



EUROPEAN
COMMISSION

European
Research Area

INTERNATIONAL COOPERATION IN FP6

PROJECT SYNOPSES



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INTERNATIONAL COOPERATION IN FP6

Project Synopses

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FOREWORD

"Specific measures in support of International Cooperation" in the 6th Framework Programme (FP6).

In January 2000, the Commission launched its initiative to establish the European Research Area (ERA)¹. The objective is to make the best possible use of scientific capabilities and material resources within the EU, through coherent policies and the free circulation of knowledge and personnel. ERA is open to the rest of the world², ideally as the fourth pillar in the Community's foreign policy, trade and development aid programmes. The openness to third countries aimed to make the best use of all the international scientific co-operation policies and activities undertaken within the European Union, whether at Community level or in Member States. The Communication³ on the International Dimension of ERA outlines the broad guidelines for a new policy of international scientific and technological co-operation fulfilling the strategic objectives of opening up the ERA to the world.

The FP6 provided three major routes for International scientific co-operation:

1. The opening of "Focusing and Integrating Community Research" to third country organisations with substantial funding,
2. Specific measures in support of international co-operation (INCO),
3. International activities under the heading of Human Resources in the specific programme for research, technological development and demonstration "Structuring the European Research Area".

Specific measures in support of international co-operation (INCO)

These measures targeted the following groups of third countries: Developing countries, Mediterranean partner countries, Western Balkan countries, and Russia and the NIS.

Research contributed to the solution of specific problems faced by third countries through equitable partnerships. Diversified objectives and approaches accommodated the specific nature and needs of the different regions and countries of the world involved with these specific measures in support of international co-operation. These activities underpin the Community's external relations and development aid policies, in particular the fight against poverty, the sustainable development and the commitments towards the Millennium Development Goals. The key areas of action included health, rational use of natural resources and protection of the environment, food security, cultural heritage and adjustment of industrial production.

A total of 1864 research teams participated in 166 projects, co-funded by 345 million. The instruments used for the implementation of the overall programme were the Specific Targeted Research Projects (STREPS), the Coordination Actions (CAs) and the Specific Support Actions (SSAs). These activities and calls for proposals under this heading were complementary to the opening to third countries of the Priority Thematic Areas of Research.

The present document is a catalogue of all specific targeted research projects (STREPs) and coordination actions projects (CAs) supported under the specific programme "International Cooperation - Integrating and Strengthening the European Research Area" of the 6th Framework programme. Each project is identified by its objectives, its activity area and the expected results and includes the list of all participating organisations and contact persons. I am confident that this catalogue will help the dissemination of information concerning the work undertaken in the FP6 INCO programme to the scientific community worldwide.



Mary Minch
Director
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¹ 'Towards a European Research Area' COM (2000) 6

² Making a reality of the European Research Area: Guidelines for EU research activities (2002-2006)' COM (2000) 612 final

³ COM (2001) 346 final

DEVELOPING COUNTRIES

FOOD SECURITY

RP/PPR MARKVAC

Development of marker vaccines, companion diagnostic tests and improvement of epidemiological knowledge to facilitate control of rinderpest and peste des petits ruminants viruses

Period: 01/01/2005 to 31/12/2008
Budget from EC: EUR 1 500 000

Coordinator: Dr Geneviève Libeau,
Centre de coopération internationale en recherche
agronomique pour le développement (CIRAD)

CONTEXT AND OBJECTIVES

The project is designed to present an integrated approach to the control and eradication of Rinderpest (RP) and peste des petits ruminants (PPR), two economically important diseases of ruminants. It will address one of the key factors hampering effective control policies involving vaccination, namely the lack of marker vaccines and companion diagnostic tests for these viruses. It will also contribute to the strengthening and further development of surveillance systems with respect to early reaction capabilities in regions that are at risk from the diseases. Therefore the main objectives of the project are specified as follows:

- To develop marker vaccines to prevent RP and PPR infections and examine safety issues relating to currently used vaccines and the marker vaccines derived from them.
- To develop marker vaccine companion diagnostic tests to differentiate between infected and vaccinated animals and validate the existing RP and PPR assays. This will provide the parameters needed when decisions have to be made on vaccine use for specific purposes.
- To use improved epidemiological information systems for a better analysis of the current situation of RP and PPR and for predicting the impact of vaccination strategies.

ACTIVITIES

The main activities of the project are summarised as follows:

- The reverse genetics strategy will be used to generate marker vaccines via genome cDNAs derived from the classical attenuated vaccine strains of RP and PPR. The overall aim is to produce double-marker vaccines by deletion (negative marker) and addition (positive marker).
- The PPR virus will be used as a model to analyse the role of the N protein and its fragments in the vaccine induced immunosuppression. The functionality of the deleted protein will be studied using minigenome rescue technology.
- Formulation of an inexpensive and robust vaccine easy to administer to animals in areas lacking a cold chain will be developed.

- Accompanying tests allowing the detection of post-infection antibodies, as well as antibodies to the positive and negative markers, will be developed. Their validation will provide information on their performances in term of epidemiological usefulness.
- Data from PPR outbreaks and surveys will be collated from existing systems and data sources to generate statistical risk models. A study of the transmission dynamic of PPR will generate a mathematical model predicting the impact of vaccination on the disease pattern.

EXPECTED RESULTS AND OUTCOMES

This project will provide marker vaccines capable of preventing RP and PPR infections and also companion tests to differentiate between infected and vaccinated animals. This differentiation is of major importance for eradication programmes because it would allow more precise targeting of the vaccination while serosurveillance of the disease could be maintained through the use of companion diagnostic tests. This would allow for a quicker lifting of control measures. The project should provide, through reverse genetics technology, a better understanding of the genetic determinants of the immunosuppressive effects associated with the current vaccines and consequently of the marker vaccines derived from them. An improved formulation for stable storage of vaccines at higher temperatures will be developed to reduce the stringent requirements for cold chain. This will greatly benefit vaccine delivery to farmers living in difficult field conditions. A clearer understanding of Morbillivirus infection cycles and the dynamics of the disease will generate models that will support decisions for vaccination policies. This proposal will boost the health status of cattle and small ruminants in Africa, allowing higher productivity and an increase in the commercial value of livestock for trade purposes.

RP/PPR MARKVAC

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MEDLABAB

Molecular characterization of Latin American and Mediterranean *Babesia bovis* and *B. bigemina* strains and its application for the development of improved control strategies

Period: 01/07/2005 to 30/06/2008
Budget from EC: EUR 800 000

Coordinator: Monica Florin-Christensen
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CONTEXT AND OBJECTIVES

The main objective of this project is to generate new knowledge and biotechnological tools that can lead to better control of bovine babesiosis. This tick-borne disease of cattle, mainly caused by *Babesia bovis* and *B. bigemina*, hampers meat and milk production in vast tropical and subtropical regions of the world. The project's specific aims include the typification of *B. bovis* and *B. bigemina* strains present in Latin America and Mediterranean Europe, the study of genetic and antigenic polymorphisms in previously identified vaccine candidate antigens among the different strains, and the detection of possible wildlife reservoirs for these parasites. This information will be useful for vaccine design and for decision-making about adequate control measures. In addition, we plan to develop and test new diagnostic methods for bovine babesiosis in the participant countries. This project is also aimed at making the most of the fruitful interaction between scientists and students from the countries involved, which will lead to strengthened research capabilities, as well as at increasing awareness and available information about the disease.

ACTIVITIES

The following work packages have been planned:

- collection of bovine blood samples from *B. bovis* and *B. bigemina* naturally-infected cattle from Argentina, Brazil, Italy, Mexico, Portugal, Spain, and Turkey;
- production of parasite in vitro cultures and biological clones;
- studies of genetic polymorphism and identification of conserved B-cell epitopes in already known vaccine and diagnostic candidates;
- definition of molecular markers for isolate characterisation;
- collection of blood samples from alternative mammals in babesiosis-endemic areas and investigation of the presence of *B. bovis* and *B. bigemina* parasites;
- development and testing of new diagnostic methods including competitive ed ELISA, strip tests, and Real Time PCR.

In addition, two work packages have been planned, to share and disseminate information: the creation of a website, discussion forum, and mailing list; and the organisation of workshops and meetings.

EXPECTED RESULTS AND OUTCOMES

This research is expected to generate a vast amount of knowledge about *B. bovis* and *B. bigemina* parasites, which can lead to new, improved vaccines, diagnostic methods, and control measures. A DNA, antigen, and serum bank for *B. bovis* and *B. bigemina* will be assembled. New diagnostic prototypes will be generated and protected by Intellectual Property Rights. The research capabilities of all participating laboratories will be enhanced through the exchange of information and methodologies among consortium members.

The gathered information will be presented in scientific meetings, publications, and reports. The project will contribute to the development of human resources and capacity-building in research, since many students and young professionals will be involved in the project, and several PhDs or MSc theses will also be generated.

The project website will post summaries of the ongoing research, together with other relevant scientific information and news about bovine babesiosis. It will constitute an important information source and means of communication not only for the members of this consortium, but also for the scientific community, public authorities and private sector.

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ECOST

Ecosystems, Societies, Consilience, Precautionary principle: Development of an assessment method of the societal cost for best fishing practices and efficient public policies

Period: 01/01/2005 to 31/12/2008
Budget from EC: EUR 3 100 000

Coordinator: Pierre Failler, University of Portsmouth

CONTEXT AND OBJECTIVES

The main aim of the ECOST project is to develop a new approach to assess the societal cost of fishing activities and fishing policies. Societal cost are defined as all costs linked to fishing activities: these may be ecological (alteration of the capacity of a system), economic (all costs linked to production, management, subsidies, and external factors), social (linked to choices made in public policy, food safety, provision for national or international markets, the eradication of poverty, and to development models [small scale fishing versus industrial fishing]).

The project has to be seen from the wider perspective of equipping public decision-makers and society with the appropriate tools and methods needed to take into account, not only immediate economic and social profits, but also the costs engendered by fishing activities which relate as much to ecosystems as to societies.

The geographical dimension of the work is spread over three continents (three countries for each continent) that are characterised respectively by ecosystems of coastal upwelling (West Africa), delta (South East Asia) and coral reef (Caribbean). Within each region/ecosystem (eco-region) several fisheries have been selected as representative of global fishing activities. Furthermore, a marine-protected area will be chosen in order to establish comparative analysis within the said eco-region and to serve as a reference point. There is a triple advantage to such a choice as it will facilitate the comparison of: first, the different ecosystems; second, fishing methods and management (public policy); and third, societies based on the choices they have made and their preoccupations regarding various marine resources. The main body of the work will therefore focus on the development of a model that addresses the societal cost of fishing activities, which can reflect the reality of such varied and contrasting coastal regions as perceived via their ecosystems and societies.

At the heart of the project will be the triple theme of 'marine environment — fishing activities — civil society' thus bringing together life and social science. The multi-disciplinary nature of the project is centred on the concept of consilience in order to gain a better understanding of

situations that require expertise in different areas of competence.

ACTIVITIES

- Development of far-reaching research into the capacity of traditional models to take into account the reality of ecological, economic and social effects using purely theoretical considerations, past application experience, and questioning the notion of value. A theoretical study of the strengths of these models cannot be separated from an in-depth study of the values of nature (resources and functions) that underlie the present models. This work on the conception of value is fundamental to the definition of societal costs — costs and values are two sides of the same coin. The result of this first stage of the work (WP1) will be a report on significance using different models until the present time. The report will also examine the notion of value to be considered when measuring the societal cost of fishing activities.
- The construction of an efficient model for societal cost. This model is founded on the close association of economics and ecology. It is constructed using a model which currently has the greatest potential for application in the domain of fishing because it takes into account the variable nature of resources and marine environmental changes. Furthermore, it is able to acquire a dynamic dimension, which is necessary for any prospective on public policy. The measurable result will therefore be a dynamic model that has environmental retro-actions in relation to the ecosystem (WP5 and WP6). To develop this model, scientists will first work in their own field (WP2, WP3, WP4) in an interactive way in order to make progress.
- The production of a generic version of the model for social impact. First, this will be a revision of the model according to the lessons learnt from its experimental application to the three chosen regions/ecosystems. Second, it will consist of a multi-disciplinary study of the biological, ecological, and economic factors that may limit the wider application of the model to other regions/ecosystems in the world. The validation of the model and its generic formulation will be accompanied

by a performance index (for example, in relation to the quality of the data and the nature of the information that has been gathered), an explanatory manual, and an analysis of the model's inherent limits. The measurable result will take the form of a generic model for assessing societal costs accompanied by an application framework (WP9).

- Comparison of the social costs of fishing activities. Comparative work will be carried out on three levels:
 - work on the ecosystem showing the repercussions of the use of distinct techniques and practices;
 - a comparison of the ecosystems themselves in order to highlight the responses made by the ecosystems to anthropic pressure; and
 - a comparison of ecosystems with free or regulated access and the ecosystems found within marine protected areas. The measurable result will be a comparative analysis of societal costs according to the means of production and valorisation of products and ecosystems (WP7 and WP8).
- Definition of options for public policy by the formulation of certain principles found within the framework of the code of conduct for responsible fishing. The popularisation of the project will be the best means of valorising the model and its application in the formulation of public policy linked to the future of fishing in regions heavily dependent on fishing resources (WP10 and WP11). The measurable result will be the production of an interactive CD-Rom that will project regional effects (as soon as the basic data required by the model is available and integrated). Tools for vulgarisation are usually devised by the public authorities when new working methods are brought out. For the purposes of this project, such tools are considered an element of added value for community research; they must be broadcast as widely as possible to communicate the knowledge of applied science to civil society (WP12).

world. The tools and methodologies that will be developed will allow robust management strategies to be formulated, ensuring sustainability of marine ecosystems at the highest level and providing greater security to fishers and fishing companies. This will enable individuals in the fishing market to make the most appropriate investment or disinvestment decisions, permit greater stability in communities dependent upon fisheries, and help diminish vulnerability in these fragile systems.

At a more global level, the project will have a strategic impact on the formulation of national and international policies regarding the governance of ocean and coastal zone resources and ecosystems. This will lead to the development of better policies that alleviate societal problems developing countries face, such as fish availability, poverty, external debt, etc.

The results of the research will be disseminated in a number of ways. First, a series of high quality research papers will be produced and published in influential journals. These will include journals covering fishery science (e.g. Fisheries Research, ICES Journal, Canadian Journal of Fisheries and Aquatic Science), fishery economics (e.g. Marine Resource Economics), fishery policy and sociology (e.g. Marine Policy, MAST) and potentially a range of other socio-economic, modelling, or decision-making journals. Project scientists will also attend key subject-specific conferences (e.g. marine science conferences, economics and social conferences) and formulate research direction based on the information presented. The objective of 'professional' dissemination is to ensure the research is of top international quality.

Dissemination will also take place between fishery scientists, economists, and sociologists via plenary meetings and workshops held as part of the coordination activity of the project. These will be open to organisations not directly involved in the project, and will be a conduit for methodology and ideas to spread throughout key scientific and economic communities in the world.

EXPECTED RESULTS AND OUTCOMES

The research suggested by the project team has the potential to change the way fisheries are managed in the

ECOST

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EPIGENEVAC

Epidemiology and new generation vaccines for Ehrlichia and Anaplasma infections of ruminants

Period: 01/07/2005 to 30/06/2009
Budget from EC: EUR 1 200 000

Coordinator: Dominique Martinez, CIRAD

CONTEXT AND OBJECTIVES

Tick transmitted Ehrlichia ruminantium (cowdriosis) and Anaplasma marginale (Anaplasmosis) infections of ruminants belong to a group of animal diseases of major economic importance in tropical and sub-tropical regions. Both diseases are classified in list B of the World Organisation for Animal Health (OIE) and their presence in a country is an obstacle to the international trade of animals. The general objective of the project is to contribute to an increase in the productivity of livestock by controlling these diseases in the context of sustainable production systems and environmental safety. In particular, alternatives must be developed to reduce the use of acaricides for vector control, which raise environment and food safety issues. This will be realised through the achievement of three main objectives:

- the development of next generation multi-component vaccines that are efficient and safe;
- the development or improvement of high-throughput multi-pathogen diagnostic tests for extensive use in epidemiological studies aimed at providing descriptions of sanitary situations at regional levels;
- the evaluation of the efficacy, impact, and cost-effectiveness of the vaccines developed in well-characterised farming systems.

ACTIVITIES

The project is divided into two related headings (laboratory and experimentally-oriented work for vaccine and molecular diagnostic development and field-oriented work for epidemiology) broken down into a logical framework of activities. Modern genomic approaches will be extensively applied to the complete genome sequence of the pathogens, including annotation (bioinformatics), comparative (bioinformatics) and functional genomics of host-vector-pathogen interactions aimed at identifying gene candidates for vaccines. After refinement of the understanding of ruminant protective immune responses, these candidates will be analysed, first in vitro, and afterwards on animals to ascertain their protection capabilities. New delivery systems and formulations will be applied to these candidates and evaluated for their ability to provide optimal protection in a potential field vaccine. Meanwhile, molecular diagnostic (detection and genotyping) will be developed. These will be used as key components of epidemiological studies aimed

at characterising the sanitary situation at regional levels in different farming systems where the vaccines will be applied.

EXPECTED RESULTS AND OUTCOMES

The project has the potential to deliver patented products, such as diagnostic kits and vaccines, as well as guidelines for their optimal use by farmers and professionals in an integrated approach bringing in other actions like strategic vector control. This will have a direct impact on the increase in animal production and therefore help alleviate poverty. In addition, the commercial use of these products by private companies will assist industrial and economic development. Epidemiological data will be managed using Geographic Information Systems; this will generate distribution and risk maps of diseases to help decision-making processes in sanitary interventions and serve as a basis for cost-benefit studies of control measures. Computerised systems can be complemented by data relative to other diseases and constitute integrated animal health management systems that assist the Services of Agriculture. Websites where databases are located will constitute a major vehicle for the dissemination of information to technical services and agencies, professionals, and the general public. Finally, scientific and technical networking will strengthen the research capacity of partner countries and contribute to the education of affected populations.

EPIGENEVAC

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TRYPADVAC2

Development of an “anti-disease” vaccine and diagnostic tests for African trypanosomosis

Period: 01/06/2005 to 31/05/2008
Budget from EC: EUR 900 000

Coordinator: Alain Boulange
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agronomique pour le développement (CIRAD)

CONTEXT AND OBJECTIVES

The aim of the project is to contribute to the improvement of livestock productivity in the developing world through the limitation of trypanosome-associated pathologies and accurate diagnostics of trypanosome infections. A non-conventional vaccine strategy is proposed, which aims at limiting pathology through immunisation against pathogenic factors of trypanosomes. The project aims at:

- identifying major pathogenic factors of trypanosomes, especially those responsible for anaemia, and producing these molecules in suitable forms for use in a multicomponent vaccine;
- developing new diagnostic tools based on antibody and antigen detection.

The specific objectives of the project are:

- to further assess the protective potential of cysteine proteases of *Trypanosoma congolense*: *T. vivax* and *T. evansi*;
- to characterise other trypanosome proteases and protease inhibitors and assess their respective roles in pathogenicity;
- to evaluate the vaccine potential of recently identified candidate antigens;
- to identify and characterise novel pathogenic factors;
- to produce candidate molecules for initial immunisation trials;
- to evaluate the diagnostic potential of recombinant and synthetic products from various trypanosome antigens in antibody and antigen detection tests.

ACTIVITIES

The project will expand initial work on trypanosomal cysteine proteases to screening, characterisation, and assessment of the protective potential of other pathogenic molecules, especially those responsible for anaemia. Trypanosomal cysteine, serine, and metallo-proteases will be characterised for their biological roles in the parasite and host. Natural protease inhibitors present in trypanosomes will be examined for their possible immuno-modulatory effects. The potential of trypanosome proteases and their inhibitors to modulate disease will be examined in immunisation trials. Non-proteolytic pathogenic factors, such as the glycosyl phosphatidyl inositol (GPI) anchor of

the variant surface glycoprotein, will also be assessed for their protective potential. Finally, recent developments in the field of proteomics as well as progress in the genome mapping of trypanosomes will provide tools to study new pathogenic pathways and molecules.

Procedures for antibody detection based on recombinant technology will be developed and/or validated. Recombinant and synthetic peptides from cysteine proteases and heat shock proteins, both previously identified as major antigens, as well as newly described molecules will be assessed for their diagnostic potential. Techniques for the detection of parasite antigens in host tissues will be re-examined using recently developed monoclonal antibodies.

EXPECTED RESULTS AND OUTCOMES

Key expected outcomes:

- adoption of new diagnostic tools based on recombinant technology;
- identification and validation of antigens with confirmed roles in pathogenesis that will be used to develop an ‘anti-disease’ vaccine for trypanosomosis.

Expected outputs:

- New knowledge generated on: Pathogenic molecules of African trypanosomes, especially trypanosomal proteases; mechanisms underlying trypanosome-induced anaemia; and mechanisms underlying bovine trypanotolerance;
- publications (15 expected);
- training (five students from DEV trained to MSc and PhD degrees in EU labs);
- technology transfer through exchange of personnel within the consortium.

Outside the consortium: transfer of new diagnostic procedures to national institutions after validation.

Beneficiaries of the outputs: academic community and government agencies in DEV countries.

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INCOFISH

Integrating multiple demands on coastal zones with emphasis on aquatic ecosystems and fisheries

Period: 01/05/2005 to 30/04/2008
Budget from EC: EUR 4 899 480

Coordinator: Dr Rainer Froese
Christian-Albrechts-Universität
Leibniz, Institut für Meereswissenschaften

CONTEXT AND OBJECTIVES

INCOFISH will conduct specifically targeted strategic research toward reconciling multiple demands on coastal zones. It will evaluate and integrate data, tools, and concepts suitable to contributing to the goals set out by the World Summit for Sustainable Development in Johannesburg, such as restoring healthy fish stocks and ecosystems by 2015.

ACTIVITIES

INCOFISH will focus its research activities on the following Integrated Coastal Zone Management (ICZM) issues:

- document the historical performance of ecosystems in dealing with the 'shifting baselines' syndrome and provide sound reference points for resource restoration;
- provide electronic maps for all coastal species to establish authoritative species inventories and explore scenarios of global change and invasive species;
- create spatial ecosystem models for selected coastal zones as a basis for understanding resources;
- provide guidelines and tools for the best sizing and placement of marine protected areas;
- research the impact of ecotourism on coastal ecosystems and provide best-practice guidelines;
- identify suitable and simple indicators to promote and monitor sustainable fisheries;
- provide an estimation of the value of coastal ecosystem products and services and different management regimes;
- review legal instruments for sustainable fishing in coastal zones;
- revisit coastal transects as a tool for structuring and understanding multiple demands on coastal zones;
- provide an archive and web portal for easy public access to all data and tools relevant for ICZM.

EXPECTED RESULTS AND OUTCOMES

The tools and concepts resulting from INCOFISH research will be tested in real-world scenarios in selected coastal systems worldwide. Together, they will form a package with the potential to solve societal problems in the coastal zones of Europe and developing countries alike. All data and tools will be available online.

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CHERLA

Promotion of sustainable cherimoya production systems in Latin America through the characterisation, conservation and use of local germplasm diversity

Period: 01/01/2006 to 31/12/2008
Budget from EC: EUR 1 550 000

Coordinator: José I. Hormaza
Estación Experimental de la Mayora

CONTEXT AND OBJECTIVES

Cultivation of fruit crops consumed locally can permit the sustainable economic development of local communities, together with the incorporation of food sources with high nutritional value into the diet. Although often surrounded by a richness of diversity, local fruit growers do not make full use of existing potential in their localities. Cherimoya is a good example of this paradox. Although native in the Andean region, the main producers, e.g. Spain, are located outside of this area. Combining European expertise, both in commercial cherimoya production and in developing and applying innovative research approaches, with local field expertise, this project aims to promote sustainable cultivation of cherimoya in three Andean countries (Bolivia, Ecuador, and Peru). This main objective is developed around three specific objectives: characterisation, conservation, and use of local genetic resources.

ACTIVITIES

The central activities of the project will develop around the three specific objectives. An assessment of local diversity will be performed through classic agro-morphological characterisation in combination with state-of-the-art molecular tools and geographic information systems. The analysis will be carried out based on existing germplasm collections (*ex situ*), as well as on cultivated, semi-cultivated and wild produce (*in situ*). It will therefore provide an excellent overview of local diversity. The conservation of this diversity will be undertaken through living core collections established both at the local (managed by local farmer associations) and national (managed by national agricultural research institutes) levels, together with the development of *in situ* conservation strategies for wild populations. The project will address the main problems faced by local farmers for sustainable cherimoya production and establish guidelines to optimise cropping, processing, and commercialisation. The results of the project will be disseminated to cherimoya producers, technicians, and policy-makers. Capacity-building events, scientist exchanges, and networking activities will allow local institutes to strengthen their research capacities.

EXPECTED RESULTS AND OUTCOMES

New scientific insights, especially on cherimoya diversity will be published in scientific journals and the results will be useful for local researchers as well as the global scientific community. The cropping recommendations, targeted at improving production and commercialisation, will be combined with practical guidelines for direct application by local cherimoya growers. The project results, based on field evidence, will permit a targeted conservation of the native diversity of an emerging fruit crop. CHERLA will also implement a sustainable production system, which will result in higher yields and better fruit quality, thereby having a direct impact on local cherimoya growing communities. The activities included in this project will help strengthen the capacities of local research institutes. This will enable the reinforcement of partnerships at regional and global levels to continue joint research beyond the duration of the current project. The project and relationships forged from it will help apply the advances obtained in cherimoya to other native fruit crops in the future.

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IndigenoVeg

Networking to Promote the Sustainable Production and Marketing of Indigenous Vegetables through Urban and Peri-Urban Agriculture in Sub-Saharan Africa

Period: 01/01/2006 to 30/06/2008
Budget from EC: EUR 849 929

Coordinator: Dr Eimir Young, University of Wales Bangor

CONTEXT AND OBJECTIVES

Indigenous vegetables (IV) play an important role in the African diet, economy, and environment. However, they have not featured significantly in the research agendas of international or local organisations, which have tended to focus on improved exotic varieties. IndigenoVeg aims to create a network of leading EU and African researchers to promote the production of IV varieties in urban and peri-urban agriculture (UPA). Its three operational objectives are to:

- coordinate and link existing research efforts on IVs and UPA by creating a forum where partners can share information on current progress, disseminate best practice, obtain feedback from their peers, and refine and strengthen their on-going activities;
- develop targeted and relevant collaborative future research proposals;
- disseminate the outcomes of the Coordination action engaging with a wider audience, comprised of EU and sub-Saharan African scientists and policy-makers.

ACTIVITIES

The forum for coordinating research and exchanging ideas hinges on a series of 14 thematic meetings organised under three subthemes: sustainable management practices for IV production; opening niche markets for IV; and development of policy for the promotion of IV in urban and peri-urban areas.

Sub-Saharan African partners will also be engaged in small-scale surveys to gather crucial missing baseline data on the nature and extent of production of IVs in urban and peri-urban areas. Partners will also conduct surveys on marketing constraints and opportunities in relation to these varieties. These data will underlie the development of collaborative research proposals which will take place at an integration meeting, which will also synthesise the outcomes of all thematic meetings. The findings and outcome of the activities will be primarily disseminated through a conference at the end of the coordination action, a specially themed book, and a regularly updated website.

EXPECTED RESULTS AND OUTCOMES

The Coordination Action will result in:

- prestige for IVs within the research and development community, farmer and consumer community, and policy-making environment;
- broader, multidisciplinary perspectives on the issues surrounding the promotion of IVs in UPA;
- capacity building in the African partner institutions;
- current research activities being addressed strategically and effectively, avoiding duplication;
- a sound platform for the development of holistic proposals characterised by the goal of enhancing food security for the urban poor under the current and future EU framework programmes.

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GUAVAMAP

Improvement of guava: linkage mapping and QTL analysis as a basis for marker-assisted selection

Period: 01/11/2005 to 31/10/2008
Budget from EC: EUR 925 000

Coordinator: W. Rohde
Max-Planck-Institut für Züchtungsforschung (MPIZ)

CONTEXT AND OBJECTIVES

The guava fruit tree (*psidium guajava* L.) is native to the tropical regions of the Americas. Although considered relatively minor in terms of commercial world trade, it is widely grown in the tropics and enriches the diet of millions of people in that region. The largest producers are the countries of Central and South America (notably Mexico and Brazil), as well as India and Thailand in Asia. The economic importance of guava is related to the use of its fruit which contains high amounts of vitamins A and C, dietary fibre and calcium and to its multiple, derived products, such as juice, cream, marmalade, desserts etc. However, there are other important uses for guava, including tropical medical treatment for diarrhoea and fungal infections.

The project aims at improving the utilisation of the perennial tropical guava fruit crop. This will be achieved by a consortium composed of three European laboratories and four institutions in Latin American producer countries. Classical conservation of the guava germplasm, indigenous to these developing countries, will be complemented with molecular analysis of guava biodiversity.

ACTIVITIES

There are two main activities foreseen in the project:

- The identification and characterisation of new guava genotypes and their utilisation in breeding programmes, according to the individual needs of developing countries; and
- The application of biotechnology in the form of DNA markers.

This data will be used for: the study of biodiversity; marker-assisted breeding by establishing individual molecular linkage maps for three existing mapping populations; aligning these individual maps into a reference guava linkage map with the help of microsatellite markers; mapping quantitative trait loci (QTLs) for important breeding traits; and developing a molecular marker set for marker-assisted selection. Guava germplasm will be conserved in situ and ex situ, and its agro-morphological characteristics will be recorded according to established descriptors and complemented by molecular analysis.

EXPECTED RESULTS AND OUTCOMES

1. Identification and conservation of guava plant genetic resources: the project will assist partner institutions in developing countries to identify and preserve new guava genotypes that will be useful for specific breeding programmes and thereby serve the needs of individual countries.
2. Molecular analysis of biodiversity: European partner laboratories will provide assistance with the formation of human resources and thus strengthen the scientific capacity of Latin American partner institutions in the use of modern molecular techniques.
3. Dissemination of results to a wider audience: a symposium with associated laboratory facilities in the region will pursue this agenda.

It is expected that by examining guava germplasm and applying DNA marker technologies to its characterisation, the project will stimulate the utilisation of natural genetic resources within developing partner countries and strengthen their position. It will also stimulate an increase in production for this under-utilised tropical crop and aid breeding programmes with marker-assisted selection.

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PAVUC

Producing added value from under-utilised tropical fruit crops with high commercial potential.

Period: 01/12/2005 to 30/11/2009
Budget from EC: EUR 1 700 000

Coordinator: Fabrice Vaillant
Centre de coopération internationale en recherche
en agronomie pour le développement (CIRAD)

CONTEXT AND OBJECTIVES

In marginal rural areas of tropical America (high lands, semi-arid and humid areas), some endogenous fruit products (Andean berry, naranjilla, and tree tomato in mountainous areas; berry cactus, red pitahaya, and cashew apples in dry areas; acai and palm peach fruit in the Amazonian basin and coastal humid regions) are often among the main productive alternatives for a population that already contributes to food security and food biodiversity at the regional level. Due to the European consumer's renewed interest in biodiverse fruit crops with specific nutritional and functional qualities, these products may represent additional commercial opportunities for the sustainable development of these regions. Nonetheless, besides potential trade interest and higher growth potential for their production, these fruits are still underutilised and their commercialisation is limited. As a result of these limitations, these products hold an unknown nutritional and functional potential. However, the informal and poorly organised production chain creates quality and safety concerns, and the lack of appropriate processing technologies limits the development of local agro-industries and access to international markets.

ACTIVITIES

The PAVUC project will concentrate efforts on issues that represent the main bottlenecks for the sustainable development of selected agri-food chains in focal areas. The project will be split into five Work Packages, assisted by scientific partners and private co-partners from Europe and Latin America, with the goal of responding to the following questions:

- What are the real nutritional and functional qualities of the fruits, taking into account the recent trade interest for specific bioactive molecules with high antioxidant capacity?
- How can this potential be improved by implementing better post-harvest practices and management of quality and safety along the production chain?
- How can the fruit's natural potential be better preserved by developing appropriate technologies to create new products that will meet international consumer and industry demands?
- What, precisely, are the expectations of the European market for new biodiverse foods and how can the

requirements of both consumers and importing agro-industries be identified correctly and reached?

- How can the project enhance the appropriation of innovations along the agri-food chain in marginal rural areas of tropical America, where there are strong structural limitations, in order to meet the global trade interest for biodiversity-rich products?

EXPECTED RESULTS AND OUTCOMES

In the end, the project should provide:

- a scientific analysis of relevant bioactive molecules with high antioxidant capacity and also their bio-availability according to in-vivo tests in order to determine the real economic potential of the selected fruit;
- a model, led by international market requirements, for the quality and safety management of agri-food chains of underutilised food crops in marginal rural areas;
- new technological alternatives that can be implemented in developing countries, in the fields, and at the level of small and larger agro-industries for better preserving nutritional and functional quality and adding value to underutilised food crops;
- a market strategy including the recommended 'ideal chain' properties to enable the production and optimal sales of novel biodiverse products.

The findings of the project, especially strategies, guidelines and models, will be tested in focal areas previously selected in four Latin American countries. This will generate concrete commercial outlets and, consequently, real, sustainable development opportunities. Also, ties between national research partners, producers' associations, and agro-industries in Europe and Latin America will be strengthened, and research and innovation capacity will be increased.

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BAMLINK

Molecular, Environmental and Nutritional Evaluation of Bambara Groundnut (*Vigna subterranean* L. Verdc.) for Food Production in Semi-Arid Africa and India

Period: 01/01/2006 to 31/12/2009
Budget from EC: EUR 1 500 000

Coordinator: Dr Sayed Azam-Ali, University of Nottingham

CONTEXT AND OBJECTIVES

Bambara groundnut can contribute to food security for some of the world's poorest people. Traditional landraces have good nutritional properties; drought tolerance and can yield protein-rich pods where other crops may fail. Recent EU-funded research has developed the first hybrids of bambara groundnut landraces.

This proposal links partners in Africa, Europe and India in a project that combines molecular, environmental and nutritional studies and end-users of bambara groundnut. By dissecting the underlying genetics of the crop and testing its performance across a range of environments, the project will establish criteria and resources required for systematic, regional breeding and improvement programmes that minimise duplication of effort. Within four years collaborators will produce the first varieties of the crop, assess products for a range of uses and identify cultivars and management practices to optimise performance in specific environments.

Two genetic linkage maps of bambara groundnut will be made — a 'wide' cross (cultivated x wild relative) and a 'narrow' cross (cultivated x cultivated), using AFLP, SSR and DArT markers. Collaborators will identify genes and QTL's for drought, heat and cold tolerance and photoperiodic control of pod filling and will link genetic and biochemical composition of seeds from genotypes to quantify nutritional composition, nutritive value and processing potential.

The development of micro-array-based accessions for landraces, micro-satellite markers and genetic maps for bambara groundnut, will be coupled with agronomic and physiological assessment, through multi-environment QTL analysis and the testing of common landraces across locations. Key traits will be dissected and markers developed. The genetics underlying nutritional and processing value will be assessed and new products developed through SMEs. At all stages end users will guide researchers towards desirable traits from new genetic material and novel products.

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SUN

Tools for management and sustainable use of natural vegetation in West Africa

Period: 01/01/2007 to 31/12/2009
Budget from EC: EUR 2 499 763

Coordinator: University of Aarhus

CONTEXT AND OBJECTIVES

Natural vegetation of arid and semi-arid West Africa is of immense value to local people's daily subsistence and nutrition, economic benefits, and survival in hunger periods. Nonetheless, poor management and unsustainable use deteriorates the vegetation at a high rate. Much scientific information and local knowledge is needed for improving management strategies. Some knowledge already exists, but it must be organised, analysed, targeted and made available to decision-makers and local communities. New research must be targeted to fill important gaps in this knowledge.

One of Africa's major development challenges is to establish a link between global initiatives and local management actions. The project 'Tools for management and sustainable use of natural vegetation in West Africa' (SUN) will broaden the role of scientists as mediators between the world of scientific information, global conventions and the African realities where practical actions are needed. SUN will develop new, practical management tools and concrete management actions for improved sustainable use of natural vegetation by combining scientific vegetation data, remote sensing and socio-economic information with local people's knowledge and needs.

SUN gathers West African and European scientists within the fields of vegetation-ecology, socio-economy, ethno-ecology and remote sensing, all with experience in applied research. A total of 17 African PhD students will be involved in the project. SUN will function as a knowledge- and technology-based platform for vegetation management in West Africa by gathering the major expertise, making innovative use of scientific data, and improving the interaction between scientists and stakeholders.

ACTIVITIES

The project combines three types of activities:

- interdisciplinary research on vegetation dynamics, causal factors, and economic instruments and policies to enhance sustainable economic growth;
- development of new decision support tools for improved natural resource management by organising scientific data;
- new low-budget management and restoration actions in collaboration between scientists and local people.

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FOSRIN

Food security through ricebean research in India and Nepal

Period: 01/04/06 to 31/03/09
Budget from EC: EUR 1 200 000

Coordinator: Dr Philip Hollington, University of Wales

OBJECTIVES

Cereal production in South Asia has far outstripped that of legumes, with serious consequences for the food security and nutritional well-being of poor farmers in marginal areas. Ricebean (*Vigna umbellata*) is a legume grown as an intercrop in Western, Northern, and Eastern (WNE) India and Nepal but landraces predominate. There are almost no improved varieties, and seed supply is poor, so it is not grown widely despite its suitability for marginal areas. Well-functioning marketing channels do not exist. Ricebean grows well on many soils, with rapid establishment, pest resistance, and the potential to produce large amounts of fodder and grain, so it has great potential for improvement.

The overall objective of the project is to popularise ricebean by doing the following:

- identifying and measuring its diversity in India and Nepal;
- characterising its suitability for local cropping systems;
- matching farmer-preferred varieties to seasons, environments, and markets;
- combining genetic, agronomic, and socio-economic approaches based on client-orientated principles to identify genotypes and parents for breeding programmes. This will help integrate ricebean into rice- and maize-based cropping systems and consumer diets in WNE India and Nepal.

ACTIVITIES

FOSRIN will survey different groups to model the supply chain, showing where value is lost due to high transaction cost and where there are weak information links. The project will also identify agents capable of fostering or opposing the introduction of ricebean. A strategy will be designed to introduce ricebean to the supply-chain and promote consumption. After statistical analysis of market and sample data, a Market-price based Legumes Traits Value Index (MLTVI) will be derived to quantify value indexes for use by breeders. The project team will survey diversity and its geographical distribution using indigenous knowledge to understand the socio-economic and biophysical factors controlling ricebean diversity and its use. Molecular markers and morphological traits in landraces will be identified, and the agreement between them will be measured to assess

the usefulness of farmers' names to describe the extent of diversity. Adaptation will be assessed by participatory approaches. Mother trials — several lines selected to meet farmers' needs, replicated across farmers' fields and on research stations — allow direct varietal comparisons. Baby trials — one or sometimes two lines compared to a local check, grown by individual farmers, with each new line tested by at least six farmers at each location — give statistical data on farmers' perceptions. Finally, to assess the potential contribution of ricebean to improved health, dietary data will be collected to establish patterns and variations according to social life, ethnicity, gender, and age. Considering that much nutrient availability depends on household food processing, the project will study food preparation, with emphasis on protein, folate, Fe, and Zn. Finally, the study will measure the yield and nutrient content of different cultivars, and the impact of improved agronomy.

EXPECTED RESULTS AND OUTCOMES

The project will have the greatest impact if farmers adopt the new technologies and germplasm developed in the project. This will be enhanced partly as a result of informal farmer-to-farmer dissemination assisted by the extension activities of the participants and their partners. These activities should have a direct impact on improving farmers' livelihoods and their food security. In the longer term, the knowledge generated will improve the breeding efficiency of new varieties of ricebean. The MLTVI will be of particular use to plant breeders, and the project team aims to develop a workable strategy to introduce the crop into the supply chain. By the end of the project, the researchers aim to understand and publish literature on ricebean distribution in Nepal and India, its diversity on the basis of farmers' names, and the indigenous technical knowledge of the production and utilisation of the crop. The development of molecular markers to describe diversity will allow comparison with agronomorphological estimates.

The identification of polymorphic SSR markers will be of great value in future mapping work, and synteny between legume species may allow their accelerated application in marker-assisted selection breeding in other crops. Information on the performance of available germplasm will be produced in a wide range of environments.

FOSRIN

The project will also generate detailed knowledge of farmers' likes and dislikes concerning ricebean varieties and traits, which will be used to target genotypes to particular situations and identify where additional breeding could produce genotypes that best meet the needs of resource-poor farmers.

Our assessment of the potential impact on human health from improved nutrition generated by ricebean crop research will help bring vulnerable populations from deficient to sufficient ranges of essential nutrients.

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MARAMAII

Development of Innovative and Healthful Marama Bean (*Tylosema Esculentum*) Products Targeting Niche Markets

Period: 01/01/2007 to 31/12/2009
Budget from EC: EUR 1 300 000

Coordinator: Aase Hansen
Royal Veterinary and Agricultural University

CONTEXT AND OBJECTIVES

The marama bean is an under-utilised legume crop native to the Kalahari Desert, the neighbouring sandy regions of Botswana and Namibia and the Transvaal region of South Africa. It forms part of the diet of the indigenous population in these countries. The overall objective of MARAMAII is to improve food safety and diversify livelihoods for poor people in Southern Africa through the development of healthful marama bean products. The products will be targeted initially to niche markets in Southern Africa as well as internationally.

ACTIVITIES

The project will work closely with small and medium-sized enterprises in Southern Africa and gain knowledge for commercial processing of the marama bean, including factors which influence product quality. This will be done by:

- conducting consumer and market studies in Southern Africa to investigate the acceptability of marama bean and its products and identify potential target markets for the products;
- optimising post-harvest methods for dehulling and processing the beans for the development of a range of high-quality, value-added, marama-based food products including marama oil, marama texturised protein products, roasted marama nuts and marama milk;
- evaluating the quality of the processed products including texture, flavour, taste, and the shelf life of the products during storage;
- evaluating the health benefits of the marama bean and its products by investigating the potential for the following: anti-microbial activity, immunomodulatory and physiologic activities, antioxidant activity, direct anti-HIV properties, and anticarcinogenic activity on different cancer cell lines.

EXPECTED RESULTS AND OUTCOMES

MARAMAII will contribute valuable information about the potential use of marama beans, due to increased knowledge of the following: how to produce marama bean products, factors influencing the shelf life of the products, and the nutrition values, potential antioxidant, and anti-carcinogenic activity of marama beans and products. Manuals for the production of marama bean products will be a constituent part of the outcomes.

It is expected that the project will create awareness amongst the stakeholders of:

- the agricultural value chain of the potential of marama;
- the range of products that can be produced;
- the quality and desirable attributes of the bean and value added products;
- the health effects of consuming the beans and bean products;
- potential target markets for bean products.

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BOMOSA

Integrating BOMOSA cage fish farming system in reservoirs, ponds and temporary water bodies in Eastern Africa

Period: 01/10/2006 to 30/09/2009
Budget from EC: EUR 1 499 998,60

Coordinator: Herwig Waidbacher
University of Natural Resources and
Applied Life Sciences Vienna

CONTEXT AND OBJECTIVES

The BOMOSA cage-based fish farming system is intended as a network of small-scale, locally-run operations whereby rural communities will set up and run the plots both during and after completion of the INCO-DEV research project. For that reason, the project science and technology objectives are also related to the fulfilment of locally and regionally defined socio-economic targets (such as demands and preferences, integration with existing farming and other economic activities, and the ethics and roles of women) rather than purely concerned with achieving fish productivity targets.

Three eastern African countries (Ethiopia, Kenya, and Uganda) share common problems in sustainable management of sensitive and dynamic ecosystems. These countries also face deficits in the supply of high-protein food and an ongoing battle to alleviate rural poverty. The BOMOSA scheme uses an existing fish farm ('hub') to supply fingerlings (mainly Nile Tilapia at approximately 25g) for rearing within suitable water bodies such as reservoirs, ponds, and naturally occurring temporary water bodies formed during the rainy season. Farmers will be trained to rear the fish in cages in their 'plots', harvest them for fresh consumption, sell the fish locally, or process them for long-term keeping i.e. drying, smoking, and packaging. The fish will be a high-protein dietary supplement and/or an additional source of income for subsistence farmers.

ACTIVITIES

The first activity of the project will be to apply a participatory approach to define targets in terms of economic viability and social acceptability at community levels for the new Bomosa plots. After this preparatory work, the next step is to develop and validate an evaluation method using remote sensing to assess and characterise water bodies for use as potential Bomosa plots. This information will then be used to set up several plots and optimise the technology for small water bodies within four eco-zones across Ethiopia, Kenya, and Uganda. Besides arranging the plots, a task group will evaluate the locally available agricultural by-products and cost-effective processing technologies as a resource for sustainable production of low-protein fish feed. A main point of the project will be to determine requirements

and make recommendations for a legal and regulatory framework based on potential veterinary, public health, and environmental impacts of BOMOSA. Another major outcome of the project is to develop capacity-building and dissemination material for the local community, relevant authorities, policy makers, and the international scientific community. In addition, the project will develop a socio-economic model for sustainable introduction and widespread uptake of the BOMOSA scheme in eastern Africa.

EXPECTED RESULTS AND OUTCOMES

The BOMOSA system will be further developed and optimised for use in four eco-zones within Ethiopia, Kenya, and Uganda within the current INCO-DEV research project. As a result, 14 Bomosa plots will be set up for research and validation, each served from hubs (fish hatcheries) within each country. Furthermore, the fisheries management authorities will initiate the establishment of an institutional framework. Each of the plots will have its own plot committee to ensure relevance in improving local socio-economic conditions through early empowerment of local stakeholders. The lessons learnt, best practices, physical and socio-economic potential, risks, and prerequisites for widespread uptake of the BOMOSA scheme will be analysed in detail and presented at the Bomosa International Conference as the dissemination highlight of the BOMOSA project.

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AMARANTH: FUTURE-FOOD

Adding Value to Holy Grain: Providing the Key Tools for the Exploitation of Amaranth - the Protein-Rich Grain of the Aztecs

Period: 01/09/2006 to 31/12/2009
Budget from EC: EUR 1 900 000

Coordinator: Inge S. Fomsgaard
Danish Institute of Agricultural Sciences

CONTEXT AND OBJECTIVES

The immediate objective of this project is to provide the tools for an extensive and sustainable exploitation of amaranth. The project will contribute to the overall development objective of providing health-promoting food and exploiting the industrial use of amaranth. It will therefore provide a source of income in regions of the world where a warm and dry climate makes the cultivation of amaranth an obvious choice.

ACTIVITIES

Modern technologies have become available to researchers both in Europe and Latin America. With these tools, the properties of the amaranth species can now be elucidated with the purpose of targeted breeding of new varieties. This will improve the basis for amaranth cultivation and use, enhance industrialised exploitation, and help to achieve food security. The project team will perform a systematised study of the industrial exploitation of individual amaranth constituents; evaluate the health effects of amaranth-based food on humans and animals; identify genes and gene complexes responsible for resistance to insects, fungi, drought and salinity; and select varieties with high competitiveness. Amaranth genotypes will be cultivated and monitored in various sites. Multivariate statistical analysis will be applied to the data generated to identify correlating patterns of gene expression. Amaranth cultivation will be introduced in Nicaragua to empower Nicaraguan women who are the household's sole earners and help them to obtain food security.

EXPECTED RESULTS AND OUTCOMES

The project team expects to produce a publicly available database (available on the Internet and through agricultural networks) presenting the results of AMARANTH: FUTURE-FOOD. With the help of this database, end-users can identify which variety of amaranth to choose for the specific purpose and location in which they wish to cultivate the crop.

AMARANTH: FUTURE-FOOD

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COMPETE

Competence Platform on Energy Crop and Agroforestry Systems for Arid and Semi-arid Ecosystems — Africa

Period: 01/01/2007 to 31/12/2009
Budget from EC: EUR 1 497 000

Coordinator: WIP — KG

CONTEXT AND OBJECTIVES

The objective of the project 'Competence Platform on Energy Crop and Agroforestry Systems for Arid and Semi-arid Ecosystems — Africa' (COMPETE) is to stimulate bioenergy implementation in arid and semi-arid regions in Africa. COMPETE will establish a platform for policy dialogue and capacity building in the major multi- and bi-lateral funding organisations, and for key stakeholders throughout the bioenergy provision and supply chains.

As global fossil energy resources become constrained, bioenergy is emerging as a major potential resource. The arid and semi-arid regions of Africa and Latin America have, in theory, very large areas of land (and associated water and human resources) 'available' for bioenergy production. However, the production of biomass for energy will have substantial impacts (positive and negative) on ecosystems and cultures of these target regions. The protection of biodiversity, rural livelihoods and management of scarce water resources are critical considerations in any analysis of the potential for sustainable bioenergy provision in arid and semi-arid regions. Similarly, while modern bioenergy could contribute significantly to poverty alleviation in rural areas, the effects of changes to the supplies of natural resources and ownership of those resources must be an integral part of the development options proposed.

Therefore, a comprehensive, multidisciplinary assessment of current land use, energy demand and technology innovation focused on Africa, will be carried out through COMPETE. It will link implementation activities, policy development, trade, funding and South-South-EU cooperation. The improved knowledge of national and regional land use and technology options generated, will provide the local and international partners with the basis for a complete assessment of social, environmental and economic impacts. Finally, all the outputs of COMPETE will be integrated into a carefully designed dissemination strategy targeted at decision-makers and stakeholders.

COMPETE

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ICTTD-3

Integrated consortium on ticks and tick-borne diseases

Period: 1/09/2004 to 31/08/2008
Budget from EC: EUR 1 842 000

Coordinator: Prof. Dr. Frans Jongejan
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CONTEXT AND OBJECTIVES

Tick-borne diseases (TBD) are responsible for major drops in livestock production and mortality in sub-Saharan Africa, Latin America and Asia. The aim of this Coordination Action (CA) is to support a research programme on tick-borne diseases jointly executed by a consortium of 45 institutions in 30 different countries. The CA will focus on tick-host-pathogen interactions to identify concrete means of control that reduce the prevalence of TBD in (sub)tropical countries.

ACTIVITIES

The project will generate a cluster of integrated databases containing information on ticks, hosts, and pathogens that will be crucial for the correct identification of ticks and the precise differential diagnosis of pathogens. The CA will function as a forum to discuss, evaluate, and recommend changes regarding biosystematics and molecular phylogeny of ticks and tick-borne pathogens. Integrated molecular diagnostic test kits will be distributed to provide research tools for comparative epidemiological studies on tick-borne pathogens. Prevalence data on ticks and tick-borne pathogens will be linked to remotely sensed eco-climatic data to create predictive maps for geographical distribution of tropical ticks and TBD in target regions. Genomics and proteomics data will be used to design integrated vaccine strategies targeting ticks and pathogens to reduce dependency on chemical tick control. The CA will act as a focal point for setting up consortia on novel genomics and sequencing projects particularly for ticks. Differential gene expression studies will be facilitated using sequences from ticks, hosts, and pathogens to provide insight into the three-way interactions of genes within the tick-host-pathogen triangle.

EXPECTED RESULTS AND OUTCOMES

All information generated by the CA project will be disseminated through ICTTD seminars, special publications and through printed and electronic versions of a newsletter on ticks and tick-borne diseases of livestock in the (sub)tropics.

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REEFRES

Developing ubiquitous practices for restoration of Indo-Pacific reefs

Period: 01/01/2005 to 31/12/2008
Budget from EC: EUR 1 700 000

Coordinator: B. Binkevich
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CONTEXT AND OBJECTIVES

Coral reefs are renowned for their spectacular diversity and have significant aesthetic and commercial value. However, many reefs around the world are increasingly threatened, principally by human activities causing excess inputs of sediment, nutrients, and pollutants. The worldwide decline of coral reefs, including those found in the Indo-Pacific region, has increased the need for urgent and quick development of adequate restoration methods. However, efforts to conserve degrading reefs have failed to produce significant results, with rehabilitation measures having failed to successfully offset the fast degradation. The major objectives of this research are therefore the following:

- to establish underwater coral nurseries specifically adapted to different Indo-Pacific reef localities;
- to develop ubiquitous protocols for nubbin and spat usage in reef restoration;
- to develop novel protocols (3-D structures in new colonies for reef restoration);
- to initiate and assess reef restoration by using different coral sources in locations where degradation has occurred;
- to transfer technology to Asian partners.

ACTIVITIES

A consortium made up of seven groups (four European - including research institutions and an SME - plus three Asian partners) have teamed up for four years to restore Indo-Pacific coral reefs under the strategy concept of 'gardening of denuded reefs areas'. In the first of a two-step restoration measure, a large pool of farmed corals and spats is established and cultured on low-profile nurseries. Secondly, nursery-grown colonies are transplanted to degraded reef sites. The group will study this simultaneously in four Asian reef areas, while the SME will investigate under ex-situ conditions. The partners have been paired up (Asian-EU), with each pair working in a specific site area. The project will test the use of branches, coral nubbins, and planula larvae, as well as study the importance of coral branch sizes for 3-D structures of developing colonies. The management of knowledge will be based on joint programme activities and annual meetings, each at a different reef site where theoretical and applied aspects of the work will be discussed. A start-up workshop will transfer

the existing knowledge to the Asian partners. An end-of-project workshop (during month 48) will summarise the outcomes for the partners and for five additional partners invited from other Asian countries.

EXPECTED RESULTS AND OUTCOMES

The project anticipates the following outcomes:

- provide assistance to business and research organisations in the EU and countries associated with the Framework Programme, so that they have access to knowledge and expertise elsewhere in the world;
- help to ensure Europe's strong and coherent participation in research initiatives conducted at the international level, in order to broaden the boundaries of knowledge or to help resolve major global issues;
- help to solve one of the major socioeconomic conflicts in tropical Asia, namely the sustainable use of coral reefs;
- contribute to the implementation of EU policy regarding site regulation and help develop a new industry that will, in the future, circumvent the need for coral import and create a new avenue for the export of environmentally-friendly material to countries outside Europe (such as the US, Japan, and Canada);
- help to unify the fragmented community of coral reef biology in Europe.

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TBTIMFACTS

Assessing impacts of TBT on multiple coastal uses

Period: 01/03/2005 to 28/02/2009
Budget from EC: EUR 799 841

Coordinator: Dr Sangeeta Sonak
The Energy and Resources Institute (TERI)

CONTEXT AND OBJECTIVES

The project seeks to address the issue of degradation of coastal resources due to organotin compounds used in antifouling paints. This will be achieved with the following objectives:

- assessment of current policy concerns and developments with regards to the ban on using organotin compounds in antifouling paints by the International Maritime Organization (IMO) and its implications on the fishing, aquaculture, shipping and cruise tourism industries;
- assessment of the impacts of organotin-based and other existing antifouling paints on coastal environments such as water, sediment, mangrove ecosystem, fish, and other biota;
- investigations on alternative antifouling strategies which will be safer to fish and marine biodiversity;
- generation of decision tools for better coastal health in the context of organotin-based antifouling paints;
- creation of greater awareness and capacity building.

ACTIVITIES

The project will review national, European, and international coastal policies and programmes currently in place. It will:

- establish baseline data of the level of organotin in coastal ecosystems (waters, sediments, mangroves and animals) in order to monitor trends in concentration of TBT in coastal environments;
- assess the environmental impact of other existing antifouling paints through literature review, participatory methods with various stakeholders, questionnaire surveys, and interviews of key informants;
- assess the environmental and economic implications of the IMO-led policy changes to ban TBT and arrive at the costs and benefits of using organotin compounds and alternatives;
- evaluate the effect of TBT on the biochemical composition of microorganisms; investigate other novel antifouling measures; isolate microorganisms for biodegradation of TBT;
- develop indicators of coastal health;
- produce quality control tools for validation of analytical data;
- develop a simple biomonitoring system to regulate TBT impacts and help implementation of legislation;

- conduct awareness raising campaigns among fishers and aquaculture farmers documenting impacts of TBT on marine organisms and disseminate information.

EXPECTED RESULTS AND OUTCOMES

The project, at international level, will inform policy debate on the environmental and economic costs and benefits of using organotin compounds and other alternatives. The project will provide information on the shipping and cruise tourism industry with a list of safer alternatives to organotin-based antifouling paints. Furthermore, it will help develop better tools for monitoring TBT/organotin compounds in coastal and marine environments such as indicators of coastal health, quality control programme, data evaluation methods, reference materials, etc. that will be helpful in monitoring coastal health beyond the life of project. It will explore the possibility of developing a waste disposal strategy for TBT. It will also create improved awareness of environmental impacts of organotin compounds at various levels of society.

TBTIMPACTS

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SPEAR

Sustainable options for PEOple, catchment and Aquatic Resources

Period: 17/11/2004 to 31/03/2008
Budget from EC: EUR 1 500 000

Coordinator: J.G. Ferreira, Institute of Marine Research (IMAR)

CONTEXT AND OBJECTIVES

SPEAR aims to develop and test an integrated framework for interpreting coastal zone structure and dynamics in areas where communities primarily depend on marine resources.

