotekforum.no		■				■
	UMB	www.umb.no	■					
	Biotech North	www.biotechnorth.no						■
	Arcticzymes	www.arcticzymes.com		■				
Poland	Institute of Oceanology PAS	www.iopan.gda.pl	■					

country	organization	webpage	research	industries	policy makers	outreach professionals	infrastructures	network
Portugal	IMAR, Uni Azores	www.imar.pt	■					
	Algarve CMS, Uni Algarve	www.ccmar.ualg.pt	■					
	Bioalvo	www.bioalvo.com		■				
	EurOceans	www.eurocean.org				■		
	Biocant	www.biocant.pt		■				
	Biotrend	www.biotrend.biz		■				
	University of Aveiro	www.ua.pt	■					
Slovenia	Marine Biology Station Piran	www.mbss.org	■					
Spain	PharmaMar	www.pharmamar.com		■				
	IMR, Vigo	www.iim.csic.es	■					
Sweden	Linnaeus University	lnu.se	■					
Switzerland	Swiss Biotech Association	www.swissbiotech.org					■	
Turkey	Ege University	ege.edu.tr	■					
UK	Biosciences KTN	connect.innovateuk.org/web/biosciencesktn		■				■
	MBC, Aberdeen	www.abdn.ac.uk	■					
	Industrial Biotechnology Leadership Forum	https://connect.innovateuk.org/web/industrial-biotechnology		■	■			■
	Marine Scotland	www.scotland.gov.uk/About/Directorates/marinescotland			■			
	PML, Plymouth	www.pml.ac.uk	■					
Europe/regional	EuropaBio	www.europabio.org						■
	Nordic Pharma	www.nordicpharmagroup.com		■				
International industry	CEVA	www.ceva.com		■				
	Croda Chemicals	www.croda.com		■				
	DSM	www.dsm.com		■				
	L´Oréal	www.loreal.com		■				
	Novozymes	www.novozymes.com		■				
	Pierre Fabre	www.pierre-fabre.com		■				
	Unilever	www.unilever.com		■				
	World Ocean Council	www.oceancouncil.org		■				
	DuPont	www.dupont.com		■				
	Sanofi	en.sanofi.com		■				
USA	Woods Hole Oceanographic Inst	www.whoi.edu	■					
Russian Federation	Genetika	eng.genetika.ru		■				
Japan	Foundation for Biomedical Research and Innovation	www.ibri-kobe.org					■	
	OP BIO Factory	www.opbio.com		■			■	

The European marine biotechnology web portal

VLIZ Partner 2 has established the MarineBiotech web-site www.marinebiotech.eu. This is a living resource that has been continuously added to during the CSA MarineBiotech project and will continue to be developed and improved after the end. As is usual for such a web-site, there is a public area for any person visiting the site for information or contact details, and a private section where the consortium members can exchange information and consult project documentation. The web-site includes publicly-available sections with information on individuals and organisations involved or interested in marine biotechnology (the Register), information pages including extracts of the project's reports (the Wiki), publications from the project (the Library), News, the Workshops and Conference, and specific information about the CSA MarineBiotech project. All these can be reached through the different tabs on the web-site. Measurement of web usage has shown a gradual increase throughout 2012 and a large acceleration of use in the period January-March 2013. The origin of web enquiries is international, not only within the consortium geographical spread itself.

The web-site will be transferred to the forthcoming ERA-NET in marine biotechnology, so that it can be further developed as the portal for marine biotechnology in Europe.

Workshops and conferences

The consortium's two workshops and final conference are summarised in reports available via the web-site, at www.marinebiotech.eu/workshops and www.marinebiotech.eu/conference respectively.

The workshops were aimed at mobilisation and engagement of funding agencies and stakeholders, to help scope the future ERA-NET.

Workshop 1 in April 2012 took place in Portugal, providing informative presentations on different aspects of the MBt landscape in the EU, including the MarineBiotech project itself and other activities, the Joint Programming Initiative on Healthy and Productive Seas and Oceans (www.jpi-oceans.eu), EuroMarine (integrating European marine research networks of excellence, www.euromarineconsortium.eu) and ERA-IB-2 (an ERA-NET focusing on industrial biotechnology, www.era-ib.net). There were also contributions from researchers from the University of Azores (Portugal), GEOMAR (the Helmholtz Centre for Ocean Research, Kiel Germany) and the University of Bergen (Norway), on the use of marine biological resources in pharmacology and human health, aquaculture and biofuel production, and from industry presenting examples of food application of MBt. Day 2 introduced the attendees to the concepts of the MarineBiotech Strategic Forum (SF) of funding agencies, intended to collaborate in the evolution of an ERA-NET, and the MarineBiotech Stakeholder Group (SG), whose input is important to ensure timeliness, relevance and context of collaborative research activities in MBt. After specific SF and SG round-tables, the workshop finished with a plenary session summarising the main outcomes and allowing the MarineBiotech consortium to confirm necessary actions and recommendations for the next stage of the project.