This framework accounts for watershed interactions, ecological structure, and human activities. Our interdisciplinary approach combines natural and social sciences and addresses the complex scaling issues inherent in integrated management.

There are five main project objectives:

- to develop an integrated framework that simulates the dynamics of coastal zone accounting for basin effects (exchanges of water, sediments, and nutrients), ecological structure, and human activities;
- to test this framework using detailed research models, which assimilate dispersed local and regional data, as well as to develop screening models which integrate key processes and interactions;
- to examine ways of internalising environmental costs and recommend response options such as optimisation of species composition and distributions, thereby restoring ecological sustainability;
- to evaluate the full economic costs and benefits of alternative management strategies and societal consequences; three strategies will be examined: business as usual, increased economic exploitation, and ecological sustainability;
- to provide managers with quantitative descriptors of environmental health, including simple screening models, as practical diagnostic tools innovatively combining local and regional datasets.

ACTIVITIES

Two contrasting systems in China will be studied: Sanggou Bay, part of a rural watershed, and Huangdun Bay, located in an industrialised area south of Shanghai. In both systems, large-scale cultivation of seaweeds, shellfish and finfish are of paramount importance for community income and livelihood.

Research and development will use existing local and regional datasets, ongoing Chinese field programmes, archived and

contemporary satellite imagery, with limited additional field and experimental measures. Complementary work packages will establish the interactions between catchment use and coastal zone. Work will focus on fluxes of nutrients, organic matter, and sediments, including exchanges at the seaward boundary and the role of ecological processes. Component models will describe the interactions between cultivated species and with their environments, taking into account different levels of human interaction (e.g. resource exploitation, basin water management practices, and sewage discharge). Integrated modelling will permit the dynamic coupling of economic drivers responsible for social issues (over-exploitation, usage conflicts) with ecological models applied by the project team, resolving inter-relations with the natural system. This will allow realistic testing of three contrasting management scenarios. Particular emphasis will be placed on how integrated multi-species aquaculture (polyculture) may be used to restore and optimise sustainability by internalising environmental costs.

Datasets and research models will be used to conceptualise, parameterise and test screening models, which will distil the knowledge obtained from the integrated system analysis into simple and practical diagnostic management tools. Model validation and technology transfer will be ensured through stakeholder involvement in project management, including experimental manipulation at culture unit test sites.

EXPECTED RESULTS AND OUTCOMES

SPEAR provides a conceptual framework for integrated interpretation of coastal zone structure and dynamics by means of a holistic approach to coastal system research, combining disciplines, techniques, and systems. Thus, one of the major scientific challenges this project addresses is the meaningful integration of patterns and processes with widely varying scales. This will provide a new, system-based understanding of the functioning of coastal zones.

This project will develop research models describing interactions among cultivated species, as well as between them and their environments, including both natural coupling and various levels of human interaction. The latter

SPEAR

include resource exploitation but also other, potentially conflicting uses such as water management practices in the river basin, sewage discharge, or coastline modifications like landfilling. The socio-economic component of the project will permit the coupling of economic drivers that are responsible for social issues (overexploitation, usage conflicts, and increasing demand) to the project research models. A dynamic coupling of this nature will provide appropriate feedbacks on the natural system, and thus allow realistic testing of different management scenarios.

SPEAR will be able to quantify the sensitivity of environmental changes on aquaculture production, thereby providing the rationale for minimising environmental stressors, and the impacts of changing demand on sustainability.

SPEAR contributes to the three strategic areas of the Sixth Framework Programme.

- Fight against poverty — by optimising sustainable management of marine resources, it will allow stable economic development at the regional level, and exemplify best practice for wider application. This will also contribute to buffer employment and reduce social penalties due to large fluctuations in harvest yields associated with unsustainable farming practices and water use conflicts.
- EU Water Initiative – by providing mechanisms for ensuring the health of aquatic systems, requirements for economic development, and tools for integrated assessment and decision-making on the balance between environmental water needs.
- Millenium Development Goals (MDG) – by contributing to the stated aims of the UN MDG, endorsed by the EU, in area 7, 'Ensure Environmental Sustainability'. In particular, this project helps integrate principles of sustainable development into country policies and programmes, reversing the loss of environmental resources and improving the lives of impoverished peri-urban communities.

The consortium implementing the research work in SPEAR is made up of a number of research institutes and universities which bring together:

- experience in field work in coastal systems across a range of disciplines in natural sciences (all partners except CSIR);

- experimental work on aquatic resources (e.g. PML, UOS, UGOT, FIO, NU)
- Technologies such as GIS and remote sensing (e.g. IMAR, PML, UOS, FIO, TIO);
- models developed at various scales and across disciplines in the natural and social sciences (e.g. IMAR, UGOT, WL|Delft Hydraulics, PML, FIO, CSIR);
- integration, stakeholder participation and adaptive management in coastal zones (e.g. IMAR, UGOT, WL|Delft Hydraulics, FIO, NU, CSIR).

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TRANSMAP

Transboundary networks of marine protected areas for integrated conservation and sustainable development: biophysical, socio-economic and governance assessment in East Africa

Period: 01/01/2005 to 30/06/2008
Budget from EC: EUR 1 700 000

Coordinator: José Paula, University of Lisbon

CONTEXT AND OBJECTIVES

The goal of this project is to develop scientific knowledge for the creation of transboundary networks of Marine Protected Areas (MPAs) in the East African region. Of particular scientific interest is the knowledge relating to the type, size, and location of reserves, which together can maintain ecological functions, resource-uses and future socio-economic developments. To achieve this, the following specific research objectives are addressed:

- to gather and synthesise existing knowledge and databases;
- to map habitat types and coastal land and sea usage;
- to assess the fundamental biophysical data, namely biodiversity evaluation, including an assessment of species and habitats important for conservation reasons;
- to evaluate sources of human income, especially those derived from natural resources, current socio-economic needs, and traditional frameworks, integrating the economic dimension in a multi-criteria analysis;
- to assess the institutional, legal, and policy frameworks for decision-making, operational assessment, and state of management;
- to develop options for zoning plans for each case study area.

ACTIVITIES

Following the project's main objectives, activities will target the acquisition of the necessary interdisciplinary knowledge required for the creation of the transboundary conservation areas. Specifically, the project will:

- produce extensive and complete searches and compile existing information; integrate these data, solve basic knowledge gaps, and merge the information in an appropriate GIS system, which will map biophysical, socio-economic, and governance data;
- develop studies on the biodiversity patterns and habitat condition in considered areas, including basic biodiversity along nested spatial scales, biodiversity hotspots, and connectivity potential;
- analyse sources of income and uses of natural resources by local populations, including gender issues and assessment of expected socio-economic development

scenarios;

- analyse governance frameworks, namely policy, legal, and institutional, and assess the state of management;
- develop options for zoning in considered marine transboundary areas using computer-based algorithms modulated by research data.

EXPECTED RESULTS AND OUTCOMES

The final outcomes are options for zoning plans for two contrasting situations, which encompass a significant fraction of the biogeographical range of the region. These plans integrate the results of the biophysical and socio-economic assessments, innovatively adapted to accommodate the local, regional and governance frameworks. New data will be obtained which will significantly increase knowledge on the regions considered. Interaction between research and end-users is a clear target for this project, and various types and levels of formal mechanisms will allow for increased interchange between partners and decision-making structures, leading to effective policy development. Regional links will also be enhanced, which are necessary for the common management of the natural heritage in the region.

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PUMPSEA

Peri-urban mangrove forests as filters and potential phytoremediators of domestic sewage in East Africa

Period: 01/02/2005 to 31/01/2008
Budget from EC: EUR 1 650 000

Coordinator: José Guerreiro
Instituto de Ciência Aplicada e Tecnologia (ICAT)

CONTEXT AND OBJECTIVES

Extensive amounts of sewage are currently being released into peri-urban mangroves, but there is limited understanding of the consequences. There is evidence to suggest that mangroves filter discharged wastewater and prevent coastal pollution, but this ecosystem service has not been applied to coastal management, nor has the filtration capacity been exploited. Mangrove is one of the world's most endangered habitats: more than a third is already lost, and the remainder is disappearing at a rate of 2 to 5 % per year, with little notice from the public. Peri-urban mangroves are particularly hard hit. In light of this, the overall objective of the PUMPSEA project is to demonstrate the ecological and economic service that peri-urban mangroves provide by mitigating coastal pollution through sewage-filtration, and to offer innovative solutions for the exploitation and management of this ability.

The project will examine two innovative ways in which mangrove filtration can be utilised to preclude coastal sewage pollution:

- facilitating sewage filtration by conserving filtering mangroves and replanting mangroves in deforested areas exposed to sewage ('strategic reforestation and conservation'); and
- using constructed mangrove wetlands for sewage treatment.

PUMPSEA will be developed in East Africa (Tanzania, Kenya, and Mozambique).

ACTIVITIES

Five main activities will be developed in order to achieve the main goals:

- Field evaluation of evidence and effects of sewage-filtration: evaluation of the effects of sewage-filtration by peri-urban mangroves on ecosystem condition and processes; development of GIS-map location of sewage input; measurement and mapping mangrove degradation and destruction; identification of suitable areas for strategic reforestation and strategic conservation.
- Experimental development of mangrove sewage filtration technology: assessment of effects of sewage exposure on the ecological, microbial and biogeochemical processes; test and refine the remediation performance of a mangrove wetland; provide experimental results that

optimise the sewage filtering performance of constructed mangrove wetlands.

- Ecological modelling: development of ecological models combining field observations and experimental results; determination of filtering effect of mangroves with respect to long term stability and optimal treatment regime of mangrove wetlands.
- Socio-economics and ecosystem goods and services: comparison of available sewage management alternatives from a socio-economic and ecological perspective and evaluation of ecosystem goods and services provided by mangroves exposed or not exposed to sewage; summarise the current drivers of mangrove degradation and destruction within the study areas.
- Implementation and governance issues: conception of a strategic plan for implementing the use of mangrove sewage filtration; transforming PUMPSEA findings into appropriate governance guidelines.

EXPECTED RESULTS AND OUTCOMES

The expected project outcomes are:

- documentation of sewage filtration in existing peri-urban mangroves, measurement and mapping of its ecological effects;
- optimisation and development of constructed mangrove wetland technology;
- development of an ecological model, which can determine and interpret the impact of sewage on mangrove environments;
- identification and quantification of ecosystem goods and services generated by mangroves exposed or not exposed to sewage;
- analysis of current sewage infrastructure, policy, and performance, culminating in an action plan for sewage management guidelines.

The expected results of PUMPSEA all have direct applications for regional environmental managers and policy-makers working to improve the current situation in East Africa. More than 25 % of the population of the East African region live within the coastal areas (UNEP 1998). This project is targeted at benefiting these people, although the generated knowledge will have evident applications for the developing world per se.

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CENSOR

Climate variability and El Niño Southern Oscillation: Implications for natural coastal resources and management

Period: 01/10/2004 to 30/09/2008
Budget from EC: EUR 3 000 000

Coordinator: Prof. Dr Wolf E. Arntz
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CONTEXT AND OBJECTIVES

Along the Chilean-Peruvian coast of the Humboldt Current upwelling system, the sustained exploitation of marine resources within their ecosystem context, surface runoff, infrastructure and socioeconomics are significantly influenced by the ENSO (El Niño-Southern Oscillation) climate oscillation, which affects both aquatic and terrestrial ecosystems. The warm phase, El Niño (EN), has drastic effects on marine and terrestrial biota, as well as on artisanal fisheries. However, both EN and the cold phase, La Niña (LN), also produce positive effects, which are not used by local fishermen and human communities to their full advantage.

The CENSOR project aims to enhance the detection, compilation and understanding of EN and LN effects on coastal environments and resources to mitigate damage and better utilise beneficial effects.

ACTIVITIES

Censor will implement a multidisciplinary approach aimed at creating a comprehensive picture of the structure and response of the Chilean-Peruvian coastal system to ENSO. Studies on benthic communities, pelago-benthic exchange processes, the effects of increased rainfall in coastal systems, and resource variability under EN and LN conditions will be compiled and analysed comparatively. Information accumulated on changes in marine fauna and flora due to climate variability will enhance the understanding of how ecosystems function and the processes steering life cycles, species interactions, and genetics. The project will support the comprehension of eco-physiological tolerance limits of upwelling species to explain shifts in resource availability and abundance, with the goal of improving fishery management and resource prediction. Biological indicators will be identified to predict and validate EN events. Aquacultural demands will be addressed to compensate EN effects and decrease EN dependence. Data on increased surface runoff, river discharge associated with EN events, and their resulting effects will be integrated and analysed on the land. The economic and socioeconomic consequences of all these changes, both in the terrestrial and marine realm, will be studied. All compilations and results of the Censor project will be integrated into a public database and

made available to the managers of the coastal zone and its resources, as well as to the scientific community and the public.

EXPECTED RESULTS AND OUTCOME

As a consequence of these activities, Censor will improve the general understanding of coastal ecosystems subject to ENSO, and will compile and disseminate this information, effectively creating a scientifically validated information exchange platform between various actors in the coastal realm. It is expected that this approach will raise the social awareness of resource management and environmental policy and will contribute to social and socioeconomic stability. Increasing the public awareness has the potential to enhance sustainable livelihood strategies of human coastal populations facing the Humboldt Current upwelling system.

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LOTASSA

Bridging Genomics and Agrosystem Management: Resources for Adaptation and Sustainable Production of forage Lotus species in Environmentally-Constrained South-American Soils

Period: 01/12/2005 to 30/11/2008
Budget from EC: EUR 1 998 996

Coordinator: Juan Sanjuan
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CONTEXT AND OBJECTIVES

In the Southern Cone of Latin America, over 45 million hectares of pastures for livestock feeding could be improved using legumes, particularly forage Lotus species. The main objectives of LOTASSA are the following:

- to establish and implement exhaustive and comprehensive catalogues of the plant and microbial resources already available in the Southern Cone;
- to develop contrasting germplasm and pre-breeding programmes for improved tolerance to abiotic stress (drought, pH stress, and salinity) in various cultivated Lotus species;
- to develop specific genetic resources, molecular markers, genes, and metabolites that will significantly facilitate the breeding and selection of Lotus genotypes more tolerant to abiotic stresses;
- to generate new and important knowledge on the physiology and metabolism of model and cultivated legumes adapting to abiotic stresses;
- to determine the actual needs for inoculation of Lotus spp. in each country and environment and to provide superior inoculants to guarantee optimal nitrogen fixation in Lotus pastures.

ACTIVITIES

LOTASSA will characterise existing genetic resources and tools and develop new ones to facilitate and promote the breeding of agriculturally important Lotus species, tolerant against abiotic stresses (water, salt, pH stresses). The development of contrasting lines of different (model and cultivated) Lotus species and the identification of molecular markers should lead to the identification of key genes, contributing to stress tolerance in Lotus and the development of marker-assisted breeding programmes. A comprehensive view of the physiological and metabolic responses in model and cultivated Lotus spp. to soil water, acid and salt stress will be gathered, thereby providing information on the biochemical parameters and genetic markers linked to stress tolerance in Lotus. In relation to nitrogen nutrition, LOTASSA will: establish a collection and detailed catalogue of Lotus symbiotic bacteria in the Southern Cone; select rhizobial strains as superior, highly specific inoculants for Lotus pastures in environmentally

constrained soils in the region; and reveal the genetic basis determining the stringent nitrogen-fixing incompatibility between certain rhizobia and Lotus species.

EXPECTED RESULTS AND OUTCOMES

Results from LOTASSA will have an impact not only on the productive system, but also on various socio-economic and environmental issues in South American countries. The results will be essential to increase the productivity and sustainability of a forage legume (Lotus species) in extensive areas of Argentina, Brazil, Chile, and Uruguay dedicated to cattle and sheep production, which are sustained on grazing systems. Livestock production is of prime importance for the development of these countries and also for commercial exportation. LOTASSA will develop knowledge, genetic resources and biologicals to aid the implementation of a more sustainable, safer, and more cost-effective production of high-quality forage for animal feeding. LOTASSA results will also be applicable to low fertility and marginal soils, through the generation of Lotus germplasm adapted to environmental constraints (abiotic stresses), helping to improve soil fertility and ecosystem diversity.

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DEVELOPING COUNTRIES

HEALTH AND PUBLIC HEALTH

PROMISE COMPONENT 2

Promoting infant health and nutrition in Sub-Saharan Africa: Safety and efficacy of exclusive breastfeeding promotion in the era of HIV

Period: 01/01/2005 to 31/12/2007
Budget from EC: EUR 1 340 000

Coordinator: Prof. Thorkild Tylleskär, University of Bergen

CONTEXT AND OBJECTIVES

One of the goals of the Millennium development is to globally reduce by two-thirds the mortality rate of children under five years of age. Promotion of exclusive breastfeeding (EBF) is the most effective child health intervention currently feasible for implementation at population level in low-income countries. It can lower infant mortality by 13 %, and by an additional 2 % were it not for the fact that breastfeeding transmits HIV. The objective of this study is to lead the way in the promotion of child health by developing, implementing and assessing the health impact of an intervention promoting exclusive breastfeeding in African settings where a high prevalence of HIV is a barrier. More precisely, the principal objective is to assess the following in a community-randomised trial:

- the impact of peer-counselling in increasing the exclusive breastfeeding rates at three months of age;
- the effects of the trial on infant morbidity (two weeks diarrhoeal disease point prevalence at three months), growth (up to six months of age), and micronutrient status.

ACTIVITIES

The PROMISE COMPONENT 2 research consortium consists of three European partners: the University of Bergen, Norway; the University of Montpellier, France; the University of Uppsala, Sweden; and four African partners: Centre Muraz, Burkina Faso; Makerere University, Uganda; University of Zambia and the University of Western Cape, South Africa. The PROMISE COMPONENT 2 EBF is a community-randomised trial of the impact on EBF promotion through peer counselling and in turn the impact of this change on infant morbidity, growth, and micronutrient status. It uses a peer counselling approach, randomised at community level, combined with the production of information that may in the longer run help overcome other constraints to EBF, such as fear that it may lead to micronutrient deficiencies, concern about cost implications, or anxiety about burdens to the health care system of implementing the intervention on a large scale.

EXPECTED RESULTS AND OUTCOMES

In this way, the EU is contributing to the production of knowledge on how to reach one of the Millennium development goals. This study will provide the first data from a randomised trial on the safety and efficacy of peer counselling as a way of increasing the rate of exclusive breastfeeding in an African context. The range of four countries included will enhance generalisability of these findings. Measuring the impact of this intervention on infant morbidity, growth, and micronutrient status as well as the costs, efficacy and implications for the health care system of implementing such an intervention will play a key role in the research.

In one package, it will provide all the information policy-makers need and if the outcome is positive, hopefully lead to more rapid replication. Since peer counsellors are by definition local women, this project presents a very low-cost intervention suitable to resource-poor environments.

PROMISE COMPONENT 2

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CHIZAP

Community- and health facility-based intervention with zinc as adjuvant therapy for pneumonia to enhance child health and nutrition

Period: 01/01/2005 to 31/08/2008
Budget from EC: EUR 915 000

Coordinator: Tor A Strand, MD, PhD, University of Bergen

CONTEXT AND OBJECTIVES

The CHIZAP project will measure the efficacy of zinc given as adjuvant therapy to standard antibiotic treatment for childhood pneumonia or severe bacterial illness in double-blind, randomised placebo-controlled clinical trials. The specific research objectives are as follows:

- to measure to what extent the daily administration of two recommended daily allowances (RDAs) of elemental zinc during pneumonia reduces the risk of treatment failure, whether it reduces the number of hospitalisations during the enrolment episode, or whether it reduces the number of visits to a physician or hospitalisation for six months after completed zinc administration in children between 2 to 35 months of age in a community in Bhaktapur, Nepal;
- to measure to what extent the daily administration of two RDAs of elemental zinc during severe pneumonia in children 2 to 35 months of age, treated in a hospital in Nepal, reduces the episode duration and number of days hospitalised;
- to measure to what extent the daily administration of two RDAs of elemental zinc during severe bacterial illness in Indian children seven days to two months of age reduces the episode duration and number of days hospitalised.

ACTIVITIES

- In a community-based clinical trial in 2 700 Nepalese children, the project partners will assess the effect of giving 10 or 20 mg elemental zinc during pneumonia. They will also measure the effect of this short-term zinc administration for six months after the zinc has been given. The main measurable factor of interest during the six-month follow-up is the number of episodes of common infection. In addition, thymus size will be measured. The partners will also collect nasopharyngeal aspirates of the enrolled children and detect viral pathogens using PCR in a laboratory that will be established in Nepal.

- In a hospital-based clinical trial in 500 Nepalese children, from 2 to 35 months of age, the partners will assess the effect of giving 10 or 20 mg elemental zinc during severe pneumonia. They will compare the time for recovery between children that receive zinc and children that are given a placebo. The children will be kept under observation until they are discharged from the hospital.
- In a hospital-based clinical trial in 600 Indian children, from 1 to 8 weeks of age, they will assess the effect of giving 10 mg elemental zinc during severe bacterial illness. The partners will compare the time for recovery between children that receive zinc and children that are given a placebo. The children will be followed for three weeks after discharge from the hospital.

EXPECTED RESULTS AND OUTCOMES

Pneumonia is one of the three most important causes of childhood deaths worldwide. Routine zinc administration to children in developing countries reduces the incidence of pneumonia and diarrhoea. The benefits of therapeutic oral zinc given to children with diarrhoea are well documented, but the therapeutic effect of zinc when given during pneumonia or other severe bacterial illnesses has yet to be demonstrated. The principal objective of the proposed project is to identify a community-based and health facility-based approach to improve zinc nutrition, thereby reducing the consequences of zinc deficiency in children with pneumonia or severe bacterial illness. If proven to be as effective as oral zinc supplementation during acute diarrhoea, this new therapeutic micronutrient intervention strategy could rapidly be translated into a cost-effective and feasible primary care-based intervention to enhance child nutrition and survival from pneumonia or other severe bacterial illnesses in developing countries.

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RHINCAV

Bringing health care to the vulnerable - developing equitable and sustainable rural health insurance in China and Vietnam

Period: 01/10/2005 to 30/09/2009
Budget from EC: EUR 1 620 000

Coordinator: Rachel Tolhurst and Shenglan Tang
Liverpool School of Tropical Medicine

CONTEXT AND OBJECTIVES

A growing number of developing countries are promoting health insurance schemes to protect people, particularly the poor, from financial catastrophe caused by expensive medical care. Among them are China and Vietnam, which have experienced rapid economic development and dramatic social changes over the past two decades. Health care financing reforms in these two countries have led health facilities to rely increasingly on user charges, which have resulted in greater financial difficulties in accessing health care, especially for the rural poor. Although the central governments of both countries have promoted the development of rural health insurance for many years, the population coverage has been far from satisfactory, due to many political, socio-economic, and managerial factors. The overall objective of this project is to promote equity in health by making evidence available for health policy makers for an effective, sustainable, and affordable rural health care financing system in China and Vietnam.

ACTIVITIES

The project will involve a situation analysis of perceived needs for rural health insurance and the strengths and weaknesses of existing schemes. This will include a review of government documents and literature on rural health insurance in China and Vietnam, a population-based household health survey, and qualitative studies with various stakeholders. It will also include the design of rural health insurance schemes that are feasible and meet the perceived needs of their target population. These designs will address issues related to the following: sources of finance and premiums, service benefit packages, provider payment methods and contractual arrangements, and organisation and management. The project aims to implement rural health insurance schemes, including the administrative preparation for the interventions, publicity of the new schemes, and membership recruitment. The study will monitor and evaluate the impacts of new schemes, focusing on whether these schemes have increased coverage, improved equity in access to and use of health care, reduced financial burdens for the majority of service users, and increased economic efficiency in service provision. Rapid household health surveys, qualitative studies, and the management information system operated in the intervention counties and districts will be used. The project will disseminate

research findings to support the design and implementation of sustainable, equity-oriented rural health insurance schemes internationally as well as in the study countries. Methods include the following: workshops with national policy makers and primary stakeholders, submission of academic papers, production of policy briefings, and presentation of papers at regional and international conferences. Strategies for research capacity development of all partner organisations, including systems for mentoring and supervising junior researchers and exchange of visiting researchers between partners will be developed.

EXPECTED RESULTS AND OUTCOMES

RHINCAV will provide a context-specific evidence base for the contribution of specific schemes to poverty reduction by assessing whether or not they prevent catastrophic health care costs and reduce the total costs of illness amongst the insured, particularly the low-income insured. Through their effective dissemination, the research findings will contribute towards policy-making for improving the financial accessibility, affordability, and equity in rural health systems in the study countries and other low and middle income countries, especially countries experiencing economic transition.

The project will promote collaboration within and between the institutions involved and build the capacity of young researchers. As a result of improved health care financing policy and better design and implementation of the health insurance schemes, financial access to health care among the rural population in the intervention areas will improve. This will have three main impacts on individuals and households:

- individuals suffering from ill health will be able to receive health care to relieve their suffering and/or cure their illness;
- individuals and households will be able to receive and use information to take action to prevent diseases or disease complications and promote health which will lead to improved individual and public health;
- poverty, financial insecurity, and vulnerability due to high medical costs should be reduced so that illness does not lead to reduced resources, especially for households operating with small margins for financial loss.

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KALANET

Efficacy, acceptability, and cost-effectiveness of long lasting insecticidal nets in the prevention of Kala-azar

Period: 01/09/2005 to 31/08/2009
Budget from EC: EUR 2 109 960

Coordinator: Marleen Boelaert
Institute of Tropical Medicine, Antwerp

CONTEXT AND OBJECTIVES

Visceral leishmaniasis (VL) is a deadly but neglected vector-borne disease, giving rise to an estimated 500 000 new cases a year, mainly in the Indian subcontinent and East Africa. So far, vector control measures have not been sustainable in many regions, because insecticides are very expensive and communities do not easily accept spraying campaigns. An effective tool for individual protection that can be managed by the community itself, would be a major asset for VL control policy. There has been much speculation over the role of bednets in VL control, but no firm evidence is available; this hampers its full endorsement and funding as a VL control measure. This project aims to evaluate the efficacy, acceptability, and cost-effectiveness of long-lasting insecticidal bednets for the prevention of VL.

ACTIVITIES

The efficacy of long-lasting impregnated bednets (LLIN) on VL prevention will be assessed in a community intervention trial in the Bihar focus, that extends on both sides of the Indian-Nepalese border. The study aims to demonstrate a 50% reduction in *L. donovani* incidence rates in the intervention group, compared to control. Twenty clusters of households will be randomly allocated to the intervention or to the control arm. Complementary to the trial, technology assessment (TA) and socio-economic studies (SES) will be conducted. TA will evaluate the efficacy of competing technologies on a scale of proof-of-principle, as several formats of treated fabrics are currently being proposed by industry. SES will evaluate the acceptability and cost-effectiveness of LLIN compared to alternative community-based vector-control methods, using an appropriate combination of quantitative and qualitative methods.

The specific activities envisaged are set out below:

- community trial (CT) preparation: collection of baseline data, cluster selection and randomisation, and mapping;
- methodological support to community trial: protocol development and data analysis;
- household surveys in CT: a baseline sero-survey (clinical and immunological assessment), trial monitoring, a second household survey and a third household survey;

- parasite transmission patterns in CT: selection of genetic markers, determination of parasite genetic structure pre-intervention and genotyping new infections;
- vector biology in CT: evaluation baseline entomological data, comparison of sand fly collection methods, determination of seasonal patterns and entomological monitoring during trial;
- clinical studies in CT: clinical protocol finalised, clinical monitoring during trial and case control study risk factors of clinical VL;
- vector control technology assessment: evaluation of different LLIN, evaluation of alternative tools;
- costing and cost-effectiveness analysis: baseline survey, costing analysis, cost-effectiveness analysis and economic impact;
- acceptability study: acceptability study of LLIN and acceptability study of alternative tools;
- coordination and dissemination of results: international coordination meeting and thematic meetings.

EXPECTED RESULTS AND OUTCOMES

KALANET expects to provide the evidence for a new tool in the control of VL, if a protective effect of long-lasting impregnated bednets on *L. donovani* incidence can be demonstrated. By establishing the evidence of efficacy, cost-effectiveness and acceptability, the advocacy for this kind of control tool will become easier, and the scaling up of bednets will become justified in the Indian subcontinent regions, where malaria is a low, but VL a major preoccupation. In case the trial fails to demonstrate a protective effect, this will allow the governments and development aid sponsors to allocate their funds to more rational alternatives. Moreover, this research project will strengthen research capacity in endemic countries.

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TRYLEIDIAG

Simplified and rapid molecular assays for diagnosis of Leishmaniasis and Human African Trypanosomiasis and parasite (sub-) species identification

Period: 01/11/2005 to 31/10/2008
Budget from EC: EUR 2 390 000

Coordinator: Philippe Buscher
Prince Leopold Institute of Tropical Medicine

CONTEXT AND OBJECTIVES

Human African Trypanosomiasis (HAT), or sleeping sickness, currently affects 500 000 people in sub-Saharan Africa. Visceral, cutaneous, and mucocutaneous leishmaniasis (LEI) threaten 350 million people, with 12 million infected persons in Latin America, Asia, Europe, and Africa. In the absence of prophylaxis or vaccination, control of both diseases is based on diagnosis and treatment of patients.

Due to limited specificity of serological tests and toxicity of the drugs, treatment is started after confirmation of the parasite presence in blood, lymph node fluid, or bone marrow in seropositive persons. Since parasitaemia can be extremely low, quite a number of infected persons remain untreated and constitute a non-controlled human reservoir next to the animal reservoir from which the parasites can always return into the human population.

Recent innovations in molecular diagnosis have opened perspectives for robust and rapid point-of-care molecular tests as a real alternative for parasitological diagnosis in leishmaniasis and sleeping sickness, together with the potential of differentiating species and subspecies in one test.

The objectives of the project are:

- to develop and validate a sensitive point-of-care test for molecular diagnosis of both diseases based on ribosomal RNA detection;
- to develop low-tech molecular tests for parasite species and strain differentiation;
- to strengthen research capacity of African investigators on the biology and diagnosis of these diseases.

ACTIVITIES

The project team will combine several innovative techniques to provide solutions for the above identified needs in diagnosis and (sub-)species identification. Activities will comprise:

- establishing documented banks of *Leishmania* and *Trypanosoma* parasites;
- establishing documented banks of patient biological samples;
- development of prototype tests;

- laboratory evaluation of the prototype tests for proof-of-principle delivery (phase I);
- large scale laboratory evaluation of the prototype tests that pass the proof-of-principle on a defined collection of patient samples (phase II);
- large scale evaluation of the tests on the target population without prior knowledge of subject status (phase III).

EXPECTED RESULTS AND OUTCOMES

The project is expected to provide the following results:

- robust, rapid, and simple point-of-care alternative for parasite detection with greatly increased sensitivity and specificity to the benefit of the target population;
- beneficiaries of the outputs: patients and the academic community in developing and European countries;
- innovative low-technology tests for parasite detection and unequivocal (sub-)species identification;
- increased scientific and technological expertise of African researchers and institutes;
- participation of researchers from southern partners in European laboratories;
- technology transfer through exchange of personnel within the project consortium;
- delivery of new diagnostic tests to national and international disease control agencies;
- technology adaptable to other diseases.

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CHIMACA

Structural hindrances to and promoters of good maternal care in rural China

Period: 01/09/2005 to 31/08/2009
Budget from EC: EUR 1 500 000

Coordinator: Dr Elina Hemminki, Marja Lampola
National Research and Development Centre for
Welfare and Health (STAKES)

OBJECTIVES

This project aims to strengthen and enhance the performance of the health care system in rural China in order to improve maternal and child health (MCH). It also provides policy-makers and health service managers with evidence for the development of informed policy on MCH.

The research focuses on women of reproductive age in rural areas of China, and their antenatal and obstetric care service providers including both clinicians and policy-makers. For the Member States and China, as well as other countries, it will provide a comprehensive analysis and synthesis of the current state of affairs — both from provider and user perspectives — of antenatal and obstetric care in rural China, at both national and local level. This understanding will form the basis for innovative intervention models carefully drafted to fit the Chinese context. The trial of these interventions will result in policy recommendations developed in close collaboration with experts from key player groups who directly participate in all phases of the project.

ACTIVITIES

Existing national data, literature, and qualitative and quantitative KAP data will be analysed and new data will also be collected by using a pre-intervention health system study at county and township level. Results from these studies will be collected in reports, presented at workshops, summarised and disseminated. Preparation of the intervention includes the following activities: informing and consulting local stakeholders about the intervention in general terms (several small working groups); mapping existing/necessary resources for implementation and data collection; checking and updating (service kits) the MCH facilities; reviewing existing data/information collection instruments; and finally ensuring that the information system adapts to what the project requires in terms of monitoring and evaluation. The intervention activities will add MCH services into the service benefit package of CMS (a community-based prepayment scheme), provide extensive in-service training (identification of procedures with risk factors, referrals, record keeping and clinical skills) to midwives and MCH workers at village and township level in order to improve quality, monitor current practice

in control sites, and inform women about the maternal services. Evaluation activities include the collection of post-intervention data, as well as a process and outcome evaluation. The publications relating to the results will be published in national and international journals.

EXPECTED RESULTS AND OUTCOMES

The expected results of this project are to have a clear and detailed understanding of the current situation of maternal health care (MCH), of the role played by socio-economic and health system barriers, as well as the process indicators, by exploring the health systems that provide care in the three study provinces in rural China. In addition, the study is expected to generate the knowledge needed to confirm the feasibility of the preliminary intervention design, and to prepare the technical and logistical bases for the intervention.

Through the synthesis of all gathered data, the project anticipates creating a better understanding of the most pertinent problems — particularly financing and system-related — of access to, and delivery of good quality maternal care in rural China: a consensus opinion of intervention that should be tested to improve the situation. Furthermore, it is expected that intervention and data collection will be carried out successfully, so that evidence-based policy recommendations on how to improve access to, and the quality of antenatal and obstetrical care can be made. Furthermore, through publishing, reporting and disseminating the results of the project, widespread knowledge will be exploited at local, national and international level by service providers, policy-makers, researchers, and development aid actors in China and the EU. Finally, it is expected that efficient and successful execution of the project will provide information and high quality data from which an intervention proposal will be compiled in the Final Project Report.

CHIMACA

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LeishEpiNetSA

Control Strategies for visceral leishmaniasis (VL) and mucocutaneous leishmaniasis (MCL) in South America: applications of molecular epidemiology

Period: 01/01/2006 to 31/12/2008
Budget from EC: EUR 2 489 823

Coordinator: Michael A. Miles
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CONTEXT AND OBJECTIVES

The Leishmania are single-celled parasites transmitted by sand flies, which cause diseases in humans and dogs. In South America, the subgenus *Viannia* causes cutaneous leishmaniasis (CL) or severe mucocutaneous leishmaniasis (MCL). In Europe and South America, *L. (L.) infantum* causes fatal visceral leishmaniasis (VL). The overall aim of this project is to apply molecular methods to improve understanding of the epidemiology of the subgenus *Viannia* and *L. infantum* in South America. The technical objectives are, firstly, to develop a full range of microsatellite and multilocus sequence typing (MLST) markers for the Leishmania (V) *braziliensis* complex and for *L. (V) guyanensis* and secondly, to establish in South America microsatellite and MLST analysis for *L. (L.) infantum*, with methods proven by a European network.

The practical objectives are to apply these methods in South America for:

- elucidating parasite-vector-host relationships;
- assessing the epidemiological impact of *L. infantum*/HIV co-infection (Brazil);
- assessing the epidemiological importance of recombinant Leishmania genotypes;
- assessing the spread of resistance against first-line treatment.

In addition, genotypes will be compared: Leishmania isolated from diverse clinical cases of leishmaniasis; and drug-susceptible and drug-resistant strains. This understanding is essential for more effective control and surveillance.

ACTIVITIES

Intense laboratory research will be dedicated to the development of a range of microsatellite and MLST markers for the subgenus *Viannia*. Epidemiological research will involve endemic areas for VL and MCL in Brazil, Paraguay, Peru, and Venezuela.

New and existing isolates will be assembled from suburban and rural endemic areas, including isolates from immunocompetent and immunocompromised human cases, from infected dogs and other mammal reservoirs, and from vectors.

Isolates will be genotyped with the new *Viannia* markers and with markers from Europe for *L. infantum*, and data then analysed. Functional genotyping of the *L. braziliensis* complex and *L. guyanensis* will also be performed using antigen genes and microsatellite analysis to reassess correlation between antigenic diversity and pathology. Genetic analysis of antimony-resistant strains of *L. infantum*, *L. braziliensis* complex, and *L. guyanensis* will be undertaken.

Bilateral and multiple exchanges will take place, including the holding of an international training workshop. A survey on the knowledge, attitude, and practices among health professionals and patients will also be carried out. Finally, a series of publications and reports will be written to disseminate findings from the project, plus recommendations for improved control strategies.

EXPECTED RESULTS AND OUTCOMES

A range of new epidemiological tools will be produced to:

- gain detailed insight into the comparative epidemiology of CL, MCL, and VL in South America;
- map the distribution of drug-resistant genotypes;
- create a new database, linked to a European database, to store the extensive data gathered, with published outputs in scientific journals;
- set-up an expanded South American repository for Leishmania, with new isolates and representatives from other endemic regions;
- strengthen local capacities for research and Latin American-European collaborations;
- improve cooperation between South American researchers mainly through the formation of a strong South American/European network, with active, shared and synergistic research objectives, multidirectional collaborations, and exchanges. A cohort of individuals will be also trained and technologies transferred between the partners;
- recommend more cost-effective methods for identifying genetic groups of Leishmania and improve strategies for control and surveillance, with consequent benefits to public health and the alleviation of poverty.

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BURULICO

Buruli ulcer: multidisciplinary research for improvement of control in Africa

Period: 01/12/2005 to 30/11/2008
Budget from EC: EUR 1 590 000

Coordinator: Prof. Bernhard Fleischer
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CONTEXT AND OBJECTIVES

Buruli ulcer (BU), a disease caused by *Mycobacterium ulcerans*, is a neglected disease of the poor in remote, rural areas. BU is the third most common mycobacterial disease after tuberculosis and leprosy. It is most endemic in West Africa with incidences as high as 280/100 000, but cases occur around the globe.

Currently, BU is treated by surgery there are no established protocols for treatment with antibiotics. This is neither affordable nor sustainable in endemic regions, and it is poorly accepted among people in endemic areas. Though mortality of the disease is low, morbidity and subsequent disability are very high, with up to half of those treated being left with disabilities that have long-term social and economic impacts. New molecular tools are needed to explore epidemiology and transmission, and improve diagnostics and treatment.

This project is a multidisciplinary treatise that aims at the development of new tools and knowledge. The overall objective is the improvement of BU control in Africa. This will be achieved by:

- acquiring new knowledge about reservoirs, transmission, diagnostics, treatment, and psycho-social attitudes; and
- application of this knowledge in order to optimise regional control programmes.

ACTIVITIES

The following activities are foreseen via close networking of partners with different expertises:

- analysis of molecular epidemiology of *M. ulcerans*;
- analysis of environmental reservoirs and possible relationship to transmission;
- evaluation of diagnostic principles with the aim of establishing guidelines;
- treatment studies with the aim of establishing guidelines for therapy both with drugs and by surgery;
- analysis of the in situ host response to obtain an understanding of the immune defence against *M. ulcerans* and to find possible correlates to prognosis;
- a socio-psychological study of the attitude towards BU and its consequences for compliance with old and new therapies.

EXPECTED RESULTS AND OUTCOMES

- Identification of the molecular basis of drug resistance in *M. ulcerans*.
- Identification of host species of *M. ulcerans* in endemic areas.
- Setup of diagnostic networks capable of supporting case finding, laboratory diagnosis of BU suspects, and epidemiological surveys.
- Proof of principle that clinical cure without recurrence can be obtained by anti-mycobacterial treatment alone in early, limited lesions of BU.
- Evaluation of feasibility of combined anti-mycobacterial and surgical treatment in larger BU lesions.
- Identification and characterisation of lesion-infiltrating T cells.
- Proof that functional limitations resulting from BU can be reduced by early case finding, improved treatment modalities, and appropriate, targeted, and culturally suitable public health campaigns in endemic regions.

BURULICO will also contribute to the optimisation of national control programmes in affected countries. It is expected that the improvement of intervention strategies aimed at in this project will subsequently lower treatment costs, allow wider access to treatment, and therefore contribute to social equity.

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SODISWATER

Solar Disinfection of Drinking Water for Use in Developing Countries or in Emergency Situations

Period: 01/09/2006 to 31/08/2009
Budget from EC: EUR 1 900 000

Coordinator: Dr Kevin McGuigan
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CONTEXT AND OBJECTIVES

Between 2000 and 2003, around 769 000 children under five years of age died annually from diarrhoeal diseases in Sub-Saharan Africa. Solar Disinfection (SODIS) is a technique for making contaminated drinking water safe. Transparent bottles are filled with biologically contaminated water and placed in direct sunlight for six hours. SODIS reduces faecal contamination levels from 1 million bacteria per ml to zero in less than 1.5 hours and is completely effective against the pathogens responsible for cholera, dysentery, typhoid, giardiasis, salmonella, gastroenteritis, and polio.

The strategic objectives of the SODISWATER project are to:

- demonstrate that SODIS of drinking water is an appropriate, effective, and acceptable intervention against waterborne disease for vulnerable communities in developing countries without reliable access to safe water;
- evaluate and test different diffusion and behavioural change strategies in areas with different social and cultural conditions for sustainable adoption of solar water disinfection;
- disseminate these research outcomes throughout the international aid and emergency relief communities so that SODIS is adopted as one of a range of standard, appropriate water quality interventions (for example, filtration, chlorination, desalination, etc.) for use in the immediate aftermath of natural disasters such as tsunami, flood, earthquake, hurricane/typhoon or man-made disasters such as war-zone, famine and refugee camps);
- develop a spectrum of appropriate SODIS enhancement technological innovations that can be matched to varying socio-economic conditions; such technological innovations would include UV dosimetric indicators of disinfection, photocatalytic inactivation, and continuous flow compound parabolic collector arrays for small community distribution systems.

ACTIVITIES

The research activities will be divided into four specific areas:

- Community Health Impact Assessment Programmes: the overall objective of this work package (WP) is

to implement appropriately designed health impact assessments to assess the change in health reasonably attributed to the provision of solar disinfected drinking water, at the point of use, in three African countries (Kenya, South Africa, and Zimbabwe).

- Pathogen Inactivation: the primary aim of this WP is to determine whether important waterborne and/or diarrhoeal pathogens are susceptible to SODIS. Previous work has clearly demonstrated that a wide variety of viral and bacterial pathogens can be inactivated with batch SODIS; however, there still remains a considerable number of important waterborne microbes which are, as yet, untested.
- SODIS Enhancement Technologies: the advantages of the batch systems for solar disinfection include simplicity and cost (small, clear container exposed to sunlight), but their limited capacity and reliance on individual compliance are significant disadvantages which could hinder widespread uptake. One of the aims of SODISWATER is to determine the capability and effectiveness of using enhanced solar collection technologies (Compound Parabolic Collector [CPC] photo-reactors, photocatalytic coatings) to disinfect community water supplies in developing countries. In addition low-cost effective indicators of disinfection will be investigated.
- SODIS Adoption and Dissemination: to offer a new technology is not sufficient to get people to use it, even if it is cheap and promising like SODIS. Several factors can play a role in the non-adoption of a technology, including the following: an unreliable source of information, time and money restrictions, beliefs, habits, or social considerations. To adopt a new technology, people first have to be informed about it and then change certain aspects of their behaviour to integrate this technology into their daily life. Diffusion strategies have to be introduced to bring the information to the people. Behavioural change strategies have to be applied to change behaviour. In the case of SODIS, the ones who will apply these strategies are international aid and emergency relief organisations. Therefore the WP 'Adoption and dissemination' has to investigate possible diffusion and behavioural change strategies for the adoption of SODIS and disseminate the knowledge about this technology to relevant organisations.

SODISWATER

EXPECTED RESULTS AND OUTCOMES

Results are expected in four different areas:

- Community Health Impact Assessment (HIA) programmes:
 - report: a field manual which will describe full details on how field trials will be conducted;
 - report: assessment of the impact of the intervention on health determinants/health outcomes;
 - report: assessment of acceptance/compliance of the SODIS method.
- Pathogen Inactivation:
 - report on efficacy of SODIS against bacterial waterborne pathogens;
 - report on low cost solar concentration system for SODIS treatment of bacterial waterborne pathogens;
 - report on SODIS treatment of viral/eukaryotic waterborne pathogens;
 - report on effect of environmental factors on SODIS efficiency.
- SODIS Enhancement Technologies:
 - operational prototype of a continuous flow SODIS reactor with add-on CPC;
 - operational prototype of a continuous flow photocatalytic SODIS reactor with add-on CPC;
 - operational batch photocatalytic SODIS reactor;
 - operational low-cost UV dosimeter/indicator for batch SODIS;
 - cost-based analysis on enhancement technologies for deployment in developing countries;
 - pro-poor business action plan.
- SODIS Adoption & Dissemination:
 - report on current water collection/storage/disinfection practices;
 - guide for deriving diffusion and behavioural change strategies from the data of a standardised survey;
 - standardised social monitoring tool for the evaluation of campaign success;
 - publications on SODIS diffusion and adoption factors;
 - SODIS brochure and presentation set for distribution to target communities/aid agencies/governmental departments;
- SODIS international conference to be held at the end of the project to highlight/disseminate results;
- dissemination of project research outcomes in international publications and at international conferences.

SODISWATER

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TFCASS

Tsetse flies and the control of African sleeping sickness

Period: 01/10/2006 to 30/09/2010
Budget from EC: EUR 2 500 000

Coordinator: M.J. Lehane, Liverpool School of Tropical Medicine

CONTEXT AND OBJECTIVES

African sleeping sickness is endemic to 37 sub-Saharan African countries, covering 9 million km², with 60 million of the 400 million inhabitants living in the region, at risk for the disease. Africa is in the middle of a sleeping sickness epidemic and the World Health Organization (WHO) estimates that in 2004 there were around 500 000 cases, with 48 000 deaths and an impact of 1 590 000 disability-adjusted life years (DALYs).

The objective of this project is to solve the major technical problems associated with regional control of the vectors of sleeping sickness by doing the following:

- developing potent odour baits for use with traps and targets against palpalis group flies — the major vectors of African sleeping sickness;
- developing tools to enable the genetic structuring, epidemiological significance, and mobility of palpalis group populations to be defined, thus enabling control activities.

ACTIVITIES

Environmentally acceptable targets and traps will be a key technology in the regional eradication of vector insects. The African and European partners in this application wish to dramatically improve the efficiency of this process. To this end, in Africa and Europe they will develop novel attractants for use with traps/targets designed for use against palpalis group flies, currently the major vectors of human disease.

Secondly, regional control of the flies depends heavily on understanding the structures and mobility of the vector populations so that epidemiologically important, isolated populations can be identified. Current techniques cannot resolve these issues; consequently, working closely as a partnership, the project team will develop new molecular and morphometric technologies in Africa and Europe for this purpose. The TFCASS project has assembled a unique group of African and European scientists who are motivated and excellently placed to achieve these goals, through a fully integrated research programme.

EXPECTED RESULTS AND OUTCOMES

The importance of sleeping sickness as a major societal problem in sub-Saharan Africa has long been recognised by all agencies involved in international health. A major political advance occurred recently when the Africa Union clearly recognised that trypanosomiasis control is of the highest importance for African development, and their initiative has been endorsed by the Food and Agriculture Organization (FAO), International Atomic Energy Agency (IAEA), and the World Health Assembly. Consequently, it is believed that the work programme proposed will have a major strategic impact, as it directly addresses major problems identified by the African Union, the WHO, and other agencies involved in international health, as well the European Community itself, through this International Cooperation proposal. The work will contribute by providing tools and techniques of immediate use to field control operations.

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ARVMAC

Effects of Antiretrovirals for HIV on African health systems, Maternal and Child health

Period: 01/11/2006 to 31/10/2010
Budget from EC: EUR 2 400 000

Coordinator: Anna Mia Ekström, Karolinska Institutet

CONTEXT AND OBJECTIVES

Increasing access to antiretroviral treatment (ART) in resource-poor settings is an obvious emergency measure, but the scaling up of ART poses serious challenges to the overall functioning of the health system. The system's answer to these challenges may jeopardise or strengthen its response to other health priorities and will affect the feasibility of MDG 4 and 5 in Sub-Saharan Africa (SSA). HIV is inherently linked to child survival, gender inequities and reproductive health. It increases infant and child mortality by up to 40 %. Women are 4 to 25 times more vulnerable to HIV transmission — on average, they are 10 years younger than men when infected — and make up the majority of people living with HIV in SSA.

Donor investment in vertical ART programmes enables the current health budget to be doubled in some SSA countries; accordingly, access is no longer constrained by drug costs. Low absorption capacity and lack of infrastructure and human resources are the major challenges to implementing the WHO '3 by 5'. Using Tanzania as an example, a redistribution of 35 % to 70 % of the health system's workforce is required, in order to increase the number of those on ART, from 8 000 to 220 000 in 2005. The lack of integration of ART with antenatal care limits the prevention of mother-to-child transmission.

Pooling of staff to ART undermines the quality of basic care (ANC, IMCI) and reduces access to second-level care (e.g. Caesarean sections), thus running the risk of increasing child and maternal mortality. Solutions need to be sought on how to: absorb ART funds; prioritise the different types of care; and correctly distribute, monitor and sustain ART in fragile health systems with weak resource allocation capacity, without harming the most vulnerable. The project partners will study health policy, the consequences of ART scale-up in population-based settings on health services, maternal and child health with existing infrastructures for registration of vital events and diseases, as well as three demographic surveillance sites in three different SSA countries, using both quantitative and qualitative research methods.

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SUPPORT

The SUPPORT Collaboration: Supporting Policy Relevant Reviews and Trials

Period: 01/10/2006 to 30/09/2009
Budget from EC: EUR 1 199 998

Coordinator: Dr Andy Oxman
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CONTEXT AND OBJECTIVES

Policymakers may not want to ignore research evidence when making policy, but they often do. The goal of the Support project is to make this phenomenon less likely for policy related to maternal and child health in low and middle income countries (LMIC), by improving access to and use of relevant and reliable research evidence.

ACTIVITIES

Support will produce highly-focused, quality-assessed, and policy-relevant summaries of research evidence in the field of maternal and child health for LMIC policymakers and researchers. Secondly, the project will increase the ability of LMIC researchers to provide, and policymakers to access, reliable evidence by developing and disseminating a range of tools and workshops to a wide audience in LMIC. Software will be developed to support the day-to-day conduct and management of trials, to make it easier for LMIC researchers to address knowledge gaps. The project will help align the priorities of policymakers and researchers, and promote more evidence-informed policies and the more effective use of research resources.

EXPECTED RESULTS AND OUTCOMES

Support will produce overviews of what is known about effective interventions in maternal and childcare and health services, and develop a software tool to foster the conduct and management of pragmatic randomised controlled trials, which will help trialists resolve practical issues regarding the day-to-day management of a trial. The project will run a series of workshops and other knowledge transfer activities for policymakers, funders, trialists and authors of systematic reviews. Through these results and outcomes, Support will improve healthcare delivery and health systems in LMIC by increasing the proportion of care that can be regarded as best practice, and the extent to which health care policies are based on rigorous evidence of intervention effectiveness. Aims and outputs of the project will support and promote European values, such as solidarity, while also directly supporting EU development policies, such as the reduction of poverty, sustainability, good governance, and long-term economic growth.

SUPPORT

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CONTENT

Evaluation and Control of Neglected Mucosal Enteric Infections in Childhood

Period: 01/10/2006 to 30/09/2010
Budget from EC: EUR 2 500 000

Coordinator: Prof. Dermot Kelleher, University of Dublin

CONTEXT AND OBJECTIVES

There is a need to focus research on enteric childhood infections, which are a leading cause of death and illness among children in developing countries, including Latin America. The diversity of these enteric infections makes diagnosis and disease surveillance difficult. Also, to date, there has been limited data on the impact of the major childhood infection *Helicobacter pylori* on global health issues in underdeveloped regions. Initial infection with *H. pylori* is associated with a period of reduced acid secretion, which facilitates the acquisition of other enteric infections, resulting in diarrhoeal disease and impaired childhood growth. In addition, *H. pylori* is likely a causative factor in childhood iron deficiency anaemia (IDA). Thus, the first strategic objective of the CONTENT project is to facilitate the implementation of sustainable surveillance systems for multiple enteropathogens through the development of innovative, non-invasive molecular diagnostic tools. The second key objective is to improve knowledge on the role of *H. pylori* and other enteric infections on the epidemiology of diarrhoeal diseases and childhood growth and on childhood IDA in Latin America.

ACTIVITIES

The key activities of the project include collecting biological samples (clinical and field) from appropriate cohorts to enable epidemiological, genomic, and microbiological data to be obtained and analysed with regard to infection and disease status of the individuals. In parallel, new state-of-the-art diagnostic tools will be developed and evaluated in the field to assess their suitability for disease diagnosis and surveillance purposes. Additionally, the molecular mechanisms whereby the gastric pathogen *H. pylori* contributes to iron deficiency anaemia and growth impairment in children will be determined in animal models of infection. Finally, the key outcomes of the project will be disseminated to stakeholder audiences pan-regionally in Latin America and Europe, to improve awareness and foster further collaborative bi-regional research activities in this area.

EXPECTED RESULTS AND OUTCOMES

This project will:

- deliver new knowledge on the role of *H. pylori* and other enteric infections on the epidemiology of diarrhoeal diseases and on childhood growth;
- deliver new knowledge on the contribution of *H. pylori* to the onset of iron deficiency anaemia in children;
- generate new molecular tools for the diagnosis and sustainable surveillance of enteric protozoan and bacterial pathogens. A crucial expected benefit of this work will be improved disease control strategies, health care, and economic benefits to developing countries.

Other expected key outcomes will be the promotion of research activities in the European Research Area and throughout Latin America resulting in improved trans-regional research co-operation in microbiology, parasitology, and paediatric gastroenterology. Further, dissemination of the new knowledge and public health issues at public meetings, via awareness campaigns (media), and through interaction with schools/local communities will be a key outreach activity.

CONTENT

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VHF Diagnostics

Development of rapid field diagnostics for identification, control and management of haemorrhagic fever outbreaks

Period: 01/12/2006 to 30/11/2009
Budget from EC: EUR 853 000

Coordinator: Dr Manfred Weidmann
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CONTEXT AND OBJECTIVES

The control of Viral Hemorrhagic Fever (VHF) outbreaks depends critically on early detection and an early alert, so as to allow, define, and deliver an appropriate response. In order to improve this process, adequate tools need to be developed to enable early detection in the basic (field) conditions of local hospitals. Once the outbreak is identified, case management also needs on-site tools such as viral genome detection to contain the spread of the outbreak, by carefully identifying and monitoring viraemic patients able to transmit the virus. The general objective of the present project is to make adequate tools available, so as to identify VHF outbreaks on-site at an early stage, and to support and complement the control of an outbreak.

To reach this general objective, the project team will develop the following: line assays (LA) for antibody detection, as an easy to use frontline detection assay for healthcare workers in local hospitals; and fluorescent reverse transcription polymerase chain reaction (F-RT-PCR) assays to be used by specialised mobile outbreak investigation teams, that can be applied at the scene of the outbreak. Both assays will cover the following viruses: the Ebola virus (EBOV), Marburg virus (MRGV), Crimean-Congo virus (CCHFV), Lassa virus (LASV), Rift Valley Fever virus (RVFV), Yellow Fever virus (YFV) and Dengue virus 1-4 (DENV). The F-RT-PCR will additionally cover the most important viral differentials, Influenza A virus (FLUAV) and Influenza B virus (FLUBV).

ACTIVITIES

In order to develop LA, purified recombinant proteins will be expressed in the in vitro RTS-500 system (Roche), and sprayed onto immunoblot strips in the manner of a barcode. The LA will be designed for VHF circulating in Africa. Validation of the LA will be achieved by using available sera in the laboratory consortium, which will be centralised in a repository for VHF diagnostics development.

Existing F-RT-PCRs will be validated for field use (EBOV, MBGV 12, CCHFV 13, RVFV 14, DENV 15, FLUAV, FLUBV16). Additionally, F-RT-PCRs not yet described for LASV and YFV will be designed and validated for field use. To assess the sensitivity of each assay, RNA-standards will be generated for each aetiological agent derived from sections of the

respective genomes. The specificity of the assays will be evaluated with recent isolates of each aetiological agent and patient and/or rodent sample provided by the collaborating laboratories. The extraction of nucleic acids from blood samples will be adapted to field conditions. The development of lyophilised ready-to-use PCR mixes for each aetiological agent, will allow field PCR without the need for refrigeration facilities.

EXPECTED RESULTS AND OUTCOMES

In the case of LA, the production of the envisioned line assay is expected, and its applicability tested in local hospitals in Mali and Guinea. It is hoped that it will be proved that an easy-to-use frontline test is indeed a tool able to reduce alert time in the case of an outbreak. Furthermore, detecting either a YFV, RVFV, or LASV outbreak during the evaluation period, would be a positive outcome.

For the F-RT-PCR, the development of an integrated toolbox for mobile outbreak investigation teams, which will enable them to perform initial differential diagnostics and follow-up on patients during the containment of the outbreak, is anticipated. This will consist of a field-evaluated set of lyophilised PCR mixes for VHFV, plus FluA and B virus detection, in combination with a field-evaluated simple extraction protocol. If successful, it may be possible to produce the LA assay for the African market.

VHF Diagnostics

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CONTRAST

A multidisciplinary alliance to optimize schistosomiasis control and transmission surveillance in sub-Saharan Africa

Period: 01/10/2006 to 30/09/2010
Budget from EC: EUR 2 900 000

Coordinator: Thomas K. Kristensen
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CONTEXT AND OBJECTIVES

CONTRAST is a multidisciplinary research alliance focused upon technological innovation and provision of new knowledge to develop locally-adapted and sustainable intervention strategies, complementary with morbidity control using praziquantel (PZQ). CONTRAST is committed to creating a new and much-needed platform for integrated schistosomiasis control in Africa, which will be effective and sustainable at national and local level.

ACTIVITIES

CONTRAST is a multidisciplinary alliance bringing together key skills and expertise to generate new knowledge on biological, environmental, and socio-economic factors relating to schistosomiasis in sub-Saharan Africa. The project will complement ongoing chemotherapy campaigns based on the drug praziquantel and deliver more effective strategies for long-term control of this debilitating disease. The project addresses the basic need of endemic countries to improve understanding of schistosomiasis transmission, in order to target, and make best use of limited resources for control. CONTRAST will lead to better local control solutions that are more sustainable. Working with five European partners (established research institutes and a representative from the commercial sector), a strong research node network across sub-Saharan Africa will do the following: establish innovative molecular tools to characterise both snails and schistosomes; define the importance of host-parasite dynamics across different ecological and epidemiological settings; develop new spatial models for disease risk maps and prediction; encourage and assess novel local control interventions using a social science approach; and ensure widespread dispersal and access to information.

EXPECTED RESULTS AND OUTCOMES

A realistic contribution to solving problems will be achieved by placing a greater emphasis on integrated strategies appropriate to the specific, local settings necessary to cater to the focality and spatial heterogeneity of schistosomiasis. The benefits will be to identify the key biological, environmental, demographic, and socio-economic factors that maintain schistosomiasis at high levels of endemicity.

As such integrated control strategies provide additional evaluation indicators upon which success or failure can be tested, these will include:

- extensive description information of snail-schistosome relationship across endemic areas for disease transmission models;
- a DNA nomenclature to quantify the extent of genetic variation within snails and schistosomes from typical disease endemic environments, enabling associated changes following chemotherapy selective pressure to be assessed;
- measurement of changes in the levels of schistosome contamination in the environment through the use of novel molecular detection methods;
- field validation through parasitological surveys of spatial epidemiological models that aim to predict the distribution of schistosomiasis at local levels;
- information on the numbers of new people provided with clean water and adequate sanitation and its local effects upon schistosomiasis transmission;
- changes in local socio-economic status associated with schistosomiasis control through the use of interrogative questionnaire methods.

Dissemination of knowledge will be to identify target groups, specifically the international scientific and medical communities, as well as all health care stakeholders working with communicable tropical diseases in sub-Saharan Africa. Contribution to health policy standards will be made through representation of partners at the following organisations: the World Health Assembly Forum and WHO technical Expertise Groups, international medical and scientific conferences on international health, as well as at other key stakeholders meeting who have access to basket funds to provide health or associated services (e.g. Global Initiatives). Partners with CONTRAST will also liaise at national governmental level, providing advice on schistosomiasis control, and environmental quality and management, including governmental authorities and NGOs working within these sectors. In addition, partners will engage with the general public in endemic areas at selected field sites.

CONTRAST

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HEVAR

Herpesvirus-based Vaccines against Rotavirus infections

Period: 01/12/2006 to 30/11/2009
Budget from EC: EUR 1 539 999

Coordinator: Alberto Epstein, Université Claude Bernard Lyon 1

CONTEXT AND OBJECTIVES

HEVAR is a collaborative project involving four teams from Europe (France, Germany, Italy and Switzerland) and four from South America (two from Argentina, Brazil and Uruguay). Rotaviruses are the most common cause of severe diarrhoea in children, representing a major challenge for public health in South America, yet there are no efficient vaccines to fight them. Furthermore, there is a serious lack of knowledge regarding many aspects of the immune biology of rotaviruses that needs to be further investigated using innovative tools. It is also critical to develop alternatives to the classical anti-rotavirus vaccine approach, both to generate a deeper understanding and to explore the potential of novel vaccination strategies using gene vectors. The main objective of HEVAR is to contribute to a better understanding of the immune biology of rotavirus infections using gene transfer vectors derived from herpes simplex virus (HSV-1) to express rotavirus antigens, as a first step towards the development of HSV-1-based vaccines to combat these pathogens.

ACTIVITIES

HEVAR will develop two main activities: scientific research and transfer of knowledge and technologies. At the scientific level, the project will develop HSV-1-based vectors (from defective HSV-1 strains) expressing and/or displaying several antigens from human and mouse rotavirus. The vectors will be inoculated to mice via different routes and they will be used to evaluate protection after mouse rotavirus challenge. In addition, the project will also evaluate the protective potential of passive immunisation via the inoculation of pregnant mice and cows with vectors expressing mouse rotavirus antigens, to investigate whether newborn mice fed with milk from vaccinated animals are protected upon challenge. Lastly, the project will attempt to identify immuno-dominant epitopes from human rotavirus strains, using HLA-2 transgenic mice expressing human MHC class I molecules. The second activity of HEVAR will be the implementation of workshops, conferences, courses, and exchanges of HEVAR participants in order to spread the current and newly generated knowledge and technologies both in Europe and in South America.

EXPECTED RESULTS AND OUTCOMES

In addition to the research activities described above and their natural outcomes (scientific papers, communications, patents), the main deliverables of HEVAR will be a set of toolboxes containing a large collection of HSV-1-based vectors expressing human and mouse rotavirus antigens, which will be rendered accessible to any academic team wishing to use them for vaccine development or fundamental research on rotaviruses. Another set of deliverables will consist of a series of scientific meetings and events which will be mandatory to achieve the transfer of knowledge and technology required to generate, produce, and evaluate the HSV-1-based gene transfer vectors and vaccines in South America, thereby improving the human capital and the technological competence of these countries. In addition, the transfer from South American to European teams of up-to-date knowledge on the biology of rotaviruses and other endemic viruses in South America will strengthen the awareness and foster a better understanding of these neglected diseases.

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SHIELD

Strategies for health insurance mechanisms to address health system inequities in Ghana, South Africa, and Tanzania

Period: 01/10/2006 to 30/09/2009
Budget from EC: EUR 1 999 443

Coordinator: Prof. Diane McIntyre, University of Cape Town

CONTENT AND OBJECTIVES

This project will critically analyse the existing health system in Ghana, Tanzania, and South Africa to identify their major equity challenges. This will allow the project to consider alternative approaches to health insurance within these countries, as a mechanism for addressing health system equity challenges and in turn contributing to achieving the Millennium Development Goals. To achieve this principal objective, the distribution of the burden of health care financing between socio-economic groups and the factors influencing this distribution will be evaluated. The project will also evaluate the distribution of health care benefits across socio-economic groups and health system related factors that influence this distribution of benefits. Furthermore, current experience and options for the likely future development of health insurance mechanisms (particularly mandatory insurance and insurance for non-formal sectors) in and between Ghana, South Africa, and Tanzania will be identified and critically evaluated. Assessment of health insurance options will particularly focus on their actual and/or potential equity impact and their feasibility and sustainability given the attitudes and preferences of key stakeholders. Finally, the project will develop strategies and policy recommendations on health insurance mechanisms that will most appropriately address identified health system equity challenges.

ACTIVITIES

There will be five main activities in this project. First, existing national household survey databases, combined with information from tax authorities, will be analysed to determine the current distribution of financing between socio-economic groups. This will be supplemented by case studies in a sample of communities (household surveys, focus group discussions and key informant interviews) to explore factors influencing this distribution. The second activity will involve similar analyses of secondary data on the distribution of health care benefits and case studies in a range of health services (exit interviews, focus group discussions, and key informant interviews) to evaluate factors influencing this distribution. Third, in-depth interviews with key actors will be undertaken to determine their views and preferences in relation to health insurance options and the reasons for these views. The fourth main

activity will involve a combination of spreadsheet modelling to identify alternative health insurance designs that would best promote equity and financial sustainability and critical assessment of the feasibility of successfully implementing each option given actor preferences and their relative power in influencing policy processes. Finally, recommendations on the most appropriate health insurance options within each country will be developed in collaboration with policy-makers.

EXPECTED RESULTS AND OUTCOMES:

This research will identify health insurance designs in each of the three African countries that are most likely to promote overall health system equity and be successfully implemented, given stakeholder preferences and ability to influence policy design and implementation. More particularly, it will consider in some detail health insurance design options, which will assist policy-makers in each country in identifying the most appropriate route for future health insurance development. This research will be innovative in its exploration of the system-wide implications of health insurance and its development of innovative tools and methods that will be made available to other groups to use.

A recent World Health Assembly resolution on universal coverage and social health insurance, called for the development of 'methodologies better to measure and analyse the benefits and cost of different practices in health financing, covering collection of revenues, pooling and provision or purchasing of services, taking account of economic and sociocultural differences'. This project promises to make a major contribution in this regard, particularly insofar as it covers the entire process involving the identification of existing health system equity challenges as well as the identification and evaluation of health insurance options and likely implementation challenges.

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SavinMucoPath

Novel Therapeutic and Prophylactic Strategies to Control Mucosal Infections by South American bacterial strains

Period: 01/10/2006 to 30/09/2009
Budget from EC: EUR 1 699 908

Coordinator: Jean-Claude Sirard
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médicale (INSERM)

CONTEXT AND OBJECTIVES

Enteric and respiratory diseases remain a leading cause of mortality worldwide. This project focuses on bacteria that colonise enteric and respiratory mucosa and that are of major importance for public health in Latin America. The bacteria *Streptococcus pneumoniae*, *Salmonella enteritidis*, and *Bordetella pertussis* are associated with significant rates of morbidity and mortality, especially in young children and low socio-economic status individuals. These infectious strains are unique to Latin America, and the scientific community has neglected development of specific therapies and vaccines.

The main objectives are to improve the understanding of the host-pathogen interaction and to develop novel mucosa-specific therapeutics and vaccines to control bacterial infections. The project strategies are based on the exploitation of innate defence mechanisms triggered by pathogen conserved molecules.

ACTIVITIES

Innate defences are up-regulated at mucosal sites upon detection of conserved microbial molecules and contribute both to the immediate barrier function to mucosal colonisation and the long lived antigen-specific mucosal immune responses. Bacterial strains will be studied in an experimental animal mucosal infection model to:

- characterise the innate mechanisms of early elimination of pathogens and the concomitant mechanisms of induction of mucosal adaptive immunity;
- define the proof of concept using the model molecule — flagellin, that is known to activate mucosal immunity;
- identify novel mucosa-specific pathogen molecules with biological activities on mucosal innate and adaptive immunity using purified bacterial components and screening on cell and animal models.

EXPECTED RESULTS AND OUTCOMES

The project team expects to identify molecules from selected bacteria that activate specifically protective mucosal innate immunity to block the infections at the port of entry of bacteria and stimulate antigen-specific responses through mucosa.

SavinMucoPath will develop cell and rodent models for high throughput screening of pathogen components to ultimately bring candidate experimental immuno-interventions against enteric and respiratory infections to clinical trials within FP7, a priority of the World Health Organization.

SavinMucoPath

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SCOTT

Sustainable Control of Onchocerciasis Today and Tomorrow

Period: 01/11/2006 to 31/10/2010
Budget from EC: EUR 2 800 000

Coordinator: David William Taylor, University of Edinburgh

CONTEXT AND OBJECTIVES

The purpose of this project is to improve sustainable control of onchocerciasis (river blindness) through refinement of existing chemotherapeutic regimes and identification of new targets and approaches for integrated control that will combine chemotherapy with vaccination. The demand for these studies comes from:

- the need to control re-emergence of onchocerciasis in regions where transmission had been interrupted;
- indications consistent with the emergence of ivermectin resistance;
- concern about adverse side reactions following ivermectin treatment in loiasis endemic areas.

There are three primary objectives:

- research into refinement of existing chemotherapeutic regimes by use of doxycycline to complement ivermectin treatment and further screening of existing drugs;
- assessment of immunological sequelae of ivermectin intervention and their implications for improved control strategies;
- identification of new targets, including vaccine candidates, and approaches for integrated control.

As doxycycline is already licensed for human use, combination therapy with ivermectin for selected indications (not mass treatment) will deliver short-term impact while providing a framework for the longer term vision of integrated chemotherapy-vaccine control of onchocerciasis.

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NEUROTRYP

Biology and clinical staging of trypanosome neuroinvasion in sleeping sickness

Period: 01/10/2006 to 30/09/2009
Budget from EC: EUR 1 700 000

Coordinator: Krister Kristensson, Karolinska Institutet

CONTEXT AND OBJECTIVES

The NEUROTRYP project foresees a highly integrated investigation of sleeping sickness or human African trypanosomiasis (HAT). This is a neglected but re-emerging disease in sub-Saharan Africa. HAT develops into an early haemolympathic and a subsequent encephalitic stage, during which the causative parasite *Trypanosoma brucei* and/or increased numbers of lymphocytes are found in the cerebrospinal fluid. Arsenic compounds are still the drugs of choice for treatment at the encephalitic stage, but they are associated with severe and often fatal side-effects. Drug resistance also poses a serious problem. There are important gaps in knowledge concerning the following: the mechanisms by which trypanosomes invade the brain; when, post-infection, such invasion occurs; and the effects of drugs on trypanosomes that have invaded the brain parenchyma. Therefore, the objective of the NEUROTRYP consortium is to discover molecules that may be considered as markers for an effective staging of HAT, and design new therapies by using drugs which have already passed clinical trials in humans for other indications.

ACTIVITIES

In order to discover mechanisms of parasite neuroinvasion and thereby devise candidate diagnostic markers for an effective staging and new therapeutic management of HAT, the NEUROTRYP project plans to pursue the following activities:

- identify candidate biomarkers for this event, for diagnostic tools to be used in therapeutic decisions and cure assessment;
- investigate the therapeutic potential of new low-toxicity drugs already in use for other diseases, which can interfere with trypanosomes that are invading or have invaded the brain;
- determine clinical, immunological, and neurophysiological parameters that correlate to trypanosome neuroinvasion, as well as therapeutic windows for drugs to clear trypanosomes from the brain;
- strengthen the research capacity of African investigators by providing transfer of technology to and training for junior investigators, especially African scientists; also to develop expertise on HAT and other neuro-inflammatory diseases, which plague the African continent.

EXPECTED RESULTS AND OUTCOMES

The research will provide new knowledge on the biology, epidemiology, and the technologies relevant to sustainable surveillance systems of HAT on a regional scale. In addition, it will provide information with the intention of improving the existing treatment of sleeping sickness. Once established as robust, such technologies can be incorporated into national laboratories and regional reference centres. By including five African and three European partners, the project will provide a basis for the development of a strong and durable partnership, with extensive interaction and exchanges between African and European countries. In particular, NEUROTRYP expects to do the following:

- provide a rationale to develop improved diagnostic tools for disease staging and cure assessment;
- strengthen the research capacity of African students and institutions, and establish durable collaboration between European and African laboratories;
- devise, as an ultimate benefit, therapeutic strategies whereby drugs may be designed to inhibit and cure trypanosome neuroinvasion, which is the most serious complication of African trypanosomiasis.

NEUROTRYP

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AUDOBEM-AFRO

Effectiveness of facility-based audits to improve the responsiveness of West African district hospitals to obstetric emergencies: a three-country cluster randomised controlled trial

Period: 01/01/2007 to 31/12/2010
Budget from EC: EUR 2 999 979

Coordinator: Matthias Borchert
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CONTEXT AND OBJECTIVES

Identifying and implementing sustainable interventions to improve the quality of hospital care in sub-Saharan Africa is challenging. Maternal and perinatal mortality ratios stagnate at a high level and improving hospitals' responsiveness to obstetric emergencies is thought to be an important potential contribution to decrease in mortality. The World Health Organisation (WHO) has launched an initiative to promote a range of quality assurance strategies, including several types of facility-based audits. While audits certainly hold promise, the evidence for their effectiveness is mixed. All randomised controlled trials of audits have been undertaken in industrialised countries, but the effectiveness of health services intervention is likely to vary according to context.

ACTIVITIES

The project plans to carry out a cluster-randomised, controlled trial in West African district hospitals to assess the effectiveness of two types of facility-based audits: criterion-based clinical audits (CBCA) and patient-centred case reviews (PCCR). WHO guidelines on the management of obstetric complications and enhanced routine documentation, including the WHO partograph, will be introduced in all 36 participating hospitals, while CBCA or PCCR will be set up in 12 hospitals each. The primary outcome variable is a responsiveness score, designed to measure technical and organisational management of obstetric emergencies. Additional outcome measurements include the delay between decision and start of emergency caesarean section, and hospital-based perinatal mortality. A concurrent anthropological study will improve our understanding of how audits work - or why they fail - and identify barriers and facilitators for their successful integration into routine practice. An economic evaluation will assess the cost-effectiveness of both interventions.

EXPECTED RESULTS AND OUTCOMES

The randomised controlled trial will provide robust evidence on the effectiveness of the two types of facility-based audits introduced by the WHO in first-line referral hospitals in resource-poor African countries. Such evidence will guide policy makers and implementers in deciding whether to adopt one of these two interventions as a quality improvement

strategy. The anthropological study will contribute to an understanding of how audits can affect change, or why they fail to do so. Thus, future audit programmes may learn how to avoid pitfalls and how to create conditions conducive to successful audits. The economic evaluation of the audit interventions will inform us about the economic viability of facility-based audits in first-line referral hospitals. If both audit types are shown to be effective, information on their cost-effectiveness will help policy makers choose between them.

The project is expected to contribute to maternal and neonatal survival and wellbeing by providing evidence that will guide policy makers on how good quality in obstetric care can be achieved and maintained. It will also contribute to capacity building in public health research in the partner countries.

AUDOBEM-AFRO

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GHIs in Africa

Experience of African countries with global health initiatives

Period: 01/11/06 to 31/12/2010
Budget from EC: EUR 3 199 531

Coordinator: Wim van Damme
Prince Leopold Institute of Tropical Medicine

CONTEXT AND OBJECTIVES

The past five years have witnessed a proliferation of global health initiatives (GHIs) which have emerged as an alternative to traditional and multilateral health development funding. GHIs are widely seen as an efficient and rational response to global health threats, yet little is known about how the shift from traditional approaches has impacted health systems in recipient countries. The general objective of the research is to understand how the rise of the GHIs has impacted the architecture of development partnerships and national-level health system management functions in four south African countries. The specific objectives of the research are:

- to assess the impact of GHIs and donor dependency on country-level decision-making and planning processes;
- to assess the impact of GHIs on country human resource policies, deployment, and effectiveness, and/or competition for human resources for programme planning, management, and service delivery;
- to evaluate how the proliferation of GHIs has influenced the within-country praxis of development assistance for health and;
- to identify best practices to integrate new GHIs within existing partnerships and country systems in a way that improves the coherence of development assistance and the coordination and efficacy of the health system.

ACTIVITIES

A document and literature review will be conducted to ensure that research undertaken complements and clarifies existing evidence, both nationally and internationally. The qualitative research methods will help us understand what these initiatives are and how they function in each country. On this basis lessons can be extrapolated from national experiences into international recommendations. The project will also organise expert meetings for partner discussions, methodology development, and exchanges with policy-makers.

EXPECTED RESULTS AND OUTCOMES

The project will close the knowledge gap by contributing information on the evolution and effectiveness of GHIs, typology of donor harmonisation initiatives, the extent and effect of integration in national planning of sub-Saharan countries, the impact on human resources and the performance of health workers. The expert meetings create opportunities to mobilise regional and national stakeholders for discussions and inform them of research findings in order to clarify relevant policy implications and action plans. The project will strengthen the interaction among research partners in Europe and Africa, and representatives of key international organisations (for example, the European Commission, WHO-Geneva, WHO-Africa, NEPAD, SADC, and country WHO offices).

GHIs in Africa

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ASSIST

Comprehensive approach to understand streptococcal diseases and their sequelae to develop innovative strategies for diagnosis, therapy, prevention and control

Period: 01/01/2007 to 31/12/2009
Budget from EC: EUR 1 475 000

Coordinator: Prof. G. S. Chhatwal
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CONTEXT AND OBJECTIVES

The disease burden of group A streptococcal (GAS) infections worldwide is extremely high. More than 600 million persons, mostly children, suffer from streptococcal pharyngitis each year. There are 600 000 cases of invasive disease. More serious are the sequelae of these infections in the form of acute rheumatic fever and rheumatic heart disease. About 15 million children are suffering from rheumatic heart disease, out of these, 6 million in India alone. Streptococcal diseases can be considered as one of the most important groups of neglected communicable diseases in India. The best perspective for controlling this disease is to develop a fast diagnostic test for rheumatogenic streptococci and to develop a region-specific vaccine against group A streptococci. Data on the epidemiology of all GAS diseases, the characterisation of the circulating strains in different regions of India, determination of genetic predisposition markers in different ethnic populations of India, and immunological data to identify region-specific vaccine candidates are urgently needed. The major objective of this project is to pull together such information in a comprehensive way which will then form the basis of a novel diagnostic test for rheumatogenic streptococci and for the identification of candidates to develop a region-specific vaccine using state-of-the-art technologies already established in Europe.

ACTIVITIES

The objectives will be achieved by setting up school health surveys and streptococcal disease registries in two different parts of India representing different ethnic populations. Besides getting information on the nature of circulating streptococcal strains in two different areas of India, the study will also address the genetic susceptibility towards these infections in two different ethnic populations. The virulence gene repertoire amongst GAS isolates from two districts of India will be surveyed using a custom designed virulence DNA array. Recently, it has been proposed that human collagen plays a key role in the induction of rheumatic fever. Therefore, all strains collected during the above-mentioned survey will be tested for collagen binding to validate its involvement. The collagen-binding factors in the Indian strains will be identified. The interaction between collagen and its streptococcal binding partner(s) will then be

characterised using biophysical techniques, mainly nuclear magnetic resonance (NMR) spectroscopy. Identification of the sites involved in both collagen and the streptococcal receptor(s) and their binding mechanism is valuable information that will form the basis of a fast diagnostic test, preferably based on latex bead agglutination. Moreover, sera from cardiologically confirmed cases of rheumatic fever and rheumatic heart disease will be tested for anticollagen antibodies. With the aim to identify candidates for a specific regional vaccine, collected sera will be analysed using protein arrays. These will then be tested for their efficacy and safety in mouse infection models.

EXPECTED RESULTS AND OUTCOMES

The results of the project, especially the development of a fast and inexpensive diagnostic kit to identify rheumatogenic streptococci and the identification of regional-specific candidates to develop a prototype vaccine, will be disseminated and used for control strategies. It is also planned to patent the usable results by utilising the services of a professional patent attorney. The members of the consortium have been involved in a number of relevant national and international projects. The results of the project will be presented at national and international conferences and will be submitted for publication in reviewed journals. Besides the standard channels for publicity of scientific results, ASSIST will also pursue the circulation of data to key target groups, such as health protection agencies, the pharmaceutical industry, medical councils, academia, and the general public. Although two geographically different areas with distinct ethnic populations are the focus of the study, the results are likely to be extrapolated to other regions. This is an ambitious project, the outcome of which will help improve the control of streptococcal diseases in India.

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SCHISTOINIR

Innate Immune Responses and Immunoregulation in Schistosomiasis: Novel mechanisms in the control of infection and disease

Period: 01/11/2006 to 31/10/2009
Budget from EC: EUR 1 999 312

Coordinator: Dr Adrian Mountford, University of York

CONTEXT AND OBJECTIVES

Chronic helminth infections, such as *Schistosoma* sp., can cause immune down-regulation through long-term, repeated stimulation of the innate immune system. This follows the binding of parasite molecules to a limited number of innate receptors, leading to changes in the innate immune system that dictate whether the development of an adaptive immune response is stimulated or regulated. This aspect of the immune system represents a novel route to exploit in the development of future control measures.

The project team has four main objectives:

- define innate immune responses in patients infected with schistosomes that are associated with down-regulation of acquired immune responses, or conversely, the development of pathology;
- characterise and manufacture the parasite-derived immunoregulatory molecules;
- use these molecules to manipulate protective immune responses and immunopathology;
- aid existing control programmes by using epidemiological and geographic data gathered in the field.

ACTIVITIES

The following activities will be carried out under the SCHISTOINIR project:

- investigate differences in the innate immune response, specifically of innate receptors and their downstream events, in groups of infected patients in three different endemic regions that have contrasting histories of infection and pathology:
 - i). Recent infection with *S. mansoni* and/or *S. haematobium*, evident in northern Senegal;
 - ii). Chronic *S. haematobium* infection but no history of treatment, evident in the Lambarene region, Gabon;
 - iii). Chronic *S. haematobium* infection and current mass treatment, evident in the Volta region, Ghana. These studies will be guided by more detailed investigations of the innate responses in experimental murine models of infection;
- glycan structures on molecules released from the schistosome parasite are likely to be important candidate ligands of host innate receptors and so will be characterised, isolated, and synthesised;

- isolated molecules will be tested using human in vitro assays and in vivo model systems, to identify those molecules with the greatest capacity to enhance or regulate immune responsiveness
- existing public health programmes will be assisted by Geographic Information Systems (GIS) that will be set up to incorporate both epidemiological and immunological data. A comprehensive GIS will allow the project team to identify spatial components of clinical data on innate immune parameters. The technology will help local teams involved in control programmes, and provide novel insights into the spatial dynamics of immune responses never studied before.

EXPECTED RESULTS AND OUTCOMES

The potential impact of the project is the improved effectiveness of control programmes i.e. drug-treatment and putative anti-schistosome vaccines, or alternatively the promotion of immunoregulatory networks in individuals with severe morbidity e.g. in patients with hepatosplenic disease. It will upgrade control standards by introducing GIS into teams active in endemic regions where it has not yet been applied. Inherent to the specific objectives will be the strengthening and development of the research capacity of scientists in endemic regions which will aid the training of EU researchers therein.

Data will be submitted for publication in high impact, peer-reviewed journals to ensure public accessibility of the project findings. Dissemination of results via international conferences and meetings is considered of great value. One likely project outcome will be the isolation of parasite molecules with immunoregulatory activity. This will be of major interest to those in the pharmaceutical industry wishing to develop novel strategies in the control of autoimmune and allergic disorders, therefore applications for patents will be filed for any discovered molecules.

SCHISTOINIR

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TRANCHI

T cell Regulation and the Control of Helminth Infections

Period: 01/10/2006 to 30/09/2009
Budget from EC: EUR 1 950 000

Coordinator: Prof. R. M. Maizels, University of Edinburgh

CONTEXT AND OBJECTIVES

Helminth infections are among the most neglected communicable diseases afflicting developing countries. Pharmacological treatments are compromised by rapid re-infection, variable compliance, and emerging resistance. Vaccination has not yet succeeded in evoking strong resistance. The critical question in helminth control remains why the immune system fails to clear parasites, which may be due to the presence of a newly-identified cell type, the Regulatory T cells (Treg). By studying this fundamental issue, the aim of the project team is to develop a novel route to promote host immunity and achieve immunological cure. The specific objectives are to:

- profile the type and functions of Tregs in filariasis and schistosomiasis infected humans;
- compare Treg activity in patient groups of differing infection status or levels of pathology;
- establish if polymorphisms for regulatory genes are linked to Treg profiles in humans;
- demonstrate the role of Tregs in helminth-associated hyporesponsiveness;
- test whether neutralisation of Tregs restores immune responsiveness in human cells;
- test whether neutralisation of Tregs restores immunity to infection in animal models;
- characterise human Treg gene expression and TCR usage;
- assess community and health system issues for new immunological interventions.

ACTIVITIES

The project contains seven well-defined work packages involving close collaboration between project partners in three EU Member States and four developing countries:

- recruitment and clinical assessment of study populations in helminth-endemic areas;
- profiling by flow cytometry the Treg populations in infected and uninfected subjects;
- testing the functional role of Tregs in an animal model of helminth infection;
- developing technology for genetic and molecular characterisation in an endemic country-practical manner;

- detailing the gene expression and TCR profile of Tregs from infected subjects;
- genotyping study population for regulatory gene polymorphisms;
- social science research on opportunities and obstacles for new immunological interventions.

EXPECTED RESULTS AND OUTCOMES

The project will have the following outcomes:

- a database of three cohorts of patients containing all clinical and parasitological data required for the project analyses;
- an understanding of the relationship between Treg activity and infection status, intensity and pathology in the two major tropical helminth diseases, filariasis and schistosomiasis;
- testing the hypothesis that Tregs maintain helminth infection in animal model systems;
- ini-gene array for expression analysis of genes associated specifically with Tregs;
- simple, accurate and high throughput genotyping that is user friendly;
- molecular gene expression profile of Treg cells;
- TCR usage and antigen specificity of Treg cells;
- a comprehensive analysis of the extent and patterns of polymorphisms in regulatory genes in Indian, Indonesian, and African populations;
- appraisal of perceptions and attitudes towards new immunological interventions.

TRANCHI

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YOLAMI

Young Labour Migrants in Chinese Cities: A demonstration-intervention project to address barriers to health care and promote their sexual and reproductive health.

Period: 01/11/2006 to 31/12/2009
Budget from EC: EUR 1 169 376

Coordinator: Marleen Temmerman, Ghent University

CONTEXT AND OBJECTIVES

The economic boom in China provoked a huge demand in manpower, mostly in the east-southern part of the country. In 2000, the Government of China reformed the household registration system to encourage labour mobility, resulting in large-scale migration of the rural population. The number of internal migrants is currently estimated at 140 million. Migrants are younger than resident populations and lower educated. Former studies demonstrated poorer health indicators in migrants with higher rates of induced abortion, lower rates of contraceptive use, and a higher maternal mortality rate. In some cities, the maternal mortality rates among migrants are higher than in the rural areas of China.

The proposed research will study determinants of access of young migrants to care and to health information. Comparisons with resident young workers will allow risks attributed to the migrant status to be assessed. The research will further focus on how the public and private services, including existing health facilities in larger factories, address the health needs of young migrant workers. In a second step, strategies to improve health service delivery and information to the migrants will be developed through interactive discussions between beneficiaries and public or private stakeholders, using the workplace as an entry point. These strategies will take into account specific characteristics of the labour migrants such as working schedule, gender, ethnic and equity issues. The third step consists in implementation of these strategies through local interventions aiming at improve the access of young migrants to reproductive health services. These projects will mobilise the working unit, health services and target population. The final step consists in the evaluation of the interventions, the discussion of results with the different actors, the definition of recommendations to optimise service delivery to the target group and the dissemination of results.

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PILDU

Emergency contraception: a means to improve reproductive health in West Africa?

Period: 01/01/2005 to 30/06/2008
Budget from EC: EUR 2 348 000

Coordinator: Nathalie Bajos, Ph. D,
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OBJECTIVES

Progesterone-only emergency contraception (EC) is currently being introduced in West Africa, and could represent an efficient means towards the reduction of unwanted pregnancies and unsafe abortions. The general objective of this research is to fill a gap in existing knowledge by understanding the potential role of EC in improving couples' sexual and reproductive health in that region. Postulating that EC use is embedded in the articulation of conflicting social logics which depend simultaneously on reproductive and sexual norms, gender relations, and client-provider relations, our specific objectives are to study the following, in the context of West Africa:

- the accessibility of EC;
- its acceptability by women, men, and providers;
- the situations in which its use is particularly adapted;
- the specific obstacles to its utilisation;
- its place in regard to the other fertility regulation practices.

The study will be conducted in Burkina Faso, Ghana and Senegal. Morocco is included in the study design to test whether the success of EC depends on pre-existing widespread contraceptive use: we focus on the capitals of the countries where the supply of contraceptives is the most diverse and the demand for EC is also likely to be the most important.

ACTIVITIES

To assess the accessibility of emergency contraception, we will identify its diffusion channels and collect information from providers. We will conduct a qualitative study (in-depth semi-directive interviews with women, men, providers, and health policy makers in reproductive health care) to analyse the acceptability of emergency contraception, the situations in which its use is particularly adapted, the specific obstacles to its utilisation, and its place in regard to other contraceptive methods. To study the situations in which EC may be particularly adapted, we will supplement the qualitative analysis by a secondary analysis of surveys at national level. We will quantify the potential demand for emergency contraception (women's socio-demographic variables, knowledge, use, and access to modern contraceptives), and study in more detail the interaction between unmet

needs and contraceptive supply. Finally, using the results of the qualitative analysis, we will elaborate a questionnaire section on the use and determinants of EC to be introduced in future reproductive health surveys, and the questionnaire will be tested.

EXPECTED RESULTS AND OUTCOMES

These three levels of research will be synthesised at the end of the project: the quantitative approach will help identify the socio-demographic characteristics of potential EC users, and thus allow for a definition of the target of new contraceptive policies. The results of the qualitative and health system approaches, by identifying obstacles to EC use, the situations in which its use is particularly adapted, its place in regard to other fertility regulation practices, and the health system strategies more adapted to its diffusion, will help design the content of these policies. Using these results, the research team, in interaction with reproductive health policy makers and other stakeholders in the field of reproductive health, will elaborate a set of programmatic guidelines on the diffusion of emergency contraception in the West African region.

This project will be conducted in collaboration with a local stakeholders' committee composed of the main stakeholders in the field. This committee will give its input throughout the project, and prepare policy recommendations with the researchers at the end of the project. Different dissemination actions will also take place at the end of the project, targeted towards policy makers and other stakeholders, as well as the general and academic publics. This project will moreover train one PhD student in reproductive health in each study country.

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PAFP CHINA

Post Abortion Family Planning in China: a demonstration-intervention project to increase contraceptive use and to reduce unwanted pregnancies and induced abortions

Period: 01/01/2005 to 31/12/2007
Budget from EC: EUR 906 401

Coordinator: Prof. Dr Marleen Temmerman
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CONTEXT AND OBJECTIVES

Ten million induced abortions are performed yearly in China, one half resulting from contraceptive failure, and the other half from non-use of contraception. Of these, 30% are repeated abortions.

Post-abortion family planning (PAFP) — an effective strategy to reduce repeated abortions — receives poor attention in Chinese abortion clinics. This project assumes that the proportion of repeated abortions can decrease with the provision of good quality PAFP services integrated in abortion clinics. To test this hypothesis, the project proposes the following:

- to compare minimal and comprehensive packages of services provided by abortion clinics, and to study the effects of integrating these services;
- to analyse different factors related to the quality and use of services, including the behavior and/or knowledge of providers and various determinants among women;
- to design a cost-effective model of provision of PAFP.

ACTIVITIES

The initial hypothesis will be completed through a literature review.

The determinants of access to and use of services will be studied through a Knowledge-Attitude-Practice (KAP) survey among providers, and in-depth interviews among women attending the clinics. These qualitative surveys will be repeated at the end of intervention as a 'before/after' analysis, with special attention to the family planning practices among women.

The abortion clinics will be randomly divided in two groups, to develop either a minimal or a comprehensive package of PAFP services. The results of both groups will be compared through a basic data collection system, and the measure of adherence to family planning six months after the abortion. The integration process will be analysed during the intervention, in terms of feasibility and acceptability for providers and users. Finally, two workshops will be organised in China to coordinate activities, research protocols, data diffusion, and policy recommendations.

EXPECTED RESULTS AND OUTCOMES

A better adherence to family planning methods is expected among beneficiaries of comprehensive family planning (FP) services in abortion clinics. This should decrease the proportion of repeated abortions, and therefore preserve the health status of the women.

If proven effective, integrated FP services in post-abortion clinics should be standardised, thus contributing to national standards. Some family planning strategies could also be revised. For example, FP programs traditionally target married women, but should better integrate high-risk unmarried adolescents.

Research gaps still exist regarding international studies on post-abortion care, including follow up, cost-effectiveness, operational research (in Asia), and women's perception or provider barriers. This intervention-study could contribute to fill in these gaps.

PAFP CHINA

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POVILL

Protecting the rural poor against the economic consequences of major illness: A challenge for Asian transitional economies

Period: 01/10/2005 to 30/09/2009
Budget from EC: EUR 2 569 955

Coordinator: Gerald Bloom, University of Sussex

CONTEXT AND OBJECTIVES

Major illness has become an important cause of household impoverishment in China, Cambodia, and Laos. Their governments have made this a priority issue. This project was designed to inform government action aimed at protecting poor households against the economic consequences of major illness. This will be accomplished by generating relevant knowledge, strengthening the capacity of national research institutes to carry out multidisciplinary research, and contributing to national, regional, and international debates. The project will generate new knowledge in the following areas: how different types of illness affect diverse households; the performance of innovative health safety-net schemes; the impact of inappropriate drug use on the cost of care, and strategies to reduce this impact; and the processes whereby evidence of the impoverishing effect of illness is translated into policy and changed practices.

ACTIVITIES

The project will begin with consultations with policymakers, and with a series of activities aimed at developing innovative, multidisciplinary approaches. The data collection will include in-depth interviews with poor families, studies of pharmaceutical use, assessments of schemes, and studies of policy formulation and implementation. The project will organise workshops and academic exchanges to strengthen the research team; each country team will establish close links with policymakers. The project will also support exchange visits amongst policymakers, and towards the end, it will organise national workshops and a regional meeting. The project will formulate and implement a communications strategy that includes publications and electronic information systems, to ensure wide sharing of results.

EXPECTED RESULTS AND OUTCOMES

The project will generate knowledge relevant to the formulation and implementation of policies to protect the poor in the three study countries. It will involve policymakers at every stage, to ensure that the findings are used. POVILL will be undertaken jointly by institutions with expertise in health systems and social science, with the aim of establishing new kinds of research partnerships. The project will promote learning between Asian transitional economies through the establishment of a regional network of researchers and policymakers. It will disseminate the findings internationally, and contribute to efforts to devise effective strategies to mitigate the impact of major illness on poor households.

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DENCO

Towards successful dengue prevention and control

Period: 01/11/2005 to 31/10/2008
Budget from EC: EUR 2 499 779

Coordinator: Dr Thomas Jaenisch, University Hospital Heidelberg

CONTEXT AND OBJECTIVES

An alarming global spread of dengue disease has been ongoing in the last decades, with a substantial social and economic burden to individuals and their societies. This mosquito borne disease is a major threat to public health throughout South-East Asia and Latin America.

Specific objectives of the DENCO project are:

- to generate new knowledge regarding the association between virus properties and the clinical spectrum of disease;
- to clarify the clinical distinction between mild and severe dengue by developing an evidence-based prospectively generated classification scheme, to develop and test clinical management guidelines, and hence reduce morbidity and mortality;
- to test novel vector control tools (long-lasting insecticide treated curtains and/or water container covers and/or slow-release insect growth regulators) which can sustainably reduce vector densities below epidemic threshold levels;
- to assess key strategies which can deliver new vector control approaches with respect to their cost-effectiveness, acceptability, and sustainability in contrasting environments; and
- to assess and document the timely translation of research findings into policy and practice.

ACTIVITIES

The five work packages related to these objectives have been designed by a multidisciplinary team of scientists from disease endemic countries in South-East Asia, Latin America, and from Europe. Basic research components, clinical research, and implementation research mutually benefit each other. Clinical studies will take place prospectively in a number of hospitals in South East Asia and Latin America. Vector control research and implementation will take place in Thailand and Venezuela. In carefully planned and conducted workshops, the data collected from the individual participating countries will be brought together, shared, and analysed.

EXPECTED RESULTS AND OUTCOMES

The expected results of this project can be summarised as follows:

- viral and host determinants contributing to the pathogenesis of disease will be identified through the correlation of disease progression, DV genetic markers, and human immune factors.
- the case classification for dengue disease will be improved and clinical management guidelines reviewed.
- the efficacy of novel vector control methods will be demonstrated.
- acceptability, sustainability, cost, and effectiveness for implementation of different vector control tools will be determined and the superior strategy/strategies will be identified.
- approval of revised dengue classification/case management and inclusion of the new vector control methods into modified guidelines by WHO Regional Offices and Headquarters will be facilitated.

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REACT

Strengthening fairness and accountability in priority setting for improving equity and access to quality health care at district level in Tanzania, Kenya and Zambia

Period: 01/01/2006 to 31/12/2010
Budget from EC: EUR 1 770 000

Coordinator: Jens Byskov
Institute for Health Research and Development
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CONTEXT AND OBJECTIVES

Health systems in many low income countries are strangled in a vicious circle: management capacity is perceived as too insufficient to be given full responsibility for priority setting. However, without effective decentralisation of the priority setting process, the capacity will never increase.

This project aims to improve health and health care through the application of new approaches to fair and accountable priority setting in order to achieve a provision of quality health care at district level that is accessible and affordable to poor people in Tanzania, Kenya, and Zambia.

The interventions study will:

- apply new approaches to fair and accountable priority setting involving all relevant stakeholders, including the users;
- evaluate changes in processes and outcomes within the domains of management, human resources; generalised care, HIV/AIDS control, emergency obstetric care, and malaria control, focusing on quality, equity, and accessibility of services;
- disseminate the most effective priority setting approaches to health policy- makers and managers for integration into policy.

ACTIVITIES

The project will introduce and apply the accountability for a reasonable priority setting tool in a selected district in each of the three study countries. This will be done via a wide participatory process between all of the partners in the consortium and other relevant stakeholders. Indicators will be selected and applied for evaluating intervention effects on quality, equity, and trust.

Evaluation will be done in both contextual, horizontal, and disease-specific service domains. This will cover the management capability for priority setting at district level based on relevant management elements. Evaluation will also cover the relevance of cultural and social institutions as determinants of the decision-making process and assess the effect on quality, equity, accessibility, and trust in relation to the following:

- HIV/AIDS prevention, treatment, and care; emergency obstetric care; malaria prevention, treatment, and care;
- generalised, horizontal care; and human resources performance.

EXPECTED RESULTS AND OUTCOMES

Sub-study results will be the basis for evaluation of policy relevance of overall study outcomes. The study anticipates far-ranging, sustainable improvements in health system performance in resource-poor countries.

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DENFRAME

Innovative diagnostic tools and therapeutic approaches for dengue disease

Period: 01/11/2005 to 01/11/2008
Budget from EC: EUR 2 550 000

Coordinator: Laurence Baril, Institut Pasteur, Paris

CONTEXT AND OBJECTIVES

The main aim of the DENFRAME project is to improve the management of dengue

disease in the human populations of Latin America and Asia. Dengue has emerged as the most important vector-borne viral disease in tropical areas. The four serotypes of dengue virus (DV) each cause human disease and are transmitted by *Aedes* mosquitoes. Epidemics with a high frequency of a severe, life-threatening illness known as dengue hemorrhagic fever (DHF) continue to expand geographically. The disease burden is estimated to be up to a hundred million cases every year, including over 500 000 cases of DHF and about 25 000 fatal cases, mainly in children under the age of fifteen. Despite the increased health and economic impact of dengue, there are as yet no specific preventive or therapeutic interventions. There is an urgent need for reliable, rapid diagnostic and new therapeutic tools for people at risk of DV infection.

The scientific objectives of the Denframe consortium are as follows:

- development and implementation of new diagnostic tools using ligand binding molecules and chemiluminescent biosensor techniques;
- comprehensive approach of innate immune response to dengue virus infection;
- development of lead compound inhibitors of dengue virus replication.

ACTIVITIES

The Consortium will be made up of a framework of 13 partners: four based in Asia, five in Europe, and four in Latin America. The project will include two complementary work programmes. The first one concentrates on the standardisation and validation of the current diagnostic assays, the development of new diagnostic tools (including biosensor technology), and the implementation of procedures to validate these new diagnostic tools. A key component of this work programme is the collection of field strains of DV associated with well-characterised clinical data and biological samples. The second work programme aims to develop an integrated approach toward understanding the DV-host interaction that focuses on key components of innate immunity to DV infection, and to identify potential therapeutic agents (small molecule inhibitors). To identify

lead compounds with anti-DV activity, two existing libraries will be used for screening: one based in Europe and one in Asia (compounds isolated from the Chinese traditional medicine).

EXPECTED RESULTS AND OUTCOMES

The tasks will be carried out by the concerted efforts of the different groups with complementary skills and experience. Achievement of the stated goals will require a multi-disciplinary approach integrating the following disciplines: medical virologists, clinicians, epidemiologists, flavivirologists, molecular and cellular biologists, specialists in proteomics, immunologists, medicinal chemists, specialists in drug discovery, and specialists in physiopathology. This multidisciplinary strategy will establish the framework to implement new diagnostic tools and test future therapeutic molecules, and represents a critical new collaborative approach that will underpin on-going efforts to combat this major public health problem.

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MUSTSCHISTUKEMA

Multi-disciplinary studies of human schistosomiasis in Uganda, Kenya and Mali: New perspectives on morbidity, immunity, treatment and control

Period: 01/09/2005 to 31/08/2009
Budget from EC: EUR 1 500 000

Coordinator: Dr Birgitte Jyding Vennervald
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OBJECTIVES

The project will focus on schistosomiasis in Uganda, Kenya, and Mali in sub-Saharan Africa. In all three countries, schistosomiasis is considered to be an important and prevalent poverty-related health problem. The overall objective of the project is to contribute towards increasing the knowledge regarding the effect of praziquantel (PZQ) on schistosomiasis-related morbidity, and specifically the ways in which PZQ affects the regulation of host immune responses as well as the parasite itself, with the overall aim of improving morbidity control strategies.

ACTIVITIES

Field studies evaluating the impact of different treatment strategies and the effect of other factors, such as malaria, on regression and the rate of reappearance of schistosomiasis morbidity, will take place in Uganda, Kenya, and Mali and address both *Schistosoma mansoni* and *S. haematobium* infections. The effect of treatment on immediate and short-term changes in immune responses will be determined, and correlated with the level of morbidity before and after treatment, as well as with the resistance to re-infection in areas with different patterns of transmission. Existing diagnostic tools will be applied and their diagnostic performance validated, with the aim of future use in evaluation of the impact of morbidity control. By application of advanced mass spectrometry (MS) technology, disease-related host or parasite biomarkers, or parasite products related to infection status or released in response to treatment, will be identified in urine samples. The project combines advanced, fundamental research with an active, operational field programme.

EXPECTED RESULTS AND OUTCOMES

In order to reach the overall objective of improving strategies for control, the following research-related outcomes are expected:

- increased knowledge about the dynamics of morbidity and how it may be affected and modulated by treatment;
- increased knowledge about the effect of PZQ on the host immune responses;

- non-invasive and reliable ways of detecting morbidity, all of which will contribute to 'new knowledge on biology, epidemiology and technologies relevant for sustainable surveillance systems of diseases on a regional scale';
- improved use of the existing drug in reduction of morbidity, which contributes to 'innovation in and improvement of existing interventions.'

The combination of all four results will 'help to implement appropriate strategies and policies for control and treatment.' The knowledge gained about the modulating and boosting effect of PZQ on immune responses, and the implications for development of resistance may be of value in the design of future vaccines and their strategies. The use of the newest and most advanced MS technology in the identification of parasite or host products related to morbidity, aims at identifying the biomolecules suitable for use in future morbidity diagnoses. This part of the project is highly innovative, and is therefore likely to reinforce competitiveness.

Close contact is established with the ministries of health in Uganda, Kenya, and Mali as well as the control programmes in Uganda and Mali. This will facilitate the transformation of the research findings into strategies for control and future use of the morbidity assessment tools, in evaluating the impact of interventions. It is plausible that some of the results generated will change the current policies. The project will assist in strengthening the research capacity in the partner countries, and contribute to solving specific problems faced by developing countries through equitable partnership, thereby complying with the objectives in the INCO programme.

MUSTSCHISTUKEMA

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HEPVIC

Health Policy-making in Vietnam, India, and China: key determinants and their inter-relationships

Period: 01/11/05 to 31/10/2008
Budget from EC: EUR 2 619 843

Coordinator: Prof. Andrew Green
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CONTEXT AND OBJECTIVES

The overall goal of this research project is to enhance and promote the use of evidence and integrated approaches to health policy-making and implementation in low-income countries using maternal health as a case study of wider policy processes. More specifically, the project objectives are:

- to identify and document the extent of evidence-based integrated policy-making in health systems in and across study contexts;
- to identify and explain the role in policy-making processes of different aspects of, and interrelationships between, context and health systems;
- to identify constraints on, and opportunities for, evidence-based policy-making;
- to identify and assess ways of deploying an integrated approach to policy-making;
- to enhance the capacity of partner research institutions in health systems research;
- to increase sustainable collaboration among partner country research institutions;
- to disseminate results of the study effectively to all stakeholders involved;
- to assist policy-making in utilising study results through support in elaborating strategic guidelines with explanatory frameworks for the development of evidence-based and integrated policy-making across and beyond study countries.

ACTIVITIES

The project is designed in the form of a 'historical' study, i.e. different determinants of policy-making and complex inter-relationships between those determinants for the past three years will be researched retrospectively. For each country, the process will start by mapping four key policy-making determinants (participation of civil society, service delivery, human resources, and organisational and management arrangements), the gaps between these, and appropriate benchmarks for good policy-making.

The project will consist of two main consecutive phases:

- Development of research methodology, including development of tools to research health policies in each of the four determinants, synthesis of research tools, and piloting of research methodology in each study country.

- Data collection and analysis. Three European partners will be paired with respective developing country partners for data collection and analysis.

The project research methodology will combine qualitative and quantitative research techniques, although the emphasis will be on the former. Findings will be triangulated using two or more sources or research approaches. In addition to country-specific analyses, data will be systematically compared and contrasted across countries to identify which results can be generalised more widely to provide approaches to improving health policy processes beyond the partner countries.

EXPECTED RESULTS AND OUTCOMES

In general terms, we expect the project to contribute to the attainment of the 'Millennium Development Goals', mainly but not solely in the three study countries (Vietnam, India, and China) by assisting effective policy development. In particular, the project will facilitate the application of integrated approaches in and promotion of evidence-based policy-making in maternal health. Although not all research outputs can be determined in detail at this stage because of the progressive nature of the project, at a minimum, the project will produce the following:

- new knowledge on how the determinants and their interactions influence health and health policy-making within and beyond the three study countries;
- practical guidance on how this new knowledge can be utilised in each of the three countries to apply evidence-based and integrated policy-making;
- case studies of good practice from the point of view of each policy-making determinant;
- a framework for other countries to investigate the influence of the four determinants on health policy-making;
- tools to assess and overcome constraints on integrated health policy-making aimed at specific audiences. For example, a tool for a Department of Human Resource Health Manager which focuses not only on human resources health policy, but also includes this policy's inter-relationships with other determinants of policy-making.

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DEVELOPING COUNTRIES

NATURAL RESOURCES

ASSESS-HKH

Development of an Assessment System to Evaluate the Ecological Status of Rivers in the Hindu Kush-Himalayan Region

Period: 15/04/2005 to 14/04/2008
Budget from EC: EUR 1 329 412

Coordinator: Prof. Dr Otto Moog
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CONTEXT AND OBJECTIVES

ASSESS-HKH is a joint project of four European and six Asian contractors, and aims to develop tools for river assessment and river basin management for the Hindu Kush-Himalayan (HKH) region. Specifically, the project aims to:

- establish scientific partnerships between Europe and Asia to promote the transfer and adaptation of European research as a significant and verifiable contribution to international sustainable development;
- develop and apply an ecological assessment system for benthic invertebrates so as to provide a scientific basis for the identification of sustainable water policy options and management strategies;
- develop tools for ecological water management and river basin planning, in particular invertebrate taxa lists, sampling methods adapted to regional conditions, river assessment systems and related tools for application;
- create public awareness of the invaluable resource water in the Hindu Kush-Himalayan region to promote the sustainable handling and usage of water.

ACTIVITIES

To achieve the objectives set out above, various protocols were developed to guide the field and laboratory processes in the first year of the project. A rough stream typology was created to provide the geographical framework for sampling and to be able to investigate common river types among the different HKH countries. The development of tools for the evaluation of the ecological status of rivers within ASSESS-HKH focused on bio-indication, i.e. the use of benthic invertebrates. As a common basis, a HKH taxa catalogue containing ecological information was drafted and used as a background for an ecological assessment. A major part of the work is devoted to the development of monitoring tools: a software package which is comparable to its European counterparts and simple evaluation tools that can easily be used in countries with low PC densities, e.g. rapid field assessment protocols for identification and calculation of water quality. Following the principles of the EU Water Framework Directive, the ASSESS-HKH methodology is based on the reference approach. The ecological quality of a river section is evaluated by comparing an observed ecological situation (expressed in terms of benthic invertebrate population criteria) with a target situation that

represents the reference status of high ecological quality. Dissemination of the results is being carried out through various activities.

EXPECTED RESULTS AND OUTCOMES

The scientific objectives of the ASSESS-HKH project will be achieved through 20 deliverables, the most important of which are as follows:

- a simple operative top-down stream typology for the HKH region;
- a list of reference criteria for the individual stream types;
- a manual to pre-classify the ecological status of rivers with a special focus on organic pollution and hydromorphological degradation;
- a manual for sampling and sorting benthic invertebrates in the HKH region;
- an identification key to determine the benthic invertebrate taxa of the HKH region;
- an ASSESS-HKH methodological manual;
- an HKH macroinvertebrate taxa catalogue and HKH Eco-data management tool;
- water quality maps for five representative river sections in the HKH region;
- policy recommendations for mitigation strategies;
- four deliverables that deal exclusively with the dissemination of the project's results, both for water managers and stakeholders in the HKH region and for scientists throughout the world.

ASSESS-HKH

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MANGROVE

Mangrove communities, ecosystems and conflicts: developing knowledge-based approaches to reconcile multiple demands

Period: 01/08/2005 to 31/01/2009
Budget from EC: EUR 850 000

Coordinator: Dr Stuart William Bunting, University of Essex

CONTEXT AND OBJECTIVES

Urbanisation and development in Southeast Asia is occurring rapidly along coastal zones. However, such areas are important food production centres and are central to the livelihoods of many disadvantaged people. Until recently the benefits of mangroves were generally not appreciated and were undervalued. Major constraints in informed policy and management of mangrove ecosystems in Asia, are the lack of relevant information on the value stakeholders ascribe to them and the absence of a balanced assessment of ecosystem functioning, livelihoods and multiple uses. Moreover, mangrove ecosystem management requires scientists, planners and policymakers to deal with changing and often conflicting demands, whilst attempting to meet the challenge of fulfilling the needs of local communities.

Considering the many important resources and functions that mangroves provide and the support afforded to poor coastal livelihoods, this project will address the lack of knowledge about their status, use and requirements for sustainable management. An improved understanding of the multiple uses of mangrove ecosystems in employment generation, asset creation, food provision and their role in sustaining the provision of societal support functions, is required.

ACTIVITIES

A multidisciplinary situation analysis of mangrove ecosystem resources, functions and management will be conducted at sites in Indonesia, Thailand and Vietnam. Several factors will be analysed: the ecological characteristics and functions of the mangrove ecosystem and adjacent coastal areas; livelihood strategies of households dependent on goods and services derived from mangroves; institutional features, including local, national and international policy and legislation, describing patterns of change, stakeholder values associated with mangroves, and conflicts or tensions.

Methods and appropriate indicators for participatory monitoring and evaluation of impacts on mangrove ecosystems will be developed. This will be followed by the formulation of action plans which will be elaborated in collaboration with national stakeholders and local communities, and designed to reconcile multiple demands.

The action plans will be piloted by stakeholders and the ecosystem, livelihoods and institutional impacts will be assessed through participatory monitoring and evaluation. High potential strategies will be identified and appropriate communication media developed, to promote national and regional policy initiatives. Research findings will be disseminated using the appropriate media and pathways, ensuring that national institutions and international development agencies use this new knowledge to promote participatory action, as part of the plan to reconcile the multiple demands placed on coastal zones, especially mangroves.

EXPECTED RESULTS AND OUTCOMES

The project will develop action plans to reconcile the multiple demands placed on mangroves and adjacent coastal zones at sites in Indonesia, Thailand and Vietnam; local and national level stakeholders will participate in action planning, ensuring widespread support and increasing the likelihood of implementation. Local ownership and involvement of civil society, local communities and local governments will be a critical measure of success. New knowledge concerning the most effective approaches to action planning involving coastal communities and national institutions, will be communicated to agencies responsible for coastal zone management and planning, to assist in developing codes of practice and policies that acknowledge and aim to reconcile the multiple demands placed on mangroves and adjacent coastal zones.