Workshop 2 in October 2012 took place in Germany. Debate continued on the role and future of MBt in Europe, contributing to plans for the final public conference of the CSA MarineBiotech, to be held in Brussels in March 2013.The work and scope of the proposal for an ERA-NET in Marine Biotechnology to be submitted to the European Commission in February 2013 was also discussed. Attendees heard about EU OpenScreen, which will link laboratories to provide screening and chemical biology expertise, and the EMBRC (the European Marine Biological Resource Centre), which will provide a continent-wide virtual marine laboratory, interlinking laboratory resources, research vessels and the knowledge and skills of the associated scientists, as well as identifying gaps and planning for their correction. Relevant for a future ERA-MBT were also presentations from other EU projects including PLATFORM, which brings together the Bioeconomy-relevant ERA-NETs, and the Joint Programming Initiative JPI-OCEANS, which will create a Strategic Research and Innovation Agenda covering all of the applicable marine topics. Although still in the process of being formally adopted, the Knowledge and Innovation Centre (Marine-KIC) was presented as a means to bring together industry, academics, and funders to move research on into industry. The KIC would provide information, Venture Capital or seed funding for spin-outs and start-ups, and higher-level training including new MSc and PhD courses.

In addition to separate round-tables for the Strategic Forum and the Stakeholder Group, the funding agencies who had committed to support the future ERA-MBT were able to work together. The outline of WPs, WP-leaders and tasks were drafted, and the Research Council of Norway elected to be coordinator of the ERA-NET and the proposal.

The final conference was held in Brussels in March 2013. Despite snowstorms which caused massive traffic and travel disruptions, 150 delegates attended, from industry, academic institutions, policy bodies and funding agencies. The EU Commissioner for Research, Innovation and Science, Máire Geoghegan Quinn, addressed the conference through a video message that recognised the role of marine biotechnology in supporting the further development of the €2 trillion bio-economy. She counted on the conference results to feed into the research agendas of the new ERA-NET in marine biotechnology, to help unlock the potential of blue growth in a coordinated and sustainable way. Over the day-and-a-half of the conference, in the splendid surroundings of the Royal Flemish Academy of Belgium for Science and the Arts, speakers and panel sessions tackled important questions for the future of coordinated research and development and their impacts on society and economy, including:

- Perspectives from the scientific community;
- Aligning and linking national research efforts with European research collaborations, to address common challenges;
- Academy-industry collaborations and lessons for the future;
- Marine Biotechnology Science Policy and Coordination, its status and challenges for Europe;
- How to move towards a coherent pan-European science policy and coordination for Marine Biotechnology Research, Innovation and value creation for society;
- How to strengthen pan-European science policy and coordination for Marine Biotechnology Research, Innovation and Development.

At the end of one major coordination effort and moving towards the next one, the conference offered an excellent opportunity to highlight the main outcomes of the CSA activities and to look forward to a future ERA-NET in Marine Biotechnology. The conference provided further insights into European marine biotechnology research, industrial developments, policy and coordination initiatives; simultaneously illustrating the progress made to date in terms of European capacity to engage in developing marine biotechnology. The presentations and discussions were instrumental in informing future policy and coordination efforts to ensure efficient and effective progress towards delivering marine biotechnology's contributions to the societal Grand Challenges in areas such as food, energy, health, environment and industrial development.

Reports

MarineBiotech has produced three important reports, two for European and one for international activities.

Marine Biotechnology RTDI in Europe - Inventory of strategic documents and Activities provides a first high-level overview of the current MBt science policy landscape. It includes information on research strategies, plans and/or policies designed to promote national or regional MBt RTDI activities; national/regional research programmes which support MBt research; national, regional and/or multi-national research infrastructures and practical supports specifically targeted at or directly relevant to MBt RTDI; and major collaborative initiatives at national, regional and pan-European level. The report is in three main sections: (1) pan-European coordination initiatives, projects and activities; (2) European Regional Sea basin profiles; and (3) national profiles. This information naturally feeds into the development of the ERA-NET in MBt.

The report is an inventory of relevant documents and information, with links to more specific sources, and is based on available public information, with some contributions from experts and stakeholders. It does not aim nor claim to be complete or final, but should be considered as a starting point for a dynamic and living online information resource that will be elaborated, updated and improved as more information becomes available, including further inputs from experts and stakeholders (see www.marinebiotech.eu).