Anticipated communication outputs include local language bulletins, media coverage, policy briefs, project reports, joint scientific publications, a project website and a compendium CD-ROM. Project outcomes will contribute to various priorities relating to the European Community's external relations, development aid policies and societal objectives of INCO; in particular, these include the fight against poverty, the EU Water Initiative and the commitment to the Millennium Development Goals. The project will take into consideration, and contribute toward the policy objectives of equitable and wise use, conservation and sustainable development. These objectives have been set by the Ramsar Convention on Wetlands of International Importance; the Convention on Biodiversity; the International Tropical Timber

MANGROVE

Organization Mangrove Workplan; the FAO Mangrove Forest Management Guidelines and Code of Conduct for Responsible Fisheries; the World Summit on Sustainable Development decision on aquatic ecosystem restoration; and the World Bank Code of Conduct for Sustainable Mangrove Management.

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SEEDSOURCE

Developing best practice for seed sourcing of planting and natural regeneration in the neotropics

Period: 01/05/2005 to 30/04/2009
Budget from EC: EUR 1 699 999

Coordinator: Dr Andrew Lowe
Natural Environment Research Council

CONTEXT AND OBJECTIVES

The primary focus of SEEDSOURCE is to communicate the necessary information on germplasm selection and utilisation to people who use trees (e.g. foresters, farmers, conservationists), to ensure that harvested systems employ the best adapted material to maximise production and profit, without eroding genetic diversity. Another focus is that regenerative projects adopt strategies that maximise the recruitment potential of natural systems to maintain ecosystem diversity and their long term adaptive potential. The project aims to provide selection and utilisation information for 50 of the most socio-economically important tree species in each of the Central and South American tropics (chosen based on extensive socio-economic survey and literature and after consultation with end-users and stakeholders during the initial startup phase of the project). These guidelines will be based on criteria and indicators developed from experimental project data of 12 study species for which studies on adaptive capacity, genetic diversity, gene flow and regenerative capacity are combined with available background information and interpreted using meta-data analysis and simulation modelling procedures. Using this integrated approach, SEEDSOURCE will provide best practice policies for selection of germplasm for reforestation within a range of degraded landscapes (logged forest, fragmented stands, degraded secondary forest and remnant trees isolated in abandoned farm land), and for trees with a range of lifestyles (pioneer or forest dependent) that are key components of a diverse ecosystem composition.

ACTIVITIES

Surveys of quantitative and molecular genetic diversity and differentiation, pollen and seed dispersal, population regeneration and recruitment, meta-analysis and data simulation modeling, and surveys of current socio-economic practices and status will be conducted on 12 case study species from which general criteria and indicators will be developed. Species will be selected from among the following: *Anacardium excelsum*, *Bertholletia excelsa*, *Bombacopsis quinata*, *Carapa guianensis*, *Cedrela odorata*, *Cordia alliodora*, *Drimys brasiliense*, *Enterolobium schomburghkii*, *Gliresia sepium*, *Hymenaea courbaril*, *Inga thibaudiana*, *Iriarteia deltoideae*, *Jacaranda copaia*, *Mauritia flexuosa*, *Minuartia guianensis*, *Ochroma pyramidale*,

Quercus oleoides, *Schizolobium parahyba*, *Simarouba amara*, *Swietenia macrophylla/humilis*, *Symphonia globulifera*, *Virola sebifera*, *Vochysia ferruginea*).

SEEDSOURCE has four core areas (CAs), with three work packages (WPs) in each area, designed to reflect project focus and balance:

- CA1: Adaptive variation and genetic differentiation at a range-wide scale (WP1: collection and exchange of materials; WP2: quantitative performance for replanting; WP3: evolutionary history and regional markers for species);
- CA2: diversity, reproductive performance and recruitment (WP4: ensuring focus of genetic studies; WP5: estimate partitioning of genetic diversity; WP6: gene dynamics and quantitative seed performance in relation to landscape);
- CA3: analysis of regional and local sourcing strategies (WP7: data compatibility; WP8: meta-analysis of data; WP9: selection and definition of resource priorities);
- CA4: knowledge gathering, integration and dissemination of priorities (WP10: communication of biological and socio-economic information; WP11: knowledge gathering; WP12: preparation and dissemination of extension materials).

EXPECTED RESULTS AND OUTCOMES

The SEEDSOURCE project is expected to produce a series of results:

- The integration of climatic, topographic and substrate information with genetic differentiation and diversity estimates from non-coding and potentially coding genetic markers and adaptive performance from growth trials will produce appropriate translocation guidelines and seed source maps for each of 12 study species of SEEDSOURCE.
- Appropriate application of hypervariable molecular markers will assess individual mating parameters and will be combined with assays of the quantitative performance of seed sourced from a variety of forest landscapes (from continuous forest to remnant trees in farm land) and pollination conditions. Recommendations will be produced on the origin of germplasm to select for future tree establishment.

SEEDSOURCE

- A metapopulation model will be developed to test the sensitivity of defined seed source areas to translocations and will be combined with the ECOGENE model, which will be further developed to be used as a tool to study genetic impacts within agroecosystems landscapes relevant to the local environment of individual trees.
- A combined field derived data and modelling approach will facilitate the development of informed management strategies for planting and natural regeneration for each study species.
- For 50 of the most socio-economically important tree species within each of the Central American and South American tropics, a classification of their genetic and flowering/reproductive syndromes, and the most appropriate seed sourcing strategies will be identified under a variety of management scenarios. Dissemination of this information in a practical and relevant format will target relevant forestry and agroforestry stakeholders across tropical Latin America (e.g. policy makers, seed banks, forest management certifiers and educators).

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ECOManage

Integrated Ecological Coastal Zone Management System

Period: 30/11/2004 to 29/11/2007
Budget from EC: EUR 1 400 000

Coordinator: Ramiro Neves, Universidade Técnica de Lisboa

CONTEXT AND OBJECTIVES

EcoManage aims to develop an integrated management system for coastal zones and apply to three coastal ecosystems, namely Aisen Fjord in Chile, Bahia Blanca in Argentina, and Santos Estuary in Brazil. The project uses a physical-ecological and socio-economic integrated approach in order to produce management tools ready to be used by stakeholders. The project will be supported by state-of-the-art numerical models, the most recent information technology tools for managing model results, satellite images, and locally acquired data. Sites with contrasting physical-ecological (a fjord and two estuaries) and socio-economic characteristics were selected.

ACTIVITIES

The project has three main components:

- The physical-ecological and socio-economic system (PHES-system), supported by field data and state-of-the-art modelling tools, will describe ecosystem processes and forecast behaviour under different scenarios of socio-economic pressures.
- A Spatial Decision Support System (SDSS) will integrate all information and supply tools for providing answers to decision-makers, researchers, and stakeholders.
- Index analysis involving spatial and temporal variability will play a vital part in illuminating the significance of environmental changes. It will also focus on the progress toward sustainable development in the complex coastal systems studied in the project.

EXPECTED RESULTS AND OUTCOMES

Results of the project include, for each site, a database, integrated model, and SDSS with classification based on indexes capable of integrating information for management purposes. These results will be valuable for local stakeholders. In addition, models and data management tools will be site independent; methods and tools will be applicable in other coastal ecosystems.

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LoGo Water

Towards effective involvement of local government in Integrated Water Resources Management (IWRM) in river basins of the Southern African Development Community (SADC) region

Period: 01/01/2005 to 31/12/2007
Budget from EC: EUR 1 148 852

Coordinator: Wolfgang Teubner
ICLEI European Secretariat GmbH

CONTEXT AND OBJECTIVES

Approximately 300 million people in Africa are affected by water shortages. Poor water allocation, wasteful use of the resource, and the lack of adequate management action have been identified as three of the most significant factors in the current lack of access to safe water supply. In this context, the LoGo Water project aims to explore the potential contribution of local governments to mitigate this situation through contributing to Integrated Water Resources Management (IWRM) at river basin level.

The objectives of the project are:

- to gain an up-to-date overview on existing research on IWRM at international level;
- to receive an overview on the current involvement of local governments in water management in the SADC region;
- to receive an overview on the current situation of the involvement of European local governments in IWRM in the light of the Water Framework Directive (WFD) of the EU;
- to find a joint position for an effective role for local governments in IWRM in the river basins of the SADC region;
- to become more aware of the constraints that prevent local governments from effectively fulfilling such a role in IWRM in the SADC region;
- to guide local governments on the implementation of actions aimed at adopting IWRM practices;
- to guide other stakeholders in IWRM at national and international level;
- to guide future research towards areas of most need for the further application of IWRM and towards an increased cooperation between EU and Southern African researchers;
- to disseminate the results of the project all across the SADC region in order to raise awareness and encourage implementation of IWRM in Southern Africa, direct policies towards sustainability, and foster further research on the topic.

ACTIVITIES

Concerning the first eight objectives, a consortium of African and European researchers and major stakeholders in

IWRM will be established. The members of this consortium will examine existing scientific findings and practical experiences regarding local government involvement in IWRM and further build on this knowledge in consultation with additional partners, especially representatives of local governments in the region. The consortium partners will exchange and discuss their expertise and opinions via electronic means of communication and during six partner meetings. As a result of this exchange the consortium will produce overview reports as a starting point for the later development of strategies, proposals for pilot projects, self-instruction material, guidelines for local governments — as well as for other stakeholders — and future research. The collection of relevant inputs for these materials will be via two consultative workshops to be held with local governments and with a wide range of stakeholders in IWRM.

Concerning the last objective, regarding dissemination and further outreach, a website will be established and information material will be produced in print. In addition, a final seminar will be organised to bring together all target groups in the final phase of the project.

EXPECTED RESULTS AND OUTCOMES

The main result of the LoGo Water project will see local governments in the SADC region becoming more aware about suitable policies and good management practices in order to play their role in river basin management in a meaningful and effective way. They will also be able to use the self-instruction material for building their knowledge and skills on the issue. A tangible change in existing local policies and management structures will be initiated through the implementation of the project proposals which will be developed during the project and carried out afterwards, if funding can be secured. Furthermore, the promotion of the engagement of local governments in sound IWRM achieved by LoGo Water will contribute to the achievement of the Millennium Development Goals, as well as the implementation of the African Component of the EU Water Initiative. Finally, European research will be enriched by bringing together EU and African researcher and by making use of existing knowledge to ameliorate problems like the water crisis and poor governance practices.

The expected outputs will be the following:

- an overview report on the existing scientific knowledge regarding the participation of local governments in IWRM and the state of the debate at international level;
- a status report covering different kinds of approaches and results of local government measures in Africa related to the implementation of IWRM in the Incomati, Zambezi and Orange River basins and, in further detail, the Limpopo river basin;
- a status report looking into the IWRM practices of local government in Europe and containing first conclusions regarding the consequences of applying the EU WFD at a local level in Europe and focusing on the Rhine, Ebro and Danube River basins;
- a concept paper reflecting the consortium partners views on an effective role of local governments in IWRM;
- a report on the main constraints to local governments in fulfilling their role in IWRM, resulting from the two consultative workshops that will be held with the SADC region local governments and the regional stakeholders respectively;
- a strategy paper assisting local governments in engaging in IWRM; proposals for IWRM pilot projects by and for associated local governments; an implementation workshop for the Limpopo river basin; and IWRM self-instruction material for local governments;
- a set of recommendations to stakeholders in order to facilitate an effective role of local governments in IWRM;
- a policy options report aimed at guiding further research on the topic and in the region;
- a project website and a leaflet, an international seminar on local governments and IWRM, presentations at international events and other means of dissemination.

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AfricaNUANCES

Exploring trade-offs around farming livelihoods and the environment: the AfricaNUANCES framework

Period: 01/12/2004 to 31/05/2008
Budget from EC: EUR 1 399 871

Coordinator: Ken E. Giller, Wageningen UR

CONTEXT AND OBJECTIVES

The primary aim of this project is to synthesise knowledge and analyse trade-offs when implementing various soil fertility technologies for smallholder farmers in mixed crop/livestock systems, in humid and semi-humid East, West and southern Africa. The emphasis will be on the efficiency of targeting and use of nutrients and legume-based soil improving technologies, with the output evaluated in terms of costs, benefits and compromises in productivity, economics and environmental services. The strategic objectives addressed are indicated below:

- to understand the spatial and temporal dynamics of rural livelihoods and their relationships with food security, sustainability and resilience of the natural resource base;
- to identify measures to promote successful and sustainable development of agricultural smallholder farming systems;
- to build capacity in integrated systems analysis, in order to evaluate approaches to sustainable intensification of smallholder agriculture in Africa.

ACTIVITIES

The project aims to carry out the following activities:

- develop databases that integrate agro-ecological and socioeconomic knowledge of farm livelihoods and their effects on environmental services;
- develop an integrated dynamic modelling tool to analyse African mixed crop/livestock systems, which includes nutrient, labour and economic balances, and effects on environmental services;
- explain current farmer decisions regarding resource allocation across heterogeneous farms, and analyse inefficiencies in resource allocation, using the database and modelling tool;
- use the databases and the analytical tool to explore different scenarios concerning changes in policy, agro-technology, markets, demographics and climate for their effects on food security at farm level, and environmental services at regional level;
- evaluate trade-offs between short-term and long-term farmers and regional stakeholder goals;
- to build capacity in Africa in integrated systems analysis at PhD level.

EXPECTED RESULTS AND OUTCOMES

- An information system will be built, specifically designed to enable the identification of opportunities for enhanced productivity and limits to sustainable production in humid and semi-(sub)-humid ecosystems.
- This information system will guide current and future research programmes on choices from 'baskets' of technologies to include in evaluations with farmers.
- Project results will be widely disseminated in Africa through the use of existing networks.
- Policy working papers will be produced in the final year, to provide syntheses of the project findings in terms of enabling policies and the major trade-offs between the goals of sustainable agricultural intensification and improvement of the environment.

AfricaNUANCES

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FONIO

Upgrading quality and competitiveness of fonio for improved livelihoods in West Africa

Period: 01/01/2006 to 31/12/2008
Budget from EC: EUR 900 000

Coordinator: Jean-François Cruz
Centre de coopération internationale en recherche
agronomique pour le développement (CIRAD)

CONTEXT AND OBJECTIVES

Traditional cereals constitute the staple diet of many African people. Among them, fonio (*Digitaria exilis*) is considered the most ancient indigenous West African cereal. This tiny grain is grown in several countries in the region (Guinea, Mali, Burkina Faso, etc.) and provides several million people with food during the most difficult months when other food resources are scarce.

Fonio, which was long regarded as a minor cereal, is now the object of renewed interest in urban areas as consumers begin to recognise its flavour and nutritional qualities. However, its very small grain size makes hulling and whitening, which are traditionally done by women using a pestle and mortar, highly laborious. In order to avoid the decline of this commodity, it is important to solve the many problems that arise after the harvest, in particular by perfecting post-harvest techniques and improving the quality and follow-up of sales and distribution operations.

The principal objectives of the FONIO project are:

- to enhance the local competitiveness of fonio by increasing the productivity of the commodity chain on different levels (adapted varieties, appropriate production and farming systems, innovations in post-harvest mechanisation, etc.);
- to improve the quality and diversity of fonio products, so as to export and thus increase producers' and processors' incomes.

ACTIVITIES

To achieve these objectives, the FONIO project favours a multidisciplinary and innovative approach involving scientists from various backgrounds: food technology, nutrition, process engineering, mechanisation, social sciences, and agronomy. It supports research/development operations with a participatory approach involving producers, processors, women's groups and small enterprises that will benefit directly and rapidly from the research results.

The planned research, technological development and innovation operations involve the following items (work packages), with the view to achieving the specific objectives of the project:

- diversification of fonio products for niche export markets and local markets
- nutritional aspects of fonio and fonio products;
- demand for new products and its effects on income generation and distribution;
- small-scale enterprises and product and process innovations
- opportunities for diversification and multipurpose uses of fonio in crop-livestock systems;
- improving knowledge of fonio-based cropping systems and ways of improving productivity.

EXPECTED RESULTS AND OUTCOMES

On a scientific level, the FONIO project will contribute to better knowledge of this neglected cereal. It will generate more detailed information on the physical structure of this tiny grain, its biochemical composition, its nutritional value (bioavailability of selected nutrients) and its technological and cooking qualities. In terms of farming and cropping systems, the FONIO project will also compile knowledge among both scientists and farmers. It will identify ecotypes with good agronomical and technological properties and promote their dissemination throughout the sub-region.

In terms of development, the project proposes to continue to alleviate the workload for women by promoting appropriate processes and equipments to make new products with consistent technological and organoleptic characteristics and of higher nutritional quality. Its originality lies in the fact that equipment will be manufactured locally with local raw materials and processes that are simple and easy to use, at lower costs. The consequence of the development of new products (better perception of consumer preferences) and processes is to be assessed during the project. Information is to be collected from along the market chain, concerning income and employment, but also gender issues and SME organisation (commercial strategy, innovation management, etc).

Moreover, the new products are aimed at local populations but, given their dietetic properties, they will encourage the creation of niche export markets and serve to diversify the range of cereal products in Europe.

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SAFRUIT

Sahelian Fruit Trees

Period: 01/01/2006 to 31/12/2009
Budget from EC: EUR 1 499 996

Coordinator: Anders Ræbild
The Royal Veterinary and Agricultural
University (KVL)

CONTEXT AND OBJECTIVES

People in the Sahel are among the poorest in the world and food security problems are severe. Fruit trees are essential in the diets of rural people, providing:

- nutrients and vitamins to diets otherwise dominated by cereals;
- food at times where stocks of annual crops are low;
- sources of income through commercialisation.

Despite the generally accepted importance of trees, most food security programmes focus on cereals. The potential of fruit trees is under-utilised. The SAFRUIT project aims to increase food security and livelihoods for people in Burkina Faso, Mali and Niger, through facilitating access to knowledge concerning four native fruit tree species.

ACTIVITIES

The project has a holistic approach involving researchers from social (including economic) and natural sciences. The aim of improving food security through increased use of fruit trees will thus be obtained through studies of:

- institutional constraints and opportunities for use of trees;
- marketing of fruit tree products;
- interactions (competition and synergy) between fruit trees and annual crops;
- appropriate technologies for vegetative propagation at village level;
- genetic variation of the selected species, enabling selection and development of superior genotypes;
- alternative pathways for distribution of tree germplasm.

Furthermore, the project will have a strong dissemination component reaching a wide range of stakeholders, including farmers, technicians, scientists and policymakers. The project will focus on four important tree species in the region: *Adansonia digitata* (baobab), *Parkia biglobosa* (African locust bean), *Tamarindus indica* (Tamarind tree) and *Ziziphus mauritiana* (Jujube or Indian Jujube).

EXPECTED RESULTS AND OUTCOMES

By the end of the project, it is expected that people in the villages studied will get a higher proportion of their nutrition, and experience higher benefits from fruit trees. This should result from adoption of technologies and management guidelines developed by the project, including:

- improved access for poor people to cultivate trees;
- better marketing strategies;
- better understanding of the impact of trees on annual crops grown underneath;
- methods for propagation of trees that can be used by villagers;
- new varieties or better seed sources of the four tree species;
- effective ways for distribution of tree seed and seedlings to farmers.

Dissemination of knowledge should impact on the whole subregion five years after the project has finished.

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INNOVKAR

Innovative tools and techniques for sustainable use of the shea tree in Sudano-Sahelian zone.

Period: 01/12/2006 to 30/11/2010
Budget from EC: EUR 1 799 972

Coordinator: Jean-Marc Bouvet
Centre de coopération internationale en recherche
agronomique pour le développement (CIRAD)

CONTEXT AND OBJECTIVES

The shea tree (*Vitellaria paradoxa*) is an important species for the production of edible vegetable fat and personal care products, processed from the dried kernel of its fruits. It shows a high potential for income generation and food security in the Sudano-Sahelian zone. To improve the sustainable production in terms of both quantity and quality and in order to promote trade with shea products, an integrated and innovative research approach that couples biophysical, biological, chemical and socio-economic methods will be applied by the INNOVKAR project team. The impact of climate change in the shea tree will be studied by modelling its distribution under climate change scenarios and assessing the resilience of the populations when faced to drought using ecophysiological variables.

Analyses of the impact of global change on natural regeneration and genetic diversity will be undertaken, fruit production in parklands assessed, as well as predicting the long-term effects by elaborating forest dynamic models. Both activities will allow the elaboration of a strategy for managing resources for medium and long term sustainable use. The valorisation of origins and farmer varieties will be studied by characterising the genetic resources, using chemical variables for edible fat and testing their new antioxidant properties for the development of personal care markets.

The traceability of the fruit and shea butter at the different stages of processing, from fruit to butter, will be studied using innovative techniques. New methodologies based on near infrared spectrometry will be tested to improve low cost, environmentally friendly chemical analyses.

Research on post-harvest quality control will be undertaken to improve the butter for export markets. The patterns and trends of shea commodity chains and the roles of market participants involved in the production, marketing and consumption of the products will also be investigated. The results will be synthesised, translated as operational recommendations and disseminated through a participative process.

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ReForLan

Restoration of forest landscapes for biodiversity conservation and rural development in the drylands of Latin America

Period: 01/01/2007 to 31/12/2009
Budget from EC: EUR 1 720 000

Coordinator: Prof. Adrian Newton
Bournemouth University Higher
Education Corporation

CONTEXT AND OBJECTIVES

The major objective of ReForLan is to identify and promote approaches for the sustainable management of arid and semi-arid forest ecosystems by researching ecosystem restoration techniques using native species of economic value. This aim will be achieved through a programme of multi-disciplinary research, analysing how restoration of degraded lands can be achieved in a way that will mitigate the effects of unsustainable land use practices and contribute to conservation of biodiversity. The research will generate tools for the sustainable development of native forest landscapes by local communities and other stakeholders, in a form that can directly support management decision-making and policy development, including information systems, decision support tools, criteria and indicators of sustainable forest management and restoration. Management plans, practical guidelines and policy recommendations will be produced to support restoration of dryland forests in ways that support the development of rural livelihoods according to the ecosystem approach.

ACTIVITIES

The project will:

- assess the distribution of dryland forest ecosystems in each of the seven study areas in Mexico and southern South America, by analysis of satellite remote sensing data;
- assess the pattern and extent of fragmentation of dryland forests using spatial analysis and Global Information Systems (GIS) techniques;
- assess the current patterns of floristic biodiversity in dryland forests using the results of field surveys supported by multivariate analyses and GIS;
- develop and test forest restoration and land reclamation techniques for reversing degradation of dryland forest ecosystems;
- determine traditional patterns of use and the socio-economic value of dryland forest resources to local communities;
- assess the impact of forest loss, fragmentation and degradation on genetic variability within socio-economically important tree species;
- parameterise a spatially explicit model of forest dynamics for dryland forests in selected study areas;

- identify priority areas for dryland forest restoration within each of the study areas based on environmental and socio-economic criteria;
- develop appropriate tools to support the communication and dissemination of research results;
- disseminate results through scientific publications and internet resources.

EXPECTED RESULTS AND OUTCOMES

The project will:

- identify opportunities for enhanced economic productivity and limits to sustainable production, with a particular focus on identifying incentives for supporting dryland forest restoration by local communities;
- analyse the natural resource use systems at local, regional and international levels through an integrated approach, by developing a comparative programme of research in seven study areas distributed in dryland areas of Mexico, Chile and Argentina;
- use information gathered applying participatory techniques to inform the planning and implementing of sustainable management strategies for dryland forest resources;
- develop appropriate decision-support tools, including information systems, criteria and indicators of sustainability and rehabilitation, together with case studies of practical restoration trials, to support dryland ecosystem management and policies;
- disseminate results through scientific publications, research reports and internet resources.

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DADOBAT

Domestication And Development Of Baobab And Tamarind

Period: 01/12/2006 to 30/11/2010
Budget from EC: EUR 2 099 944

Coordinator: Prof Dr ir. Patrick Van Damme, University of Ghent

CONTENT AND OBJECTIVES

Both baobab and tamarind are plant species with high potential for arid and semi-arid areas in the developing world. They can provide food, medicine, wood and a number of secondary processed products for income generation that can help meet the basic needs of an increasing number of people within a context of decreasing land availability. The strategic overall objectives of the project that will be addressed through a multi-pronged and multidisciplinary research approach are: evaluation and characterisation of germplasm collected in four African countries in different ecological zones (Benin, Ghana, Mali and Senegal); eco-physiological characterisation of field and greenhouse-grown material; domestication of superior germplasm material; development of adapted cropping techniques; development of adapted plant material for introduction into (traditional and improved) agroforestry systems; evaluation of nutritional/medicinal composition of different plant parts; improvement of processing/transformation of the species' products; and development of (inter)national marketing strategies. The project addresses issues of new crop/niche development through a holistic research approach and envisages multidisciplinary activities to broaden availability of improved plant material for introduction into agroforestry systems.

ACTIVITIES

The project combines activities of research, capacity building and transfer to bridge the gap between knowledge and successful application of the results by the end users. The work plan is divided into six work packages (WPs) and a documentation and information dissemination work package:

- WP1: field characterisation of plant material over different agro-ecological zones in the four countries, and matching of macroscopic characterisation using 'traditional' descriptors with results of molecular fingerprinting;
- WP2: eco-physiological characterisation of plant material for understanding drought stress tolerance/resistance in situ and ex situ;
- WP3: domestication: determination of optimal germination conditions and maximum germination rates;

- WP4: development of improved cropping techniques: pruning, irrigation, fertilisers, etc.;
- WP5: characterisation of nutritional and medicinal properties of primary and secondary products;
- WP6: production and marketing chain analysis, including socio-economics and SWOT analysis.

EXPECTED RESULTS AND OUTCOMES

- Morphological and genotypic characterisation, inventory and presentation of genetic resources conserved ex situ in the different countries are completed. Superior germplasm of baobab and tamarind for further eco-physiological characterisation and propagation/domestication studies is selected. The main pests/diseases/weeds involved are identified.
- Drought tolerance of tamarind and baobab, and their photosynthesis and WUE behaviour are understood.
- Dormancy breaking mechanisms are known and documented of baobab and tamarind. Participative propagation/multiplication techniques are defined, and needed for subsequent sustainable planting.
- Improved protocols for cropping of baobab and tamarind are developed, and needed for subsequent extension and vulgarisation. Irrigation water use of baobab and tamarind is documented and known for different development stages.
- Ethnobotanical profiles of baobab/tamarind are documented. Processing methods are documented.
- The main problems affecting commercialisation, marketing and price formation are documented and known; this result is needed to be able to develop sustainable marketing strategies for the different baobab and tamarind (by-)products.

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ACACIAGUM

Innovative management of Acacia senegal trees to improve resource productivity and gum-arabic production in arid and semi-arid sub-Saharan Africa

Period: 01/01/2007 to 31/12/2010
Budget from EC: EUR 1 799 999

Coordinator: Dr Didier Lesueur
Centre de coopération internationale en
recherche agronomique pour le développement
(CIRAD)

CONTEXT AND OBJECTIVES

The overall objective is to enhance the sustainable management and use of natural Acacia senegal tree resources thereby supporting the environment and livelihoods in arid and semi-arid sub-Saharan Africa.

A potential solution to land degradation is to promote the utilisation, regeneration and planting of a native under-utilised legume tree: Acacia senegal, the main species in the world producing the internationally traded gum-arabic. In order to mitigate land degradation and enhance sustainability of farming systems, the overall objective of the project is to provide tools to promote use and sustainable management of A. senegal tree resources. The goal is to combine high gum quality and increased gum production with sustainable tree management.

The project will use a multidisciplinary approach focusing on the socio-economic viability of the gum-arabic commodity chain under different tree management and/or site conditions (climate and soil type) on:

- tree eco-physiology and gum production;
- tree genetics and gum quality and production;
- biological soil-tree interactions and tree-crop interactions.

ACTIVITIES

The project team has initiated the following research activities, organised in different Work Packages:

- to gather information on local populations' experience and constraints in A. senegal management in order to ascertain user priorities with respect to different activities (tree planting, tapping, gum picking, fodder harvest, crop associations, etc) and factors influencing their decisions (Work Package 1);
- to understand the inter-linkages between the institutional organisation of supply chain networks with the dynamics of innovation regimes in gum-arabic production and their implications for rural livelihoods (Work Package 2);
- to characterise the impact of the biophysical environment and tree management on gum yield and quality in multiple A. senegal based systems, and to investigate the consequences of tree management for

associated crop production (Work Package 3);

- to characterise existing quantitative and neutral genetic variation and identify and understand the basis of variation in gum quality/yield (Work Package 4);
- to improve understanding of the relationship between soil microbial communities involved in the N cycle and the capacity of A. senegal trees to produce gum-arabic in different environmental conditions and to rehabilitate degraded lands (Work Package 5);
- to ensure that information generated is properly packaged and made available to different stakeholders in a form that is appropriate to each of them (Work Package 6).

EXPECTED RESULTS AND OUTCOMES

In the course of the project, each Work Package (WP) is expected to produce specific results:

- WP1: identification of all the different stakeholders and relevant dimensions that shape the diversity in 'Acacia related livelihoods', and also understanding of their main drives in the management of the resource;
- WP2: identification of multiple market outlets for arabic-gum producers and the determinants of bargaining power between different supply chain agents. Delimitation of the opportunities and constraints for 'valuing' innovative management of Acacia senegal tree supply chains;
- WP3: knowledge about the important climatic, edaphic and genetic determinants of gum-arabic production by A. senegal, disseminated to scientists, policy-makers, plantation managers and local farmers in target countries. Improved tapping management and tree management techniques adopted by workers and farmers in target countries, resulting in increased gum yields and improved management of associated crops;
- WP4: Assessment of the importance of genetic and environmental factors in gum quality / yield variation and optimised provenance selection for target farm sites, maximising gum production;
- WP5: use of soil bio-indicators as management tools to maintain a sustainable gum-arabic production, farmers routinely use microsymbiont inoculants to establish new plantations, and mature trees to stimulate tree vigour and gum-arabic production;

- WP6: coherent outputs for dissemination and technology transfer from different work packages evaluated and prioritised, specific dissemination/technology transfer packages prepared and suitable dissemination/technology transfer pathways developed and implemented.

COORDINATOR

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RETPEC

Range Enclosure on the Tibetan Plateau of China: Impacts on Pastoral Livelihoods, Marketing, Livestock Productivity and Rangeland Biodiversity

Period: 01/03/2007 to 30/06/2010
Budget from EC: EUR 1 705 000

Coordinator: Grant Davidson
Macaulay Land Use Research Institute

CONTEXT AND OBJECTIVES

This project investigates the biophysical and socio-economic impacts of policy-driven land use change in China's semi-arid regions. Range enclosure, livestock intensification and nomadic settlement are being implemented by the Chinese government with the rationale to restore degraded land, prevent desertification and improve pastoral welfare. This project examines the current performance and likely future success of these policies in meeting their stated goals. Across the Tibetan plateau, the project will compare regions representing five ecological zones in Sichuan, Gansu and Qinghai and the Tibet Autonomous Region. Proposed field sites reflect the gradation of fencing intensity — from unenclosed rangelands to private fencing of all pastures. It is probable that no single system of grazing and rangeland tenure is optimal, under all conditions in a heterogeneous environment constituting half of the rangeland area of China. The project goal is to identify forms of management appropriate to specific market and ecological conditions, to engage Chinese policy-makers, and to improve the capacity of the Chinese scientific community so as to influence their government's rangeland development policies.

ACTIVITIES

The research programme of the project will be a combination of interdisciplinary field-based research, syntheses of existing research findings, and participatory work with pastoral communities, local administrations and NGOs. A hierarchical research design begins with analysis of national policies, their application at local administrative levels, field site investigations of biological parameters at community level and detailed surveys of individual households and flocks. This assessment compares measurable indicators of vegetation, livestock productivity, land use, household incomes and wildlife biodiversity in enclosed versus unenclosed systems of rangeland management.

Qualitative methods will evaluate the social, cultural and economic repercussions of policy. Participatory techniques involving local stakeholders will be integrated with field data, ensuring incorporation of indigenous knowledge and local concerns and to contextualise quantified data. Technical innovations and best practices will be identified and evaluated in collaboration with stakeholders. The

project will inform public policy by assessing whether land degradation is ameliorated by new land tenure and grazing regimes. The overall purpose of this research is to identify the immediate and long-term environmental, social and economic impacts of current policy implementation.

EXPECTED RESULTS AND OUTCOMES

The research will seek prospects for increasing economic outputs from livestock production systems while balancing the need for environmental protection. The project hypothesizes that government policies and land management regulations can be modified using new field data, participatory methods and co-management techniques, to better adapt to local market and ecological conditions. The historical and institutional factors underlying current land use and livestock husbandry practices of Tibetan pastoralists will be analysed. Their indigenous knowledge and cultural perceptions will be incorporated into the project design, complementing data obtained from conventional scientific field research. Existing and new data will be synthesised on indicators of ecological sustainability and rangeland rehabilitation. Locally-initiated, as well as introduced innovations, will be tested for their potential to diversify incomes and increase pastoral livelihood security under conditions of rapid and fundamental change. For international science, changes in grazing intensity — given the sheer size of the Tibetan plateau — makes this work significant for understanding global climate change and carbon sequestration.

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EULACIAS

Breaking the spiral of unsustainability in arid and semi-arid areas in Latin America using an ecosystems approach for co-innovation of farm livelihoods

Period: 01/02/2007 to 31/01/2010
Budget from EC: EUR 1 799 917

Coordinator: Dr Walter A. H. Rossing
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CONTEXT AND OBJECTIVES

In many arid and semi-arid environments in Latin America, misguided agricultural intensification and specialisation in response to decreasing farm margins threatens farm livelihoods and places a burden on natural resources. Over- and under-use of water, soil nutrients, mining of soil organic matter, high levels of soil-borne pests and erosion have implications beyond the farm scale. At the same time, off-farm sources of income are scarce under current economic conditions, and cities cannot absorb rural workers. The rapid changes in the socio-economic environment require adaptation of agro-ecosystems as a whole and cannot be addressed by changes in one component alone. To arrive at such complex system innovations, rural stakeholders and researchers need to engage in collective learning processes or co-innovation. Up to date, quantitative systems approaches have only occasionally been used in such processes. The primary aim of this project is to identify opportunities and trade-offs for income generation and sustainable use of natural resources by linking quantitative systems approaches to participatory learning processes with researchers, farmers, advisers and local policy-makers as participants. Capacity building in ecosystems analysis is a key element, aimed at creating critical mass for dissemination of the ecosystem co-innovation approach in Latin America.

ACTIVITIES

A co-innovation approach is developed, based on locally available and 'best-bet' participatory approaches, structured around concepts of social learning and action research. A quantitative ecosystem toolkit, which mobilises databases and models for ecosystem diagnosis and design, is integrated into the co-innovation approach. Case study areas in Argentina, Mexico and Uruguay are chosen as pilots across the continent, representing gradients of human activity pressure and stage of co-innovation, while similar in their systems perspective. In each of the case studies, drivers of development are analysed at the scales of region, farm and field, and agro-ecological and socio-economic options are identified based on a systems approach. The ecosystem toolkit and the co-innovation approach enable the bringing together of scientific information with local knowledge for case study specific innovation. Because the same systems

methodology is adopted in each case study, approaches can be shared and in-depth comparative analysis of the co-innovation approach is possible.

EXPECTED RESULTS AND OUTCOMES

The project will train teams of Latin American scientists in the ecosystems approach, enabling at least five to obtain a PhD from a European university. The project will interact with 60 to 90 farmers in the case study regions directly and at least five times as many indirectly, on locally relevant innovation issues. The project will create a methodology and an ecosystem toolkit for identifying opportunities for farm development and their institutional requirements.

Outcomes are expected at three levels. The first level of local impact involves changes in perceptions of the causes of unsustainability and the effects of livelihood strategies on income and resource use among local actors. The second level of local impact involves concrete changes in practice, i.e. experimentation with alternative strategies at field level (e.g. by testing alternative production technologies), at farm level (e.g. by changing crop-livestock ratios, market orientation or off-farm income generation) or at regional level (e.g. by setting up new organisational structures for marketing or certification). Impact on national and continental levels will be achieved by providing analyses of effects of alternative policy scenarios on livelihood development opportunities, and by improving the efficiency of development research through integration of knowledge and tools in co-innovation research networks.

EULACIAS

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MAI-TAI

Managing water scarcity: Intelligent tools and cooperative strategies

Period: 01/03/2007 to 28/02/2010
Budget from EC: EUR 800 000

Coordinator: Markus Starkl
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Applied Life Sciences, Vienna

CONTEXT AND OBJECTIVES

The MAI-TAI project focuses on integrated water resources management in arid and semi-arid areas in Asia, specifically in China and India. With water needs growing at a tremendous rate to meet the demands of agricultural modernisation, industrialisation and urbanisation, as well as the growing population, both river and groundwater are being overexploited and, at the same time, increasingly polluted. All major cities in Asia today face acute water shortages and rural areas are strongly underserved by modern infrastructures, while being increasingly unable to rely on their traditional water harvesting technologies.

In this context, the prime objective of MAI-TAI is to develop a coherent set of innovative and relevant policy options and management strategies that rely on extensive, leading research on both state of the art and traditional knowledge to manage scarce water resources. This joint effort will also strengthen the capacity in INCO partner countries to integrate and make better use of the excellent, but often fragmented knowledge already available. In turn, this will facilitate the uptake and integration of solutions.

ACTIVITIES

The project will work with one to two selected river basins in China and India, and is structured in five thematic Work Packages (WPs) (WP 2, 3, 4, 6 and 7) and two supporting WPs (1 and 5):

- WP 1 will develop a comparative framework for analysis across the whole project (institutional framework, policies, etc.).
- WP 2 and 3 will provide an overview of both state-of-the-art and indigenous technologies and practices currently used in the river basins, and will analyse their respective innovation potential.
- WP 4 will try to develop learning spaces between traditional and state-of-the-art approaches to water management through a wide range of tools, including the organisation of stakeholder workshops.
- WP 5 will support the entire project through the definition of appropriate knowledge management tools, and will develop information systems and decision support tools that shall be applied in a participatory context in WP 6.

- WP 6 will carry out a multi-stakeholder interaction for the identification and exploration of policy options and management strategies and ensure a strong link between technological research as conducted in the context of WP 2 and 3 and management and policy research (addressed in WP 4, 5 and 6).
- WP 7 will take up the results of WP 6 and develop appropriate measures to facilitate the uptake and integration of the project results at different scales and among different audiences.

EXPECTED RESULTS AND OUTCOMES

MAI-TAI will generally contribute to sustainable development, which is a key focus of this project. In seeking to understand all stakeholders' perspectives in a multi-stakeholder interaction, it will produce results that are adaptable and adapted to the context of individual case studies, and develop a methodology that will enable similar processes to be followed in comparable areas of the target countries.

The expected results and outcomes are linked directly to the above-mentioned activities, i.e., a set-up of a comparative framework in view of the different institutional frameworks in the case study on river basins; reports on state-of-the-art and traditional technologies, as well as on practices for water management; an analysis of the existing technologies and practices in the selected river basins in view of the potential for increasing water use efficiency as well as recycling; and development of information systems and decision support systems, among others.

Gender roles will be explicitly addressed in several WPs, although the target of the proposal is an overall empowerment of entire local communities. The final expected result is a set of innovative, relevant and cooperative policy options and management strategies, enabling the partner countries to significantly improve the current situation.

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WAFLA

Integrated Water Resource Management by the Implementation of Improved Agro-Forestry Concepts in Arid and Semi-Arid Areas in Latin America

Period: 01/10/2006 to 31/03/2009
Budget from EC: EUR 1 369 846

Coordinator: TTZ-Bremerhaven
Verein zur Förderung des Technologietransfers
an der Hochschule Bremerhaven e.V.

CONTEXT AND OBJECTIVES

About one-quarter of Latin America is covered by dry land including the Pacific coast, the dry plains of the Andean mountains, the arid region extending to Patagonia and the dry areas of Mesoamerica. Desertification is the most challenging problem in these areas, resulting from the non-sustainable use of the natural resources, leading to a reduction of the productivity of ecosystems and agriculture, thus increasing the poverty of the inhabitants. It is imperative that we contribute to the fight against land degradation and eradicate the poverty in dry areas in Latin America, through a sustainable management of resources in an international scope. Bringing together agro-forestry approaches with integrated water resource management (IWRM) is the key direction that must be followed in order to enhance the sustainable development of arid and semi-arid areas in Latin America. In spite of the existing initiatives, there is a need for establishing positive links, which could fortify the scope of these activities, by integrating stakeholders in a multidisciplinary approach.

The general objective of WAFLA is to coordinate the current research, technological innovation and social and policy development activities, creating synergies to promote the adoption of IWRM and to improve agroforestry systems in order to propose real solutions to combat the degradation of dry lands and to enhance rural development in Latin America.

ACTIVITIES

WAFLA Coordination Action will become a collective and social space to revitalise citizen responsibility in combating poverty and desertification. As a multidisciplinary network, WAFLA will promote international cooperation between research organisations, universities, associations, NGOs and social stakeholders in a Latin American context, which devote themselves to the research, development and application of agro-forestry and integrated water management in arid and semi-arid areas of Latin America. It will aim at the unification and coordination of efforts and at the exchange of knowledge and expertise to promote the development and adoption of innovative technologies to enhance the application and acceptance of agro-forestry concepts in arid and semi-arid regions. An agro-forestry/

water management research coordination platform as well as an expertise network will be established, in order to define, organise and manage common initiatives and to coordinate, assess and guide suitable research and strategic activities with the aim of identifying best practices and suitable technology packages, and to propose directions for futures research. WAFLA will be the scenario of discussion and joint work of Expert Groups, who will congregate in workshops and seminars to carry out different tasks, case studies and analysis in the following areas:

- management of arid and semi-arid ecosystem/ combating desertification;
- IWRM;
- agro-forestry modules focusing on indigenous crops and livestock;
- agro-forestry products focusing on transformation processes;
- marketing and socio-economic trade;
- institutional and policy dimensions.

EXPECTED RESULTS AND OUTCOMES

The main outcome of WAFLA will be the identification of management strategies and policy options for the promotion of region-adapted agro-forestry structures, by providing Latin-American joint arid agro-forestry management guidelines, based on the participatory management of agro-forestry modules, with the involvement of local communities. This concept will harmonise technology, institution and environment, proposing implementation strategies based on local conditions, with appropriate technological, economical and social tools, which will include:

- local identification of indigenous and adapted species with industrial value;
- identification and development of suitable technology packages for production of quality crops;
- development of adaptable management prescriptions for planting, irrigating, maintenance, harvesting and processing;
- development of an information network of markets for agro-forestry products to empower local producers and traders;
- development of a sustainable arid agro-forestry extension and dissemination strategy.

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BIOSAFOR

Biosaline agroforestry: remediation of saline wastelands through the production of biosaline biomass (for bioenergy, fodder and biomaterials)

Period: 01/12/2006 to 30/11/2009
Budget from EC: EUR 1 198 817

Coordinator: Jeanette Hoek
Organisation for Agriculture in Saline
Environments (Oase Foundation)

CONTEXT AND OBJECTIVES

Increasing salinity is more than a threat to agricultural production alone. It contributes to desertification, disrupts socio-economic structures, and causes rural exodus. Biosaline agro-forestry applies innovative approaches to salinity, using the qualities of salt tolerant species combined with improved soil and water management practices. Little research has been performed on this subject and the potentials of biosaline agriculture and forestry are insufficiently investigated.

The overall objective of the BIOSAFOR project is twofold: to contribute to the development of biosaline agro-forestry systems for various saline environments (local/regional approach), and to explore the potentials and options for biomass production in saline environments (globally).

More specific objectives are:

- to contribute to the regeneration of saline wastelands;
- to select and screen tree species for the production of biomass in specific saline environments;
- to develop agro-forestry systems for biomass production in different kind of saline environments;
- to assess the economic and environmental performance of selected biosaline agro-forestry production systems;
- to estimate the amount of biomass that can globally be produced in saline environments;
- to assess the potential contribution of biomass from saline environments to a sustainable biomass, respectively biofuel and biomaterial supply in development countries and the EU;
- to disseminate the results to relevant gremia (decision makers, politicians) in the EU and to organisations dealing with salinity globally especially the biosaline networks.

The project team expects that they will be able to systemise and further develop/improve several agro-forestry strategies for the remediation and economic (re-)use of saline wastelands and saline water resources. Emphasis will be on competitive, cost effective and sustainable solutions and how to create the level playing field necessary to realise them.

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CAMINAR

Catchment Management and Mining Impacts in Arid and Semi-Arid South America

Period: 01/02/2007 to 31/01/2010
Budget from EC: EUR 1 799 645

Coordinator: Prof. Paul Younger
(coordination support: Dr Jaime Amezaga)
Newcastle University

CONTEXT AND OBJECTIVES

More than 25 % of South America is arid or semi-arid. A general lack of rational water management systems hinders the sustenance/recovery of ecosystems and human communities in these areas. The twin scourges of erosion and salinisation are prone to exacerbation by various human activities. Mining is the sector with the highest environmental impact, yet it contributes more to legal export earnings in the region than any other sector. There is clearly a need to rigorously review the effectiveness of existing policies, and to develop new approaches to river-basin management to ensure that such vital economic activity can be carried out in a manner which does not permanently damage fragile ecosystems and water resources upon which human communities depend in arid/semi-arid areas. CAMINAR has the general aim of contributing to the establishment of policy options, management strategies and technologies for the sustainable management of ecosystems in those river-basins of arid and semi-arid South America which are subject to impacts from mining. This aim will be achieved, using Peru, Bolivia and Chile as 'demonstration' countries.

ACTIVITIES

This aim will be achieved through the following activities:

- Establishment of forums for dialogue on the impacts of mining on water management in arid/semi-arid river-basins in each of the demonstration countries and at regional level. For each case-study there will be river-basin workshops and a process of involvement of local stakeholders. In each country a national working group will be formed to discuss policy options.
- River-basin case studies (Peru, River Chili; Bolivia, Lake Poopo and Uru Uru basin; and Chile, River Elqui). They will include river-basin characterisation, study of impact of mining, development of technical and managerial options and river-basin plan.
- Develop guidelines for integrated water resources management in arid/semi-arid zones of South America with particular emphasis on mining impacts. The focus of the guidelines is on the full life-cycle of mining considered within the context of integrated water management at the river-basin level and paying particular attention to the equitable use of resources.

- Develop decision support tools to support participatory water management planning in the demonstration river-basins. The development of the tools will be one of the components of the stakeholder participation process. The tools will be adapted to local requirement including, in principle, a GIS environment for data management, vulnerability and risk appraisals and modelling capabilities.
- Derive a set of principles for future policy development and implementation to protect fragile ecosystems and dependant human communities in arid/semi-arid regions. The project partners will actively engage a wide network of policy actors to promote the uptake of the findings of the project.

EXPECTED RESULTS AND OUTCOMES

At river-basin level, the project will implement a wide process of social involvement in three particular river-basins in Peru, Bolivia and Chile. The project will deliver river-basin management plans and Decision Support Tools specifically developed for them. It is thus expected that the project will have a strategic impact on the management of the river-basins of the Chili (Peru), Poopó y Uru Uru (Bolivia) and Elqui (Chile) with direct benefits to the urban and rural areas in the regions of Arequipa (Peru), Oruro (Bolivia) and La Serena (Chile).

At national level, CAMINAR will involve stakeholders at the policy-making levels in Peru, Bolivia and Chile. The project will produce policy options for the management of arid and semi arid ecosystems. The existing institutional links of the project partners with water, environment and mining regulators provide a very good platform for strategic impact at the policy level. At regional level, CAMINAR will initiate a process of regional dialogue on the issues of the project. If successful, that will be a unique contribution to cooperation in the region. Taking into account the composition of the Consortium, it is expected that these dialogues will have a guaranteed impact amongst professional and academic users. CAMINAR will also seek to link other social actors within the region. The guidelines for water management in arid zones will be disseminated regionally.

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EPIC FORCE

Evidence-based policy for integrated control of forested river catchments in extreme rainfall and snowmelt

Period: 01/02/2005 to 31/01/2008
Budget from EC: EUR 1 700 000

Coordinator: Dr James C. Bathurst, University of Newcastle

CONTEXT AND OBJECTIVES

EPIC FORCE aims to improve the integrated management of forest and water resources at the river basin scale, through the development of policies based on sound science. Its focus is the impact of forest management on river basin response (in terms of water flow and soil erosion) for extreme rainfall events: this is an area in which there is considerable scientific uncertainty as well as poorly conceived policy.

EPIC FORCE will achieve its aims by linking scientific, management and policy research via the following objectives:

- development of a generic model for the response to extreme rainfall events in basins under different forest management, to be used as a reference for guiding future management practice: the model will be derived from existing advanced modelling technology and from field studies;
- development of improved strategies for integrated forest and water management relevant to extreme events at the basin scale: this will be based on reviews of current management practices and of best practice, along with applications of the generic model and field studies;
- development of evidence-based policy recommendations, provision of policy briefs for national agencies and production of recommendations for European and World Bank development policies: this will involve improvement of existing policies in the light of the modelling and management studies, in association with national forest and water agencies.

ACTIVITIES

The project will work in focus areas in four countries along the Andean Cordillera and its extension into Central America (Costa Rica, Ecuador, Chile and Argentina). These areas represent a range of humid forest (tropical and temperate) and rainfall/snowmelt (hurricane, El Niño event and mid-latitude depression) regimes with major flood and erosion problems, all suffering from a lack of integrated water and forest policies.

Each Latin American participant will form a National Working Group of water and forest resource agencies.

These agencies will provide advice and data, ensure that the development of management strategies and policy briefs are targeted towards their needs, participate in dissemination and capacity building activities and receive the project deliverables as end-users. The project activities are divided into ten work packages (WP) as follows:

- WP 1-4: analysis of basin response to forest management for extreme rainfall and snowmelt in a Latin American basin;
- WP 5: development of generic basin response model and scenario applications to determine response for different conditions;
- WP 6: development of methodology for evaluating and dealing with the impact of Large Woody Debris;
- WP 7: development of improved strategies for water and forest resource management relevant to extreme events at the basin scale;
- WP 8: development of evidence-based policy briefs and recommendations for water and forest resource management;
- WP 9: dissemination of project deliverables and institutional capacity building at national and international levels;
- WP 10: project management, including review and assessment of project results.

EXPECTED RESULTS AND OUTCOMES

EPIC FORCE will improve understanding of forest ecosystem dynamics (for extreme rainfall events) under human pressure (from logging and land use conversion), allowing a more sustainable use of water and forest resources and improvements in the efficiency and direction of decision-making and in environmental management. It will directly examine the impact of forests on river basin response (in terms of water flow and soil erosion) to extreme rainfall. The project team will extend the previous research into the effects of forest management on floods (dominated largely by environments in the USA) to the rainfall regimes and forest environments and tree species of Latin America. It will add new data to the database on extreme floods and will use these data to develop a generic model which tests the hypothesis that, as the size of the flood peak increases, the effects of land use become less important. The project

EPIC FORCE

will advance upon current capability by developing a methodology for predicting the mobility and impact of large woody debris during flood events. It will provide recommendations for improving management practices for forest and water resources in the focus areas and will critically review the currently accepted international best practices. EPIC FORCE will use the data and the model to propose evidence-based policies for forest and water resources management, enabling improvements in current policies and practices. Finally, the project will provide a fundamental shift in the basis for policy-making, from current misperception to firm scientific evidence.

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BORASSUS

The Environmental and Socio-economic Contribution of Palm Geotextiles to Sustainable Development and Soil Conservation

Period: 01/07/2005 to 30/06/2008
Budget from EC: EUR 1 749 876

Coordinator: Dr Michael Augustine Fullen
University of Wolverhampton

CONTEXT AND OBJECTIVES

Palm leaf geotextiles offer considerable potential in contributing to global sustainable development and soil conservation. Their use will promote sustainable and environmentally friendly palm agriculture, labour-intensive employment, SME development and earn hard currency. In the industrialised world, they will assist the stabilisation of complex slopes.

The project will test geotextile mats made from 'Borassus aethiopum' leaves along with other structurally similar species in field and laboratory conditions, to evaluate their long-term effectiveness in controlling soil erosion and to assess their sustainability and socio-economic viability.

Objectives include:

- promotion of sustainable and environmentally-friendly palm agriculture to discourage deforestation and promote both reforestation and agroforestry;
- construction of palm geotextiles to develop a rural based labour-intensive industry, particularly encouraging the employment of socially-disadvantaged groups;
- export of completed palm geotextiles to industrialised countries to earn hard currency for the developing economy and promote development, based on the principles of fair trade;
- geotextiles efficiently and economically conserve soil. Palm geotextiles will be especially beneficial for complex engineering problems, particularly in the building and road construction industries and coastal defence, to stabilise engineered slopes.

ACTIVITIES

These include:

- assessment of palm-mat geotextile effectiveness for reducing soil erodibility and soil loss in relation to specific soil properties, environmental conditions and land-uses, selection of soil types and materials, and in a range of climatic conditions;
- evaluating palm geotextiles effects, compared to established soil erosion control techniques;
- investigating — under different crop production systems — the economic aspects of applying palm geotextiles on soil fertility changes by using traditional

cultivation practices to demonstrate their efficiency as a reliable and sustainable technique;

- developing palm geotextiles for use by the construction industry in ground strengthening to refine analytical and design technologies, advance novel material production and define the performance characteristics and indices of palm geotextiles when used under realistic construction conditions;
- adapting existing soil erosion models, so that the impact of the establishment of palm-mat geotextiles on hydrological and erosion processes can be predicted for a range of environmental conditions;
- formulating recommendations to advise policy-makers, particularly in rural development economies, of environmental protection and soil conservation abilities;
- reducing poverty, particularly in rural areas, through teaching people to produce palm geotextiles;
- developing validated production standards and protocols, so that the mats can be efficiently produced by SMEs in INCO-DEV countries.

EXPECTED RESULTS AND OUTCOMES

The project is novel and offers new bioengineering solutions to environmental problems. Preliminary investigations suggest palm geotextiles are an effective, cheap and economically viable soil conservation method, with enormous global potential. BORASSUS will provide multi-faceted environmental benefits, which include technologies for sustainable plant production, promoting sustainable use of indigenous plants, improved ecosystem management for sustainability, decreasing deforestation, improved agroforestry and successful and cost-effective geotextile applications in diverse environments. The project will improve socio-economic foundations for sustainable development, with the benefits for INCO-DEV countries including poverty alleviation, engagement of disadvantaged groups as stakeholders, employment for disadvantaged groups, SME development, export of geotextiles earning hard currency, environmental education and local community involvement in reclamation and environmental-improvement programmes. Information dissemination via research publications, a website, conference presentations, workshops, media groups, educational pamphlets and

BORASSUS

instructional videos, will broaden the project's appeal at multiple levels (international, national, regional and local) to include academics, scientists, policy-makers, environmental planners and managers, and local communities.

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FOREAIM

Bridging restoration and multi-functionality in degraded forest landscape of Eastern Africa and Indian Ocean Islands

Period: 01/06/2005 to 30/05/2009
Budget from EC: EUR 1 639 997

Coordinator: Centre de coopération internationale en recherche agronomique pour le développement (CIRAD)

OBJECTIVES

Uganda, Kenya and Madagascar are strongly affected by deforestation and degradation of forest ecosystems, especially in humid and sub-humid zones. In those countries, forest restoration and rehabilitation are urgently required to secure rural livelihoods, enhance environmental benefits and enable economic development. However, despite this expanding degradation, little hard information is available on restoration options for tropical humid and sub-humid regions. Strategies for rehabilitation to achieve sustainable forest management are extremely limited at both national and regional levels.

By adopting a broad based multidisciplinary approach instead of the mono disciplinary methods which currently predominate local forest restoration research, FOREAIM shall:

- advance scientific understanding of the restoration processes, and through this;
- produce knowledge, practical tools, models and management guidelines for restoration implementation;
- synthesise information on economic, societal, policy and marketing issues, with full involvement of all stakeholders, to enhance employment opportunities and incomes, thus improving livelihoods for all sectors of the community.

ACTIVITIES

The FOREAIM project will use an integrated multidisciplinary approach involving methods in restoration ecology, biophysical techniques and social and economic approaches. It comprises seven work packages (WPs) elaborated in such a way that each work package achieves one specific objective of FOREAIM.

WPs 1 and 6 concern sociological and economics research, WPs 2 and 3 consider biological studies related to vegetation and dynamics, while WPs 4 and 5 address biophysical topics such as soil and erosion and biological indicators. WP 7 integrates all results to produce tools to transfer restoration and rehabilitation technologies and practices to stakeholders, i.e., local populations, economic stakeholders, extension services and governments, both local and

national. The project involves the active participation of social scientists, economists, ecologists, specialists in soils, soil microsymbionts and erosion, physiologists working on plant propagation and soil functioning, researchers involved in marketing and in negotiation and decision making processes. Research scientists from European countries and developing countries (Uganda, Kenya and Madagascar) will actively participate together in the implementation of the work-packages described.

EXPECTED RESULTS AND OUTCOMES

Results and outcomes expected from the FOREAIM project are several:

- promote the sciences of restoration ecology and biodiversity conservation by generating a wide variety of data and results on forest restoration dynamics and methodologies deriving from both biological and social disciplines in an integrated manner;
- provide of a set of low cost tools, methods and recommendations to combat and reverse land and forest degradation;
- share and disseminate information on innovative restoration strategies and technologies for sustainable management of natural forests, agro-ecosystems and allied natural resources through country workshops and conferences;
- ensure European researchers' strong involvement in the project to complement rather than duplicate existing research activities in the field;
- strengthen, develop and consolidate the research knowledge and systems of Partner countries;
- provide employment and improve living standards locally.

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ASEMWATERNET

Multi-stakeholder Platform for ASEM S&T cooperation on sustainable water use

Period: 01/09/2005 to 31/08/2009
Budget from EC: EUR 1 500 000

Coordinator: Dr Caroline Wittwer
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CONTEXT AND OBJECTIVES

Water is a driving force for sustainable development. The main objective of the Coordination Action ASEMWaterNet is to contribute to the commitments of the EU Water Initiative and the Millennium Goal by building and promoting a multi-stakeholder and scientific platform on water resources management. The platform will mobilise the individual strengths of 18 ASEM (Asia Europe Meeting) partner countries, interact with existing networks, and promote interdisciplinary activities between public authorities, scientific community, private sector and civil society. Through several types of coordinating activities, the 53 participating organisations will gather their experiences on five priority areas, defined during a first workshop in 2002, namely:

- river basin approach;
- water use efficiency in agriculture;
- erosion, flash floods and floods;
- pollution and water quality;
- water governance.

These joint activities will lead to identifying new solutions for improved water use, protection and reduction of risks i.e. pollution, depletion, erosion, flood. Furthermore, through the organisation of workshops and a conference, they will boost and promote exchanges between the scientific community and the industrial and political representatives. The spirit of the ASEM process, built on a framework of respectful and open cooperation between equal partners, will therefore be promoted on water management issues.

ASEMWATERNET

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ForLive

Forest Management by small farmers in the Amazon — An opportunity to enhance forest ecosystem stability and rural livelihood

Period: 01/02/2005 to 31/01/2009
Budget from EC: EUR 1 849 720

Coordinator: Benno Pokorny
Albert-Ludwigs-University of Freiburg

CONTEXT AND OBJECTIVES

In many situations, forest management concepts for small farmers in the Amazon have been externally defined and do not correspond adequately to their livelihood systems and competences. This is one of the reasons why only few farmers effectively use the potential of the wide variety of forest management options to enhance their human well being. The project aims to identify locally viable forest management options, contributing to local livelihoods and the ecological stabilisation of landscapes and to define possibilities to promote them as a basis for sustainable development in the rural areas of the Amazon. The project also searches to strengthen the capacity for collaborative research and the networking among local and international project partners.

ACTIVITIES

The project will identify and analyse existing local forest management initiatives in the Bolivian, Brazilian, Ecuadorian and Peruvian Amazon, where farmers have decided to manage and not clear forests for other land-use purposes. Following the approach of 'Integrated Natural Resource Management', the project will analyse institutional, environmental and technical aspects within the livelihoods of small farmers, to assess and value the local viability of selected forest management systems and their possible contribution to the ecological stability of the different regions. Through the application of both 'Action Research' and traditional research approaches, the project will ensure local relevance and stimulate constructive learning processes. A sound background to the decisions made by small farmers to invest in forests is provided through the analysis of formal and informal institutional framework, such as political, economic, legislative and key infrastructural drivers. A complementary analysis will also be carried out concerning livelihoods and environmental aspects. This is taken as a basis to develop key indicators for sustainable forest management by small farmers in the Amazon.

EXPECTED RESULTS AND OUTCOMES

The project will provide important insights into local farmers views on forests and locally adapted forest management strategies. This will provide essential information to define policy instruments, which promote forest management strategies in accordance with the realities facing rural farmers. The project will provide specific recommendations to improve environmental regulations, to design governmental programmes for financial support of local forest management initiatives, and to develop more effective extension services. In addition, it is expected that non-governmental organisations will adapt their funding priorities and working methodologies in accordance with the information carried out by the project. Finally, local farmers will receive support to articulate their demands and participate more actively in public policy. The project will directly contribute to one of the priority problems of the partner countries, namely how to combine forest conservation with rural development and will therefore provide an important foundation for new policy developments aimed at maintaining forest cover in the Amazon basin.

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DIM-SUM

Innovative Decision Making for a Sustainable Management of Water in Developing Countries

Period: 01/01/2005 to 30/06/2008
Budget from EC: EUR 1 700 000

Coordinator: Markus Starkl
University of Natural Resources and Applied
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CONTEXT AND OBJECTIVES

The many challenges for water management in developing countries are well documented. Integrated water management seems difficult, where conflicting and overlapping institutions exist and where the way in which demand is expressed is very different from the way potential solutions are managed at the local or state level. Although participation and integration are often invoked in the mainstream of world water politics today, in reality such exercises may often be carried out in a superficial way only.

DIM-SUM focuses on the very core aspect concerning these issues, which is the decision making process (DMP). The overall project goal is to develop recommendations for a sustainable DMP, based on several DIM-SUM research projects (see activities below), and encompassing an adaptive tool box, guidelines and policy recommendations. This will enable local decision makers in developing countries to carry out an assessment of technical scenarios at an appropriate level of integration and participation, and hence contribute to a sustainable management of water.

ACTIVITIES

Focusing on water supply and sanitation (WSS), DIM-SUM will carry out one case study in a river basin in each participating partner country, namely in Indonesia, Malaysia, Nepal and the state of Maharashtra, India.

The activities of the project will encompass a baseline study, an analysis of existing decision-making frameworks, an analysis of decision-making strategies (ranging from fragmented to integrated assessments, for example), research in the fields of stakeholder participation, scenario development and group decision making, evaluation of selected existing and implemented technologies, the development of an inventory of state-of-the-art technologies for WSS (ranging from conventional to emerging technologies, e.g. technologies for ecological sanitation), development and integrated assessment of various technical scenarios for WSS in the case study sites, broad dissemination of the project results and, finally, the management of the project. Many of these activities will be based on several related projects and involve a number of stakeholders, such as the general public, NGOs, water service providers, governmental and international organisations.

EXPECTED RESULTS AND OUTCOMES

The expected results and outcomes are, on the one hand, directly connected to the above mentioned activities, e.g. an integrated and participatory assessment of various technical scenarios for WSS. On the other hand, they will be based on a synthesis of the comprehensive project results. The latter will result in recommendations for a sustainable DMP (see objectives above) taking into account relevant issues relating to equity, gender, information, institutions, partnerships, risks and uncertainties. These results will be disseminated to various stakeholders who will be directly involved in the project (see activities above), but will also be adaptable to other circumstances.

DIM-SUM will therefore contribute to the EU Water Initiative by providing links between its objectives of providing water supply and sanitation in the context of integrated water resource management, governance and enhanced participation of civil society in policy formulation and decision making, and conflicting issues such as opening the water markets and privatisation.

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RESTORPEAT

Restoration of tropical peatland to promote sustainable use of renewable natural resources

Period: 01/11/2004 to 01/11/2007
Budget from EC: EUR 1 450 000

Coordinator: Dr Henk Wösten, Alterra

CONTEXT AND OBJECTIVES

RESTORPEAT will coordinate the activities of 14 international partners in Europe and Southeast Asia to address global and regional issues of:

- carbon balance;
- water management;
- biodiversity and poverty alleviation related to restoration;
- sustainable management of tropical peatland renewable natural resources.

It will facilitate access to existing knowledge and expertise as well as conduct targeted research on the restoration of tropical peatland in order to promote sustainable livelihoods for local communities. A scientific and technological framework for knowledge transfer and human capacity development related to restoration of tropical peatland is to be set up, benefiting both the EC and DCs.

ACTIVITIES

In order to achieve these aims, the problems of fire and inappropriate land use planning will be addressed by developing a model fire hazard warning and control system based upon remote sensing. The system will be operated by local communities through the promotion of fire awareness, prevention and suppression.

Stakeholder platforms and skills transfer to the DCs will be focal activities to provide ownership of the project outputs to the bottom levels. Through partnership with local governments, these activities will empower local people to become guardians of their own environment and its resources.

Implementation of the project will involve a range of measures including: the blocking of channels and drains; the restoration of hydrology and ecological functions; the rehabilitation of peat swamp forest and its biodiversity; the identification of alternative funding mechanisms to promote sustainable livelihoods; and the formulation of guidelines for sustainable agriculture and forestry.

EXPECTED RESULTS AND OUTCOMES

These activities will result in a better understanding of the socioeconomic base of local people and their communities by determining the nature and degree of their dependence on renewable natural resources and how this has been affected by major land development projects and fire.

Project outputs will be transferred to local governments through collaboration, and to local communities through stakeholder participation platforms. Furthermore, outputs will be used to network information, share experiences and promote action, as well as to form the basis of peatland landscape management and planning strategies, information dissemination activities and skills transfer to the DCs.

RESTORPEAT

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GUYAGROFOR

Development of Sustainable Agroforestry Systems based on Indigenous and Maroon knowledge in the Guyana Shield Region

Period: 01/11/2004 to 01/11/2008
Budget from EC: EUR 1 550 000

Coordinator: Dr Coen Ritsema, Alterra

CONTEXT AND OBJECTIVES

In the rainforests of Suriname, Brazil and Venezuela, Indigenous and Maroon communities are facing increased outside pressures on their communal lands. Their capacities as managers of the forest resource base have so far been insufficiently exploited for the benefit of their national economies. The main objective of GUYAGROFOR is to develop new strategies for sustainable development of agro-forestry systems that support the socio-economic and organisational empowerment of Indigenous and Maroon communities in Suriname, Brazil and Venezuela, while contributing to the national economy.

products, the organisational and institutional framework needed to allow successful participation in regional and international markets will be indicated. Further in-depth studies will be done on selected product chains that are environmentally and organisationally most favourable, in order to make investments for further development towards international exports. Finally, tailor-made guidelines and recommendations on environmental management, product chain improvement and organisational/institutional strengthening will be provided for all stakeholders, including joint scientific publications and a final report.

ACTIVITIES

A farming systems analysis, focused on socio-economical, environmental and institutional aspects of Indigenous and Maroon agroforestry systems will be done. Simultaneously an inventory of market opportunities will be carried out for the production and commercialisation of cash crops and (non-) timber forest products for local, regional and European markets. After synthesis and evaluation, the priorities and conditions will be set for further research in consultation with multi-stakeholder platforms. According to these priorities and conditions, field trials will be implemented for environmental management and simultaneously an in-depth study of selected Indigenous and Maroon products will be carried out for improvement and further development of their market chains. Finally, tailor-made guidelines for sustainable development of Indigenous and Maroon agroforestry systems will be prepared.

EXPECTED RESULTS AND OUTCOMES

The GUYAGROFOR project will provide insight into Indigenous and Maroon views of forest ecology, soil fertility and biodiversity management, the structure and functioning of their households and their needs for institutional support. Indigenous techniques will be identified and integrated with formal environmental management strategies to develop integrated farming strategies that allow farming systems to be productive, balanced according to their water and nutrient use (soil fertility), diverse (biodiversity) and adapted to the ecology of the forest ecosystem. Training curricula will be designed for community groups and researchers. Through market analyses of cash crops, timber and non-timber forest

GUYAGROFOR

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CULTURAL HERITAGE

MEDISTONE

Preservation of ancient MEDiterranean sites in terms of their ornamental and building STONE: from determining stone provenance to proposing conservation/restoration techniques

Period: 01/01/2006 to 31/12/2008
Budget from EC: EUR 1 043 120

Coordinator: David Dessandier
Bureau de recherches géologiques et minières

CONTEXT AND OBJECTIVES

The conservation of archaeological sites around the Mediterranean basin constitutes a major challenge for the future. Until now, studies of archaeological sites have tended to lack sustained follow-up over time, and have not interacted sufficiently with other similar sites to enhance the results of research. Three archaeological sites — two of which are listed within UNESCO's World Heritage List (Djemila, Algeria; Volubilis, Morocco; Alexandria Lighthouse, Egypt) — have been selected for this study. Site selection has been based on priorities for site preservation and tourism indicated by those non-European participating partner countries where a demonstrable scientific challenge and possible breakthroughs for site preservation have been identified.

The MEDISTONE objectives are:

- identifying stones used at the selected sites and determining their origins in terms of geographic areas and, if possible, the former quarry sites; at the present time, the region of origin of numerous decorative stones used in constructions dating from antiquity, both in the West and the Orient (and often reused in the Middle Ages) remains poorly defined or even unknown;
- establishing diagnosis of the state of conservation of the stones at the sites; while the causes and mechanisms of deterioration to stones are relatively well known for temperate European climates, the semi-arid continental climate of the selected sites, characterised by strong thermal amplitudes, high evaporation and strong wind action, together bring about specific weathering and alteration requiring more thorough investigations;
- providing answers to the main problems regarding stone conservation/restoration that are liable to be met at the selected sites; it involves developing techniques for reassembling fractured and fissured stones; this phase will be based on European know-how and will take into account the climatic and environmental specificity, as well as the social-economic context in each Mediterranean Partner Country (MPC).

ACTIVITIES

The project objectives will be addressed through a work plan of four work packages organised into three groups of activities covering research aspects, technical developments and dissemination of results, and will:

- identify stones used at the three selected sites and determine their origins in terms of geographic areas and, if possible, the former quarry sites;
- establish a diagnosis of the state of conservation of the decorative stones and constructions at the sites;
- develop and test reassembling of fractured and fissured stone techniques, based on European know-how, and taking into account the climatic and environmental specificity (thermal amplitude related to the particular semi-arid continental climate at the Mediterranean located sites), as well as the socio-economic context in each MPC;
- carry out the dissemination of the scientific and technical research results and data obtained.

EXPECTED RESULTS AND OUTCOMES

The scientific and techniques results issuing from the MEDISTONE project will be compiled into three synthetic volumes per site, jointly produced by the partners involved, as follows:

- an atlas including data record for each ornamental or building stone inventoried in the site, including location maps of ancient quarries with explanatory notes;
- a guide for stone conservation, including guidelines for diagnosis and the illustrated index of stone decays observed on the site, and recommendations for maintenance and restoration/conservation strategy;
- technical protocols for reassembling fractured and fissured stones adapted to the site, and long-term monitoring fiches of the in situ test zone

Training of MPC doctorate students during the three years of the project (supervised and guided by both the EU scientists and those from their respective countries) will enable a transfer of know-how from the EU scientists to a new generation of MPC scientists and, at the same time, enhance the transfer and diffusion of data and knowledge in this direction.

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InfrArtSonic

Development of a novel and integrated portable non-destructive analysis system for the documentation of artworks

Period: 01/01/2006 to 31/12/2008
Budget from EC: EUR 1 259 988

Coordinator: Sacred Convent of the Annunciation

OBJECTIVES

The core objective of this project is the development of an integrated, non-destructive and portable analysis-diagnosis system for 3D 'sampling', archiving and reconstruction of painted artworks called InfrArtSonic (Infrared and ultraSonics for Art diagnosis). This system will be a unique and invaluable aid for art historians and restorers.

A portable, non-destructive artwork analysis system will be integrated using acoustic microscopy combined with Vis-nIR-mIR spectroscopy. This scientific instrument will be capable of studying the existing stratigraphy of artworks. This will constitute a unique research device for art historians and restorers in the Mediterranean and in pan-European area.

The InfrArtSonic system will combine two modalities that will be developed:

- an Acoustic Microscope for Art Diagnosis (AMAD);
- a Visible near-Infrared/mid-Infrared (VIS-nIR-mIR) reflectance spectroscope (Infrared System for Art Diagnosis (ISAD).

The information acquired by these subsystems (AMAD-ISAD) will be complementary. The AMAD will provide with an in-depth 'image' (the depth profile) of the paint layers' distribution and the ISAD will identify the materials — mainly the inorganic ones — in each layer.

ACTIVITIES

Scientific activities include the following:

- An algorithm describing the identification of the present stratigraphy, using spectral data as well as acoustic microscopy data will be developed. This algorithm will be applied to the case study artworks in order to test the effectiveness of the complete methodology and developed system. The final product of the overall research work will be a tool for materials' identification (mapping) and stratigraphy definition.
- An advanced 3D reconstruction algorithm and software for paint layers will be developed. This system will take into consideration data provided by the AMAD and ISAD systems. An overlay technique will put both datasets on the top of each other and correlating them to a multi-modal dataset.

- Development of special libraries containing Vis-nIR-mIR spectra obtained in a non-destructive way will be created and/or extended — depending on if some of these spectra are already available.
- Updating and developing a rich and multilevel database which will be integrated into the system. This database will be based on the system already developed during previous European projects, including both multispectral images and multi-spectral information. New forms and data will be supported by this system, such as ultrasonic-acoustic microscopy and VIS-nIR-mIR spectroscopic data. The algorithms of fusion and signal processing that will be developed will be linked to the new and updated system, which will constitute a new documentation tool for artworks.

Dissemination activities

Activities within this task are devoted to carrying on all promotional activities of the project, with a view to commercially exploiting the research results. The works on dissemination and exploitation will be based on two main actions: permanent observation of state-of-the-art and potential competitors; and direct contact with potential customers by creating a user group to inform them of the project's progress in real-time.

In addition, on the day before consortium meetings, the consortium will organise training seminars or presentations to potential users of the system, or more generally, users of non-destructive testing techniques on artworks. Participants at these meetings — which are to be held on their premises — will include the target group: conservators, art historians, archaeologists, and possibly scientists as well, who may need or use this kind of system.

EXPECTED RESULTS AND OUTCOMES

The project plans to achieve the following:

- an innovative scientific device will be developed;
- publications and workshops will be organised for the scientific dissemination of the results;
- a patent will be applied for;
- workshops for the dissemination of results to the end users — conservators, art historians and archaeologists — will be also organised.

InfrArtSonic

All these results will contribute to the EU policy concerning the opening up of the European research area to the rest of the world. At least at a scientific and social level the consortium's proposal will ensure the opening up of the European research area to Mediterranean countries. The project partners involved come from a wide range of policy fields and from countries such as Germany, Greece, Italy, Cyprus, Egypt, Jordan, and Lebanon.

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MED-COLOUR-TECH

Investigation, Revival and Optimisation of Traditional Mediterranean Colouring Technology for the Conservation of the Cultural Heritage

Period: 01/01/2006 to 31/12/2008
Budget from EC: EUR 1 200 000

Coordinator: Ioannis Karapanagiotis
Sacred Convent of the Annunciation

CONTEXT AND OBJECTIVES

Colouring or painting with natural dyeing materials has been fundamental in art and intrinsic to the cultural identity of the Mediterranean area, since antiquity. The reconstruction and revival of traditional manufacturing processes for natural colorants, as well as of dyeing procedures or painting techniques, is essential for the preservation of the Mediterranean cultural heritage.

This project has the following overall objectives:

- establishment of an analytical methodology for dyestuff identification of selected art objects of the cultural heritage in the Mediterranean area, and formulation of corresponding recommendations on conservation;
- systematic analysis and reconstruction of ancient colouring techniques, typical for civilisations developed in the Mediterranean area, to elucidate the local ancient colouring technology;
- dissemination of new natural organic pigments and corresponding colouring components, currently not available in the market, to the scientific community, interested target groups and the general public.

ACTIVITIES

The activities to be undertaken during this project consist primarily of the following:

- collection of historical data (e.g. ancient dye recipes) and sources of natural dyestuffs and art objects of the Mediterranean area;
- production (chemical synthesis) of colouring components (standards) of the dyestuffs of interest;
- identification of natural dyes in art objects, using analytical techniques such as HPLC-PDA, LC-MS, FTIR;
- production and characterisation of natural organic pigments based on ancient recipes;
- optimisation and standardisation of the production processes of natural organic pigments;
- pilot (industrial) production of natural organic pigments and corresponding standards;
- recommendations for conservation strategies;
- creation of an encyclopaedia of natural organic pigments of the Mediterranean area.

EXPECTED RESULTS AND OUTCOMES

MED-COLOUR-TECH reinforces the competitiveness of EU and Mediterranean countries at multiple levels, scientifically through the development of new diagnostic and identification methodologies, associated with art objects. The project reinforces European organisations and companies with the production of new materials (dyes and colouring components) which are currently in great demand by various bodies active in the area of cultural heritage conservation, pharmacology, plant pathology and analytical chemistry. Protocols for the production of natural organic pigments will be formulated, according to ancient recipes. MED-COLOUR-TECH is expected to elucidate aspects of colouring technologies developed by several civilisations of the Mediterranean area, leading ultimately to the setting up of a database containing recommendations for conservation strategies.

MED-COLOUR-TECH

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QUARRYSCAPES

Conservation of Ancient Stone Quarry Landscapes in the Eastern Mediterranean

Period: 01/11/2005 to 31/10/2008
Budget from EC: EUR 999 998

Coordinator: Tom Heldal, Geological Survey of Norway (NGU)

CONTEXT AND OBJECTIVES

The cultural heritage of the eastern Mediterranean is predominantly one of stone, taken from thousands of quarries throughout antiquity. The archaeological record of the quarries comprises rare evidence of stone extraction sites, roads, harbours, settlements, ceramics and inscriptions, which collectively constitute an 'ancient quarry landscape'. Yet, heritage sites of such historical importance as these have largely gone unrecognised, mainly due to poor documentation, which has consequently led to their current indiscriminate destruction, as a result of actions such as modern development and quarrying.

QUARRYSCAPES will enhance cultural heritage management of ancient quarry landscapes, through the development of methodology and conservation models that can be effectively implemented in a range of cultural contexts. The project will develop scientific and practical methodologies for the documentation, characterisation and conservation of ancient quarry landscapes, and will also raise awareness of the significance and vulnerability of such sites, and contribute to legal protection measures and sustainable management of ancient quarry landscapes.

ACTIVITIES

Through case studies in Egypt, Jordan and Turkey, QUARRYSCAPES will develop theoretical and practical methods pertaining to the major steps in the process of conservation, from recognition, investigation and assessment of significance, to understanding the risks, developing sound conservation and monitoring concepts, and suggesting mechanisms for sustainable management. QUARRYSCAPES is divided into ten work packages (WPs), of which one is a case study in Jordan, two in Turkey and four in Egypt, exploring different aspects of a range of quarry landscapes. One WP will be assigned to extract the general scientific achievements from the case studies and form the basis for the compilation of general guidelines for conservation of quarry sites. The ninth WP covers the organisation of workshops and dissemination of project achievements. WP ten contains project management activities.

EXPECTED RESULTS AND OUTCOMES

QUARRYSCAPES aims to create knowledge and understanding of the significance of several important, and potentially threatened, ancient quarry landscapes in the eastern Mediterranean. Furthermore, the project aims to generate valuable tools for the characterisation, conservation and management of such sites in general, especially through the development and publication of practical guidelines for conservation of ancient quarry landscapes. With its ambitious dissemination plan, QUARRYSCAPES also aims at contributing significantly in raising the awareness of such sites in general, and in the three Mediterranean countries in particular. Through the project website, an atlas of ancient quarries in the eastern Mediterranean, workshops and active publication in scientific and professional magazines, the project intends to reach an audience much wider than that of the scientific community.

QUARRYSCAPES

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WIND-CHIME

Wide-range Non-intrusive Devices toward Conservation of Historical Monuments in the Mediterranean Area

Period: 01/06/2004 to 31/05/2007
Budget from EC: EUR 780 000

Coordinator: Fabio Casciati, University of Pavia

OBJECTIVES

The objective of this project is the development of a sustainable and cost-effective retrofit technology, which will allow non-intrusive rehabilitation of historical monuments in the Mediterranean area. Following the main results achieved on a theoretical and experimental level within a project of the EU's Fifth Framework programme, the two main goals of the present proposal are:

- to enlarge the geographical area of intervention of the past cooperative effort;
- to translate the design features from the ongoing project into devices to actually be implemented in some specific cases. In particular, shape memory alloy (SMA) pre-stressed devices will be used to fasten cracked brick and stone monuments, and SMA dampers will be introduced in slender structures such as minarets and bell-towers.

ACTIVITIES

The following three steps are envisaged:

- a metallurgical and thermo mechanical characterisation of different alloys (mainly the classical Ni-Ti alloy and a Cu-based alloy) in order to avoid a last moment inconsistency between material and application;
- a smart implementation of the materials' properties into suitable devices;
- full validation pursued through case studies located in the historical areas of the Mediterranean partners, namely, a palace in Tunisia, a couple of minarets in Egypt, and two historical masonry constructions in Jordan and Algeria.

EXPECTED RESULTS AND OUTCOMES

The expected results are listed in order of importance to the project:

- structural analysis and consolidation methods for monuments: adaptive reuse of monuments and sites and an integrated approach to conservation (activity code INCO-2002-B2.2);
- development, characterisation, and evaluation of new materials for the conservation and restoration of archaeological artefacts and monuments, assessing matters of compatibility (activity code INCO-2002-B2.1).

Both results will be disseminated through scientific papers and case study reports. A final dissemination conference is planned.

WIND-CHIME

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PAPERTECH

Innovative materials and technologies for the conservation of paper of historical, artistic and archaeological value

Period: 01/07/2004 to 31/12/2007
Budget from EC: EUR 1 300 000

Coordinator: Gennaro Gentile, Campec Srl

CONTEXT AND OBJECTIVES

The aim of PAPERTECH is the development of innovative diagnostic techniques and protocols to evaluate the deterioration degree of paper and papyri items of historical and artistic value, and the study of innovative materials and technologies for their conservation.

The objectives of this project are:

- the development of innovative diagnostic techniques to evaluate the deterioration degree of paper items of historical, artistic and archaeological value;
- the selection and the characterisation of paper/papyri samples of artistic and historical value, and the setting up of model paper samples, i.e. modern samples artificially aged, reproducing the degradation degrees of the ancient samples;
- the development of innovative materials and technologies for the conservation of paper;
- the evaluation of the efficiency of conservative treatments and their endurance with reference to the chemico-physical characteristics of modern papers;
- the dissemination and exploitation of the results.

ACTIVITIES

The preliminary actions will be focused on the selection of paper items recovered in different areas of the Mediterranean Basin. These items will be characterised by means of non-destructive and micro-destructive methods.

In particular, attention will be focused on the:

- identification of the materials and the technologies used in their manufacture;
- evaluation of their origin/provenance;
- identification of inks and pigments eventually present;
- analysis of the deterioration morphologies;
- study of the causes and mechanisms of degradation;
- planning of suitable and eco-sustainable restorative interventions through preliminary tested compatible materials and applicative technologies;
- development, inter-calibration and validation of non-destructive techniques for in situ analysis.

EXPECTED RESULTS AND OUTCOMES

The results and outcomes expected from the described activities are:

- publishing of the project website — an electronic platform considered as the nucleus of a network for exchanging information;
- summary on the analytical results of the diagnostic techniques applied on ancient and model samples, and suggestions for a protocol for analysing the characterisation of ancient items;
- summary on the results of the new materials and technologies set up for the conservation of ancient items;
- production of a CD ROM entitled: Innovative Materials and technologies for the conservation of paper and papyri of historical, artistic and archaeological value;
- dissemination of scientific results through the publication of papers by the partners in national and international scientific and disseminative magazines;
- organisation of an exhibition showing the results of the project, including historical items characterised and restored following the protocols obtained from the research undertaken.

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PATINE DU DESERT

Re-creation of the patina of Saharan sandstones, carrying engraved or painted work, 15 000-year witnesses of climate changes

Period: 01/09/2004 to 01/09/2007
Budget from EC: EUR 895 000

Coordinator: Prof. Max Schvoerer, Network PACT

CONTEXT AND OBJECTIVES

- Recreate in situ and in laboratory the patina of sandstones of the Saharan desert;
- engraving and/or cave painting supports.
- Seek if there is an 'images-climate' correlation.

ACTIVITIES

- Interpret and model the mechanisms of creation of the patina and surface of sandstone, taking into account the characteristics of the rock and their dependence on the local climate parameters. The re-creation strategies envisage the use of liquid silicates and/or of micro-organisms generating bio-minerals.
- Propose an innovative reading of Saharan rupestral art to contribute information on the capacity of ancient people to adapt to climate changes which have occurred in this region for about 15 millennia.

EXPECTED RESULTS AND OUTCOMES

- Development of an innovative method of restoration of the patina of sandstones.
- Evaluation of a new interpretative reading of Saharan rupestral art in relation to climate changes for 15 000 years.

PATINE DU DESERT

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SHADUF

Traditional Water Techniques: Cultural Heritage for a Sustainable Future

Period: 01/07/2004 to 30/09/2007
Budget from EC: EUR 1 109 880

Coordinator: Elena Piccinotti
European Jewellery Technology Network

CONTEXT AND OBJECTIVES

For years, the ancient practices of water harvesting, catchment and distribution has guaranteed water supply to countries and towns all over the Mediterranean area. Such techniques are rooted in society and the environment, thus becoming part of local knowledge, creating the identity and harmonious management of the landscape. Nowadays, the risk of water shortage, desertification and degradation of soils due to global warming, as well as the increase of urbanisation and agricultural industrialisation is high. As a consequence, the reuse of traditional water systems represents, on the one hand, a fundamental contribution to water resource management based on local sustainability and, on the other, restores the aesthetical values of monuments, as a further resource for people.

The project aims at:

- developing a database containing information on key water management practices in ancient times using archaeological, historical, and environmental information and field work;
- carrying out an inventory of traditional Mediterranean water catchment techniques still being used;
- evaluating the nature of monuments and the cultural significance of the techniques under consideration and proposing appropriate strategies for restoration and conservation;
- evaluating the sustainability of current water management activities as well as the proposed activities with regard to the long-term perspective of the project.

ACTIVITIES

The principal project activities will be to:

- investigate water hydraulic engineering technologies in use at water and wastewater heritage sites;
- document the environmental aspects related to water and wastewater heritage sites, and the impact of waterworks on the local environment;
- create a database on archaeological data, historical information, and environmental data, including watershed analysis to assess flash flood control measures where relevant;

- investigate the social and cultural dimensions of water catchment techniques in the various case studies with a comparative interregional analysis of the data;
- utilise the long-time perspective from archaeological data and traditional practices still used.

The project will document the traditional techniques under study. Ancient dams, cisterns, channels and flash flood control measures will be carefully studied. Where the danger of seasonal flash floods is encountered (as in Petra), terrain modelling will be used to analyse the watersheds involved and proposals for flash flood control scarcity will be elaborated. This is an innovative approach that promotes an economic return and brings added value that will justify the efforts in reusing and revitalising the ancient water management technologies.

EXPECTED RESULTS AND OUTCOMES

Adaptive reuse of monuments and sites will help promote an integrated approach to conservation. Cultural heritage sites related to water-works will be surveyed and documented in all case studies using archaeological and historical methods.

The strategic impact of the SHADUF will be to reinforce local economy and competitiveness by solving societal problems. This will be achieved by comparing traditional technologies and approaches to water savings with sustainable irrigation and water use — including reuse — for overall reduction of water consumption.

As water conflicts in the southern Mediterranean are sure to increase in the future, any measures aimed at assessing and alleviating water shortages falls within the common goal of maintaining peace in the area.

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PROHITECH

Seismic Protection of Historical Buildings by Reversible Mixed Technologies

Period: 01/10/2004 to 30/09/2008
Budget from EC: EUR 2 400 000

Coordinator: Federico M. Mazzolani
University of Naples Federico II

CONTEXT AND OBJECTIVES

It is well known that many countries and cities in the southern part of Europe are extremely exposed to seismic hazard, which causes its valuable building heritage to be greatly at risk due to earthquakes. This problem occurs due to the fact that most of them frequently lack basic anti-seismic features with adequate provisions against earthquake actions. The main objective of the PROHITECH project is to develop suitable methodologies for the use of Reversible Mixed Technologies (RMTs) in the seismic protection of existing buildings of historical and monumental interest.

RMTs are based on the integration of structural members of different materials and construction methods into a single construction. The basic feature of RMTs is that their application should be always recoverable and reversible. Their main aim is to exploit the material and technological features in the best possible way, in order to optimise the structural behaviour under any condition, including very severe seismic actions. The outcome of the research will be a proposal for codification on the use of such technologies which will meet the most up-to-date codification issues at European level and comply with the layout, language and philosophy of structural Eurocodes.

ACTIVITIES

The PROHITECH project has been conceived to yield practical guidelines useful for both design and constructional purposes. Project activities have been subdivided into four research areas:

- intervention strategies: assessing the main criteria and methodologies underlying the common practice of seismic upgrading, and improving the knowledge and awareness of engineers with regard to the importance of innovative materials and technologies in seismic rehabilitation;
- selection of materials and technologies: individuation of innovative materials on the basis of their mechanical features in order to select suitable ones for creating both strengthening systems and special devices aimed at achieving adequate structural performances compared with conventional solutions;

- experimental and numerical research: development of advanced design guidelines for the repair and strengthening of existing structures on the basis of the obtained experimental data and numerical simulations;
- set-up of codification rules: selection of study cases of the historical building heritage in the Mediterranean area; preparation of an operational manual for the practical implementation; and proposal of codification rules for the design of seismic protection interventions based on innovative reversible mixed technologies.

EXPECTED RESULTS AND OUTCOMES

The project will mark a valuable step towards the diffusion of a more effective, environmentally friendly policy in seismic protection of constructions, including those with monumental features. The main direct outputs of the project are purely scientific: it is expected to produce about 50 papers to be published in international journals and presented at international conferences. It is expected that several PhD theses will be written as part of the project.

The final product of PROHITECH will be a proposal for a set of design and execution rules, most likely to be introduced into European codification. This product will consist of the final main deliverable: a 'Proposal of codification on the use of reversible mixed technologies in the seismic protection of historical buildings'. This proposal will comply with the most up-to-date codification issues in the field of seismic design, e.g. the Performance Based Design, and will share the same global layout, language and philosophy as Structural Eurocodes issued by the European Committee for Standardization (CEN). This codification will fill a real gap that exists in the seismic regulations of all European and Mediterranean Countries which, at the moment, do not allow for any specific provision for seismic protection of their cultural heritage.

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PROMET

Innovative conservation approaches for monitoring and protecting ancient and historic metals collections from the Mediterranean basin

Period: 01/11/2004 to 30/04/2008
Budget from EC: EUR 2 599 999

Coordinator: Vasilike Argyropoulos
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CONTEXT AND OBJECTIVES

Museums and historical sites in the Mediterranean region exhibit collections of Phoenician, Hellenistic, Roman and Islamic metallic works of art that are witnesses to our past. Unfortunately, these objects often suffer serious conservation problems due to the corrosion and degradation phenomena that may, for example, take place during their burial and/or after their excavation during storage and exhibition. The high relative humidity and aggressive agents in the atmosphere may accelerate these problems. Conservation strategies have to be tailored to take into account the different environmental conditions and the degradation causes occurring in the countries of the Mediterranean Basin. While experts seek to slow down the degradation phenomena, it is not possible to protect the metal collections by placing them in strict environmentally controlled areas or by treating them on a regular basis; the large number of objects and the heavy cost of repeated maintenance do not permit this. PROMET aims to establish and promote a preventive strategy designed for the Mediterranean region by developing portable monitoring systems and protection methods, including the identification of degradation phenomena, for collections of precious metals, iron and copper alloys.

ACTIVITIES

New portable techniques, such as Laser-induced breakdown spectroscopy (LIBS), micro X-ray Fluorescence (i-XRF) and Electrochemical impedance spectroscopy, will be developed as analytical tools for metal objects to be used in parallel with scientific techniques for identifying degradation phenomena and to tailor conservation strategies. These advanced analytical methods will be applied to a number of survey collections — including archaeological artefacts in different countries in the Mediterranean region, such as Egypt, Greece, Italy, Jordan, Malta, Morocco, Spain, Syria, Tunisia and Turkey — to identify the conservation problems.

In parallel, safe corrosion inhibitors and chemical agents, as well as PVD and PECVD barrier films combined with synthetic microcrystalline or polyethylene-based waxes, will be developed and validated for use on artificially and naturally aged metal reference alloys.

A maintenance policy for metals collections will be highlighted through dissemination-related activities, such as workshops, conferences, an English-Arab website and the publication of a book.

EXPECTED RESULTS AND OUTCOMES

The project will deliver two prototype portable pieces of equipment to the market: LIBS and i-XRF, which will be able to carry out non-destructive or semi-destructive analyses of ancient metal artefacts. The surveys conducted will provide an accurate description of the different degradation phenomena occurring in the Mediterranean Basin.

PROMET will offer new products, i.e., corrosion inhibitors and barrier coatings for the protection of metal artefacts, to be used for the conservation of ancient metal objects of a different nature, degradation phenomena and manufacturing processes.

The findings of PROMET will make it possible to provide effective tools for the protection of culture heritage by offering reliable solutions that can be applied by end-users e.g. museum curators. Furthermore, this new preventive approach will promote a legislative policy for conservation of metallic objects collections. Finally, a number of PhD theses, scientific publications, conservation guidelines, and new conservation products for metal objects would be the expected outcomes of this project.

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NOESIS

NON-dESTructive Image-based manuscript analysis System

Period: 01/09/2004 to 30/08/2008
Budget from EC: EUR 709 850

Coordinator: Dr Alexandra Psarrou, University of Westminster

CONTEXT AND OBJECTIVES

The main aim of the project is to promote closer research and cultural links within the Mediterranean region by enhancing accessibility to, and historical research of rare manuscripts. To achieve this, the consortium members will cooperate to establish regional laboratories, and to produce a non-destructive non-invasive image-based processing tool to aid the historical analysis and examination of major Mediterranean collections of manuscripts. To succeed in its goals, the NOESIS consortium will investigate a number of areas of significant scientific and historical research including:

- the creation of online databases of ink and support models;
- the use of the models to examine palimpsests and faded inks;
- aid in authenticating and dating manuscripts from the Mediterranean region.

ACTIVITIES

To enable the study and analysis of the Mediterranean manuscripts using image-based non-destructive and non-invasive techniques, the consortium will:

- photograph and digitise a number of manuscripts from the Mediterranean partner collections, based on established selection and evaluation criteria;
- study and analyse the photometric and morphological characteristics of the inks and supports under varying illumination conditions;
- study the historical cross-referencing of manuscripts found in the Mediterranean region;
- verify the homogeneity of the links and supports of the manuscripts;
- develop a suitable interactive and interoperable online tool to enable access to information about the manuscripts;
- disseminate the produced tools to support future research in the common historical and cultural roots between Europe and the Mediterranean region countries.

EXPECTED RESULTS AND OUTCOMES

The main results and outcomes expected to be produced are:

- the creation of an interactive model database which will be accessible from the internet and allow search, submission and analysis of manuscripts based on the stored models;
- to share further development and commercial exploitation of the digital modelling techniques used for the categorisation of inks and supports;
- the presentation of the results at major international conferences;
- the promotion of the project through the production of a CD-ROM and national workshops.

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HAMMAM

Hamмам, Aspects and Multidisciplinary Methods of Analysis for the Mediterranean Region

Period: 01/09/05 to 31/08/08
Budget from EC: EUR 1 900 000

Coordinator: Dr Heidi Dumreicher
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CONTEXT AND OBJECTIVES

The Islamic public bath 'hammam' is a gift from the past to the future. The aim of this study is to develop strategies and scenarios for the safeguard, revitalisation and adaptive re-use of historic Islamic public baths or hammams as important social spaces and facilities within the contemporary and future conditions of Mediterranean Islamic cities. The hammam is a central place of cultural heritage of the Mediterranean civilisation. Hammams are an integral part of the Islamic city and are well embedded in the historic urban fabric. With the disappearance of hammams, Islamic cities are about to lose a major feature of their cultural heritage with deteriorating consequences on the urbanistic, societal and architectural qualities.

The HAMMAM study will develop sustainability-oriented strategies for the adaptive revitalisation of hammams in Mediterranean countries to improve their role as places of cultural heritage that serve both the local communities and tourists. The project will apply an interdisciplinary and trans-sectoral approach, based on the concept of sustainability. It will integrate architectural and technological considerations with the socio-cultural and economic dimensions in order to ensure ways of sustainable restoration of these important cultural heritage sites.

The HAMMAM study uses the methodology of case-studies to fulfill the need for an integrative approach to the research-issue. Starting from the investigation and analysis of the local situation (technical, socio-cultural and economic) of specific carefully selected hammams in six different Mediterranean countries (Algeria, Egypt, Morocco, Palestinian-administered areas, Syria and Turkey), the study develops sustainable future scenarios for these hammams.

ACTIVITIES

The project team has assigned a four-month-orientation phase in which the first results of the background studies will be ready to be presented to all participants in order to configure a common scientific basic knowledge of the hammams.

The data-collection phase will set the basis for the case-study-approach, at the same time establishing the

beginning of the participatory sustainability process in the neighbourhoods. During this phase, Mediterranean participants will host members of the HAMMAM project team. It is a phase of intense contact with the hammam users and the stakeholders concerned.

Ten months will be assigned to the analysis phase where the existing patterns and typologies of hammam usage and restoration will become more visible. This phase will rely heavily on the cooperation of the researchers in order to integrate their findings in an efficient way. It is also the time for an intense participatory process in the hammam neighbourhoods and exchange between local and expert knowledge.

The so-called 'Future concepts phase' will take eight months and will be dedicated to scenario-making and future strategies. This is a time of intense contact between the researchers who will hold reporting writing workshops in order to strengthen the interdisciplinarity of the scientific results.

The dissemination and documentation phase of HAMMAM will last for five months. As dissemination and policy-making is an important part of this study, special attention will be given to the visual appearance of the findings. The exhibition on the move that has started already in the previous phase will find its final configuration.

EXPECTED RESULTS AND OUTCOMES

The result will be the development of future scenarios for the reconstruction of past and present Mediterranean techniques, lifestyles and environments, contributing to the actual life and restoration activities concerning the hammam. The development of strategies and scenarios for the sustainable or adaptive use of historic hammams will take into account the singularity of each location as well as the common factors between the six cities under investigation. The methodology adopted and the results achieved in this study will be replicable to other case studies of cultural heritage buildings with a high social value. The project team will proceed to show examples for other similar cultural heritages, considered not only as architectural highlights, but also as having a major contribution to urban day-to-

HAMMAM

day-life. Sustainable and innovative ways of restoration and revitalisation will be studied which will be applicable to a wide variety of contexts. Particular recommendations for the different sites under investigation will therefore be replicable to other sites of cultural heritage.

Besides this, it is considered that the interest shown to the historic hammams by an EU research team will have a positive impact on increasing local people's awareness of their cultural heritage and traditional building know-how. It will also provide a strong incentive for local stakeholders in understanding the processes of revitalisation of a cultural heritage building combining vernacular technologies with appropriate contemporary technologies.

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OPERHA

Open and fully compatible next generation of strengthening system for the ReHAbilitation of Mediterranean cultural heritage

Period: 01/01/2006 to 31/12/2008
Budget from EC: EUR 1 299 997

Coordinator: Tomàs San-Jose, Fundació Labein

OBJECTIVES

The overall objective of OPERHA is the design, development, testing and validation of an adaptable and reversible restoration solution for structural strengthening of historical buildings in Europe and the Mediterranean Area, focused on the use of the fiber reinforced polymer. Major state-of-the-art advances are expected to be made in both the laminate and anchoring systems. The aim is to provide an integrated solution, bridging technical, architectural and socio-economic settings. Restoration work on the ancient buildings needs to be carried out with the minimum intervention necessary, while paying attention to reduce the impact on the structure during and after its strengthening.

The flexibility and integration of all the above technical, cultural, socio-economic aspects requires multidisciplinary teams. As such, the OPERHA consortium is composed of experienced professionals in architecture, engineering, sociology, archaeology and history in the field of restoration of heritage buildings all over Europe and the Mediterranean Area. The scientific and technological testing and validation will be done at lab scale. The validation of the final solution will be done in pilot proofs. These trials will be made at different real heritage buildings in the Mediterranean countries. The selection of buildings has been made on the basis of their geographical location, common use, material and structural components, seismic conditions and environmental conditions.

The work plan has been divided into seven WPs: two WPs address specific socio-economic and cultural objective, three are focused on research, technological and innovation activities and the remaining two WPs relate to dissemination and exploitation activities, and project management.

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MEDITERRANEAN PARTNER COUNTRIES

ENVIRONMENT

QUALIWATER

Diagnosis and Control of Salinity and Nitrate Pollution in Mediterranean Irrigated Agriculture

Period: 01/01/2006 to 31/12/2009
Budget from EC: EUR 1 450 000

Coordinator: Luis Esteruelas (administrative coordinator)
Ramón Aragüés (scientific coordinator)
International Centre for Advanced Mediterranean
Agronomic Studies

CONTEXT AND OBJECTIVES

The ultimate objective of this project is to provide guidelines to sustain irrigated agriculture while protecting water resources from the negative impacts of pollution resulting from the disposal of agricultural drainage water. Therefore, our strategic aim is to provide scientific, technical and socioeconomic information on the salt and nitrogen contamination effects and on pollution control measures in Mediterranean irrigated agriculture.

brochures, software release on policy control measures, final synthesis publication, website integration of project results.

ACTIVITIES

The main activities of the project will be: input-output mass balances in representative irrigation districts and assessment of salt and nitrogen pollution effects of present agricultural management; model simulation studies analysing potential best management strategies for pollution control; evaluation of these strategies in selected pilot field trials (in particular: scheduling of irrigation, nitrogen fertilisation and reuse of drainage waters for irrigation); socio-economic analysis of present agricultural management and of source-sink pollution control management alternatives; and dissemination of results to water users and policy makers. Feedback with project end-users will take place via the participation of the stakeholders, thus ensuring that all relevant issues are properly addressed.

EXPECTED RESULTS AND OUTCOMES

The most relevant deliverables of the project will be: historical characterisation of selected districts, booklet on the use of the EM38 sensor, mapping of salt-affected soils, booklet on agro-meteorological stations, booklet on water level recorders, booklet on water collectors, booklet on gauging stations, water, salt and nitrate balances, booklet on guidelines to improve water use, irrigation model calibration, validation and application, salinity model calibration, validation and application, nitrogen model calibration, validation and application, feasibility analysis of best management practices, field-tested best management practices, current economic/environmental situation, biophysical economic model, transaction costs, environmental cost-benefit analyses, economic costs on ecosystems, edition of project information brochures, support materials for training workshops, support material attendees in IAMZ courses, edition of project results

QUALIWATER

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WADI

Sustainable management of Mediterranean coastal fresh and transitional water bodies: a socio-economic and environmental analysis of changes and trends to enhance and sustain stakeholder benefits

Period: 01/01/2006 to 31/12/2008
Budget from EC: EUR 1 820 000

Coordinator: Prof. Felicita Scapini
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CONTEXT AND OBJECTIVES

The general objective of the project is to encourage the rational and sustainable use of freshwater resources within Mediterranean coastal areas. The project will focus on issues, constraints and conflicts as identified through the active participation of key stakeholders, with a view to increase awareness and collaboration among actors, for the conservation of freshwater resources and their sustainable use for the benefit of the community at large. Specific objectives are:

- to identify conflicts of use among stakeholders arising from improper management of water bodies and related constraints within selected study sites, which suffer from water scarcity and associated constraints;
- to assess and estimate the impact/s of various water uses as well as nearby human activities on coastal water bodies, such as fluvial systems, estuaries, marshlands and lagoons;
- to produce interdisciplinary scientific inputs for improved participatory water management strategies and related planning regimes for a rational use of water resources, taking into account economical, socio-cultural and environmental constraints at local level, without losing sight of other broader scales (national, regional and international);
- to develop and propose alternative management strategies and plans for the selected sites as well as general guidelines for appropriate and sustainable management of water resources;
- to establish a network of scientists, authorities and local communities in order to enhance local awareness on water quality, use and misuse.

ACTIVITIES

A number of significant case studies across the Mediterranean coastal areas will be thoroughly studied from socio-cultural, economic and environmental perspectives:

- Key issues of water demand and sustainability of selected water bodies will be identified through meetings with different stakeholders, promoting their reciprocal interactions. A conceptual framework will be developed for the context of each case study, focusing on water demand and conflicts that may affect sustainability of the benefits to the community provided by the water body.

- Impacts will be assessed, indicators of impacts will be identified and their magnitude estimated according to prevailing conditions at each study site. Baseline conditions will, meanwhile, be assessed using available paleo-biological, historical and archaeological information. Databases will be built and results will be integrated in a Global Information System (GIS), which will provide a suitable interface for management purposes. Moreover, models will be developed to highlight trends of changes, and influential factors will be estimated.
- Soft-system analysis, among which 'focus group seminars' for stakeholders, will be used to identify key issues and constraints for subsequent management of water resources. The results of the analyses conducted in the case studies will help to develop alternative scenarios of water management and chose the most feasible ones.
- These will be proposed to the stakeholders for the specific cases analysed, and in a wider context in the Mediterranean.
- The follow up will be made through international meetings held in different countries.

EXPECTED RESULTS AND OUTCOMES

The project will contribute to enhancing local competence for a sustainable use of water bodies and to reducing the existing and potential conflicts for water uses between different stakeholders, with special attention given to the weakest components of the community and to sustainability for the benefit of future generations. At the same time, the project will conduct a comparison of various case studies from the Mediterranean coastal area, on both northern and southern sides, in international cooperation and collaboration with governmental stakeholders from different Mediterranean countries. Databases on a wide geographical scale (ideally the Mediterranean region, comparing databases) and time scale (using time series) would enhance the power of the management plans and assist stakeholders in applying for financial support at national and international level.

The project will contribute to identifying the various stakeholders of water in different case studies and their various forms of contribution to water management

according to various physical, socio-economic and cultural backgrounds. This can assist in profiling different local communities and defining the roles of men and women at different areas and levels in water management and planning. The specific role of women as end users of water will be a main focus, and special attention will be

paid to their involvement in the local dissemination of the project findings and results. Dissemination material will be produced to convey easy to understand messages about the importance of water resources and their conservation through correct use.

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CRESMED

Cost efficient and reliable rural electrification schemes for South Mediterranean countries based on multi Solar Hybrid grids

Period: 01/01/2006 to 30/06/2009
Budget from EC: EUR 900 000

Coordinator: Trama TecnoAmbiental

CONTEXT AND OBJECTIVES

Rural electrification (RE) in South Mediterranean countries is mostly achieved by solar home systems, which are only capable of serving a very limited number of appliances, such as lights. This gives the image that photovoltaic (PV) solutions are destined for the poor, and are not sufficient for stimulating economic activities in rural areas. Fuel generators, also used, give more electrical power, but suffer from high maintenance costs, irregular availability of fuel, and are mostly used to provide a limited energy service for only 6 to 14 hours per day. The solution is the employment of hybrid systems using a mix of renewable energies and fossil fuel, and provision of an energy service for a rural community population via a micro grid.

The integrated approach for RE using such multi-user hybrid grids has been tested for electrification in Europe, but has still to be adapted to the different social, economical and environmental conditions found in South Mediterranean countries.

The main strategic objectives of the project are the development of:

- RE electricity produced from multi-user solar hybrid systems (MSGs) combining solar and other locally available energy sources on local micro grids;
- management tools to rationally operate a larger number of MSGs in a region by satellite and other communication technologies

ACTIVITIES

The project follows a clear set of work packages (WPs), which can be broadly grouped as follows: research, technological development and field testing.

WP 1 deals with research studies on the need for energy services in the Mediterranean Partner Countries (MPCs). This gives partners in the Mediterranean countries the possibility to investigate the energy needs in the area, with regard to hybrid systems.

The results obtained in WP 1 are used in WP 2 to define a strategy for RE-programmes for each of the MPCs, addressing all non-technical issues requiring research activities.

There are two WPs dealing with research and appropriate technology development. The first is WP 3, which covers the additional development of system components (power conditioner, water and wind turbine) in order to fit the social and environmental conditions of the target countries.

WP 4 covers an advanced control system, which is based on a unified communication bus for system components and is used for the monitoring system, which also allows for remote control.

Finally, WP 5 covers research on general technical aspects for the implementation of hybrid systems with high renewable energy content in the target countries. The outcomes of these WPs will be gathered into a design manual for such systems, which may additionally be used in the development of standards.

The results of the work done so far will be tested in a field test system to be carried out in a Moroccan village. All steps for the implementation of such a system will be followed, as well as effecting any necessary improvements to the procedures. After implementation, this system will be monitored technically, socially, and economically for at least six months.

The results of this project are to be disseminated to the decision-makers and stakeholders of the MPCs.

EXPECTED RESULTS AND OUTCOMES

The results of the study on the needs for RE in Mediterranean countries will be used for the development of a RE-strategy, where strategic targets are to be set. Financing schemes and models will be developed in order to achieve a service scheme, which is socially and economically sustainable in the Mediterranean countries. The close cooperation between the European and the partner countries' research centres will ensure that INCO objectives are met, especially by boosting the RTD capability of MPCs and establishing links between the different centres.

These results will be used in the research and development of appropriate components which can cope with the special

operating conditions found in Mediterranean countries, such as high temperatures and high dust content in the ambient atmosphere. The close cooperation of all participants will help to strengthen the links between research centres, businesses and other stakeholders in the society, in addition to the links between research institutions in the EU and MPCs.

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ELMAA

Integrated water management of Mediterranean phosphate mining and local agricultural systems

Period: 01/09/2005 to 30/06/2009
Budget from EC: EUR 1 600 000

Coordinator: Hervé Gaboriau
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CONTEXT AND OBJECTIVES

The phosphate mining industry is a major contributor to the economy of some Mediterranean countries i.e. Morocco, Jordan, Tunisia, etc. Large volumes of water are required by the mining industry from areas where water resources are limited. Water scarcity may be worsened by a degradation of the water quality after phosphate processing. The pressure on water resources is liable to hamper the development of the phosphate industry and results in competition with other water-reliant economic sectors such as agriculture or tourism. The ELMAA project meets this strategic need: to reduce tensions on water resources (quantity and quality) and to consolidate the sustainable development of the phosphate mining industry.

ELMAA will focus priority on the interface between the mining and agricultural sectors, given the economic and social importance of the latter sector. The general objective of ELMAA is to provide the phosphate industry and the water managers with a methodology for the integrated management of water resources in the zone of influence of the mine sites and provide technological innovations to reduce the pressure on water resources, in mining and agricultural practices. This methodology will integrate a customised Decision Support System (DSS) which will serve to formulate and rank the actions to be initiated, whether they result from technological innovations, or from a change in the institutional or regulatory framework.

ACTIVITIES

The project will concentrate on three major and strategic phosphate mining areas located in Jordan, Morocco and Tunisia. ELMAA will comprise the following activities.

The qualitative and quantitative description of water management in the three selected phosphate mining areas will specifically address the four main components involved in water management, namely phosphate mining, the agricultural sector, the regional, hydrological and socio-economic context. This description will include the analysis of all technological, socio-economic, environmental and regulatory factors that have an impact on water management.

The investigation of different technological routes with the aim of improving the water use will take into account not only the quantity but also quality aspects, both in the mining sector (reduction of water consumption, recycling optimisation, use of municipal waste water) and in the agricultural sector (evaluation of the mining water and the slimes for agriculture use).

The development of a DSS tool aims to provide a simplified but realistic representation of water management at the interface between mining and farming activities, integrating technical, economic, social and environmental dimensions. The DSS will serve to simulate and evaluate different technological development scenarios.

EXPECTED RESULTS AND OUTCOMES

ELMAA meets a strategic need: to reduce existing tensions on water resources — quantity and quality — to consolidate the development of the Mediterranean phosphate industry. The anticipated benefits are commensurate with the challenges associated with the phosphate industry which is a vector of social and economic development.

The ELMAA project focuses on the coupled management of water between the mining and agricultural sectors. Examples of projects in Morocco and in Jordan have demonstrated the full benefit that the regional economy can derive from this coupled management of water. The ambition of ELMAA is to contribute to the generalisation of this type of approach.

ELMAA also takes into account the recommendations of the European Water Framework Directive with respect to the promotion of water use for long-term protection of this resource and participatory approaches to design water-management policies. The objectives of ELMAA fit into this framework by formulating proposals to improve the availability of water resources and promoting a participative approach associating different stakeholders. The ELMAA project will also be a valuable source of inspiration for decision-makers and end users in the ongoing process of water policy review.

The objective of the ELMAA dissemination plan is to spread awareness and information about project results beyond the consortium members and the scientific community, and thus perpetuate the actions initiated within the project.