The report on *Strategic Analysis of Marine Biotechnology RTDI in Europe* provides a high-level analysis of the information collected during CSA MarineBiotech, and has two main objectives: (1) to provide an essential information resource to guide the funding agencies interested in developing an ERA-NET in the area of MBt research and development; and (2) to develop a preliminary overview and analysis of the situation in Europe at national, regional and pan-European level for interested stakeholders. The first objective is important because of the main aim of the CSA MarineBiotech, to prepare the foundation of a potential ERA-NET in the area of Marine Biotechnology. The second objective is important as a starting point for a long-term effort to improve our understanding of the MBt landscape in Europe, so as to inform future policies and coordination efforts at various geographic scales.

This is a preliminary analysis, based on the information collected from public sources, experts and stakeholders for the inventory project. The www.marinebiotech.eu portal will

be used to consolidate and refresh the information, including further inputs from experts and stakeholders.

The overall conclusions from these two reports are that the wide disparity between the approach and level of support to marine biotechnology research in different European countries and regions, revealed by earlier exercises (notably the Marine Board Working Group on Marine Biotechnology and the European Commission KBBE Collaborative Working Group on Marine Biotechnology), still remains. Although some countries have developed specific programmes to fund MBt research, the majority include their support in more general marine science, biotechnology or generic science programmes. Hence, in most cases there is a serious lack of quantitative information about the contribution of marine biotechnology to the bio-economy as well as the investments by governments and private sector in R&D specifically towards marine biotechnology applications. Indicators for assessing levels of investment are not standardised across Europe so that, even where quantitative data exists, it lacks coherence, and it is not possible to achieve inter-comparability among the different countries. This problem has been recognised by the Organisation for Economic Cooperation and Development (OECD), which will be exploring options for metrics and indicators to measure the contribution of marine biotechnology to the bio-economy, investments in R&D and the return on these investments.

The third report, *A Global Perspective: High-level analysis of key trends and developments in global marine biotechnology RTDI*, brings together as much information as can initially be found on national strategies for biotechnology and marine biotechnology, programmes and major research centres for countries outside Europe. Like the reports on Europe, it is a high-level overview and analysis of research, investments, research programmes and trends, and is also a 'living document', through the Infopages of the MarineBiotech website. It will be corrected, expanded and brought up to date by interested parties who have access to direct knowledge and accurate information. It is also intended to raise interest in transnational collaborative possibilities between European countries and others.

The countries that are the focus of this report include those that are relatively highly active, such as USA, Brazil, Canada, China, Japan, South Korea and Australia, as well as others where activities are growing from a smaller base (Thailand, India, Chile, Argentina, Mexico, South Africa) and where there are signs that marine biotechnology is increasing in importance as a research priority. Multinational regional approaches and infrastructures are also included where appropriate. It is notable that the major international effort, the Census of Marine Life (CoML), involved 2700 researchers, about 31% from Europe, 44% from USA and Canada, and 25% from the rest of the world, including Australia, New Zealand, Japan, China, South Africa, India, Indonesia and Brazil.

Perhaps the most important strategic move is that OECD is now involved in marine biotechnology considerations. OECD has established a steering group to develop a strategy for marine biotechnology, initiated by Norway in 2010 and now including Belgium, Canada, Denmark, France, South Korea, Israel, Mexico, USA, the EU and the OECD's BIAC (Business and Industry Advisory Committee). In addition, OECD maintains an interest in facilitating the international networking of Biological Resource Centres, to ensure that collections are properly managed.

The conclusions from this report are that MBt strategies and policies are not common, and that coordinated MBt support programmes are even rarer, but that some countries (examples include Brazil and Mozambique) have embraced the potential of MBt via national strategies and programmes, and others (eg China) give it a high value in overall science support efforts.

Extracts from the reports are available on the web-site in the Infopages section, at http://www.marinebiotech.eu/wiki .

Other contributions to marine biotechnology

The four newsletters and the informative brochures produced by the consortium are also downloadable from the marinebiotech web-site, at www.marinebiotech.eu/library.

Future actions

The CSA MarineBiotech has now handed over the baton to a future ERA-NET in marine biotechnology, ERA-MBT, which will have the aim of constructing jointly-funded common-interest research programmes, bringing different European countries together. There are already well-defined shared areas across Europe, and considerable interest from non-European countries in collaborating with such an ERA-NET. The resources created by the CSA MarineBiotech, notably the web portal, will be available to ERA-MBT, assuring continuity, and so this web-site will continue to be supported by VLIZ and therefore be available to interested parties, including the public, to consult for information.