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REACT

Self-sufficient Renewable Energy Air-Conditioning system for Mediterranean countries

Period: 01/01/2006 to 31/12/2008
Budget from EC: EUR 1 700 000

Coordinator: Toufic El Asmar, Università degli Studi di Firenze

CONTEXT AND OBJECTIVES

The project aims to set up innovative pilot Renewable Energy Source- (RES) based co-generation plants (heat and air conditioning), to be used in specific environments, i.e. private or public medium and large-sized facilities (hospitals, tourist resorts, etc.) in highly sun-irradiated Mediterranean countries. The main objective of the proposed systems will therefore be to make hot water and air conditioning available in the selected sites without requesting power from the local electricity grid. Moreover, the systems will provide a test-bed for innovative technologies that will result in efficient and cost-effective production of heat and refrigeration. The systems will also be an example and model for future dissemination of the technology to other facilities and resorts. Two different layouts, with different and highly innovative technological solutions, will be developed and evaluated, in order to maximise the energy trapped from the sun by linear parabolic solar collectors. Primarily both solutions will aim to produce heat that will be used in advanced two stage ammonia chillers for the production of refrigeration (cold water: ca. 5 °C) — to be used for air conditioning — and hot water (50 °C) for sanitary needs.

ACTIVITIES

Activities take a straightforward approach starting with a review of the climatic and energetic conditions for both sites (hospital and hotel) as well as full economic and cost-effectiveness analysis; in this way the project will proceed with the appropriate solutions and recommendations enabling the integration of RES solar-based air conditioning and passive measures. The climatic analysis of solar irradiation at both sites will provide the optimised analysis for the passive solutions, taking into account the different climatic conditions of the targeted sites.

The main activities can be summarised as follows:

- preliminary analysis of climatic, environmental and economic conditions of the targeted areas as well as setting up the systems' requirements;
- assessment of the preliminary design of the systems, by determining the characteristics of each subsystem (troughs and collectors, heat transfer system, chillers, etc.);

- final engineering design of the system and simulation of it, determining which prototype will be developed, assembled and tested in Europe;
- transfer, installation and onsite testing of the systems at the targeted sites;
- final assessment of the efficiency of both technologies at each site;
- exploitation and dissemination.

EXPECTED RESULTS AND OUTCOMES

The project's activities should lead to different and important results, with the design and development of two different solar-based systems. One is to be installed in a public hospital in Casablanca, Morocco and the other in a hotel in Aqaba City, Jordan. Both systems should be able to successfully produce heat and cooling for each building. The local personnel will be able to manage the system independently after a reasonable period of training. This project should reduce non-technical barriers for renewable energy penetration in the EU and Mediterranean Partner Countries (MPCs) through an increased interest in the REACT technology installations from other tourist resorts and hospitals. Finally, citizens, authorities and public organisations of the MPCs and of other Mediterranean and EU Member States will be made aware of the potential for using the newly developed REACT Renewable Energy System-based air conditioning systems.

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PuraTreat

New energy efficient approach to the operation of membrane bioreactors for decentralised wastewater treatment

Period: 01/01/2006 to 31/12/2008
Budget from EC: EUR 899 986

Coordinator: Patricio López Expósito, TTZ-Bremerhaven

CONTEXT AND OBJECTIVES

The Mediterranean Basin is one of the poorest regions in the world, in terms of water resources. With limited renewable water resources, most countries in the area have been driven to reuse their wastewaters. However, especially in the east and northern Mediterranean regions, wastewaters are inefficiently treated or even reused directly without treatment for irrigation or sanitary purposes, serving as a carrier for diseases, or causing water pollution when discharged to water bodies.

The main aim of Puratreat is to investigate the performance of membrane bioreactors (MBRs) for the treatment of wastewater under operating conditions, which are expected to produce low maintenance and running costs. This project will initiate a new approach to operating MBR systems, adapted to the financial constraints affecting Southern Mediterranean and Middle East peri-urban and rural communities. The consortium will study the behaviour and feasibility of three different bioreactor configurations working at minimum aeration rate and short solids retention time, operating conditions that, if proved effective, would allow the adoption of this kind of technology as a cost-effective decentralised wastewater treatment solution. In addition, the construction and running costs of a potential full scale decentralised wastewater treatment plant will be contrasted with the investment capacity available to several Mediterranean peri-urban areas in North Africa and the Middle East.

ACTIVITIES

A laboratory modular membrane bioreactor will be built and installed in the facilities of a wastewater treatment plant in Tunisia in order to:

- compare the performance of MBR bioreactors working under conventional operating conditions with the performance achieved under conditions specially adapted to the requirements of Middle East and North Africa (MENA) countries;
- study the performance, energy consumption and maintenance requirements of MBRs working at low Solids Retention Times as a possible operating procedure for the application of these system in peri-urban areas of MENA countries;

- study the characteristics of the microbial community present in the reactor for the different experimental conditions studied;
- propose the most suitable technology for the application of decentralised MBR wastewater systems and its optimum operating conditions;
- study the feasibility of decentralised wastewater treatment plants based on MBR technologies in the Mediterranean Partner Countries (MPCs).

EXPECTED RESULTS AND OUTCOMES

With the experimental results obtained in the project, the consortium expects to be able to assess the feasibility of membrane bioreactors operated in such a way as to address the budgetary constraints that affect the provision of sanitation services in the MENA countries. The consortium intends to identify the most appropriate operating modes and applications for each one of the membrane technologies studied. The consortium expects that MBRs running at low energy, energy consumption modes will prove effective for the provision of affordable decentralised wastewater treatment in the INCO-MED countries.

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CIBEWU

Citrus rootstock breeding for efficient water and nutrient use

Period: 01/01/2006 to 31/12/2008
Budget from EC: EUR 1 280 000

Coordinator: Patrick Ollitrault
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CONTEXT AND OBJECTIVES

Mediterranean citriculture face an increasing combination of biotic (Citrus tristeza virus (CTV)/phytophthora) and abiotic stresses (salinity/alkalinity). Most of these constraints should be individually managed by the rootstock choice. However, the spread of CTV all over the Mediterranean Basin will soon prohibit the current use of the traditional sour orange rootstock that provides adequate tolerance to salinity and alkalinity. Therefore there is an urgent need to select new citrus rootstocks. All the required traits are present in citrus germplasm but the complexity of citrus biology and genetics make it difficult to combine them through traditional breeding. The objective of this project is to enhance the efficiency of citrus germplasm exploitation for rootstock breeding under two main breeding strategies: sexual recombination and somatic hybridisation.

ACTIVITIES

To attain this objective, possible improvements will be investigated throughout the varietal innovation process. Knowledge and methodologies will be developed by combining physiological, genomic, genetic and biotechnological approaches. The project will focus on tolerance to salinity, and tolerance to iron deficiency associated with alkaline soils:

- identification of a physiological indicator of tolerance and development of standardised protocols for physiological evaluation;
- searching of candidate genes, study of their genetic and physical distribution on the genome, and analysis of the relationship between variability of physiological indicators and variability of candidate genes for tolerance to abiotic stresses;
- comparative genetic mapping between citrus and poncirus, and analysis of recombination at intergeneric level;
- development and optimisation of new breeding methods including Assisted Marker Selection and somatic hybridisation.

For a shorter term impact, two regional networks will be implemented:

- a regional citrus rootstock germplasm network; and
- a network for the agronomical evaluation of new rootstocks. Training and methodology transfer to the end users are important components of the project.

EXPECTED RESULTS AND OUTCOMES

The CIBEWU project will contribute to providing answers to the citrus industry rootstock challenge in several steps. In the short term, the control of genetic conformity of rootstock collection will give a guarantee on mother trees of rootstock amplification schemes. This guarantee will ensure homogeneity of the planting material and conformity of agronomical behaviour. The network for agronomical evaluation of new rootstock will allow the consortium partners, in the medium term, to share pre-existing rootstock innovation. Multi-local data will give an accurate estimation of new rootstock global behaviour and of their adaptation in the specific context of the producing countries. Adoption of these new rootstocks by citrus growers in the Mediterranean Basin should occur in the next eight to ten years. In the long run, a new generation of rootstock will be created by somatic hybridisation with the specific goals of the Mediterranean Basin in mind. Moreover, the CIBEWU project will give a very strong basis for tolerances to abiotic stresses at genetic and genomic level. This knowledge plus the molecular tools for early selection developed in the project will support to a great extent the management of these tolerance traits both in somatic hybridisation and sexual breeding schemes.

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OPTIWHEAT

Improving the yield stability of Durum wheat under Mediterranean conditions

Period: 01/07/2006 to 30/06/2010
Budget from EC: EUR 1 800 000

Coordinator: Dr Martin Parry, Rothamsted Research Ltd

CONTEXT AND OBJECTIVES

Water is essential to sustaining human and environmental health but is already at scarcity level in some eastern and southern Mediterranean countries. Agriculture is by far the largest user of water resources accounting for around 75 % of consumption, but nevertheless water remains a major determinant of crop yield. Under rain-fed conditions, characterised by low and uncertain rainfall, durum wheat is one of the most widely cultivated crops.

OPTIWHEAT will use a powerful systems-biology approach combining genomics, crop physiology and agronomy to generate durum wheat cultivars that have higher and more stable yields under Mediterranean drought conditions. The central thrust of the project is to both identify existing variation in durum wheat germplasm and to generate novel genetic variation for the stability of yield under drought stress (SYDS) in durum wheat.

The project will generate a novel mutant population and use these lines to establish for the first time the targeting of induced local lesions in genomes (Tilling) in durum wheat. This population will be used for forward and reverse genetic approaches to identify lines with enhanced SYDS and to understand how the structure and expression of specific genes contribute to the variation of yield trait components under Mediterranean conditions.

ACTIVITIES

The major activities of OPTIWHEAT are to provide additional novel variation to durum wheat germplasm by random chemical mutagenesis and Tilling technology through the production of a Tilling population. This population will be used for forward and reverse genetic approaches to identify lines with enhanced SYDS and to understand how the structure and expression of specific genes contribute to the variation of yield trait components under Mediterranean conditions.

Other researchers and breeders will be given access to this resource to improve the sustainability of durum wheat production under field conditions. This will lead to the development of improved plant crop germplasm more adapted to drought by the identification of genotypes

that outperform those currently available in individual Mediterranean Partner Countries (MPCs). This will be determined from the agronomic performance of genotypes grown with and without drought.

EXPECTED RESULTS AND OUTCOMES

The main outcomes of OPTIWHEAT will be:

- a large Tilling population of durum wheat produced from mutagenised seed;
- DNA stocks and seed for the Tilling population archived at two mirror sites (one site will be within an MPC) and made available to interested researchers and breeding companies;
- datasets for field trials to determine the agronomic performance of genotypes grown with and without drought;
- durum gene expression datasets generated under both controlled and field drought conditions;
- a list of candidate gene sets associated with durum wheat stability of yield under drought stress;
- an improved research infrastructure in MPCs;
- training of personnel.

OPTIWHEAT

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CEDROME

Developing drought-resistant cereals to support efficient water use in the Mediterranean area

Period: 01/01/2006 to 31/12/2008
Budget from EC: EUR 1 700 000

Coordinator: Dr Pieter B.F. Ouwkerk, Leiden University

CONTEXT AND OBJECTIVES

Limited water resources are now a major challenge to world food security, especially in many developing countries such as those in the Mediterranean (MPC) basin. Cereal cultivation, including rice and wheat, requires a tremendous amount of water, and any deficiency can severely affect yield. CEDROME aims to enhance drought-resistance in durum wheat and rice, both strategic crops for the MPC region, to support the efficient use of water supplies. The strategy is to use knowledge obtained from the model plant rice and to extrapolate this to durum wheat via a process of technology transfer from European and Chinese partners to the MPC region. Two strategic objectives are addressed:

- Enhancement of drought-resistance: development of improved cereal germplasms and varieties that are more adapted to dry conditions in the MPC region.
- Technology transfer from Europe to the MPC region: the level of education and experience has become a major constraint for development in many countries. Therefore, key factors in CEDROME will not only be transfer of capital, but also of know-how and technology.

ACTIVITIES

With the available genomic sequence, the well-defined genetic maps and large collection of mutation and insertion lines, rice is the obvious model for this research. The knowledge obtained and functional genes identified from rice can be extrapolated in the improvement of other cereal crops such as wheat, barley and sorghum since they are closely related. This multi-disciplinary project combines European, Chinese and MPC expertise in classical breeding, plant physiology and cereal crop biotechnology to assist the development of a new generation of cereals with enhanced drought-resistance. Molecular markers will be used to identify drought-related loci. Conventional breeding will be used to combine drought resistance genes in new cultivars and new candidate drought resistance genes will be identified. Constructs will be made with these new and existing putative drought resistance genes, where transgenic rice and wheat plants will be evaluated in various countries under different growing conditions. In addition genetic approaches will be taken to identify new genes from different mutagenised populations.

EXPECTED RESULTS AND OUTCOMES

The EU has taken its responsibility via the INCO Programme to generate knowledge that can pave the way for innovations that are necessary for scientific development, sustainable agriculture and industrial prosperity in the MPC region and developing countries. In agreement with the INCO objectives, results of this project will support sustainable development in the MPC region and will also be applicable to other cereal-growing countries. Expected outcomes are joint scientific publications (e.g. about identification of novel drought-resistance genes in rice and durum wheat and application in conventional and molecular breeding for drought-resistance), other dissemination activities (website, work shop), PhD theses, guidelines and protocols, patents, cereal crops improved for drought-resistance. Experience from European partners gained from rice research will be extrapolated to the wheat research community in North-Africa via training visits. As a consequence, the human resources in the MPC partners will be strengthened allowing further development. Ultimately, this will lead to fair participation in the world economy.

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DISTRES

Promotion and consolidation of all RTD activities for renewable distributed generation technologies in the Mediterranean region

Period: 01/01/2007 to 31/12/2009
Budget from EC: EUR 999 832

Coordinator: Dr Andreas Poullikkas
Electricity Authority of Cyprus

CONTEXT AND OBJECTIVES

The overall goal of the DISTRES coordination action project is to exchange and disseminate good practice developed in the field of RES-DG technologies by isolating research activities and performing studies and/or analyses for the Mediterranean needs. DISTRES specific scientific and technological objectives may be summarised as follows:

- to coordinate RTD projects in RES-DG technologies;
- to promote the electricity generation from solar energy, photovoltaic systems and solar thermal systems, paving the way for pilot systems and products;
- to produce capacity building methodologies;
- to disseminate the results as widely as possible in Mediterranean countries and in the EU.

ACTIVITIES

DISTRES is organised into five work packages (WPs) with a total duration of 36 months. WP1 involves various studies concerning RES-DG policies including green hydrogen status and socio-environmental benefits for the EU and the Mediterranean countries. WP2 is targeted to the identification of various successful RES-DG business models. WP3 involves the various studies concerning the EU and Mediterranean countries regulatory regimes. WP4 purpose is to provide building capacity methodologies for the promotion of RES-DG technologies in the Mediterranean region. Finally, WP5 concerns the project management and the coordination of DISTRES. It is intended that the results of DISTRES will be made widely available, both during and after completion of the coordination action. The work programme includes three workshops, a conference, the development of capacity building methodologies, the creation of a website, newsletters and a press release.

EXPECTED RESULTS AND OUTCOMES

To date, RES-DG (solar thermal systems and photovoltaic systems) is deemed neither commercially viable, nor profitable, unless strong subsidies are available within the Mediterranean countries. An immediate conclusion from concerted European research, however, is that solar thermal systems and photovoltaic systems are reliable and technically feasible for installation and operation in the Mediterranean region. It still remains though, to develop strong financial incentives in order that RES-DG may

become viable on technical and economic terms. Persistent obstacles are the technology cost, the stability issue for isolated power systems and the Mediterranean countries' energy policies. DISTRES contributes to the promotion of RES-DG technologies and policies while safeguarding the environment, and thus has application at a pan-European level. In particular DISTRES responds to EU policies at a number of different levels, such as:

- promoting the use of solar thermal and photovoltaic systems;
- promoting RES-DG technologies, including green hydrogen based systems (hydrogen as an energy carrier is one of the key technology sectors identified by the EU for the Union's long-term competitiveness and strength of the European economy with a clear goal of providing Europe with a realistic and economically viable route to a green hydrogen economy);
- helping to encourage the development of a European hydrogen economy, this work will help to maintain the ability of Europe's energy supply infrastructure to smooth the increasingly fluctuating supply/demand balance inherent in an increasing dependence on renewable energy sources;
- contributing to the efforts of the EU of reducing its greenhouse gas emissions and thereby acting constructively in terms of the global climate change issue.

DISTRES

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TERMISOL

New low-emissivity and long lasting paints for cost-effective solar collectors

Period: 01/10/2006 to 30/09/2009
Budget from EC: EUR 875 000

Coordinator: Dr Javier García Jaca, CIDEMCO
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CONTEXT AND OBJECTIVES

The project aims to develop improved types of selective paints, with high photothermal performance in solar energy conversion, for coating solar collectors. Solar thermal devices converting solar radiation into heat are mainly flat-plate collectors. Their most important and critical part is the absorber surface which is often expensive and mainly based on the application of heavy metals. Nowadays, some manufacturers use alternatives based on painting the solar panels, presenting a substantial economical advantage but of limited use due to drawbacks related to high emissivity-low energy efficiency and low durability in service life. To help overcome these drawbacks, new coatings will provide hybrid-structured surfaces at defined thickness ranges as a result of control application methods and by combining multilayer systems to adjust the whole system performance. The project considers the development of this technology to be applicable everywhere. Moreover, it is especially suited for implementation in Mediterranean countries, which benefit from optimal solar conditions and demand solar infrastructures in remote places such as rural areas and villages, in addition to general buildings e.g. hospitals and hotels.

ACTIVITIES

The technical aspects necessary to develop the project are defined by the following key phases:

Research, technological development and innovation related activities:

- search, characterisation and selection of raw materials;
- formulation and development of the selective paint;
- optical and physico-chemical characterisation;
- application methods, design and building-up of multilayer systems;
- artificial ageing and following of the degradation;
- construction of real prototypes and optimisation of performance;
- evaluation of economic feasibility and energetic performance;
- field tests and control of performance.

Demonstration and integration activities:

- training workshop to update partners in the relevant areas and to share knowledge;
- regular six-monthly project meetings involving all partners;
- travel by researchers spending time to learn about other relevant fields.

EXPECTED RESULTS AND OUTCOMES

Partners from different participating countries will join together to share knowledge and capacity building in the field of development, as well as research into photothermic paints.

The project's results are to be patented. The coating technology developed will be commercialised by the consortium's coating manufacturers and the producers of the solar collectors.

The development of appropriate and more cost-effective renewable energy technologies that are suitable for simple manufacturing facilities will help this technology to be taken up by basic workshops.

The different results obtained — from applying different accelerated ageing methods on solar collector surfaces — will be disseminated by conferences and scientific publications.

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HYRESS

Hybrid Renewable Energy Systems for the Supply of Services in Rural Settlements of Mediterranean Partner Countries

Period: 01/10/2006 to 30/09/2009
Budget from EC: EUR 1 249 990

Coordinator: George Papadakis, Agricultural University of Athens

CONTEXT AND OBJECTIVES

The strategic objective of the project is to remove the knowledge barriers preventing the installation of Renewable Energy Systems (RES) and the creation of mini-grids based on renewables. Research challenges can be found in the field of system management but also best combination of available technologies according to the local prevailing conditions, that is build up hybrid systems to match a varying supply with very different consumption profiles. In order to reduce expenses, it is also very important to minimise the system's storage requirements. Parallel to having excellent system management, the design technology has to be carefully adapted to meet the extreme framework conditions.

- The technologies have to be very robust and designed for the local climatic and social conditions;
- The requirements for service and maintenance must be very low;
- The technologies should be cost effective and preferably locally manufactured;
- Appliances must have low levels of energy consumption, and be able to cope with the power supplied from stand-alone systems (e.g. fluctuating power, Direct Current or Alternating Current supply etc.);
- Several system typologies will be examined i.e. Direct Current versus Alternating Current based mini-grid systems for optimum and continuous power and energy supply;
- The storage systems have to perform well under the high temperature conditions of the MPC. Under these conditions, the research that has already taken place for the operation of hydrogen subsystems is minimal and so this project will provide valuable new data.

ACTIVITIES

Three systems will be installed in remote rural areas of Egypt, Morocco and Tunisia. The hybrid systems should fulfil criteria such as modularity, robustness, and simplicity of use and also require very low maintenance. Additional considerations to be taken into account for the technologies' selection and implementation regard the possibility of potential systems' standardised production and replication. Furthermore, the local installations will serve as good practice, accelerate local skill development, and promote and encourage international partnerships amongst all relevant

stakeholders, such as research, financial, and regulatory institutions, industry and service companies, in particular SMEs, local representatives and social facilitators.

EXPECTED RESULTS AND OUTCOMES

The ultimate objective of the project is to develop, combine, install, test and assess (technically and socially) the performance of low cost pilot hybrid RES in remote areas of the Mediterranean, which are not yet grid-connected. The hybrid systems will consist of photovoltaics, small wind generators, hydrogen subsystems and biomass combustion and/or solar heaters and they will be installed in selected areas of the Mediterranean Partner Countries (MPCs) to set-up and provide energy and thus help improve living conditions in these rural communities.

By setting up the aforementioned three pilot installations in Egypt, Morocco and Tunisia, the proposed research will make a significant contribution to the creation of sustainable structures with a decent quality of living in the rural environments of the MPCs, by developing highly innovative hybrid RES installations based on the availability of local renewable energy sources and the local social conditions and needs.

Finally, a no less important project objective is to propose — and possibly find — new ways and means for project sustainability and repeatability after it concludes, especially in the MPCs.

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MEDRES

Cost-effective renewable energy for rural areas in the Mediterranean region

Period: 01/01/2007 to 31/12/2009
Budget from EC: EUR 1 159 781

Coordinator: Dr Houda Ben Jannet Allal
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CONTEXT AND OBJECTIVES

The objectives of the MEDRES research proposal, starting from the analysis of the present situation and announced objectives by the countries, with a special focus on the rural and peri-urban areas, are: to assess the opportunities for cost-effective renewable energies for rural areas and villages, by selection and analysis of pilot projects; to assess the real effectiveness of 'new' technologies through better knowledge of end user acceptability for energy efficient technologies and practices; and to measure the impact of electrification on socio-economic development in rural areas. The main results of the project will be elaborated in a set of recommendations and proposed adapted strategies to be largely disseminated in the Mediterranean region.

The Southern Mediterranean countries will be studied in order to promote cost-effective renewable energy for rural areas in the Mediterranean region, and best practices to enhance the sustainable development in these regions. This is in line with the Development Millennium Goals; the outcome of the International Conference on Renewable Energies in Bonn 2004 and its follow up initiatives; the Mediterranean Renewable Energy Programme (MEDREP); the Type II Initiative; the newly adopted Mediterranean Strategy for Sustainable Development; and the EU strategy within its neighbouring countries and especially the Mediterranean Partner Countries.

ACTIVITIES

The MEDRES proposal is structured along five main work programmes and the related deliverables:

- analysis of the present renewable energy context in the Southern Mediterranean countries and prospects;
- research on sustainable power for rural areas and villages. Specific attention will be given to diesel mini-grid retrofit using renewable energies, distributed generation in rural weak grids and distributed generation in LV grids, using the concept of micro-grids. Studies of selected projects identified by the partners as being strategic and of priority will be performed in each country;
- analysis of energy efficient use in peri-urban and rural areas, technologies and practices effectiveness through surveys, selection of local initiatives, implementation

of surveys and analysis of results and lessons learned. The purpose will be to assess the real effectiveness of such solutions, through better knowledge of end-user acceptability for energy efficient technologies and practices;

- measuring the impact of electrification on socio-economic development in rural areas. A selection of internationally recognised indicators will be chosen, and measurement methods developed and tested. 'Before-after' comparisons will be made on selected villages to be electrified during the project. The results will be the object of analyses. Strategies for successful implementation will be elaborated;
- management, exploitation and dissemination.

EXPECTED RESULTS AND OUTCOMES

The MEDRES research will have a large impact on sustainable development in the selected Mediterranean Partner Countries and will serve and support the decision makers in these countries to better define the best practices of sustainable energy in the rural and peri-urban areas, especially regarding renewable energy and energy efficient technologies. The project will also assist the European Commission in the formulation of future INCO programmes focusing on the thematic issue of 'Sustainable Energy', as well as elaborate draft concepts for 'Renewable Energy' projects which may be supported by the EC and the Mediterranean Countries. In this way, the project will help achieve the objectives of the Type II Energy Initiative launched at the WSSD in Johannesburg: the 'Mediterranean Renewable Energy Programme' (MEDREP) and the newly adopted 'Mediterranean Strategy for Sustainable Development'.

MEDRES

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MEDITERRANEAN-AIRCON

An advanced solar-driven air conditioning system for Mediterranean climate

Period: 01/01/2007 to 31/12/2009
Budget from EC: EUR 1 147 980

Coordinator: Saffa B. Riffat, University of Nottingham

CONTEXT AND OBJECTIVES

The research project aims to investigate an advanced solar-driven air-conditioning system suitable for the Mediterranean climate. The proposed system is comprised of modular evacuated solar tubes coupled with an ejector-cooling device, a booster cold storage and air handling unit. The system will use glass-glass sealed, evacuated tube solar collectors, able to provide a substantial energy output even under extreme weather conditions, and which have an advantage over other types of evacuated tubes in that the vacuum is maintained between two glass tubes, thus providing excellent sealing, for long term use. The evacuated tubes could be installed on the roof of buildings in order to collect solar energy. The heat from the tubes would be extracted using closed-loop heat-pipes and the extracted heat would be used to produce vapour to drive a jet refrigeration device.

The system will use a new, compact ejector configuration, which incorporates all the ejector components in a single shell-and-tube heat exchanger unit. The proposed ejector system eliminates the need for separate heat exchangers, and allows more effective heat transfer in the evaporator as well as condenser sections. Significant reduction of the size, weight and cost of the ejector system is therefore possible.

Other components of the system will include a cold store unit employing microencapsulated phase change material (MCPCM) slurries for improved continuity of cooling supply, and an air handling unit which could be integrated into the air-conditioning system. MCPCM has the advantage that it could be used as a heat transport and storage medium at the same time.

ACTIVITIES

The work programme will involve design optimisation and evaluation of laboratory-scale components of the system, development of a parametric computer model for system performance analysis, investigation of a building-solar tubes integration and construction and evaluation of a full-scale prototype in a Mediterranean climate.

MEDITERRANEAN-AIRCON

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SOLATERM

Promotion of a New Generation of Solar Thermal Systems in the MPC

Period: 02/10/2006 to 01/10/2008
Budget from EC: EUR 800 000

Coordinator: Deutsche Gesellschaft für Technische
Zusammenarbeit (GTZ) GmbH

OBJECTIVES

The Mediterranean region has major potential for the use of renewable energies, particularly solar energy, due to its high level of solar radiation. Only a small variety of solar thermal technologies — first and foremost solar water heaters — are used in the region. A closer cooperation between research institutions and energy agencies from the Mediterranean Partner Countries (MPC) and the EU is needed in order to promote a new generation of solar thermal and cooling systems (solar combi-systems, solar cooling systems and high-efficient solar collectors) in the MPC. SOLATERM is working with 18 partners from eight MPC and five EU countries covering R & D, policy and promotion aspects of renewable energies in their daily work. SOLATERM aims at the widespread application of a new generation of solar thermal and cooling systems in the MPC.

The project approach can be summarised in three specific objectives:

- to transfer technological know-how on solar thermal and cooling systems to the MPC and adapt new technologies to the specific needs of MPC;
- to broaden the spectrum of solar thermal and cooling applications in the MPC through the promotion of cost-effective solutions, e.g. combi-systems;
- to support the R & D and application of solar thermal and cooling systems in the MPC with political measures.

ACTIVITIES

The project is based on a north-south, south-north and south-south exchange of know-how and experiences regarding solar thermal systems and their application in the MPC. In order to boost solar thermal combi-systems, solar cooling and high efficient solar collectors in the region the consortium partners are carrying out the following joint activities:

- Opening conference on current technological trends in solar thermal systems.
- Three working groups will elaborate:
 - an analytical report of the political, socio-economic and climatic conditions in the MPC;
 - the potential analysis for the new generation of solar thermal and cooling systems in the MPC;
 - guidelines for planning and dimensioning of solar

thermal systems for complex buildings and case studies for selected buildings.

- Mid-term conference on the political framework for the promotion of solar thermal applications.
- Consulting on running or planned pilot projects on upgrading solar thermal technology in the MPC.
- Dissemination of results in regional scientific networks and to political stakeholders.

EXPECTED RESULTS AND OUTCOMES

SOLATERM will promote the widespread application of solar thermal and cooling systems, which have the potential, in the MPC, to substitute a large part of systems for hot water preparation, heating and cooling of complex buildings based on conventional energy resources. SOLATERM concentrates on the aspects of R&D and the political framework in order to contribute to sustainable solutions for the general problems of shrinking conventional energy resources. The project brings together innovative approaches (e.g. combined solar thermal systems for hot water and space heating and solar cooling) with regional knowledge on the conditions in the MPC.

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POWERSOL

Mechanical Power Generation Based on Solar Heat Engines

Period: 01/01/2007 to 31/12/2009
Budget from EC: EUR 1 050 000

Coordinator: Julian Blanco
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CONTEXT AND OBJECTIVES

The main project objective is the development of an environmentally friendly and cheap shaft power generation technology, based on solar thermal energy and optimised for supplying basic needs to rural communities. The project focuses on the technological development of a solar thermal-driven mechanical power generation system based on a solar-heated thermodynamic cycle (the POWERSOL system). This technological development consists in optimising a solar-assisted thermodynamic cycle that generates mechanical power at low to medium temperature ranges. The optimisation is performed by means of experimental testing of the thermodynamic cycle with selected working fluids and of three solar collector prototypes. Mechanical energy could be used to either generate electricity directly (using a generator) or for the desalination of brackish or seawater by coupling the output to a high-pressure pump connected to a conventional reverse osmosis system.

ACTIVITIES

The following activities are planned:

- modelling a solar-heated thermodynamic cycle (selecting the most suitable boundary conditions and working fluids at three different top temperature ranges);
- development and construction of three solar collector prototypes optimised for operating at around 80 °C, 100 °C to 150 °C, and 200 °C to 250 °C. These are, respectively, a flat plate collector (static), a compound parabolic concentrator (static) and a parabolic trough collector (sun-tracking)
- experimental testing of solar-driven mechanical power generation and solar collector prototypes;
- comparing the cycles at the three temperature ranges for operating autonomously or with energy back-up at different capacity ranges;
- full technical evaluation of the proposed POWERSOL technology;
- economic assessment of the developed technology compared to conventional and solar-driven ones;
- assessment of final potential social and development impact.

EXPECTED RESULTS AND OUTCOMES

The expected result would be the development of a distributed, solar-powered shaft power generation system in the range of 50 kW up to about 500 kW, more cost-effective and efficient than other solar power sources, such as photovoltaic systems (i.e. with real market possibilities). The progress of the project research will be measured according to the results of defined project deliverables and the achievement of the following project milestones:

- preliminary selection of candidate main design features of the POWERSOL technology;
- initial preliminary design of the proposed POWERSOL technology;
- design of solar collectors, optimised for the proposed POWERSOL technology;
- construction of three experimental facilities for testing the solar collector prototypes, one in an EU country and two in third countries;
- design of the proposed POWERSOL technology;
- mid-term assessment meeting: from the results obtained, decisions will be taken for the technological design phase;
- construction of three experimental facilities, one in an EU country and two in third countries, for testing POWERSOL technology;
- final experimental POWERSOL system ready for onsite testing;
- assessment of the developed technology's contribution to development in remote areas;
- execution of a defined scientist exchange and training programme;
- definition of future consortium exploitation plans and project follow-up.

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RAMSES

Renewable Energy Agricultural Multipurpose for Farmers

Period: 01/10/2006 to 30/09/2009
Budget from EC: EUR 1 300 000

Coordinator: Leonardo Casini, University of Florence

CONTEXT AND OBJECTIVES

The RAMSES project aims to introduce renewable energy in agriculture (specifically photovoltaic power) in an approach producing a two-fold advantage: to solve the problems that are usually associated with renewable energy: intermittency and storage needs; and to provide concrete support for farms and farmers. The proposal aims at an innovative approach of coupling photovoltaic power to a battery powered, all-purpose vehicle. In this scheme, the batteries serve a dual purpose as storage elements and power sources for the vehicle, thus optimising their value and spreading costs.

The vehicle can then be used for a variety of agricultural tasks. The innovative and integrated all-solar power system and multi-purpose agricultural vehicle is therefore a complete solar power system able to achieve the project goals of advancing towards sustainability. The proposed integrated prototype of the solar power storage and agricultural vehicle will be based on concepts which by now are sufficiently developed and usable to build a practical and efficient system composed of a photovoltaic system and a light/medium duty vehicle for agricultural work.

At the same time, these technologies ensure low cost and suitability for the specific socio-economic local conditions. The solar power photovoltaic system would be used to generate and manage electrical energy. The vehicle is not just a vehicle, but also a multi-purpose energy system for a series of services, which include energy storage, power production on demand, and a back-up power system against grid blackouts, which are frequent in Mediterranean countries.

As a vehicle, it would be used for a variety of purposes such as crop transportation, spraying of pesticides, irrigation, crop collection and it can also operate as an all-purpose, low speed road vehicle. It would be especially suitable for Southern Mediterranean countries where the potential for renewable energy is very high in terms of solar irradiation.

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OPEN-GAIN

Optimal Engineering Design for Dependable Water and Power Generation in Remote Areas Using Renewable Energies and Intelligent Automation

Period: 01/01/2007 to 31/12/2009
Budget from EC: EUR 1 299 985

Coordinator: Prof. Dr.sc.techn. E. Badreddin
University of Mannheim

CONTEXT AND OBJECTIVES

To combat water scarcity and desertification, intensive desalination activities have been carried out in remote arid regions. Very large desalination plants located at coast are inadequate for remote areas because of their expensive infrastructure and high distribution costs, which include important pipe losses. De-centralised solutions therefore offer advantages over large central production sites. In addition, desalting is resource and energy intensive, thus water production must be increased while keeping the consumption of resources affordable. As energy has to be generated to supply the desalination plant, it is logical to think in terms of a co-generating system for water and electricity. Finally, skilled personnel are normally absent in such areas that require dependable systems.

The global objective of this project is therefore to coordinate research and technological development (RTD) joint efforts to produce, with minimum environmental impact, sustainable essential life-resources — water and energy — , in Mediterranean Partner Countries (MPC), by introducing high technology and automation. A review of the standard plant construction and design techniques will lead to a new model-based optimal system design approach, which will economically improve the overall performance, dependability, reliability and availability of these co-generating water-electricity plants. The plants located in remote arid areas are, besides diesel generators, also powered by renewable energy and use a high level of automation. This is necessary to increase reliability, adapt to working conditions and strongly varying renewable energy supply, for remote maintenance as well as to meet specific cost requirements. The approach is based on thorough modelling of the processes and offers a large degree of flexibility in design to meet different production requirements. Finally, the new technology will be disseminated in MPC and the Middle East and North Africa.

ACTIVITIES

The main activities that have to be carried out during this project can be classified into three large work blocks:

- studies, simulation and software development;
- plant design and construction;
- prototype integration, start-up and real-time control implementation.

This subdivision also corresponds to the three-year time frame, as the blocks are scheduled for the first, second and third year, respectively. It should be noted that the dissemination and coordination efforts will be carried out during the entire project period.

EXPECTED RESULTS AND OUTCOMES

As a result of the three main activities, three sets of results are expected, in addition to the concept itself:

- studies on resources, conditions and potentials assessment, as well as market analysis and data collection;
- dynamic models and software for decision support;
- control algorithms and prototype plans.

OPEN-GAIN

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MEDISCO

MEDiterranean food and agro industry applications of Solar COling technologies

Period: 01/10/2006 to 30/09/2009
Budget from EC: EUR 1 400 000

Coordinator: Dr Mario Motta, Politecnico di Milano

CONTEXT AND OBJECTIVES

MEDISCO aims to develop, test and optimise solar thermally driven cooling concepts for the food and agronomy industries in the Mediterranean region, which — given the local conditions — can become economically and socially sustainable. The objective is to assess which systems could better suit the actual and future demands of the food and conservation industry sectors in the south edge of the basin and estimate in technical and economical terms the most appropriate approach for the application of solar thermally driven systems. The project partners will carry out a survey and analysis of the energy requirement for the industrial sector in Egypt, Morocco and Tunisia.

Furthermore, the project will be devoted to the development of novel high performing solar driven cooling and refrigeration concepts, aiming at the best possible compromise in terms of innovative technologies use, primary energy savings and economic issues. The concepts developed will be implemented through the collaborative work of the research institutions and technology providers involved, resulting in theoretical and simulation activities.

As a result, the optimised system will be constructed and installed in two experimental set ups (including one in Tunisia), allowing on-site monitoring of system performance activities. The experiences gained through the experimental activities will be used to create guidelines for best practice applications. The project results will increase the knowledge and strengthen the awareness, among the major stakeholders, of the penetration potential of solar technologies in the food industry in the region.

The achievements of the MEDISCO project will contribute to future Community RTD activities related to these systems. Transfer of experiences within the project, at regional level, will be amplified thanks to the Mediterranean Renewable Energy Centre (MEDREC), based in Tunis within the Mediterranean Renewable Energy Programme (MEDREP). Further dissemination to the international scientific community will be carried out (IES-SHC Tasks).

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DIMAS

Deficit Irrigation for Mediterranean Agricultural Systems

Period: 01/09/2004 to 31/05/2008
Budget from EC: EUR 1 015 000

Coordinator: Elías Fereres, University of Cordoba

OBJECTIVES

Irrigation uses about 80% of all water diverted for various uses in the Mediterranean. It is crucial to reduce the irrigation water use in order to release this scarce resource for alternative uses. The main objective of this project is to evaluate the concept of deficit irrigation (DI) as a means of reducing irrigation water use while maintaining or increasing farmers' profits. DI will be the subject of multidisciplinary research at different scales, geographic locations, and with different perennial and annual crops. This objective includes other specific objectives:

- development and validation of a simulation model for DI design and for yield prediction in water-limited situations in various Mediterranean countries;
- characterisation of current DI situations in participating countries and documentation of farmers' performance and the limitations of existing irrigation networks;
- assessment of the economic viability of DI for various crops and environments;
- determination of the acceptability of DI for the institutional and cultural conditions of the countries involved.
- generation of DI recommendations for farmers and water managers;
- integration of DI strategies into the management of irrigation water at the watershed, irrigation district, and farm levels.

ACTIVITIES

The project team aims at carrying out the following activities:

- development and validation of a crop simulation model for cotton, wheat, sugarbeet, citrus, olive and pistachio;
- developing an inventory of deficit irrigation practices: agro-climatic and water resources assessment, surveys with water authorities and water associations and characterisation of the biophysical and socio-economic environments;
- socio-economic optimisation: assessment of crop production economics, cost-benefit analysis and integration with the crop simulation model;
- scaling-up deficit irrigation to watershed: scenario development for designing deficit irrigation strategies,

taking into account the socio-political implications of deficit irrigation;

- synthesis, coordination and dissemination of the results (meetings, web-based and paper publications, workshops, seminars, etc.).

EXPECTED RESULTS AND OUTCOMES

The results of the project will provide recommendations for reducing irrigation water use while ensuring the sustainability of irrigated agricultural systems in the Mediterranean basin. The knowledge output of the project will be disseminated among end users (farmers associations, irrigation water agencies, etc.). The expected results are:

- a crop growth model and computer model of DI management at field level, including economical optimisation. The model will be made available to the public;
- inventory of deficit irrigation practices and situations in the Mediterranean;
- deficit irrigation recommendations for farmers, water district and water agencies in the various countries involved;
- quantification of the consumptive water savings potential for the different scenarios of DI.

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OPTIMA

Optimisation for Sustainable Water Resources Management

Period: 01/07/2004 to 30/06/2007
Budget from EC: EUR 1 499 997

Coordinator: Dino Pinelli, Fondazione Eni Enrico Mattei

OBJECTIVES

The overall aim of OPTIMA is to develop, implement, test, critically evaluate and exploit an innovative, scientifically rigorous yet practical approach to water resources management, in close cooperation with local and regional stakeholders, intended to increase efficiency and reconcile conflicting demands based on the European Water Framework Directive (2000/60/EC). The approach equally considers economic efficiency, environmental compatibility and social equity as the pillars of sustainable development. The project realises not only the importance — if not dominance — of the socio-political and economic aspects, but also the importance of a reliable, consistent and shared information basis for the policy and decision-making process. Empowerment through scientifically-based but policy-relevant information is a key concept.

ACTIVITIES

The first phase of the project is dedicated to the analysis of detailed requirements and constraints, the structure of the decision-making processes in the case study regions and identification of major actors.

The second phase will concentrate on data compilation and tool development, integrating quantitative methods (simulation modelling) and qualitative assessment in the socio-economic domain for a broad multi-criteria optimisation approach. Data compilation will also include the building of a regional data base of water technologies and associated cost functions.

The third phase will use the common methodology and tools in the individual case studies. Parallel to the modelling and optimisation tasks, the participatory approach and actor involvement will be prepared and tested, leading to the regional dissemination tasks.

Finally, comparative evaluation and dissemination will be carried out. Formats such as online guidebooks and distance learning tools will be considered in addition to more classical dissemination workshops.

EXPECTED RESULTS AND OUTCOMES

OPTIMA will develop optimisation-based tools and methods for water resource management. These will be tested in local and regional case studies in seven countries, namely Cyprus, Jordan, Lebanon, Morocco, Palestine, Tunisia and Turkey, around the Southern and Eastern Mediterranean. Specific emphasis on local acceptance and implementation will be made, by including stakeholders in an interactive, participatory decision-making process. This will be achieved by carefully embedded institutional structures using a discrete multi-criteria reference point methodology. The project also aims at building a wide dissemination network involving all relevant actors and stakeholders, in particular, all administrative bodies of local and regional governments and the developing water industry. Wide dissemination of results at regional and international level will be through a website and a special regional dissemination workshop with invited participants in addition to the project team.

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ADU-RES

Co-ordination Action for Autonomous Desalination Units based on Renewable Energy Systems

Period: 01/04/2004 to 30/09/2006
Budget from EC: EUR 620 000

Coordinator: Dr Christian Epp, WIP — Renewable Energies KG

CONTEXT AND OBJECTIVES

The looming water crisis in the Mediterranean endangers the livelihood of the entire region. Millions of people do not have access to safe potable water and the situation is expected to worsen. In the past few decades extensive research has been performed on small-scale desalination of sea and brackish water. This technology has great potential for providing isolated rural areas with potable water.

The Coordination Action (CA) ADU-RES is striving to remove the remaining technical barriers facing autonomous, renewable energy-powered desalination units. The CA aims to identify policy and institutional obstacles to market penetration of such systems and to suggest appropriate improvements to institutional and policy framework. Finally, the key objective of ADU-RES is to widely disseminate the results to decision-makers and the scientific community, and to start implementation of commercial applications supplying people with safe potable water.

ACTIVITIES

ADU-RES has brought together leading research institutions from five European and eight Mediterranean Partner Countries (MPCs) specialising in the fields of water desalination and renewable energy systems. This strong and committed consortium will undertake the following tasks:

- existing R & D work as well as the results of their own technical and economic research will be collected and specific guidelines for further development of ADU-RES plant design and construction will be formulated;
- socioeconomic and political framework conditions in the target countries including the relevant EU directives will be analysed in detail. Based on this analysis, a political strategy to boost decentralised, renewable energy-based desalination units will be developed;
- a well-designed dissemination action will take place, comprising widespread circulation of reports, papers, methodology and guidelines at relevant conferences as well as through the media, internet portals and two international seminars — one in Tunisia and one in Jordan.

EXPECTED RESULTS AND OUTCOMES

There are three main outcomes resulting directly from actions undertaken:

- guidelines with recommendations for improved ADU-RES design and construction, incorporating technical, environmental and social concerns;
- recommendations for improvements in the institutional and policy framework of the EU and involved Mediterranean countries will be designed;
- development of information materials to be made available to all interested parties, from local populations to decision-makers.

These direct outcomes will strongly support the objectives of the INCO programme — namely by improving international cooperation between the EU and the MPCs in a vitally important research field.

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WatNitMED

Management Improvements of Water and Nitrogen Use Efficiency of Mediterranean Strategic Crops

Period: 01/01/2005 to 31/12/2008
Budget from EC: EUR 1 386 700

Coordinator: Luis Esteruelas and Gustavo Slafer
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CONTENT AND OBJECTIVES

Mediterranean climate is marked by a high seasonal variability in rainfall, with soils characterised by their relatively low and variable nitrogen content. As crop productivity for a particular region is the consequence of the breeding x management x weather interaction, understanding the basis for improved management has been becoming increasingly important.

The general objective of this proposal is to identify and transfer improvements in management of wheat and barley to increase productivity while mitigating environmental impacts. In this context the project team aims to improve the understanding of the determinants of the crop's ability to capture more water and/or to use water more efficiently (WUE) in a range of nitrogen availability conditions; as well as to capture more nitrogen and/or to use nitrogen more efficiently (NUE) in a range of water availability conditions. This knowledge would help identify management strategies by increasing efficiency in the capture and/or the use of the most limiting factors (water and nitrogen) which determine cereal productivity in Mediterranean environments.

ACTIVITIES

Due to the required combination of scientific activities at different levels of organisation, a work plan has been designed over a four year period, combining the expertise and experience of 14 partners, including farmers' associations. A premise of this project is that a better understanding of the physiological basis of the responses to water x nitrogen shortages is required in order to design more consistent management practices and to overcome the deficiencies explored by the strategic crops, with an objective to make them more profitable and sustainable. This improved understanding would then be introduced into the mechanistically-defined management strategies to be evaluated, both in actual agronomic studies and through modelling exercises.

There are three different types of work packages: one environmental, one socio-economic, and ten work packages that cover the agronomic issues to be analysed. These include levels of organisation believed to have a direct impact on management practices design: three work packages on

'Whole-Plant Physiology', three on 'Crop Physiology', two on 'Modelling', and two on 'Agronomy'.

EXPECTED RESULTS AND OUTCOMES

By arranging experiments to explore different levels of organisation, but in all cases within the actual regional differences in soil and climatic factors, the project attempts to produce a solid basis for cereal behaviour in a range of water x nitrogen deficiencies that may be confidently used in the design of management strategies with mechanistic basis. In addition, the use and adaptation — including parameterisation, calibration and validation — of a crop simulation model facilitates the study of interactions between year x climate x cultivars x management strategies that will be appropriately complemented by traditional agronomic research.

The project will offer opportunities to students from agricultural universities to work on postgraduate theses in the different areas, thereby contributing to scientific capacity building and the development of human resources. All partners will be exposed to a series of specific, and novel methodologies that are relatively unknown to them. Finally, the project includes farmers' associations within the partnership in order to ensure a realistic scenario for experimentation and a successful outreach process.

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MEDITATE

MEditerranean Development of Innovative Technologies for integrATed waTer managemEnt

Period: 01/05/2004 to 31/10/2007
Budget from EC: EUR 1 648 497

Coordinator: Nathalie Dörfliger
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CONTEXT AND OBJECTIVES

Mediterranean countries have a long experience in water management as they all suffer the effects of water scarcity. Indeed, water resources are a limiting factor to economic development and are implicit in the need to find the best path for water valuation. The MEDITATE project aims to develop a Water Management Support System (WMSS) to deal with water scarcity, at Mediterranean catchment level, by integrating the use of alternative water resources such as karst submarine springs, seawater or brackish water desalination and water reuse.

The specific objectives of the project are:

- to develop an integrated WMSS at catchment scale including socio-economic analysis concerning water demand, water policy and management structure;
- to develop, test and implement a WMSS in two out of four catchments, one in Lebanon (coastal karst aquifer of Chekka) and one in Jordan (Amman Zarqa basin);
- to consider new alternative water resources such as submarine springs with temporary desalination plants;
- to use innovative technologies to develop and test an Autonomous Underwater Vehicle for submarine spring surveys; to develop a prototype for monitoring discharge and water quality of submarine springs, and to analyse the feasibility of developing new low cost and low energy desalination treatment plants.

ACTIVITIES

The activities of the MEDITATE project are subdivided into five Work Packages (WPs):

- WP1: to set up an inventory and database for each catchment, in order to identify the minimum additional new data required, define the characteristics of the hydrogeology and socio-economic situation of the four catchments; and carry out the hydrological modelling and set up water scenarios to be considered in the WMSS;
- WP2: methodological development specifically for karst aquifers within the catchment and also methodological development for the socio-economical study, namely for water governance description and cost effectiveness analysis;

- WP3: technological development based around the alternative water resources — submarine springs, brackish and seawater desalination and water reuse — in order to test the importance and feasibility of capturing submarine springs, design new small desalination units for temporary use, and review water reuse for water management in a water scarcity framework;
- WP4: WMSS development in order to integrate hydrogeological and water scenarios including cost and energy analysis of various alternative solutions;
- WP5: dissemination of the results of the project, through a website, workshops and scientific and technological papers.

EXPECTED RESULTS AND OUTCOMES

The main results of the project are expected to:

- be a building block for constructing solutions to meet future challenges facing the water crisis in Mediterranean countries, including guidelines for setting up WMSS taking into consideration physical water modelling, water scenarios for 2025 based on water demand, water policy, and social and economic analysis, applying a participative approach process through the organisation of workshops;
- create a guidance document on planning sustainable water livelihoods in Mediterranean catchments (to be provided in English, French and Arabic);
- develop guidelines to study, characterise and model karst coastal aquifer in order to integrate water resources management in a sustainable manner;
- develop a prototype and demonstrate an Autonomous Underwater Vehicle for submarine springs surveys;
- report on the feasibility of new development for a low cost desalination small unit and of state-of-the-art of water reuse in drought areas;
- reinforce synergies between scientific teams and industry in order to solve specific and major problems of water scarcity.

MEDITATE

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AQUARHIZ

Modulation of plant-bacteria interactions to enhance tolerance to water deficit for grain legumes in the Mediterranean dry lands

Period: 01/03/2004 to 28/02/2007
Budget from EC: EUR 1 030 000

Coordinator: Carmen Vargas, University of Seville

CONTEXT AND OBJECTIVES

Cultivation of leguminous crops helps to improve soil fertility by symbiotic nitrogen (N) fixation and protects ground water from toxicity due to excessive application of N-fertilisers. Nevertheless, the production of legumes in farming systems is decreasing because its yield instability results in low-market competitiveness. Productivity of grain-legumes in several parts in the Mediterranean Basin is frequently limited by water insufficiency. This causes the need of importation to fulfill deficits in markets.

The primary goal of AQUARHIZ is to increase the production of chickpea, common bean and faba bean in Algeria, Egypt, Morocco and Tunisia, where their productivity is affected by water deficit. For this purpose, combinations of legume genotype/host-specific rhizobia showing enhanced nitrogen fixation under water deficit will be tested in field trials in reference production areas of the above countries. The economic competitiveness of this strategy in sustainable farming systems of the Mediterranean Basin will be assessed. In addition, physiological and molecular mechanisms of tolerance to water deficit will be studied with the aim of identifying genes that could be used for marker-assisted selection in breeding programmes.

ACTIVITIES

The main activities of the AQUARHIZ project are to:

- determine, under controlled conditions, the stimulatory effect of a number of local rhizobial strains isolated from drought-affected areas on the efficiency of stress-tolerant genotypes of chickpea, common bean, and faba bean to fix nitrogen under water deficit;
- assess the yield and effects on soil fertility of the most promising legume-line/bacterial-inoculant combinations in reference production areas of the targeted countries;
- evaluate inoculant strains with prospective industrial use on their survival in inoculant formulations and their competitiveness and persistence in soil, as well as their impact on the biodiversity of the ecosystems targeted;
- study the economic feasibility of the approach in sustainable farming systems of the targeted countries;
- investigate the mechanisms and genes involved in differences of tolerance to water deficit for symbiotic

nitrogen fixation in legumes and rhizobia;

- initiate technology transfer towards professionals and policy makers;
- provide the best biological material to seed and inoculant industries, introduced in breeding programmes to improve local lines appreciated by consumers, and used to enhance tolerance to water deficit of legume lines adapted to other stresses.

EXPECTED RESULTS AND OUTCOMES

The beneficiaries of the project will be farmers, consumers, and the environment of the targeted countries. The contributions to be presented to the community, public and regulatory authorities as well as interested industries are:

- improved drought-tolerant lines of grain legumes to be utilised for seed production or introduced in breeding programmes;
- a number of specific rhizobial strains that can be used as bacterial inoculants for grain legume-cultivation in the Mediterranean Basin;
- knowledge on the physiological and genetic bases of tolerance to water deficit in grain-legumes and inoculant strains;
- initiation of technology transfer to private (plant breeders, seed and inoculant industrialists), and public (local extension services) sectors, as well as the final users (farmers).

In the Mediterranean Basin, the safety and impact on the environment of agricultural production of food is of paramount importance. Biotechnologies targeting replacement of chemical fertilisers with microbial assisted plant nutrition are considered as a highly promising tool for increasing yield of crop plants in an environment-friendly way. Social impact of the project will have effects beyond the farm, extending indirectly to the community as a whole, and contributing to the reduction of urbanisation.

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TRITIMED

Exploiting the wheat genome to optimise water use in Mediterranean ecosystems

Period: 01/09/2004 to 31/08/2008
Budget from EC: EUR 1 320 000

Coordinator: Dimah Habash, Rothamsted Research

OBJECTIVES

Water is a major determinant of yield for farming wheat in the Mediterranean Basin. Wheat (mostly durum wheat) is one of the most widely cultivated crops mainly grown under rain-fed conditions often characterised by relatively low and uncertain rainfall. As a result, durum wheat farming faces continuous fluctuations in production. However, bread wheat is imported to a relatively large extent, in many countries. Therefore there is an urgent economic need to improve water use as well as water use efficiency (WUE) in wheat production. This proposal aims to identify crop traits and wheat germplasm, that impart higher and more stable yield under Mediterranean drought conditions. It will be achieved by using an integrated approach combining genomics, quantitative genetics and crop physiology.

ACTIVITIES

This project will:

- evaluate a range of different genotypes of durum and bread wheat for WUE, integrative morpho-physiological traits, yield and quality under Mediterranean field conditions ranging in water availability;
- select best durum and bread wheat lines evaluated under field conditions for integration into breeding programmes;
- detect new regions of the wheat genome — quantitative trait loci (QTL) — that are correlated with water use traits;
- identify new molecular markers closely linked with useful genomic regions for future plant breeding programmes;
- design and build a new custom wheat chip for the study of gene expression in select genotypes evaluated under field conditions in the Mediterranean;
- develop the experience and knowledge of young scientists from West Asian and North Africa (WANA) countries in the latest molecular and physiological techniques;
- conduct a socio-economic study on wheat farming and new technology in Mediterranean countries.

EXPECTED RESULTS AND OUTCOMES

For the scientific community:

- crop traits that impart tolerance to drought;
- germplasm for efficient use of water under Mediterranean conditions;
- new QTL for water use efficiency in wheat;
- new molecular markers linked with high water use efficiency;
- knowledge derived from microarray analysis of wheat subjected to drought stress (scientific publications).

For the emerging science in the region:

- Build up scientific capacity and development of human resources in WANA countries in the latest molecular and physiological techniques.

For the breeders:

- New molecular markers for marker-assisted breeding related to ecophysiological and agronomical traits determining yield under Mediterranean conditions;
- Development of novel wheat germplasm efficient in water use to integrate into breeding programmes.

For the farmers:

- Improved wheat germplasm efficient in water use;
- Involvement in the socio-economic study on water use in wheat farming to identify problems and solutions (integration into breeding efforts).

For the policy makers:

- An integrated study of the socio-economic aspects of water use in wheat for the Mediterranean region (socio-economic study and guidelines);
- Application of the latest scientific tools towards solving aspects of wheat farming.

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PERMED

Improvement of native perennial forage plants for sustainability of Mediterranean farming systems

Period: 01/10/2004 to 30/09/2008
Budget from EC: EUR 1 365 000

Coordinator: François Lelièvre
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CONTEXT AND OBJECTIVES

The amount of water available to agriculture in the Mediterranean is declining because of increasing population pressure and greater incidence of drought. Perennial forage species utilise water more efficiently than annuals, can restore soil fertility and enhance forage production, thereby contributing to greater sustainability of rain-fed agricultural systems in the southern EU countries and North Africa. By adopting a multidisciplinary approach and targeting the key breeding objectives of superior drought resistance and Water Use Efficiency (WUE), this project aims to:

- accelerate plant improvement in a number of important perennial forage species (alfalfa, cocksfoot, tall fescue, sulla) for various environments across the western Mediterranean;
- develop technical packages for easy on-farm adoption;
- organise plant breeding and multisite evaluation in participating countries, thereby ensuring a long-term interest of the seed industry to produce commercially viable cultivars of broad regional interest and adaptation.

ACTIVITIES

The activities are divided into eight complementary work-packages:

- collection, evaluation and conservation of North African germplasm in perennial grasses and lucerne;
- use of molecular genetics to identify Quantitative Trait Loci (QTLs) related to drought tolerance and WUE in mapping populations of lucerne;
- evaluation of elite forage populations for high WUE and adaptation to drought through multisite experiments in wide climatic gradients in the region, and analysis of genotype x environment interactions to define traits of new cultivars;
- ecophysiological analysis of traits determining drought survival, perenniality and WUE in forage perennial species;
- variability of Rhizobium strains associated with North African lucerne germplasm and selection of elite strains;
- technical packages to increase the use of perennial forages in four representative farming systems in the Mediterranean;

- enhancement of plant breeding methodologies and activities in perennial forage plants for semi-arid and arid environments, and seed multiplication of improved cultivars;
- coordination and dissemination of the results in participating countries.

EXPECTED RESULTS AND OUTCOMES

The project aims to benefit rural societies in Mediterranean semi-arid and arid areas, submitted to increasing impacts of global climate change on water availability for agricultural activities. It intends to organise a permanent multidisciplinary cooperation in forage science between countries of the West Mediterranean Basin, with a common objective to develop more perennial forage plants in farming systems of the region. A database and a conservatory of North African germplasm will be created. Plant breeding objectives and activities will be coordinated, with attention to new technologies and education of young researchers. A network will be organised to test selected elite material at multisite level, from which acceleration of registration and commercial development of new cultivars is expected. Technical solutions will be proposed for on-farm development of this new material, combining the constitution of grass-legume mixtures for different purposes and environments and subsequent management techniques. Impacts on livestock feeding and on sustainability of biophysical resources (soils, water, biodiversity) in farming systems will be evaluated.

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IRRISEASOIL

A cheap easy-to-handle desalination approach for crop irrigation under Mediterranean conditions

Period: 01/04/2004 to 31/12/2007
Budget from EC: EUR 1 250 000

Coordinator: Prof. Angela F. Danil de Namor, University of Surrey

CONTEXT AND OBJECTIVES

The objectives of this project are:

- the development of selective polymeric materials (cheap to produce) for desalination of seawater, post-irrigation water and soil with the aim of developing a more effective technological approach than the existing ones.
- the use of biotechnological modes and means for promoting efficient and nutrient use of water by plants, improving their immunity and resistance towards diseases and droughts.

To achieve these objectives the following steps are to be undertaken:

- Selection of main strategic cultivars of three Mediterranean countries as pilot sites for vegetation experiments based on socio-economic importance, crops quality and structure, agronomical and climatic conditions of their cultivation.
- Synthesis and characterisation of calix-chitin polymers for desalination of seawater, post-irrigation water and soil, followed by their application at laboratory and pilot plant scale.
- Qualitative and quantitative assessment of the industrial potential of the de-sorption solutions resulting from sea, post-irrigation waters and soil.
- Design of phenylpropanoid polymeric derivatives with the capability to function as a plant growth regulatory, fertilisers, quality enhancers for the protection of crop quality and productivity under drought conditions.
- Combination of desalination and nutritional processes for crop irrigation and optimisation of dripping irrigation systems.

ACTIVITIES

The activities are summarised as follows:

- characterisation of crops, salted water resources and soil of three Mediterranean countries (Morocco, Palestinian-administered areas and Lebanon);
- synthesis and characterisation of calix-chitin extracting agents; recycling; desalinating with calix-chitine polymers at laboratory and pilot plant scale;
- investigation of crop's response to treated sea and

- post-irrigation water under Mediterranean conditions;
- improvement of water consumption in agricultural zones by using silicon — containing derivatives of natural phenylpropanoids;
- desalination of soil by calix-chitine using the results of the steps described above and optimisation of drip irrigation systems by calix-chitin containing desalination units.

EXPECTED RESULTS AND OUTCOMES

The IRRISEASOIL project team aims at achieving the following results:

- Constitution of libraries of main strategic regional crops, nutrients and chemical compositions of salted regional water sources and soil projected for desalination;
- availability of novel polymeric materials using natural resources and a new approach to desalination processes, and technological development at pilot plant scale;
- detailed response of horticultural plants to low quality waters in terms of yield and quality of yield, and remediation of soil for horticultural purposes;
- minimisation of the use of mineral fertilisers and toxic synthetic fungicides, and rehabilitation of soil;
- development of a novel method to regain agricultural land rapidly and without the financial burden or technical problems associated to other conventional methods;
- optimisation of current drip irrigation systems and enhancement of the market for irrigation systems.

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NOSTRUM-DSS

Network on gOvernance, Science and Technology for sustainable water ResoUrce management in the Mediterranean. The role of Dss tools.

Period: 01/08/2004 to 31/01/2008
Budget from EC: EUR 1 010 000

Coordinator: Prof. Carlo Giupponi
Fondazione Eni Enrico Mattei (FEEM)

CONTEXT AND OBJECTIVES

NOSTRUM-DSS aims to contribute towards achieving improved governance and planning in the field of sustainable water management within the Mediterranean Basin by: establishing a network between the science, policy and civil society arenas; fostering active involvement of stakeholders in the project's different stages; and developing and disseminating best practice guidelines for the design and implementation of DSS tools for Integrated Water Resources Management (IWRM) in the Mediterranean area.

In order to contribute to a more policy-oriented research community and a more informed policy-making process, this Coordination Action (CA) — aided by the use of DSS — will pursue three main strategic objectives:

- to establish durable links between scientific institutions, governments, non-governmental organisations, SMEs and other stakeholders in the Mediterranean countries, and to improve public awareness on water management;
- to contribute to the improvement of scientific knowledge and applied methodologies in the field of IWRM;
- to promote the design and development of effective and suitable DSS tools, built on the basis of the real needs of the Mediterranean countries for developing a policy for IWRM.

ACTIVITIES

This CA is divided into three general groups of activities. The first group is composed of coordination activities that aim at establishing the network and exchange channels and at defining a common starting point for the implementation of the CA. In the context of these activities, all countries participating in the CA will produce a national report with the aim of providing state-of-the-art of water resource management for each country, and of ensuring the active involvement of local stakeholders from the start of the project.

The second group consists of training activities which are devoted to further investigate, consolidate and integrate the aspects related to IWRM and the role of DSS tools emerging from the national reports, and to train policy-makers, young researchers and other interested stakeholders on

such issues during the events organised within the project. The organisation of three thematic workshops and two conferences is envisaged within these activities.

The last group refers to consortium management activities, which will be undertaken by the project coordinator during the entire project life-cycle, in order to ensure the implementation of the usual project coordination activities, and to guarantee monitoring, review, assessment and dissemination of project results.

EXPECTED RESULTS AND OUTCOMES

NOSTRUM-DSS is expected to provide contributions for reducing the gap between science and real life, in order to provide DSS developers with an insight into the language and needs of policy-makers and stakeholders. Subsequently, policy-makers will have at their disposal effective tools based on an integrated approach to IWRM problem-solving.

In particular, some of the expected benefits of the CA are to:

- improve communication between science and policy;
- improve cooperation among Mediterranean institutions;
- support participatory planning for water resources management and to facilitate multilateral exchange of expertise and experiences of water management across the Mediterranean region;
- support the creation of DSS tools more targeted to real needs and of greater use for decision making.

The ultimate tangible output of the CA will be a set of best practice guidelines for the development and application of DSS tools for IWRM in the countries of the Mediterranean Basin. The guidelines will be developed with the active participation of scientists, policy-makers, and key stakeholders (such as SMEs and user groups), through a structured sequence of actions aimed at favouring efficient exchanges of information, knowledge and experiences between the various components of the CA.

The establishment of durable links and long-term collaborations between the partners and representatives of the policy and academic institutions in the Mediterranean area will be achieved through the support and early

NOSTRUM-DSS

involvement of those international institutions with a long tradition there: (ICS-UNIDO and CIHEAM-IAMB) and a centre of excellence with focus on the Mediterranean area (IDEAS/CESD). Moreover, at the end of the CA, a monographic book on DSS tools in policy-making will be published, targeted for use in teaching, training and skills development.

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MedIndus

Advanced technologies for the treatment of industrial and coastal waters of the Mediterranean region

Period: 01/10/2004 to 30/09/2007
Budget from EC: EUR 941 995

Coordinator: Prof. Angela F. Danil de Namor, University of Surrey

CONTEXT AND OBJECTIVES

Following the selection of three pilot zones in Morocco, Tunisia and Lebanon, this project aims to develop novel technological approaches (making use of regional resources) for industrial (prevention) and coastal (remediation) water treatments with a higher degree of efficiency than existing ones. These treatments are based on:

- the production of easily recyclable and low cost receptors grafted into regional silicates (modified silicates) for the removal of phosphates and POP's from industrial and coastal waters of the Mediterranean Region;
- the use of soil-applied mobilised receptors aiming to enhance the uptake of toxic metal cations by regional plants.

To achieve these objectives the research programme consists of:

1. Search on water chemistry of coastal areas and industrial effluents:

- Knowledge about the speciations present is crucial for the design of selective receptors. Samples of industrial, coastal and fresh water pilot zones would be investigated by electrochemical methods;

2. Design of immobilised receptors:

- Receptors to be attached to silicates are: cyclodextrins (known to form inclusion and exclusion adducts with apolar substances); aminocalix[4]arenes (basic centres for interaction with acidic toxic phenols); and calix[4]pyrroles (interact selectively with phosphates).

3. Use of Soil-Applied Receptors:

- Soil-applied receptors able to enhance the capability of plants to extract heavy metal cations will be used with the aim of developing a more efficient phytoremediation process. Socio-economic aspects of the approach are considered.

ACTIVITIES

The activities involved are summarised as follows:

- An investigation on the solution chemistry (speciations) of industrial and coastal waters of the Mediterranean region. This step is of fundamental importance for both the design of encapsulating agents to graft on silicates, and the selection of plants for phytoremediation purposes.

- Synthesis, characterisation and computer simulation studies of novel receptors based on cyclodextrins, calixarenes and calyx[4]pyrrole. Affinity of receptors for pollutants (1H NMR, conductance measurements, thermodynamics). Grafting receptors into silicates for the production of recyclable materials. Process development laboratory and pilot plant scale.
- Evaluation of a new system for heavy metal removal from soils by plants followed by an investigation of the improved ability of some plants species after treatment of contaminated soils with the new system. Comparison between the phytoremediation and the synthetic approach.
- Running educational programmes on the environment at an international conference in the field.

EXPECTED RESULTS AND OUTCOMES

The project team aims to achieve the following results:

- indepth knowledge of the solution chemistry of contaminants in industrial water and coastal waters of the Mediterranean region for the design of selective receptors;
- availability of novel receptors with selective properties for a variety of pollutants of organic and mineral nature for use in the development of a technological approach for the removal of pollutants from ecosystems;
- background knowledge to propose a technology based on material resources resulting from detailed physiological aspects of the treatment mechanisms by plants and adaptation tests to real conditions of treatment;
- public awareness of regional environmental problems and their implications to human health as well as enhancing the link between the University and both the public sector and industry in the Mediterranean region.

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MELIA

MEditerranean DiaLogue on Integrated Water ManAgement

Period: 01/09/2006 to 31/08/2010
Budget from EC: EUR 2 000 000

Coordinator: Rafael Rodríguez-Clemente
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CONTEXT AND OBJECTIVES

The main objective of MELIA is to contribute to the improvement of effective regional water management to promote sustainable development in the Mediterranean region. In particular, the specific objective is the technical, socio-economic and political exploitation of the dialogue and communication among its 45 relevant partners and other experts and stakeholders, to build-up and share a common knowledge and awareness that would contribute to the sustainable management of water in the Mediterranean region. MELIA aims to provide research review, knowledgebase, debate-dialogue, co-ordination among the various categories of players (researchers, decision- and policy-makers, end-users /providers, SMEs, NGOs), a shared/common conceptual framework for recommendation to policy- and decision-makers on integrated water management in the Mediterranean, dissemination and knowledge transfer, and public access to information. MELIA will be undertaken so that the new common knowledgebase, conceptual frames and recommendations will be built through the coordination and harmonisation of inputs from other relevant project actions in which most of the partners are or were involved as coordinator or members. Moreover, MELIA will constantly look after the needs of a full integration of Mediterranean water actions and policies with the three main dimensions of sustainable development (natural, social and economic dimensions).

ACTIVITIES

Establish a Euro-Mediterranean-wide structure based on ICT to enable communication and dialogue between the players of the project aiming at finding the common ground between them based on a sound knowledge of management for sustainable development, and the correct and effective management of water resources, with the aim of setting a reference system to support decision-making in normal regulatory processes and occurrences of natural water crises. Periodically, a workshop dedicated to specific work packages will be organised incorporating external stakeholders. The dialogue will indirectly constitute a platform for enhancing the attribution of common meanings to technical and non-technical terms, the use of common semantics, the acceptance of standards to be

used in technical cooperation, and the application of shared common indicators. Further activities are to promote and facilitate continuous Internet-/media-based dialogue with citizens, through project partners acting as national focal points. This is foreseen in order to listen to the 'voice' of the citizens, collect their thoughts, understand their different positions, define a hierarchical list of public concerns and involve them in the building of the knowledgebase in a way that reflects linguistic diversity.

The project will:

- link activities to the real needs and concerns of the Mediterranean countries;
- disseminate and ease access to the relevant common knowledge; discuss and prepare a comprehensive conceptual framework to plan regional sustainable water management based on an efficient system and policy setting;
- create a gateway for the introduction of the criteria and tools of the 'Water Directive' in the Mediterranean countries.

EXPECTED RESULTS AND OUTCOMES

The project is expected to provide the following achievements:

- improved national and regional dialogue on Integrated Water Resources Management (IWRM) at different levels;
- increased awareness of Mediterranean citizens, decision- and policy-makers to develop sustainable IWRM;
- improved understanding of cultural heritage and societal impact on water management;
- increased awareness with regard to the need for a culturally-socially sound water management and planning;
- improved understanding and perspectives of Water Technology development and transfer in the Mediterranean;
- improved assessment of strategies needed to optimise use of water resources through combined-integrated saving and conservation practices in urban, agricultural and industrial sectors;
- improved tools for estimation of water saving yields at

- catchment's scale;
- increased awareness on best practices for the ecosystem and a socio-economic sound rational use of water resources;
- participatory' consensus on formulation of possible water pricing strategies and increased awareness for the bottom-up participatory policy development on good Water Governance;
- improved relevant knowledge shared by the MELIA partners using the Community of Practice (CoP) tools;
- Networking for knowledge share with other stable structures and networks dealing with water issues in the Mediterranean area in order to obtain a Mediterranean-wide Integrated Knowledge sharing (vertically and horizontally);
- full awareness of MELIA partners on citizens' perception of water problems and adequate involvement of citizens in MELIA dialogue measured through the qualitative and quantitative participation in fora, public activities and groupware tools;
- material for dissemination in the media on citizens perception of the water issues;
- enlarged awareness of decision makers about the adequate use of relevant indicators;
- a broader knowledge of problems and perspectives linked to the application of the Water Framework Directive in the Mediterranean.

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INECO

Institutional and Economic Instruments for Sustainable Water Management in the Mediterranean Region

Period: 01/07/2006 to 30/06/2009
Budget from EC: EUR 739 987

Coordinator: Prof. Dionysios Assimacopoulos
National Technical University of Athens

CONTEXT AND OBJECTIVES

The water scarcity problems faced by the Mediterranean region, coupled with the wide diversity in socio-economic, environmental, geographical, and technological conditions of the countries situated there, have placed it at the centre of research for the water sector. Although policy recommendations and suggestions are a focal point of interest for the scientific and research community, the aspect of water governance and required reforms and policies have rarely been touched upon.

The aim of INECO is to establish a Mediterranean network of research institutes, public authorities and stakeholders for coordinating research and analysing decision-making practices with regard to the application of institutional changes in the water sector. With this in mind, the specific objectives of INECO encompass the exchange and dissemination of good practice, information and research between the participating institutes on institutional and economic instruments for improving sustainable water use. The performance of studies on the assessment of the efficiency of currently applied water management practices, focusing on the financial sustainability of water services and the economic efficiency of water allocation will also be included as one of the primarily objectives.

The key goal of the project is the formulation of adaptive guidelines for alternative institutional arrangements, capable of promoting Integrated Water Resources Management through the application of economic instruments.

ACTIVITIES

INECO encompasses a series of coordination activities, aiming to strengthen the cooperation between the consortium members, but most importantly, to provide public meetings to facilitate dialogue, as well as to exchange and receive live feedback on the issue of institutional and economic reforms in the water sector.

Activities include the review and dissemination of good practice on the application of institutional and economic instruments in arid and semi-arid environments, the performance of studies and analysis regarding both the efficiency of current water and cost allocation mechanisms

and governance structures, and the formulation and formalisation of guidelines for alternative institutional arrangements in the form of a web toolbox.

Furthermore, the project will organise a series of workshops in all participating Mediterranean countries (Algeria, Egypt, Lebanon, Morocco, Syria and Tunisia), and Cyprus, to disseminate and validate the results of the Coordination Action and for collecting public opinions on the aspects addressed by INECO. Additional dissemination and information exchange with stakeholders and social actors will be performed through the project website and the established web fora, while scientific publications on current practices, typology of governance structures and guidelines, as well as a Conference organised at the end of the project will target the scientific community.

EXPECTED RESULTS AND OUTCOMES

Through dissemination and information exchange on good practices, the analysis of current governance structures and the formulation of adaptive and socially acceptable guidelines for the application of institutional and economic instruments, INECO aims at raising awareness on making water governance more effective, and proposing structures for a more efficient and transparent allocation of water and the costs of water services.

In addition, the strong participation of stakeholders — with emphasis on the integration of cross-sectoral views and disciplines, promoted through workshops, publications, and web forums — will raise awareness on the importance of a more sustainable, equitable and socially acceptable water allocation. This is of particular importance in the Mediterranean region, where the scarcity of resources and their allocation is an issue that creates conflicts and transboundary water management issues that accentuate social problems.

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GEWAMED

Mainstreaming gender dimensions into water resources development and management in the Mediterranean Region

Period: 15/02/2006 to 14/02/2010
Budget from EC: EUR 1 250 000

Coordinator: Dr Atef Hamdy
Istituto Agronomico Mediterraneo di Bari
(CIHEAM)

CONTEXT AND OBJECTIVES

The project plans to build an extensive knowledge base for mainstreaming gender dimensions into IWRM. To achieve this objective the project will build a regional network and establish six national ones using internet technology in at least six countries of the South East Mediterranean Region (SEMR). The regional network will be essentially a mean for exchanging experiences, disseminate results and allow for enhanced coordination among national projects' activities and participants.

The project will improve the cooperation and dialogue among partners and external organisations interested in this subject through participation in three regional workshops and an international conference that will be held at the end of the project's life cycle. The project will interact with other EU-funded MPC projects, like MELIA, INECO and WADI that also focus on information knowledge management to promote coordination and exchange of experiences.

It is also expected that the project will contribute to improving the coordination of gender activities in an IWRM context and to disseminate information, particularly in the rural areas. For this purpose GEWAMED will establish a National Central Focal Point in each SEMR country that will interact with the other collaborating institutions involved in the water sector. This will not only be a coordination mechanism but also an important means of collecting and disseminating gender information spread among many institutions. One of the most distinctive features of GEWAMED is precisely the establishment of a knowledge base for acquiring and disseminating gender information at national level. The project may also contribute to the adoption of national policies and other related instruments (strategies, approaches, guidelines, incentives and legislation) by involving decision-makers and politicians in the processes of mainstreaming gender dimensions in IWRM. For this purpose the project will organise at least one national policy seminar in each SEMR country.

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INNOVAMED

Innovative processes and practices for wastewater treatment and re-use in the Mediterranean region

Period: 01/01/2007 to 31/12/2009
Budget from EC: EUR 480 000

Coordinator: Prof. Damia Barcelo
Consejo Superior de Investigaciones Cientificas

CONTEXT AND OBJECTIVES

The need to introduce remediation and treatment technologies in the water cycle was recognised by the European Commission under the Fifth and Sixth Framework Programmes (FP5 and FP6 respectively) and several research projects aiming at improving wastewater (WW) treatment techniques through process optimisation to minimise environmental impacts from WW treatment were funded. In parallel, various initiatives are being conducted at national level, both in the EU and Mediterranean Partner Countries (MPC). However, communication gaps still existing among scientists and local communities (and water users) and the lack of networking among different Mediterranean countries are the main obstacles to a more efficient use of the gained knowledge.

The main objective is to explore the synergies of the research carried out within different programmes and countries (e.g. ED, WBC, DEV, NIS, MCP), and to coordinate the research activities of ongoing EU and national projects dealing with the development of innovative technologies for wastewater treatment, treatment and disposal of sludge, and application of innovative practices for re-use of reclaimed water. INNOVAMED also aims to facilitate communication between researchers and national and regional institutions from the MPC and to allow a broad dissemination and transfer of the knowledge/technology/practice to the Mediterranean area.

The INNOVAMED Coordination Action will include seven EU funded projects (P-THREE, CADOX, EMCO, AQUACAT, EmWATER, WATERBENCH and HOLIWAST) dealing with wastewater treatment and water management:

- two from the EESD programme (FP5), sub-programme area 'Waste water treatment and re-use';
- three from the INCO programme (for western Balkan countries and developing countries and newly industrialised states);
- one from the policy-orientated 'Scientific support to policies' (SSP) programme; and
- one project from the EU-MEDA programme.

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MEDITERRANEAN PARTNER COUNTRIES

HEALTH

Bedouin Health

Improving Access to and Quality of Reproductive and Child Health Care to Marginal Peoples: Bedouin in Jordan and Syria

Period: 01/01/2006 to 31/12/2009
Budget from EC: EUR 1 000 000

Coordinator: Prof. Gillian Ann Lewando Hundt
University of Warwick

CONTEXT AND OBJECTIVES

Basic health care provision for pastoral peoples in the Middle East has been difficult to provide due to their remoteness and mobility. Government services are designed for fixed, permanently domiciled populations. In the arena of health care, these marginal mobile or recently settled populations have had limited access to government health care provision. Jordan and Syria have pursued different models of governmental health care; Jordan has set up health centres where Bedouin have settled whereas Syria has maintained general health services for its rural population, with some mobile services for Bedouin.

This study aims to:

- assess the current health status, health seeking behaviour and practices of marginal pastoral peoples in relation to reproductive and child health;
- assess the scope of current health care delivery and the views on the matter of stakeholders-policy makers, health personnel and the Bedouin themselves;
- develop in partnership with local providers, model interventions to improve access to and the quality of reproductive and child health care;
- evaluate and disseminate the interventions locally, nationally and regionally.

The study will take place in the northern deserts of Syria and Jordan with the support of both Ministries of Health. The study sites within each area will include mobile and recently settled Bedouin. In the first year a needs assessment will be carried out using quantitative and qualitative data collection on health service utilisation and resourcing, health seeking behaviour, as well as participatory learning and action techniques designed to generate an understanding of reproductive and child health care needs, provision and delivery. During the second and the third year the research teams and partners in the Ministry of Health and local communities will develop model pilot interventions with ongoing evaluation.

Bedouin Health

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MedGeNet

Euro-Mediterranean Network for Genetic Services

Period: 01/10/2006 to 30/09/2008
Budget from EC: EUR 749 000

Coordinator: Michele Bianco, European Genetics Foundation

CONTEXT AND OBJECTIVES

The revolution in medical genetics and prenatal health practice during the past two decades has profoundly benefited health in many populations of the industrialised world. The success of the Human Genome project has contributed to knowledge that can help reduce birth defects mortality and disability worldwide. Genetic research has led to the identification of the genes responsible for an increasing number of monogenic disorders and the active investigation in large population cohorts of the genetic bases of the more common polygenic disorders has increased our understanding of multifactorial or 'complex' genetic disorders such as cancer. Unfortunately, the enormous progress in medical genetics has had little or no impact in the developing countries, where more than 80 % of the world's population lives.

The primary objective of the MedGeNet project is to expand the human expertise in clinical genetics and cancer genetics in Mediterranean Partner Countries (MPC) through the transfer of knowledge and technology between the two rims of the Mediterranean which share a common burden of genetic diseases. In particular the following three main areas of intervention and related objectives will be covered by the project activities: Medical Diagnosis and Integrated Medical Management; Information and Communication Technology; Education for health professionals and the general public.

ACTIVITIES

The MedGeNet work plan will consist of different sets of activities:

- coordination and management tasks;
- setting up a technological platform for distant learning and knowledge transfer concerning all the main project aims;
- supporting the Integrated Medical Management approach envisaged by the project, as well as genetic telecounselling and DNA chips;
- dissemination strategy to raise public awareness and visibility.

EXPECTED RESULTS AND OUTCOMES

Concerning the first area of intervention related to Medical Diagnosis and Integrated Medical Management, a Euro-Mediterranean network of genetic telecounselling and telepathology consultation will be set up to allow clinical geneticists from European countries and MPC to work together from remote locations. In particular, a medical genetics database will be created and the introduction of new mutation screening technology into the routine of the MPC laboratories/institutes will support collaboration especially on problematic diagnosis in the field of medical genetics.

In the framework of the second area of intervention, Information and Communication Technology, a common information/communication environment will be set up in order to facilitate collaborative research, diagnostic activities, exchange of data and protocols using Internet based tools and services.

Finally, the third area of intervention concerning education for health professionals and the general public will foresee the following outputs and products:

- the extension of an already existing Remote Training Centres Network which will allow physicians, nurses and health professionals from MPC to attend highly specialised courses on genetics without requiring them to invest time and resources for travel;
- the production of educational materials aimed at improving knowledge among caregivers as well as the general public regarding genetic services and prevention of birth defects;
- the creation of a Euro-Mediterranean Federation for Genetics and Medicine and an international event for the public awareness of genetics to give visibility to project outputs and to guarantee the continuation of the MedGeNet goals and activities in the Mediterranean region.

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CHILD TRAUMA NETWORK

Psychological network support to violence traumatized children: disasters, conflicts

Period: 01/01/2005 to 31/12/2006
Budget from EC: EUR 780 000

Coordinator: Juan José López-Ibor
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CONTEXT AND OBJECTIVES

The objectives of this network are to:

- conceive, carry out and benefit from the experience of a Euro-Mediterranean network, for consultation and help when intervening to give medico-psychological support to children traumatised by violence during disasters and wars;
- confront the knowledge and experiences of each country in the network, as well as harmonise action and doctrines for diagnosis, evaluation and psychological care or support;
- elaborate and produce a common handbook for teaching and practice of medico-psychological support;
- start up a country-by-country help system whereby, in the case of a major disaster and a country asks for help, needs would be evaluated and reinforcement teams sent out;
- take into account the different cultural values, gender equality and ethical issues.

ACTIVITIES

The activities are to:

- create national networks for each country in the network;
- exchange bibliographies, specific experiences and registration techniques;
- transmission of clinical data and behaviours via internet;
- hold meetings and workshops in each partner country to define the common objectives;
- elaborate a common theory and doctrine of action;
- elaborate procedures for communication;
- prepare a plan for mutual help in case of major disaster;
- determine the specific clinical profiles of traumatised children by war or disaster, during the three phases: immediate, post-immediate and delayed-chronic;
- propose or elaborate common standard clinical tools for detection, examination and evaluation;
- select, teach and train young psychiatrists and psychologists;
- compare the different methods of care, treatment and psychological support.

EXPECTED RESULTS AND OUTCOMES

The CHILD TRAUMA NETWORK aims to achieve the following results:

- demonstrate the effective functioning of an international Euro-Mediterranean network for the psychological care and support of traumatised children;
- advance the exploration and precision of the clinical profiles of traumatised children, after taking into account cultural specificities and differences;
- advances in ethical issues and gender equality;
- elaborate common clinical tools for examination and evaluation in child psychotraumatology;
- produce a common handbook for teaching and practice in the detection, evaluation and care of traumatised children;
- produce a plan for mutual help in case of major disaster in any of the countries belonging to the network;
- possibly extend the network to other countries.

CHILD TRAUMA NETWORK

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Leish-MED

Monitoring risk factors of spreading of Leishmaniasis around the Mediterranean Basin

Period: 01/12/2004 to 30/11/2007
Budget from EC: EUR 600 000

Coordinator: Jean-Claude Dujardin
Prins Leopold Instituut voor Tropische Geneeskunde

CONTEXT AND OBJECTIVES

Visceral and cutaneous leishmaniasis are serious communicable diseases around the entire Mediterranean Basin, including Southern Europe. These diseases are spreading and control is challenged by three escalating risk factors: human-made environmental changes, immunosuppression (essentially because of leishmania/HIV co-infection) and parasite resistance to first line drugs, pentavalent antimonials. Trans-border multidisciplinary surveillance of these three risk factors is essential for:

- precise and integrated assessment of the risks;
- defining adequate control measures, and;
- the orientation of R&D priorities.

The general objective of this project is to create a multidisciplinary network linking European and South/East Mediterranean partners in order to document the main risk factors involved in the spread of leishmaniasis around the Mediterranean and to promote transborder control strategies. The specific objectives of the project team are:

- to review, assess and inform on current scientific knowledge on the epidemiology and control of leishmaniasis around the Mediterranean;
- to co-ordinate existing research on surveillance and control of leishmaniasis;
- to disseminate and standardise relevant tools and good practice arising from research;
- to advise national, regional and international health authorities about the most effective transborder control measures;
- to identify the gaps in current knowledge and expertise; and
- to define future multidisciplinary research to remedy the situation through co-ordinated action.

ACTIVITIES

Objectives will be achieved through:

- five workshops for the 22 Euro-Mediterranean consortium partners on the following topics: diagnostics and epidemiology, molecular epidemiology, drugs, vaccine and environmental control;
- three short training courses open essentially for Southern Mediterranean partners, on three topics covered during the workshops: diagnosis and epidemiology, molecular epidemiology and, GIS and environmental control;
- one international conference for dissemination of findings.

EXPECTED RESULTS AND OUTCOMES

The present project will allow the constitution of a Euro-Mediterranean and multidisciplinary group of interactive experts on leishmaniasis. It will update knowledge and know-how in surveillance and control of Euro-Mediterranean leishmaniasis and establish the bases for both long-term collaborative research, and transborder surveillance and control network. Practically, the project team expects a series of position papers and updated guidelines for surveillance and control of leishmaniasis around the Mediterranean, as well as new research proposals stemming from the Leish-MED consortium.

Leish-MED

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Leish-MED

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ECHINONET

From country level to a pan-European perspective: A co-ordinated approach to controlling cystic echinococcosis

Period: 01/07/2004 to 30/06/2007
Budget from EC: EUR 422 783

Coordinator: Dr Thomas Junghanss and Dr Oliver Razum
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CONTEXT AND OBJECTIVES

Cystic echinococcosis (CE) is a major regionally-relevant communicable disease in the whole Mediterranean region and among migrants to the EU. Its public health importance is growing while surveillance, prevention, and clinical management are still far from satisfactory. In EU Member States, CE is an orphan disease, and there is comparatively little experience with treatment. However, health services in EU partner countries are increasingly confronted with the clinical management of CE patients due to migration.

The project aims at:

- devising a standard methodology for transborder data collection and uniform data presentation in the fields of surveillance, prevention and clinical management of CE;
- identifying effective and feasible prevention measures;
- collecting data systematically from endemic (Mediterranean Partner Countries [MPC]) and non-endemic (EU) countries with respect to clinical management procedures of CE for the four treatment categories: 'surgery', 'PAIR', 'drug treatment', and 'watch & wait';
- assessing the clinical management procedures with respect to cure rate, complication rate, recurrence rate, and cost;
- making recommendations for improved surveillance, prevention, and case management and quality of care.

ACTIVITIES

To achieve the project goals, two key strategies will be employed:

- systematic data collection in a uniform format in the participating countries, with the help of trained personal (doctoral students and post doctoral students);
- carefully planned and conducted workshops to bring together the data collected from the individual participating countries, to share and analyse these data among all the partner countries and to prepare updated 'best practice' guidelines for surveillance, prevention and treatment.

EXPECTED RESULTS AND OUTCOMES

EchinoNET will benefit all community members because:

- prevention activities for CE in the Mediterranean area can in future be targeted, based on epidemiological evidence;
- in Mediterranean countries, treatment costs can be reduced and unnecessary interventions avoided through the development of 'best practice' treatment guidelines;
- in northern EU Member States, where case numbers of CE are increasing because of immigration from endemic regions, treatment quality can be improved;
- there will be a North-South transfer of epidemiological research methods and of methods for quality assurance in clinical procedures;
- there will be a North-South transfer of ultrasound technology;
- there will be a South-North transfer of treatment experience;
- there will be increased South-South cooperation in cross-border surveillance for CE; and
- there will be a South-South exchange and adaptation of techniques (e.g. PAIR).

The consortium combines extensive research expertise in the field of clinical, epidemiological and socio-economic research on echinococcosis as well as practical clinical management skills of the disease with regard to all tools (ultrasound [Italy, Turkey, Morocco 2], serology [Egypt, Morocco, Tunisia, Germany]) and treatment techniques (surgery [Portugal, Morocco 2], percutaneous cyst drainage (PAIR) [Italy, Turkey, Morocco 2,], and long-term treatment with benzimidazole compounds [Germany, Italy, Turkey, Morocco 2]). This is complemented by an extensive experience in epidemiology and biostatistics [Germany]. Furthermore, some of the partners have been largely involved in the prevention of CE [Morocco 1, Spain, Algeria, Tunisia]. Finally, the consortium members are well connected to the relevant government authorities, medical associations, other national medical centers and relevant international bodies (International Society of Hydatidology, WHO) to ensure a wide local, regional and international audience for the dissemination of findings.

ECHINONET

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RABMEDCONTROL

Identifying ecological and epidemiological key factors for rabies dynamics and control in North Africa and implications for rabies status in South West Europe

Period: 01/07/2006 to 30/06/2009
Budget from EC: EUR 1 100 000

Coordinator: Chokri Bahloul, Institut Pasteur de Tunis

CONTEXT AND OBJECTIVES

Rabies is a serious public health concern in North Africa, causing heavy social and economic burden, and its reintroduction represents a threat to Western European countries presently free of rabies in non-flying animals. This project will take a global multidisciplinary approach to draw a precise picture of the rabies epidemiology in North Africa, by identifying and quantifying epidemiological, ecological, sociological and vaccinological key factors for rabies dynamics. This will provide health authorities with recommendations based on scientific evidence for prevention and control strategies. Furthermore, despite the fact that Western European countries have almost completely eliminated canine and vulpine rabies, they continue to declare some human and animal cases mostly imported from North Africa, in addition to the presence of the disease in bats with some spillover to humans. Therefore, the study of rabies in North Africa and West Europe will determine the possible overlapping of rabies epidemiological cycles between both shores.

ACTIVITIES

AND EXPECTED RESULTS AND OUTCOMES

For present project allowing to draw a precise picture of rabies epidemiology in North Africa and West Europe and to improve the control measures, multidisciplinary approaches will be followed. They can be grouped into four categories:

- WP1 and WP3 will allow the drawing up of an up to date picture of the rabies descriptive epidemiology in North Africa. WP1 will focus on standardisation of the sampling and diagnosis techniques in order to gather data from different countries which can be compared. A GIS tool will then be implemented to stress the importance of the rabies endemicity. WP3 is dedicated to molecular epidemiology tools that will draw the phylogeny of the circulating lyssaviruses in North Africa by sequencing the RT-PCR of different amplified regions inside the glycoprotein and the nucleoprotein. This phylogeny can provide a hypothetical reconstruction of the geographic and temporal evolution of the North African strains.
- WP2 and WP4, will provide milestones particularly relevant to the animal rabies reservoirs. The potential of bats as rabies reservoirs and a possible overlapping between Southern European and North African shores will be investigated in the context of WP2. 'Sociological investigations with KAP and interviews investigations' describes the overall objective of WP4, allowing the collection of key parameters of dog ethology in rural, urban and suburban areas. A special emphasis will be given to understanding the perception of rabies risk by the local population.
- The combined data from the above mentioned WPs will be analysed by computer and mathematically modeled to draw an analytical and synthetic description of rabies epidemiology. The consequent synthetic studies will highlight some targets inside the complex situation of rabies where intervention measures could be envisioned. Finally such outcomes are expected to provide health authorities — thanks to the support of international health experts — with appropriate recommendations to set up an adapted rabies control strategy (WP5).

RABMEDCONTROL

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RUSSIA

AND THE NEW INDEPENDENT STATES (NIS)

ENVIRONMENT

ECOPHOS

Waste utilisation in phosphoric acid industry through the development of ecologically sustainable and environmentally friendly processes for a wide class of phosphorous-containing products

Period: 01/12/2005 to 30/11/2008
Budget from EC: EUR 1 025 000

Coordinator: Dr Panos Seferlis
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CONTEXT AND OBJECTIVES

The ECOPHOS project is investigating the development of a new research and innovation strategy on waste minimalisation and usage in the phosphoric acid industry. The main aim is to develop ecologically-sustainable, environmentally-friendly, resource and energy-saving industrial process technologies for the production of a wide range of phosphorus-containing substances. The project focuses on new technologies for:

- the production of useful phosphorous salts (fodder, food and pharmaceutical phosphates), phosphorous acid and phosphates in a cost-efficient and ecologically-sustainable way;
- the improvement of existing methods in phosphoric acid production so as to radically minimalise waste;
- the utilisation and processing of industrial solid waste resulting from the production of phosphoric acid; and
- the production of a new generation of phosphoric fertilisers.

ACTIVITIES

In order to achieve the key objectives of cost, waste and energy reduction, mathematical models and computer-aided process engineering tools will be created to guarantee that the production systems' operations are efficient and sustainable. To ensure easy access and use, these new technological developments will be stored in an information management system. The newly-developed production systems will be classified according to the potential of both their environmental and sustainable properties. Furthermore, a knowledge-based system will be set up to assist users in selecting the appropriate production scheme, according to their needs and particular specifications.

EXPECTED RESULTS AND OUTCOMES

Waste minimalisation and usage technologies currently employed in the phosphorus chemical industries are definitely outdated and unable to respond to environmental problems. This project will attempt to merge the best expertise available in the field of phosphorus chemistry with the latest advances in computer-aided tools for synthesis, design and optimisation. The results will pave the way towards the creation of new and useful products from phosphoric acid waste generated during production. The broad spectrum of new and sustainable production technologies will bring about tremendous changes on the environmental impact of the relevant industries and furthermore increase their competitiveness.

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OMRISK

Impacts and risks from anthropogenic disturbances on soils, carbon dynamics and vegetation in podzolic ecosystems project

Period: 15/06/2005 to 14/06/2008
Budget from EC: EUR 899 378

Coordinator: Eleonora Bonifacio, Università degli Studi di Torino

CONTEXT AND OBJECTIVES

Boreal forests and podzolic soils are of utmost importance in the global carbon cycle. The role of Russian forests as a sink of carbon is acknowledged, but soils have an even higher capacity to store carbon, and the dynamics of organic matter in podzolic soils is different from that occurring in the other soil types. Thus, an appropriate viewpoint of the ecosystem must take into account not only the forests, but also the soils that support them, the soil processes and all the complex links between the two environmental systems. However, anthropogenic disturbances may interfere deeply with ecosystem functionality and this sink of carbon may turn into a source.

The general objective of the project is thus to evaluate the risks of carbon release caused by human actions. Some anthropogenic disturbances, such as contamination can be avoided only on a global scale, while others can be prevented more easily if scientific results are transferred into best practices to protect the role of the podzolic ecosystem. This is the case of harvest operations, clear cutting, tree selection and other silvicultural practices. Therefore, the project takes into account the effect of pollution on forest cover and soil buffering capacity, the influence of silvicultural practices on the dynamics of carbon, and the preservation of productive soils, as well as the effects of revegetation where the original forest cover has been destroyed by intense anthropogenic disturbances, such as open mine exploitation.

ACTIVITIES

The objective will be reached through specific activities in three Russian areas, in which one type of disturbance is dominant. The evaluation of the effects of revegetation of spoiled areas on the carbon cycle will be carried out through an investigation of the processes governing vegetation, the effects of vegetation on the inflow of organic matter in the soil and carbon accumulation in roots and litter, and the characterisation of organic matter stability at different ages of the forest cover.

The effects of anthropogenic contamination on capacity of podzolic ecosystems to act as a sink of carbon will instead consider the health status of vegetation, the buffering capacity of the soils, the release of potentially

toxic elements, and how all these aspects affect soil organic matter decomposition rate. Forest management practices also have an effect on carbon dynamics in podzolic environments, and may lead to the loss of productive soils and to an enhancement of the release of carbon.

The activities here focus on understanding the conditions of both the living components of the system (vegetation dynamics, fungal biomass and microbial activity), and the properties of soil organic matter. Another activity, linking all those described above, aims to extrapolate other similar environments from the results obtained, through the development of models, allowing, in turn, for the analysis of the consequences of different human interferences.

EXPECTED RESULTS AND OUTCOMES

The expected outcomes of this project are related both to the scientific aims and to its potential applications. The scientific results will be disseminated, through international journals, and conferences will be the main outcomes. From a scientific point of view, while a huge mass of data is available about organic soil horizons, few take into account what occurs in the whole soil profile. In contrast, this project will result in an improved knowledge of the different processes governing the accumulation of carbon not only in the litter, but also in mineral horizons in an ecosystems type, which constitutes a large proportion of European terrestrial ecosystems. Outside the scientific community, the project will help to solve large environmental problems, such as those addressed by the Kyoto Protocol, through the correct management of soil carbon in the whole soil profile, and its impact will be enhanced by the involvement in seminars of organisations that can influence national policy in the use of natural resources. Booklets and thematic workshops specifically directed at foresters and technicians will summarise the scientific results in an easier to read form, to enhance the level of acceptance of the decision support system within the end-user community. A website helps in the dissemination of results and activities, and also ensures a higher impact.

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MERCW

Modelling of Ecological Risks related to Sea-dumped Chemical Weapons

Period: 01/11/2005 to 31/10/2008
Budget from EC: EUR 2 247 062

Coordinator: Tapani Stipa, Finnish Institute of Marine Research

CONTEXT AND OBJECTIVES

The MERCW project focuses on the study of chemical munition dump sites in the Baltic Sea and Skagerrak area. Through focused site investigations, an assessment will be made of the ecological risks related to the dumped warfare for the marine ecosystem and people.

The main objectives of the project are as follows:

- develop and apply innovative, integrated geophysical, geochemical and hydrochemical, hydrographical, and hydrobiological site investigations;
- evaluate and model the release, migration and degradation of toxic compounds as well as their degradation products in the environment;
- develop a regional ecological risk assessment model;
- illustrate the results from the risk assessment using innovative visualization methods;
- develop an indicator concept for use in decision-making, based on the DPSIR-concept.

ACTIVITIES

The project work plan involves the implementation of eight linked work packages. The project team will analyse existing data and integrated geophysical remote sensing investigations, including seismics, magnetometry, side-scan sonar, electromagnetic and bathymetric measurements, and acquire hydrographical, geo- and hydrochemical, and hydrobiological information on the dumpsites (seawater structure and motion, general properties of bottom sediments, and presence of toxic compounds).

The findings will be analysed together with 3-D models of physical processes that control propagation of toxic compounds in the bottom sediments seawater system. A generic model for the trophic enrichment of toxins will also be developed during the project. These models will be applied separately and combined for scenario studies to estimate the risks of bioaccumulation of chemical weapon products in the food web.

EXPECTED RESULTS AND OUTCOMES

The ecological risk value (ERV) of the modelled risks will be assessed for marine ecosystems and people. Innovative visualisation, virtual reality technology and interactive data analysis will be applied. The resulting scenarios are crucial to support decision-making, risk analysis, and emergency plans. A documented database will be constructed and project results disseminated towards end-users and the public.

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CLEANSOIL

An innovative method for the on-site remediation of polluted soil under existing infrastructures

Period: 05/01/2005 to 30/04/2008
Budget from EC: EUR 755 000

Coordinator: Mirko Hänel
Verein zur Förderung des Technologie Transfers an
der Hochschule Bremerhaven e.V.

CONTEXT AND OBJECTIVES

Soil pollution with harmful substances (heavy metals, PCB, chlorinated hydrocarbons) is a global problem nowadays, affecting groundwater and public health. In the EU, 1 500 000 polluted sites have been estimated, and even more worrying trends in the case of the soil quality in Russia and the New Independent States (NIS), due to former military sites, machinery repair and fuel stations, and industrial production sites. Most common techniques method to address land pollutants are extremely costly and induce huge environmental loads. The development of new technologies for the removal of pollutants from the soil has thus become a priority.

The CLEANSOIL project aims to develop and promote a very simple and cost-efficient alternative method to enable on-site, in situ treatment of hazardous substances, especially for large areas of polluted land, while causing minimum site disturbance. The system will lead to the remediation of soil below buildings, roads, pipelines, railroads, etc., for both local and/or diffuse contamination, and even for preventive applications. The method consists of the insertion of several chords connecting a multitude of sorbent material-containing sockets inside the same number of parallel horizontal holes drilled in the ground. After a period of time the system is removed and the sorbent regenerated for further application. The present project will study and define the potential applications of this new method for a wide range of contaminated soils especially in Russia and other NIS, in order to establish selective systems for each kind of pollutant.

ACTIVITIES

The proposed project will investigate and clearly define the potential applications of the CLEANSOIL system. By making the necessary adaptations, CLEANSOIL will be able to offer solutions for large contaminated areas at moderate cost. However, further applied research is required in order to adapt the method to different soil conditions and contamination problems. With these aims, tests will be conducted to select the most suitable sorbents and reactive agents for removing a wide range of pollutant compounds, in conjunction with studies of soil geological properties and hydraulic characteristics. The tasks to be

performed include: firstly a general problem specification and parameters definition, field survey and remediation targeting, sorbents identification and laboratory scale tests; and finally CLEANSOIL system design, construction, start-up, optimisation and functioning evaluation.

EXPECTED RESULTS AND OUTCOMES

CLEANSOIL addresses problems of mutual interest, not only for Russia and the other NIS, but also the EU, for which scientific and international co-operation is required, as it will lead to a very valuable exchange of knowledge between both sides. The proposed CLEANSOIL project will have a positive impact on the affected areas' economy and ground water quality, by providing a method for the remediation of the soil and the protection of water resources to a degree that will allow recovery of its initial capacity for full performance of its functions. It will thus have a very beneficial socio-economic and environmental impact, strengthened further still by its preventive properties when installed in high contamination risk zones. The gains are not only in terms of cost and clean up, but also the wider effects on the land value and the way in which communities on or near the land are affected. Following successful outcomes, important dissemination activities will be carried out among the NIS countries, Russia and the EU, including seminars, in-situ demonstrations, publications in relevant journals, building contacts and exchanging information with existing soil remediation networks. Local governments and other relevant stakeholders, NGOs and potential users will be directly involved. The project results are also to be integrated and given special consideration in the development of new ecological legislation for the rehabilitation of polluted lands in Russia and Ukraine.

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CABRI-Volga

Cooperation Along a Big River: Institutional coordination among stakeholders for environmental risk management in the Volga basin

Period: 01/12/2004 to 28/02/2007
Budget from EC: EUR 1 040 000

Coordinator: Siegfried Rupprecht
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CONTEXT AND OBJECTIVES

CABRI-Volga is an international coordination action to facilitate cooperation and coordinate research in environmental risk management in river basins in the EU, Russia and the New Independent States (NIS). It focuses on the Volga basin where environmental risk management is fundamental for protecting the environment, improving socio-economic conditions and promoting agricultural and industrial economies as well as the health of the Caspian sea. Low effectiveness and deficiencies in governance and civil society involvement, business commitment to sustainable development, as well as low levels of cooperation between academic and policy-making institutions have led to a situation of significant ecological, social and economic risks and human vulnerability in the basin.

The strategic objectives of CABRI-Volga are, inter alia, to mobilise existing, isolated human and institutional resources, increase the research potential on environmental risk management in river basins as well as strengthen links between scientific communities and policy-making processes.

ACTIVITIES

A scientifically and institutionally complementary consortium of 18 partners from Russia and the EU is following an elaborated workplan to achieve the project objectives. For three series of parallel expert group meetings, Russian and EU experts (approximately 70 per series) from various scientific and institutional backgrounds will be recruited from the extensive network of CABRI-Volga stakeholder organisations. The invited experts will discuss and exchange knowledge and expertise in the CABRI-Volga thematic areas, namely: environmental rehabilitation, vulnerabilities and human security; natural resources and their sustainable use; connecting goods and people (transport and mobility); and institutional coordination and cooperation. All expert group meetings as well as a mid-term validation workshop and the final conference will be organised by the project consortium in different Russian partner cities, i.e. in Astrakhan, Cherepovets, Kostroma, Moscow, Nizhniy Novgorod, Saratov and Yaroslavl.

EXPECTED RESULTS AND OUTCOMES

CABRI-Volga will achieve a number of concrete outputs to be widely disseminated via the CABRI-Volga website, including case studies, state-of-the-art review, good practices report, policy recommendations, action plan and research agenda, an established network of experts and stakeholders from Russia/NIS and the EU, as well as coordination mechanisms such as the Volga basin council.

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Enviro-RISKS

Man-induced Environmental Risks: Monitoring, Management and Remediation of Man-made Changes in Siberia

Period: 01/11/2005 to 31/10/2008
Budget from EC: EUR 499 000

Coordinator: Dr Alexander Baklanov
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CONTEXT AND OBJECTIVES

Siberia environment has been subjected to serious man-made transformations during last 50 years. Current regional level environmental risks are: direct damage to the environment caused by accidents in the process of petroleum/gas production and transportation; caused by deforestation variations in Siberian rivers runoffs and wetland regimes; influence of forest fires, flambeau lights and loss of gas and petroleum during their transportation on regional atmosphere composition; and deposition of hazardous species leading to risks to soil, water and consequently to risks in the food chain.

The strategic objective of the project is to facilitate the elaboration of a solid scientific background and understanding of man-made associated environmental risks, their influence on all aspects of regional environment and optimal ways for remediation, by means of coordinated initiatives of a range of relevant Research and Technological Development (RTD) project, as well as to achieve improved integration of the EU research, therefore giving the projects additional synergy in current activities and potential for practical applications.

Scientific background is formed by a number of different levels RTD projects devoted to near all aspects of the theme but in virtue of synergy lack not resulting in improvement of regional environmental situation. The set comprises coordinated/performed by Partners EC funded thematic international projects, Russian national projects and other projects performed by NIS Partners.

ACTIVITIES

The main activities, aimed at achieving the coordination action (CA) objectives of a number of environmentally oriented projects, in total 18, will be broken into 11 interrelated work packages including:

- development and support of the project web portal and environmental information distributed database;
- gathering and systematisation of information resources obtained;
- gathering, analysis and synergy search in different level projects on Siberian environment;
- organisation of first conference and experts meeting;

- preparation of technical implementation plan on finished projects;
- gathering of information on recently started projects in Siberia;
- search for synergy between the different projects on Siberian environment and elaboration of recommendation for new projects;
- organisation of second conference and experts meeting;
- documentation and dissemination;
- exchange of research personnel and postgraduates.

EXPECTED RESULTS AND OUTCOMES

Direct impact of the CA is in elaboration of on the base of dedicated studies of the expert groups' practical recommendations for regional level activities in basic and applied environmental problems solving. It includes based on satellite remote sensing methods, local measurements and numerical modelling early detection and monitoring of accidents in process of petroleum/gas production and transporting including their influence on water, soil, vegetation and animals; appearance of new forest fires and flambeau lights, variations in Siberian rivers runoffs and wetland regimes; and best approaches to mitigate environmental risks in process of industrial activity in the region and modern technologies for remediation of damaged territories.

Strategic impact of the CA is by dissemination of effective approaches and tools for monitoring, management and remediation of man-made environmental risks in Siberia and in suffering from similar problems regions of NIS. Due synergism and synchronisation in project performance it also improves the state-of-the-art of Environmental Science and applications in Russia, NIS and the EU. Elaborated by the expert groups' practical recommendations being implemented at the Siberian federal District will lead to improvement of the well being and security of local populations.

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CALTER

Long term ecological research program for monitoring aeolian soil erosion in Central Asia

Period: 01/11/2005 to 31/10/2009
Budget from EC: EUR 670 000

Coordinator: Dr Leah Orlovsky and Dr Dan Blumberg
Ben-Gurion University of the Negev

CONTEXT AND OBJECTIVES

Sand and dust storms can be both a symptom of serious anthropogenic land degradation and a problem in its own right, with dire consequences. In Central Asia, large-scale anthropogenic changes lead to the formation of new salt/dust-emitting sites. The overall aim of this project is to investigate the temporal and spatial pattern of airborne salt-dust deposition across Central Asia, and model the current and future trends of aeolian processes in this region.

ACTIVITIES

The proposed research will be carried out in the three largest Central Asian States — Kazakhstan, Turkmenistan and Uzbekistan — which refer to a specific geopolitical region having much in common: the physical environment, similar traditions in agriculture, similar culture and religions, and economic heritage. The Newly Independent States (NIS) inherited the problem of desertification from the past. Large-scale irrigation development led to the ecological catastrophe in the Aral region.

The activities of the project are related to the specific objectives of the project:

- set up a spatial database for monitoring the region in order to make the information available to a research network with further integration of the project's findings into GIS database;
- monitor dust storms using high temporal resolution remote sensing imagery concurrent with ground data collection and analysis;
- reveal and monitor the dust-salt emission sites using high spatial satellite images;
- monitor the changes in land use and land cover;
- study the potential sand drift in the region and its spatial variability using model and real wind data, and assess volume of sand/dust transportation;
- study the frequency, distribution and seasonality of the salty, dust, and sand storms in Central Asia;
- create elaboration recommendations for phyto-ameliorative measures in the active dust-salt emission sites for reducing the amount of blown salts-dust and sand.

EXPECTED RESULTS AND OUTCOMES

Major innovative efforts will be directed towards the establishment of a long-term monitoring system on current emission sites, frequency of dust storms, qualitative and quantitative properties of dust/salt deposits. The other important outcome of the proposed research will be monitoring the behaviour of the existing emission sites and modelling the potential dust/salt emission sites.

The project will result in:

- the establishment of a long-term monitoring network;
- the creation of a geographic and temporal database on dust storm events, amount, and chemical composition of dry depositions based on remotely sensed data and ground observations and analyses.

Recommendations for phyto-ameliorative measures in the active dust-salt emission sites for reducing future amounts of blown salts-dust and sand will be developed. The expected results of the project include effective tools for limiting man-induced environmental damage, increased linkages between researchers from European and target countries, and re-establishing of the cooperation among NIS countries themselves. The results of the project will be represented in the workshop with participation of the interested governmental organisations, local NGOs and authorities. The final report will be published as a brochure in both English and Russian and disseminated among the interested organisations of the Central Asian States by the Regional Research Information Center on Aral Problems, as well as presented at the annual meeting of the leaders of the Aral Sea Basin States.

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WATER REUSE

Sustainable waste water recycling technologies for irrigated land in NIS and Southern European states

Period: 01/09/2005 to 31/08/2009
Budget from EC: EUR 1 180 000

Coordinator: Prof. Dr C.J. Ritsema, Alterra B.V.

CONTEXT AND OBJECTIVES

In irrigated areas in the New Independent States (NIS) and southern European countries, inefficient use of conventional water resources occurs through incomplete wetting of soils, which causes accelerated runoff and preferential flow, and also through excessive evaporation associated with unhindered capillary rise. Furthermore, a largely unexploited potential exists to save conventional irrigation water by supplementation with organic-rich waste water, which, if used appropriately, can also lead to improvements to soil physical properties and soil nutrient and organic matter content.

This project aims to:

- reduce irrigation water losses by developing, evaluating and promoting techniques that improve the wetting properties of soils;
- investigate the use of organic-rich waste water as a non-conventional water resource in irrigation and, in addition, as a tool in improving soil physical properties and soil nutrient and organic matter content.

ACTIVITIES

The work plan of this project comprises of:

- an interrelated series of physical and socio-economic data collection activities, field and laboratory trials and analyses, simulations of water, nutrient and contaminant fluxes and the quantification of water savings associated with the implementation of the proposed technologies using a numerical hydrological model;
- the development and evaluation of sustainable water saving technologies for irrigated land to achieve maximum water use efficiency in the context of prevailing socio-economic and institutional arrangements.

Field trial sites and regions for detailed study will be selected in Russia, Ukraine, Greece and Spain:

- identifying, for the NIS and southern European countries, the soil type/land use combinations, for which the above approaches are expected to be most effective and their implementation most feasible;
- examining the water saving potential, physical, biological and chemical effects on soils of the above approaches, and their impact on performance.

EXPECTED RESULTS AND OUTCOMES

Expected outputs include techniques for sustainable improvements in soil wettability management as a novel approach in water saving, detailed evaluation of the prospects and effects of using supplemental organic-rich waste waters in irrigation, an advanced process-based numerical hydrological model adapted to quantify and upscale resulting water savings and nutrient and potential contaminant fluxes, and identification of suitable areas in the NIS and southern European countries.

A major feature of this project's strategic impact on the European Community is the interaction, collaboration and exchange of knowledge between Europe and the NIS, which, in many regions, face the same problem of water resource depletion. In the NIS and southern European countries, land irrigation accounts for some 80 % of the total demand and large amounts of water are inefficiently used. Land irrigation is therefore considered to be the sector for which the largest volume of water can be saved.

Furthermore, the project will give partner countries an opportunity to train students and strengthen local curricula through guest lectures at university level, as well as high school and primary school level. Students will be able to participate in the project to carry out their BSc or MSc thesis. The universities will be asked to choose a set of topics to define a lecture series that could be presented, in addition to existing curricula. High school and primary schools will be asked to define short study projects for their pupils.

WATER REUSE

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NISMIST

Management of environmental risks from landfills in seismically active regions in the New Independent States (NIS) of Central Asia

Period: 01/08/2005 to 31/07/2008
Budget from EC: EUR 1 139 960

Coordinator: Prof. Wei Wu
Universität für Bodenkultur Wien
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CONTEXT AND OBJECTIVES

The main objective of the NISMIST project is to analyse and manage risks associated with non-radioactive landfills in seismically active regions of the Central Asian countries; Kyrgyzstan, Uzbekistan, Kazakhstan, Tajikistan and Turkmenistan. In particular, it deals with data acquisition and processing via a Geographical Information System (GIS), analysis of dynamic response of landfills, risk analysis and risk management of landfills, leading to recommendations for cost-effective remediation measures, dissemination of results and creation of environmental awareness. The NISMIST project will increase international research capacity in analysing and managing environmental risks (i.e. degradation of soil, water and air) associated with landfills in seismically active regions. NISMIST will be mutually beneficial to the partners in Europe, Russia and the New Independent States (NIS). The Russian and NIS partners will benefit from the techniques and expertise of the EU partners' analysis and management of complex environmental systems. The EU partners will benefit from the rich seismic records, experience gained specifically from landfill problems in Central Asia and Russia. The outcome of this project can also be applied in seismically active zones in Europe, e.g. Greece and Turkey.

ACTIVITIES

The following activities will be carried out during the project:

- a GIS landfill site database within the partner NIS countries will be established to provide an overview and classification according to environmental risk;
- dynamic analyses of the seismic settings for three representative landfills will be performed. The dynamic properties of waste and the dynamic response of landfill during earthquakes will be analysed for use both as remediation and design factors;
- field and lab scale investigations into the current and potential emissions of selected landfills current and potential emissions followed up by lab-based research using landfill simulation reactors (LSR) in St. Petersburg to determine potential emission behaviour and simulation of physical impacts on the landfill as a result of an earthquake;

- analyses of environmental risk posed by landfills in seismically active regions in relation to aquifers providing water to population centres. The risk analysis will include scenarios of socio-economic impacts of water and soil degradation for the various phases of a landfill's lifetime;
- development of possible remediation measures to existing sites and guidelines for designing future landfills by cost-benefit analysis and considering the socio-economic aspects;
- dissemination of project results to end users e.g. municipalities, the international scientific community, authorities, waste generators and the general public.

EXPECTED RESULTS AND OUTCOMES

GIS database of landfills in participating NIS countries and investigation of at least three landfill sites that represent considerable risk and that are representative for the NIS region.

Environmental risk analyses of the selected representative landfill sites. The methodologies, tools applied and experience gained will serve as for transfer and application to other NIS landfill sites upon completion of the project.

A partner programme will be established for young (i.e. under 35 years old) NIS scientists to work with their project colleagues. Recommendations for remediation measures and waste management strategies will be made. Dissemination will consist of a series of local events and will conclude with an international project symposium.

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JAYHUN

Interstate water resource risk management: towards a sustainable future for the Aral Basin

Period: 01/11/2005 to 31/10/2008
Budget from EC: EUR 1 040 000

Coordinator: Jochen Froebrich, Leibniz University of Hannover

CONTEXT AND OBJECTIVES

The main objective of the project is to ensure a sustainable future for the Aral Basin, that takes into account the rapid glacier melt that is occurring in the upper catchment, and the rapid decline in reservoir storage capacity caused by siltation. To provide sustainable water management, it is important to obtain reliable information on present and future water resources and their evolution in relation to the human activities, global changes and climate evolution that affect the hydrological and melting regime of the main tributaries to the Amu Darya.

ACTIVITIES

The specific objectives of the project are, therefore, presented below:

- provide a precise basis for a safer allocation of water resources under changing hydrological conditions, to minimise the risk of further environmental degradation;
- establish realistic estimates of the amount of water that might be expected from the upper catchment in the next 50 years;
- improve regional capabilities to forecast the annual available water resources for irrigation and drinking water supply, in the lower parts of the Aral Basin;
- determine the actual volumes of usable water in the large upstream reservoirs;
- develop improved reservoir operation and water management strategies to consider future decrease of available surface water resources in the allocation of transboundary water resources;
- determine the minimum water requirements for the basins;
- identify a sustainable water resource management strategy for the basin that will ensure equitable allocation to all riparian needs, including environmental ones.

the discussions will be included in the final consensus summarising the recommendations on risk management strategies. These findings will lead to a revised paper, which will be presented to the Interstate Coordination Water Commission (ICWC) with a request for examination, criticism and remarks.

For the first time, the project will combine sophisticated estimations on future water availability and an interstate reservoir management to address further pressing water scarcity. This will lead to highly innovative risk management strategies, which clearly go beyond the state of the art of previous fragmented approaches. Secondly, the much deeper involvement of Tajik partners and key institutions controlling the primary dams in upstream regions, will completely break new ground for an interstate dialogue, and for development of more realistic water allocation patterns since the collapse of the Soviet Union.

The project brings together modern tools for water resource planning, (i.e. remote sensing for establishing water resources and estimating crop water use, modern hydrological surveying tools to establish water storage, and water resource management tools), into an integrated package, that can provide solutions for complex water resource planning in a large basin. The innovation lies not in the tools but in the integrated approach adopted by the project. This study adopts cost-effective tools that are capable of efficiently acquiring data over the vast area of the basin. The project will establish the true boundary conditions within which the water resources have to be managed; without establishing this, realistic management of the water resources of the Aral Basin is not possible.

EXPECTED RESULTS AND OUTCOMES

The final workshop, 'Interstate water resources risk management', expected to be held in Urgench, will be designed to derive practical applicable recommendations from the research results, and the project effort will be used to achieve a political dimension. The outcome from

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RUSSIA

AND THE NEW INDEPENDENT STATES (NIS)

INDUSTRIAL PROTECTION

ESCIRRU

Economic and Social Consequences of Industrial Restructuring in Russia and Ukraine

Period: 01/11/2005 to 31/01/2009
Budget from EC: EUR 1 429 994

Coordinator: Dr Tilman Brück
German Institute for Economic Research

CONTEXT AND OBJECTIVES

The project uses large micro data sets to address three objectives connected to the economic and social consequences of restructuring and conversion in Russian and Ukrainian industry. These objectives are:

- first, to analyse how the restructuring and civil conversion processes affected the performance of the industrial sector in the emerging market economies of Russia and the Ukraine;
- second, to analyse the socio-economic impact of these conversion processes at the household level;
- third, to increase the data foundations and the research potential of several partner institutions in Russia and Ukraine.

ACTIVITIES

The project involves three activities. First, it will analyse job and worker reallocation and how they affect the productivity of enterprises. There will be a special look at the determinants of firm performance, including R&D, technology transfer and management practices. A special focus on this analysis will be industries which have been converted from military production, to the production of civilian goods — very prominent in both Ukraine and the Urals region.

Second, the project will take a look inside industrial firms by using very rich personnel data spanning a decade of restructuring. The changing personnel and wage structure, along with the wage and promotion policies of the firms undergoing transition can be thoroughly explored with these data sets. The evolution of management practices with respect to the management of human resources can hence be traced out over the transition period.

Third, the socio-economic consequences of this restructuring will be estimated. Using very rich data from the Ukrainian Longitudinal Monitoring Survey (ULMS) and data from a supplement of the Russian Labour Force Survey (RLFS), the project will investigate the fate of displaced workers, looking at the incidence and cost of job loss.

EXPECTED RESULTS AND OUTCOMES

The main findings of the research and associated data work will be published as discussion papers and peer-reviewed journal articles. These papers will be documented online. The key policy implications will be published in book form and presented at a news conference. The project results will be available for researchers, policy analysts and policy makers in various publishing formats. All results will thus enter into the public domain where they can be further used by future researchers and analysts.

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INDEUNIS

Industrial Restructuring in the NIS: experience of and lessons from the new EU Member States

Period: 01/04/2005 to 30/09/2007
Budget from EC: EUR 797 852

Coordinator: Peter Havlik
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OBJECTIVES

INDEUNIS will provide a comprehensive and up-to-date analysis of the recent experience with economic transition, industrial restructuring and integration in both EU New Member States from Central and Eastern Europe (NMS) and selected Newly Independent States (NIS: Russia, Ukraine, Belarus, Kazakhstan and Moldova), in particular with respect to the role of trade integration, Foreign Direct Investments (FDI) and European integration (institutional aspects). It will draw policy conclusions related to restructuring in the NIS, address the challenges of their WTO accession and evaluate prospects for a closer integration between the enlarged EU and NIS neighbour states, as well as for a regional integration in the NIS. Additional aims are to intensify cross-border research cooperation and knowledge transfer between partners from the EU and NIS. By disseminating the research results to both scientific community, policy-makers and to a broader public the project will stimulate expert discussions and help to raise the general understanding of the topics concerned.

ACTIVITIES

Within 12 individual work packages undertaken in a jointly conducted research by the team of 10 partners from the EU and NIS, the following key problem areas will be investigated with regards to patterns of industrial restructuring and trade specialisation in the NMS and the role of FDI and European integration:

- Are there any country- or industry-specific features of NMS' restructuring and what are their key determinants?
- How has restructuring in the NIS proceeded and what are the reasons for differences compared to NMS?
- What are the emerging industry, employment and trade specialisation patterns of NIS?
- What are the obstacles and prospects for the future EU-NIS trade?
- What lessons can be drawn from the experience of NMS regarding restructuring, trade specialisation, FDI and integration for the NIS?
- What the specific innovation strategies of firms in the NMS and NIS?

- What are the social impacts of FDI, especially in terms of the transfer of know-how and employment?
- How is EU integration affecting EU-NIS economic relations and what are the prospects and policies regarding the regional integration of the NIS, and between the enlarged EU and NIS?

EXPECTED RESULTS AND OUTCOMES

A series of research papers (in English) on the above topics will be prepared by the project team. Papers will be presented, disseminated and discussed at workshops in Kiev and Moscow, discussing also policy analysis and recommendations. After each workshop a press release will be issued. All papers will be disseminated also via the project website. At the end of the project in autumn 2007 selected papers prepared within the framework of INDEUNIS will be published as a book.

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RUSMECO

Enhancing Russian SME collaboration and business development through Communities of Practice

Period: 15/05/2005 to 15/05/2007
Budget from EC: EUR 1 270 000

Coordinator: Dr Patricia Wolf, University of Stuttgart

CONTEXT AND OBJECTIVES

The vision of RUSMECO is to explore and create a collaborative network supporting Russian SMEs in business development and collaboration, based on a detailed investigation of their political, cultural and economic context. The focus will be on small and medium-sized manufacturing or service companies.

The scientific and technological objectives of the project are to:

- research into the current practices of Russian SMEs in business development and collaboration;
- identify gaps between current Russian SME practices and western European standards;
- research into the further development of the Russian SME sector and provide recommendations for the Russian Government;
- identify success factors and barriers concerning the transferability of western European management approaches to Russia;
- develop methods for improving business development and collaboration of Russian SMEs;
- develop software for supporting virtual collaboration of SMEs;
- set up a model collaboration network among Russian SMEs to demonstrate feasibility and enable continuous exchange even after the project has finished;
- validate RUSMECO hypotheses, concepts and solutions;
- describe RUSMECO processes, methods and tools developed, as well as success factors and barriers.

ACTIVITIES

The activities related to the S & T-objectives are to:

- conduct interviews and a survey with SMEs involved in the project and make literature surveys;
- deliver a report on current practices, literature surveys and interviews with European companies in Russia;
- carry out literature research, industrial surveys and road mapping methods/tools;
- carry out literature research, surveys, observation, gap analysis, comparative studies;

- develop instruments and training modules for virtual collaboration, the organisation of innovation, internal processes and external relationships;
- use software programming skills;
- develop marketing activities to gain new network members;
- conduct validation workshops and surveys;
- ensure continuous dissemination activities via congresses, articles, deliverables and a book.

EXPECTED RESULTS AND OUTCOMES

The main impacts of the project results will be the:

- enhancement of Russian industrial productivity i.e. to expand market opportunities, increase efficiency, reduce production costs, delivery times and improve responsiveness to meet market demands and customer needs;
- establishment of links between the Russian research community, Russian SMEs and Russian Government;
- improvement of third country level of Russian SMEs;
- increase in the dissemination of knowledge and simultaneous protection of intellectual property;
- improvement of quality standards in Russian SMEs.

The practical results relating to the S & T-objectives will be:

- a report on Russian state of the art (RUSMECO-STUDY) in business development and collaboration practices;
- a gap analysis indicating collaboration and business development needs of Russian SMEs comparing it with western European standards (RUSMECO-ANALYSIS);
- roadmap on the further development of the SME sector in Russia (RUSMECO-FUTURE), including recommendations for the Russian Government, administrative bodies and the European Commission;
- a framework indicating success factors and barriers with respect to the transferability of western European management approaches to Russia (RUSMECO-FRAME);
- a set of methodological modules for business development and collaboration (RUSMECO-METHS), consisting of instruments and training modules for virtual collaboration, SME self-assessment, organisation

of innovation, internal processes and external relationships;

- a software prototype (RUSMECO-PROTO) for supporting virtual collaboration among Russian SMEs as well as for SME self-assessment;
- a model collaboration network among Russian SMEs (RUSMECO-NETWORK);
- Empirical validation report (RUSMECO-VALID) on validation of RUSMECO hypotheses, concepts and solutions;
- a book describing and reflecting on the project processes, the methods and tools developed, as well as success factors and barriers (RUSMECO-BOOK).

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WESTERN BALKAN COUNTRIES

ENVIRONMENT

SARIB

Sava River Basin: Sustainable Use, Management and Protection of Resources

Period: 01/08/2004 to 01/08/2007
Budget from EC: EUR 1 200 000

Coordinator: Radmila Mila i , Jozef Stefan Institute

CONTEXT AND OBJECTIVES

The Sava River (945 km) is the biggest tributary to the Danube River. The 95 551 km² large catchment is extended over Slovenia, Croatia, Bosnia and Herzegovina and Serbia and Montenegro. In the development of the river basin management plan, all countries are already collaborating under the International Commission for the Protection of the Danube River (ICPDR) guidance. Although the methodological bases for data collection have been reasonably unified, data on the ecological character of the river basin, inventory of pollution sources, dangerous substances, socio-economic parameters, and cost and benefit implications are still lacking due to insufficient financing and recent warfare. In the project, specific tools based on the combination of chemical analysis and biological effect methods will be developed and validated to estimate the pollution of sediments and impact on water biota. Geographical distribution of pollution will be identified and historical trends defined. An integrated prediction model on the behaviour of hazardous chemical substances will be combined with the socio-economic prediction model to serve as a base for the elaboration of scenario, remediation measures and best practice techniques. For this purpose, an expert data and information management system will be developed.

ACTIVITIES

The project's main activities are:

- to establish integrated tools based on a combination of chemical analysis and biological effect methods in order to assess the geographical distribution and historical trends in sediment contamination of the Sava River Basin: estimation of the extent of pollution by the identification of the most hazardous highly mobile metal fractions and anthropogenic inputs of metals to sediments using advanced analytical methods; characterisation of persistent organic pollutants; assessment of the total toxic potential of pollutants in sediments using biological effect methods, characterisation of the health status of indigenous fish species;

- to build harmonised, reliable and efficient sets of data and information on the Sava River catchment with the purpose of modelling and analysing the state of the Sava River water, as well as ecological quality and trends;
- to create an integrated decision support tool based on GIS, dynamic modelling and risk assessment for 'hot spots';
- to develop common criteria for assessment of remediation techniques of 'hot spots' and to propose alternatives for the prevention of pollution;
- to achieve sustainable economic development for the societies inhabiting the Sava River Basin.
- to disseminate information to users of water resources throughout the Sava River Basin and to perform proposed remediation of the contaminated sites.

EXPECTED RESULTS AND OUTCOMES

The developed and validated specific tools for estimating the extent of chemical pollution of sediments and biological effect methods will serve as a model tool for other river catchments. On the basis of the geographical distribution of pollution, 'hot spots' will be identified and historical trends of pollution defined. An integrated decision support tool based on GIS, dynamic modelling and risk assessment for 'hot spots' will be created. An integrated prediction model dealing with the behaviour of hazardous chemical substances will be combined with the socio-economic prediction model as a basis for the elaboration of scenario, remediation measures and best practice techniques. The expert data and information management systems developed in the project will serve as a model for other river catchments. International joint scientific publications will result from the project and guidelines for the improvement of the environmental quality of the river basin will be provided.

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RISE

Renewables for Isolated Systems - Energy Supply and Waste Water Treatment

Period: 01/12/2004 to 30/11/2007
Budget from EC: EUR 1 273 065

Coordinator: Prof. Nikos Hatzigiorgiou
National Technical University of Athens
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CONTEXT AND OBJECTIVES

The project has as its main objective the investigation of the possibilities offered by Renewable Energy Sources (RES) — mainly solar, wind and biomass, as well as biogas as a by-product of wastewater treatment — for energy supply in isolated areas. To achieve its goals, the consortium will investigate the application of low-cost innovative RES technologies and develop innovative decision, support and operational tools for a wide implementation of RES in isolated regions for energy supply and wastewater treatment. These tools will be applied to the design of selected case studies from five Western Balkan countries, namely Serbia, Montenegro, Croatia, the Former Yugoslav Republic of Macedonia, and Bosnia-Herzegovina. The selected case studies comprise remote regions, including islands, that are not connected to the electricity grid and have been particularly affected by the war. The results of these activities will be extended to a large scale implementation of RES for a greater number of isolated regions within these countries.

ACTIVITIES

To achieve the objectives of the project, the work has been organised into seven work packages:

- collection and analysis of data in the Western Balkan countries;
- investigation of low-cost, innovative RES and wastewater treatment solutions;
- development of advanced decision support methodologies for the dimensioning of RES in isolated grids;
- application to selected test sites;
- design of operational tools;
- projection to future large-scale integration of RES in isolated systems;
- dissemination.

EXPECTED RESULTS AND OUTCOMES

The expected results and outcomes of the project will contribute towards sustainable development in the region — which has suffered considerably as a consequence of war — especially by improving environmental and health conditions. The project will also contribute significantly to the increase in, and re-establishment of, collaborations between industry and research/academic institutions in the Western Balkan countries and as such, have a positive effect on the overall future development of the region.

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WATERWEB

Water Resource Strategies and Drought Alleviation in Western Balkan Agriculture

Period: 01/04/2004 to 31/01/2008
Budget from EC: EUR 1 200 000

Coordinator: Sven-Erik Jacobsen
Royal Veterinary and Agricultural University

OBJECTIVES

The main objectives of this project are:

- to contribute to the development of the Western Balkans by introducing strategic water management for drought alleviation and sustainable agricultural practices;
- to establish and reinforce research expertise in the Western Balkans in a range of technologies for water and crop management.

ACTIVITIES

In order to achieve these objectives, the following activities will be carried out:

- development of procedures for the strategic management of water in two river catchment areas in Serbia and one in FYROM;
- introduction of Geographic Information System (GIS) technologies in Serbia and FYROM, and the creation of a Land-Water-Economic Information System (LWEIS) that includes existing and new European Environmental Agency (EEA) data sources;
- development of information systems, such as coupled models of crop water use, hydrology, water quality and economics, which can then be used to assess changes in land use, as well as their impact on water availability, water use and water quality;
- collection of microclimatic, pedological and crop data, and identification of how they are used to develop models of water demands and irrigation scheduling for important field and vegetable crops in the Western Balkans;
- information on microbiological residues on fresh vegetables through the use and reuse of contaminated water sources and their likely health hazards;
- information on the risks of eutrophication and ecotoxicological implications from using contaminated water sources within intense farming systems;
- establishment of the relative advantages of partial root drying (PRD) in relation to other deficit irrigation (DI) strategies for vegetable and cereal crops (maize, potato, tomato, and grapes for wine production);
- development of strategies for applying PRD in different agro-ecosystems (field or glasshouse) to grapevine, potato, tomato and maize, and determination of the effects on crop and fruit yield and quality;

- establishment of the commercial potential of quinoa as a new highly drought and salt tolerant crop for FYROM;
- evaluation of water management strategies and agricultural Best Management Practices (which are now common across the EU) on local farms in Serbia and FYROM;
- socio-economic analysis of different water management strategies and risks from use of contaminated water, as well as the application of PRD technology with distinct cropping and irrigation scenarios;
- establishment of channels for information dissemination and regular interactions with stakeholders for the 'outreach' of database resources in the Western Balkans.

EXPECTED RESULTS AND OUTCOMES

The outcome will be an enhanced, yet, sustainable economic environment that can capitalise on current Best Management Practices and catchment management planning. A LWEIS will be created and applied to 4 river basins to represent local and regional water sources, sources of contaminated runoff, agricultural water use, and potential impacts of farmer uptake on new water use/treatment technology. Modelling results and trials on water/nutrient use with maize, grapevine, potato and tomato will be tested on local farms.

The project work will be divided into 5 work packages focusing on water quantity, water quality, crop water use, socio-economics and dissemination of project results. The first year will be devoted to data collection characterising water quantity, quality and crop water use in order to develop optimum water use models that will be refined under field/glasshouse conditions in the subsequent years of the project. In the final year, the work will focus on applying models on local farms and on elaborating socio-economic studies of the potential impacts, benefits, environmental/health risks, etc.

WATERWEB will deliver procedures for strategic water management, models of water/nutrient use for 4 major crops, irrigation methods, confidence in GIS construction/usage, and outreach of database/modelling resources for the Western Balkans.

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FLEXHEAT

Flexible Premixed Burners for Low-Cost Domestic Heating Systems

Period: 01/11/2004 to 31/10/2007
Budget from EC: EUR 1 298 336

Coordinator: Dr Ing. Dimosthenis Trimis
Friedrich-Alexander-University of
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CONTEXT AND OBJECTIVES

The war in former Yugoslavia disastrously affected the region but particularly Serbia and Montenegro, and Bosnia and Herzegovina suffered in many areas that form an organised society and state. Industry collapsed, unemployment rose by tens of percents, energy production failed to satisfy elementary needs, and old ecological problems stayed unsolved while new appeared. As a consequence, immense economical and social problems arose. Research and science were even more affected, falling to 1970 levels, due to little or no financial support from governments and a lack of projects from the collapsed industries. Many high-quality young researchers left the region. Even in 1990, the research equipment at universities and institutes was still considered old.

The FLEXHEAT project is aimed at developing cost-effective, fuel-flexible, efficient and low-polluting premix burners for domestic heating appliances such as floor-standing boilers, wall-hung boilers and stoves, by means of advanced modelling and design tools developed and validated ad hoc. Low cost and fuel flexibility are essential features to achieve wide penetration of these advanced technologies in such an economically-depressed region as the Western Balkans, where local natural gas composition is changing significantly in terms of both space and time coordinates.

ACTIVITIES

Cost-effective, fuel-flexible, efficient and clean premix burners will be developed for domestic heating systems via fully-validated advanced modelling and design tools. Low cost and fuel flexibility are essential to gain wide market penetration in the Western Balkans, where natural gas composition changes remarkably from site-to-site and over time. The major FLEXHEAT targets are:

- development of 1:3 power modulating atmospheric premix metal burners with no water cooling, optimised material composition and pollutants emissions below 50 mg/kWh;
- development of 1:5 power modulating fully-premixed metal burners, optimised material composition and pollutants emissions below 40 mg/kWh;
- achievement of enhanced fuel flexibility, i.e. capability of handling different feed gases (from natural gas, LPG, renewables such as biogas — several kinds of biogas

will be considered for both burners — low-heating value gas from the Western Balkans), and reliability (30 000 h and 200 000 thermal cycles);

- a fully-validated modelling/design platform, based on combined CFD modelling of flames, and finite-elements modelling of burner stress and strain, mainly aimed at tailoring the burner geometry and the slits-and-holes shape and pattern;
- pollutants emissions, flame stability and noise generation will also be analysed;
- model validation will be performed in specific test rigs and in real appliances (validators), assembled and tested by the end-users, where the above targets will be demonstrated.

EXPECTED RESULTS AND OUTCOMES

This project will increase the competitiveness of the Western Balkans and European industry through an effective cooperation between partners, so that it will deliver faster economic growth and new jobs in the highly-technological area of domestic boiler manufacturing. At the moment, there are no purposely-designed flexible domestic boilers of this kind on the market. As society places an increased emphasis on the environment, climate change, energy sustainability and renewable and local energy sources, conventional technologies will have to be substituted with cleaner and more efficient ones for a direct improvement in quality of life and health.

Employment within the EU and the Western Balkans region will benefit from a successful outcome of the project, both from a defensive perspective, and through expansion and new job creation. By helping to meet increasing performance demands on the economy and efficiency of combustion devices, the market share will be protected against erosion by substitute products and inferior competitive products from outside the EU. Successful intellectual property rights (IPR) and industrialisation strategies will ensure that the benefits are maximised for companies within the EU. It is finally worth mentioning that beyond advanced knowledge and expertise, the Western Balkans partners will acquire advanced equipment from the FLEXHEAT project, which will reinforce their experimental capability and competitiveness in the field of research and development.

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INTREAT

Integrated Treatment of Industrial Wastes towards Prevention of Regional Water Resources Contamination

Period: 01/08/2004 to 31/07/2007
Budget from EC: EUR 1 000 000

Coordinator: Papias Dimitrios
National Technical University of Athens

CONTEXT AND OBJECTIVES

Exploitation of copper-bearing sulphide ores is one of the most dynamic industrial sectors in the Western Balkan countries. The exploitation of the sulphide ores is accomplished either by open-pit or underground mining, while copper is removed from the ore after flotation, pyrometallurgical treatment and refining. During the whole copper production cycle, large amounts of solid, liquid and gaseous wastes are generated, and then interact with the local environment, resulting in serious problems to the local ecosystem. The main objectives of the present project are set out below:

- the development of innovative, cost-effective and environmentally acceptable technologies, in order to prevent the environmental degradation caused by the copper mining and metallurgical industry;
- the development of an integrated environmental management scheme, in order to apply preventive and remedial technologies for the protection of the local to the copper mining and metallurgical industry environment, to produce a novel methodology for the proper disposal of all hazardous wastes generated, and finally to diminish the wastes and control the rehabilitated sites on a long-term basis.

ACTIVITIES

The worst environmental problem associated with underground and open pit mining works is Acid Mine Drainage (AMD). The first activity of the present project concerns the prevention of AMD either by chemical/bacterial leaching of the solid wastes, or by in situ or ex situ chemical immobilisation of the contained heavy metals. During the pyrometallurgical treatment of sulphide ores, large quantities of industrial wastewaters are generated, which contain high concentrations of sulphuric acid, base and heavy metals and therefore constitute a permanent danger of pollution of the regional water resources. The second activity concerns the decontamination of underground water by means of reactive barriers, constructed either by conventional materials or by fly ash and organic matter. The treatment of industrial wastewaters and leachates, comprise the third activity. This treatment involves the remediation of leachates generated by the sulphidic solid wastes and of the industrial wastewaters through innovative biotechnological,

photochemical and electrochemical processes, so that metals or groups of metals can be recovered in a marketable form.

EXPECTED RESULTS AND OUTCOMES

The present project aims at the prevention and minimisation of environmental pollution caused by the mining and metallurgical industry. Therefore the project will contribute directly to the reinforcement of environmental protection and, at the same time, will result in a recovery of the mining and metallurgical industry, which will initiate economic development in this sector. This growth will make an immediate contribution to the prevention of migration, by means of business and job creation policy in the Western Balkan region.

Furthermore, equal opportunities will be strengthened, and therefore the base for social cohesion in the region will be set. The impact of the project — as mentioned before — will raise living standards for the people in the region, therefore contributing to the fight against poverty there. It is believed that the development and dissemination of knowledge, along with the possible adoption of the proposed methodology as a guidance tool for similar cases, will reinforce and stabilise the research potential of the Western Balkan countries, and at the same time will facilitate the cooperation of the regional and local bodies concerning environmental issues.

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RECOAL

Reintegration of coal ash disposal sites and mitigation of pollution in the West Balkan Area

Period: 01/01/2005 to 31/12/2007
Budget from EC: EUR 699 118

Coordinator: Walter W. Wenzel
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Life Sciences (BOKU)

CONTEXT AND OBJECTIVES

Large areas of the West Balkan region have been exposed to coal ash deposits for several decades. Due to high concentrations of heavy metals, polluted effluxes from such ash deposits, as well as dust dispersion by wind erosion, contaminate surface and ground water sources, standing and running waters, as well as agro-ecosystems even beyond the affected areas. Consequently, heavy metals entering both the food chain and the respiratory tracts of people by dust emission severely affect public health. The aim of the RECOAL project is to develop and test new and innovative methods for the remediation of coal ash deposits and affected water resources.

ACTIVITIES

Conventional and new plant-based technologies will be considered for their potential to purify polluted water bodies and to eliminate toxic effluents from contaminated ash deposits. Immobilisation of heavy metals using various site adapted amendments, in line with soil covering technologies and re-vegetation, will be applied to reduce the transfer of toxic metals to ground water, open water bodies and air. Crops with low metal uptake preference, as well as remediative (inter)cropping systems will be implemented to warrant food quality standards and the sustainable remediation of contaminated sites.

The technologies to be used in this project will be tested under laboratory conditions and at field scale. Up-to-date monitoring techniques will be applied to evaluate the effectiveness, sustainability and cost-efficiency of the methods. Special emphasis will be put on socioeconomic aspects concerning public acceptance, stakeholders support, public health and success of remediation measures.

EXPECTED RESULTS AND OUTCOMES

New remediation technologies developed and tested in this project will ensure a cheap and environmentally-friendly approach to clean up the coal ash deposits and affected areas. Quality standards for reintegration of such sites into agricultural management and tools for the sustainability assessment of remediation measures will be developed on the basis of project results.

The results will be used to develop and compile decision tools, which will then be published in a handbook and provided to local authorities, stakeholders and problem owners for further decision support.

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TRABOREMA

Concepts for integrated transboundary water management and sustainable socio-economic development in the cross border region of Albania, Former Yugoslav Republic of Macedonia (FYROM) and Greece

Period: 01/06/2004 to 31/05/2007
Budget from EC: EUR 1 000 000

Coordinator: Jürgen Wolfbauer, University of Leoben

CONTEXT AND OBJECTIVES

The TRABOREMA project is focused on gaining new knowledge in the field of transboundary integrated water resource management in the Western Balkans to meet the needs of society and EU policies. A consortium comprised of universities from three EU Member States (Austria, Spain and Greece), and three partners from the former Yugoslav Republic of Macedonia (FYROM) and Albania will collaborate to analyse and assess the ecological status of a transboundary lake district, as a pilot model for verifiable sustainable development in the Western Balkans. The integrated approach developed and applied within this project will focus mainly on water resources, but will also include facets of energy and waste management.

The strategic objectives are as follows:

- form successful and enduring partnerships within the consortium, and with interested parties such as authorities, policymakers and public participants within countries of the target region, and with EU Member States, to help settle the political and social situation in the Western Balkans;
- communicate the importance of integrated water management — which incorporates waste and energy — as a theme of common interest, to contribute to sustainable development in the Western Balkans;
- develop methodologies for implementation of transboundary integrated water management in Lake Prespa and the associated river basin, as a pilot region which can then be transferred to other regions.

ACTIVITIES

The TRABOREMA project will stabilise and reinforce research potential in the field of integrated management of regional water resources planning and policy in a transboundary lake region between Albania, the FYROM and Greece. Using the EU Water Framework Directive as a guideline, the Consortium, which also includes universities specialising in environmental issues from Austria and Spain, will design and implement a monitoring system in the catchment to Lake Prespa. Together they will research upstream/downstream water-user demands, to determine environmental pressures and impacts in terms of ecological quality ratios (EQRs) for the target region. This data will be modelled and

simulated using state-of-the-art computer applications to make predictions and perform scenarios. The results will be analysed and used as a basis for transboundary policy recommendations for integrated management of the water resources, and sustainable socio-economic development of the region.

EXPECTED RESULTS AND OUTCOMES

The project is aiming to achieve the following:

- implementation of a monitoring system to deliver data for the development and verification of EQRs and computer-based modelling and simulation for the target region;
- establishment of a basis concept for a River Basin Management Plan for the target region, as a contribution to the Intercalibration Network for Hellenic Western Balkan Ecoregion, as defined in Directive 2000/60/EC;
- provision of coherent policy recommendations based on qualitative and quantitative findings established within the TRABOREMA project, and promotion of the integration of water policy into socio-economic policies as a contributor to achieving sustainable development;
- definition and prioritisation of themes and regions for transfer and application of knowledge gained with TRABOREMA project.

TRABOREMA

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LPAMS

Production process for industrial fabrication of low price amorphous-microcrystalline silicon solar cells

Period: 01/10/2004 to 31/03/2008
Budget from EC: EUR 609 000

Coordinator: Dr Wim J. Soppe
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CONTEXT AND OBJECTIVES

In the medium- to long-term future, photovoltaics (PV) should play an important role as a renewable energy source for the production of clean electricity in Western Balkan Countries (WBC). Such large-scale implementation of PV requires at least a drastic reduction in prices of PV systems, to reach a more competitive level. Production of PV modules and systems in WBC facilitates low cost PV production with the additional benefit of local development of innovative and clean technologies. This project aims at a lower cost price per Wattpeak (Wp) for film-Si PV produced in a local production plant in WBCs, by a significant upgrading of cell and module efficiency, while keeping production costs per square metre almost constant.

ACTIVITIES

The increase in cell and module efficiency will be achieved mainly by the introduction of microcrystalline silicon as the photo-absorbing layer. The following activities are foreseen:

- development of a high-rate deposition process, based on Microwave PECVD for intrinsic micro-crystalline silicon (micro-Si) layers;
- development of thin doped microcrystalline silicon layers, using RF-PECVD;
- integration of doped and intrinsic layers into single junction cells and — in combination with amorphous silicon (a-Si) layers — into a-Si/micro-Si tandem cells on glass substrates;
- improvement of TCO layers (better stability in hydrogen plasma, better transparency), using the existing industrial APCVD system, and a laboratory scale MOCVD system;
- design of an upgraded production line.

EXPECTED RESULTS AND OUTCOMES

This project should lead to a concept for upgraded production whereby the existing module efficiency (from 4.5% to 5 %) can be increased up to 8 %. This will result in a decrease in production costs, from more than 3 EUR/Wp to about less than 2 EUR/Wp.

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ECO-PCCM

Eco-houses based on eco-friendly Polymer Composite Construction Materials

Period: 01/10/2004 to 30/09/2007
Budget from EC: EUR 845 000

Coordinator: Dr Maurizio Avella
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CONTENT AND OBJECTIVES

The main objective of the project is to introduce a new class of eco-friendly and cost-effective polymer composite construction materials. The project draws on a combination of European and Balkan scientific and engineering expertise in natural fibre composites, innovative house-component design and construction, low cost/low energy building composites and waste recycling processes. The results will serve as the basis for developing a new generation of housing systems that are both environmentally friendly, economically viable and socially desirable. As the project is directly involved in the construction of essential life goods, it will play an active role in the war on environmental destruction and thus contribute to sustainable development. As a consequence, it will go some way towards stabilising the political, financial and social situation in the Western Balkan region.

To create housing systems with significantly reduced environmental cost, it will develop and integrate technologies using new construction materials (based on renewable agricultural resources); innovative component design; easy assembly; integrated energy generation systems and waste recycling procedures.

ACTIVITIES

The ECO-PCCM project will last 36 months. It is divided into six key phases in a logical sequence of actions to be performed, to achieve the projects' objectives:

- development and creation of new technologies for the production of innovative, eco-friendly polymer composite construction materials, tailored to customer requirements (from month 1 to 12);
- development of suitable means of connecting panelised natural fibre composite structural components, with an emphasis on ease of assembly and modification during the life of the building (from month 9 to 18);
- development of panelised components with integral thermal and acoustic insulation for improvement of energy efficiency in eco-buildings (from month 18 to 30);
- development of appropriate manufacturing techniques suitable for rapid industrial application, a wide range of products and optimised low-production costs (from month 24 to 36);

- waste minimisation: exploring the possibilities for reuse and recycling; development of materials and processes that allow easy deconstruction-recycling-reuse; selective demolition (from month 18 to 36);
- project management (from month 1 to 36).

EXPECTED RESULTS AND OUTCOMES

Through the innovation of a new class of eco-composite construction materials which possess improved engineering properties compared to conventional ones, the ECO-PCCM project would hope to contribute towards new forms of construction that embrace an environment-friendly technology. Furthermore, the use of biodegradable plastics uses overall less oil than currently needed for their manufacture, thus reducing the negative impact on the environment.

ECO-PCCM makes use of different European countries' know-how and experience in the implementation of construction industry projects in Balkan countries. On the one hand, this project is expected to help Balkan communities increase their industrial potential by improving environmental standards. On the other hand, the competitiveness generated will, in turn, help to improve general trans-national problems, for example, by contributing to both the modernisation and adaptation to change of the construction industry. Consequently, this would, to some extent, assist in the creation and maintenance of sufficient jobs in Europe to arrest the decline in industrial employment.

The outcomes of this project are expected to be the following:

- joint scientific publications and patents;
- PhD theses;
- guidelines on new constructive materials in compliance with EU directives and standards on safety, environmental protection, recycling and waste treatment, and industrial strategies.

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ADEG

Advanced Decentralised Energy Generation Systems in Western Balkans

Period: 01/05/2004 to 30/04/2007
Budget from EC: EUR 1 189 802

Coordinator: Prof. Emmanuel Kakaras
National Technical University of Athens

CONTEXT AND OBJECTIVES

Technological concepts for advanced power production are to be formulated in the context of the increasing awareness of environmental issues, and the demand for rational and effective production and use of energy. A key driver concerning sustainable development is the integration of renewable energy sources (RES) in the energy chain, and the development of viable and attractive concepts for end users. The establishment of hybrid concepts for power generation is of paramount importance for a 'green' energy future, particularly for countries with significant potential in biomass, hydro, solar and wind capacity. The project aims to conduct research on the development of renewable energy technologies and hybrid systems and their applications for stand-alone electricity supply in isolated regions, as well as heating and cooling. This research will take place in the Western Balkan countries, namely Bosnia-Herzegovina, Croatia and Serbia and Montenegro.

There are several project objectives: to map the potential for RES exploitation in Decentralised Energy Generation (DEG); to create a standard modelling procedure for DEG system selection, allowing the best possible solution in a given area to be identified; to single out specific concepts for DEG in the chosen countries and for their integration into multi-technology systems for stable and high efficiency power production; and finally, to increase the efficiency and competitiveness of RES and hybrid stand-alone power supplies in decentralised areas in the Western Balkans, and to improve their environmental performance.

ACTIVITIES

The activities of the project are as follows:

- Examination of RES potential in terms of availability and the specific characteristics of each type, taking into account biomass, wind, hydro and solar.
- Development of regional maps of power production sources and technologies used, in conjunction with the particularities of power demand side focusing on DEG.
- Investigation of technological concepts to identify the prospects and limitations of each technology, namely biomass, solar-photovoltaics, wind, small hydro, CHP and hydrogen concepts, according to the local

characteristics. Experimental work will be carried out dealing with biomass combustion, co-combustion with domestic solid fuels and/or wastes and gasification process.

- Identification of the most promising configurations for the advanced utilisation of RES in DEG systems, based on the system's increased efficiency in power production and hydrogen as an energy carrier, and the establishment of reliable and low-cost energy generation for stand-alone grids and applications with advanced security of supply. The technical and operational characteristics will be formed based on the results of a multi-criteria analysis.
- Optimisation of the most promising concepts, based on the detailed characteristics of selected areas; the relevant economic and environmental aspects will be assessed.

EXPECTED RESULTS AND OUTCOMES

The project will contribute to the promotion of viable hybrid DEG solutions in the Western Balkans, through the formulation of specifications for the optimisation of RES and hybrid concepts-based grids, in conjunction with the determination of specific low-cost power production schemes for decentralised areas in Bosnia-Herzegovina, Croatia and Serbia and Montenegro.

The deliverables of the project are set out below:

- map of DEG potential in the Western Balkans;
- reports on the technological, economical and environmental aspects of examined technologies;
- description of technological concepts suitable for the Western Balkans;
- reports with characteristics of each concept, based on existing installations in the EU;
- standard modelling procedure for selection of the DEG concept in the Western Balkans;
- parameters affecting the effectiveness of a DEG System;
- description of Specific Concepts for DEG applicable in the Western Balkans;
- specifications for optimisation of grid penetration;
- dissemination activities.

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EMCO

Reduction of environmental risks, posed by Emerging Contaminants, through advanced treatment of municipal and industrial wastes

Period: 01/07/2004 to 30/06/2007
Budget from EC: EUR 1 199 987

Coordinator: Damia Barcelo
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CONTEXT AND OBJECTIVES

In the Western Balkan countries, a decade of regional conflicts combined with insufficient institutional infrastructure, a decaying industrial system and a legacy of years of unchecked pollution have left the environment of the region in a state of serious neglect, which is especially reflected in poor water quality and waste problems.

EMCO focuses on the tracing of emerging contaminants in industrial and municipal wastewaters and on their removal by advanced water treatment technologies. Emphasis is on the application of small units for the treatment of industrial and municipal effluents with the objective of reducing environmental and health risks through the improvement in quality of receiving surface waters.

The EMCO project aims to improve the best available technology for the elimination of selected classes of emerging compounds i.e. human and veterinary drugs, surfactants, textile dyes, from municipal wastewaters, as well as effluents from textile and pharmaceutical production plants, by applying a range of advanced and cost-effective technologies. Elimination of such a diverse group of compounds requires an integrated approach associating innovative technologies with existing physico-chemical and biological treatments.

The project also aims to achieve an improved understanding of the biotransformation and ecotoxicity of emerging contaminants in the environment and during water treatment by applying advanced analytical methods based on the Toxicity Identification Evaluation (TIE) approach.

ACTIVITIES

To achieve the planned objectives, three main elements are being integrated in the project work plan:

- Stocktaking: compilation of existing data and collection of missing data on the occurrence of priority and emerging contaminants in the aquatic system of Western Balkan countries.
- Development of analytical tools: development, optimisation, validation of chemical and biological methods to be used for ecotoxicological study and risk assessment. Analyses will include both parent

compounds and possible degradation products, studying the behaviour of selected compounds in the environment, and during waste and drinking water treatment.

- Evaluation of treatment technologies: the stepwise adjustment of wastewater treatment technologies from laboratory scale and synthetic samples to pilot plants installed at industrial partner sites evaluating the efficiency of the technology under real-world conditions.

EXPECTED RESULTS AND OUTCOMES

The following results are expected from EMCO:

- to improve treatment of wastewaters by using novel membrane technology and to investigate its removal potential with respect to emerging contaminants from household and industry (pharmaceutical and textile);
- to apply advanced sorption treatment using recycled materials as cost-effective sorbents for the treatment of textile effluents;
- to recommend battery of treatment steps for the elimination of emerging contaminants from different types of wastewater prior to their discharge to municipal collection systems or receiving waters;
- to evaluate the ecotoxicological relevance of selected classes of emerging contaminants in relation with their biodegradability and elimination during treatment by existing and advanced wastewater and drinking water technologies;
- to provide the EU and the Western Balkan countries with sufficient information about emerging contaminants on the basis of their degree of elimination during wastewater treatment.

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RES INTEGRATION

Rural Sustainable Development through Integration of RES

Period: 01/11 2004 to 30/10/2007
Budget from EC: EUR 900 000

Coordinator: Spyros Kyritsis, Agricultural University of Athens

CONTEXT AND OBJECTIVES

The ultimate goal of the RES INTEGRATION project is to study the implementation of innovative, low cost Renewable Energy and Energy Saving Technologies to selected poor regions in the participating countries. Locally available energy resources will be used, with a final goal of regional sustainable socio-economic development. Pathways will be developed for maximising renewable energy penetration in the region. Ideally, the goal would be to attain 100 % renewable energy penetration.

The project's objectives can be generalised into two main topics:

- significantly increase the share of renewable energy sources to particular regions in the participating countries, thus benefiting other sectors, e.g. for CO₂ emissions and job creation;
- develop cost-effective local renewable solutions integrated in sectors with significant social and environmental issues in the selected poor regions.

ACTIVITIES

Through the project, specific Integrated Renewable Energy Systems (IRES) will be proposed for sustainable development in each region. The term 'IRES' refers to an energy system with an optimal energetic autonomy, including food production, where if any excess energy is generated, it can be exported.

Each partner team will select a pilot rural region and perform the following tasks:

- study the current energy situation in the region (sources of energy, consumption by sector and space, and time distribution of the consumption);
- study the local energy potential, and space and time distribution;
- define development scenarios for the region;
- develop a prototype model (expert system) for introducing IRES into the specific region;
- propose specific IRES and development policies to be applied in the regions through the developed model (expert system);
- explore the socio-economic and environmental aspects;
- dissemination activities.

The results of the studies of each region will provide local governments with the plans for regional sustainable development.

EXPECTED RESULTS AND OUTCOMES

The project is expected to produce the following achievements:

- inventory of Renewable Energy Systems (RES) potential (in the form of detailed data) for the corresponding regions of each participating country;
- development of a common methodology for the implementation of the IRES;
- expert system-model for determining optimum IRES schemes;
- cost benefit and socio-economic impact analyses of the proposed IRES;
- environmental and ecological impact assessment of the proposed IRES schemes;
- road map for the implementation of RES in restructuring and reconstruction programmes;
- dissemination of acquired knowledge with brochures of the model and results, audio-visual tool (CD-ROM), and workshops in the participating sites.

RES INTEGRATION

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VBPC-RES

Virtual Balkan Power Centre for Advance of Renewable Energy Sources in Western Balkans

Period: 01/01/2005 to 31/12/2007
Budget from EC: EUR 597 396

Coordinator: University of Ljubljana

CONTEXT AND OBJECTIVES

Countries in the Western Balkan (WB) region have a vast, unexploited potential for renewable energy sources (RES), which through their efficient use, could contribute significantly to securing energy supplies both within the region and beyond. However, special care has to be devoted to finding sound solutions for electricity supplies in undeveloped and isolated regions, due to war damage.

The main objectives of the VBPC-RES project are:

- to enhance cooperation in war-torn regions among: researchers; between researchers, the community and key public groups; policy-makers and decision-makers in the business sector;
- to transfer know-how in RES technology and its implementation in isolated regions;
- to provide inputs for the development of regulatory and institutional frameworks for the energy sector, and therefore enhance a progressive alignment of national policies to the *acquis communautaire*;
- to build awareness and educate on modes, means and benefits of renewable energy sources;
- to contribute to the stabilisation and reinforcement of research potential within the field of renewable energy sources.

ACTIVITIES

The important role of the VBPC-RES project is to set up a series of mechanisms in order to provide the critical mass of capacities, and to prepare local experts in their future pro-active role and knowledge generation in this field.

A network of experts will be established. Thematic workshops and seminars for experts on best practice in RES technologies will be organised to explore their implementation, legal and institutional framework, as well as incentives to concentrate knowledge, focus and motivate in order to speed up future research. In this way, the know-how needed to adopt best practices according to local circumstances will be increased.

Events for policy-makers and the business community, together with experts on RES implementation will also be held. Strong emphasis will be given to the local circumstances and exchange of experiences within the region. These activities within VBPC-RES will assure critical mass with common knowledge. They will initiate an intensive exchange of information, and favour dialogue among the different actors and the preparation of solutions for adopting best practices in the EU.

A series of workshops will be organised for coordinating the ongoing RES project activities, to exchange early results, and present the latest knowledge from other countries. Special emphasis will be given to ensure a strong link is maintained between ongoing FP6 and other European projects, and to help speed up the inclusion of the WB partners in RES activities in the ERA.

EXPECTED RESULTS AND OUTCOMES

The VBPC-RES Coordination Action will provide a number of innovations and improvements, which in turn will allow its objectives to be more smoothly achieved.

Mechanisms will be developed to motivate and prepare local experts for their future pro-active role and knowledge generation in the field. A critical insight will be provided into the current development of RES in WB countries and selection of the most relevant good practices and lessons learned in the EU for efficient transfer of these achievements to the WB Countries. The link between the scientific community and decision-makers will be strengthened, and will focus discussion on crucial points for RES implementation, and on enhancement of methods for decision support. The project will bring together institutions involved in the preparation of regulatory frameworks for restructuring energy sectors, as well as those in renewable energy research, thus facilitating the exchange of experiences and setting the foundations for future common projects.

VBPC-RES

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WESTERN BALKAN COUNTRIES

HEALTH

CONNECT

Components, organisation, costs and outcomes of health and community based interventions for people with posttraumatic stress following war and conflict in the Balkans

Period: 08/01/2004 to 30/04/2008
Budget from EC: EUR 1 699 228

Coordinator: Prof. Stefan Priebe
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CONTEXT AND OBJECTIVES

Large numbers of people in Balkan countries and in refugee groups in EU Member States have been affected by posttraumatic stress due the worst armed conflict in Europe within the last 50 years. This project assesses components, organisation, utilisation, costs and outcomes of health care and social interventions for people with posttraumatic stress following war and migration in the Balkans. More specifically, it has the following research objectives:

- to assess the components and organisation of health care and community based interventions for people with posttraumatic stress;
- to develop a model predicting long-term service use and outcome in people who experienced potentially traumatic events;
- to assess components, costs and subjective outcomes of health care and community based interventions in people with persistent posttraumatic stress;
- to identify factors influencing change in people with persistent posttraumatic stress; and
- to estimate whether and, if so, to what extent, results gained in refugee populations can be generalised to people who stayed in the area of the conflict and vice versa.

ACTIVITIES

The research consists of three interrelated parts:

- A new instrument to register health care and community based interventions for people with posttraumatic stress is developed and tested in four Western Balkan countries (Bosnia and Herzegovina, Croatia, Serbia and Montenegro and Former Yugoslavian Republic of Macedonia) and three EU Member States (Germany, Italy and the United Kingdom).
- A survey of people who experienced potentially traumatic events in the Balkans is to be conducted in each of the seven participating countries, 640 in each Balkan country and 250 in each Member State. Stressful events, utilisation of health care and community based services since the traumatic experience, costs of interventions, current and past levels of posttraumatic stress and other mental health disorders, and quality of life will be assessed. The data will be used to develop statistical predictor models for the use of interventions

and their outcome, i.e. level of posttraumatic stress and quality of life, which will be validated for each country and compared.

- In the above survey a total of more than 800 people with persistent posttraumatic stress are to be identified, interviewed in more detail, and followed-up after one year. Thus, the project team investigates factors that influence symptom change in people with chronic symptoms, and estimate the cost-consequences of interventions in this group.

EXPECTED OUTCOMES AND RESULTS

Overall, the project will identify long-term social and clinical outcomes after the experience of potentially traumatic events and the relative contribution of medical care and community based social interventions to recovery from posttraumatic stress. This will be specified and compared for different groups and contexts. The findings will help to develop evidence based models for estimating long-term service needs of future groups with posttraumatic stress, including refugees within the area of conflict and in other countries in Europe. Moreover, the study will provide empirical evidence for designing effective health and social care policies for people with posttraumatic stress, including the particularly challenging group with symptoms that have been persistent over many years.

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PBPTSD

Psychobiology of Post-traumatic Stress Disorder

Period: 01/10/2004 to 31/03/2008
Budget from EC: EUR 1 296 869

Coordinator: Dr Eric Vermetten
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CONTEXT AND OBJECTIVES

It is estimated that 15% of the world population suffers from Post-Traumatic Stress Disorder (PTSD). It is not exclusively a war-related disease, but rather occurs as a possible consequence of any traumatic event. In the Western Balkan region, this percentage is much higher, as one of the consequences of the recent wars. The unfortunate opportunity of having such a large sample of PTSD patients and the rich experience of Western Balkan specialists in examining and treating them, was at the core of this project. In addition to health problems, PTSD causes significant long-term socio-economic damage. The best results in PTSD understanding, diagnosis and treatment could be achieved by integrating psychological, biological and pharmacotherapeutical approaches. The general objective of this project is to better understand the biological basis for the psychophysical profiles of PTSD patients. Nine consortium members in five different countries will participate in this study, which will focus on establishing multiple correlations of different PTSD subtypes with relevant psychological, biochemical, endocrinological, genetic, physiological and anthropometric parameters.

ACTIVITIES

This study is designed as cross-sectional, multicentre research performed on ten groups, five representing each gender:

- patients with war-zone related PTSD;
- patients with war-zone related PTSD in remission;
- war-zone exposed subjects, non-PTSD;
- war-zone exposure controls from Western Balkans, non-PTSD;
- war-zone exposure controls from Western Europe, non-PTSD.

Each group will consist of about a 100 participants (90 will be the minimum), with the exception of the second group, which is expected to be significantly smaller (50 will be the maximum). The main psychological instruments to be used are personality inventories, memory scales and dissociation questionnaires. Biological measurements will encompass parameters related to hypothalamo-pituitary-adrenocortical axis (including cortisol receptor and its gene polymorphism), anthropometry, body composition, lipid status, insulin resistance, and sleep disturbances.

EXPECTED RESULTS AND OUTCOMES

After an advanced statistical analysis of the data, this study will yield new knowledge on relations between the following: basic psychological variables and PTSD, biological variables and PTSD, and biological and basic psychological variables in health and in PTSD. In addition, the predicted benefits of the project include the following: development of combined psycho-biological batteries for PTSD screening, diagnosing and risk-factor assessing; improvement of psychological instruments for measuring PTSD; implementation of new biological markers for PTSD, as well as recommendations for the improvement of combined psychotherapy and pharmacotherapy of PTSD.

Furthermore, this project will yield strengthened scientific capacity in partner countries, and generate wide public awareness of the consequences of war and trauma on mind and body, by organising conferences and workshops. It will also contribute to the construction of a network of Centers of Excellence on the topic of PTSD. Several scientific publications in peer-reviewed journals will also result from this work. Students participating will benefit by using the results in the development of their PhD theses.

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INTAILRISK

Assessment of environmental risk for use of radioactively contaminated industrial tailings

Period: 01/04/04 to 31/03/2007
Budget from EC: EUR 1 000 000

Coordinator: Jean Klerkx
International Bureau for Environmental Studies

CONTEXT AND OBJECTIVES

The objectives of the project are to assess and quantify the health risks for the population and environment from the presence of radionuclides in the wastes of coal mines and coal-burning plants, as well as the aluminium industry, in the Western Balkan countries. The project will investigate the risk from the wastes themselves, as well as assessing the best use of recycled material taking into consideration the risk factors. It will proceed by the investigation of selected occurrences for:

- assessing the presence and type of radionuclides in the primary and waste products, and its parameters;
- analysing and identifying the pathways for dispersion of radionuclides (erosion, dust re-suspension, surface water, groundwater) in the neighbourhood of the wastes, and defining the impact of the wastes on the ecosystem;
- assessing the impact on health to the population in the plants and vicinity of the wastes, due to the presence of radionuclides (gas-emission, inhalation);
- defining the risk from the use of by-products made from the wastes (building material that contains fly ash, disposal in engineered surface impoundments and landfills, industrial product based on waste material).

ACTIVITIES

An integrated, multidisciplinary approach will be applied to the investigation of case studies in each country involved, in order to:

- investigate the processes that are related to the transfer of the radionuclides in the environment;
- assess the risk and to quantify risk zones;
- use the results for monitoring and remediation practices;
- relate these results to regulations that are in agreement with the EU regulations concerned.

The project will proceed by:

- assessing the nature and effects of radionuclides in the basic products (coal and bauxite);
- assessing the health risk of industrial processing of the ore;
- assessing the in situ risk of the industrial wastes;
- assessing the risk of dispersal of industrial wastes (fly ash from coal tailings and red mud tailings from

the aluminium industry,) in the neighbourhood of the plant;

- assessing the risk of migration of radionuclides from the wastes, in particular the contamination of surface and groundwater;
- assessing the radon risk in houses that are built on wastes and in neighbouring areas;
- assessing the radon risk in houses that are built on impoundments filled by contaminated waste material;
- assessing the radiation and radon risk of building material consisting of ash from coal with increased levels of the natural radionuclides, as well as in houses built from this material;
- assessing the radon risk in houses that use the coal for domestic purposes;
- assessing the specific activity of natural radionuclides in agricultural and animal products in the neighbourhood of industrial wastes.

EXPECTED RESULTS AND OUTCOMES

Based on the results of these case studies, the project will:

- examine the radiation protection management and the monitoring practice for the investigated test-sites,
- it will develop recommendations for each type of tailing dump in order to optimise the existing protection and remediation practice
- it will promote the adoption of legislations and regulations in the participating Western Balkan countries in conformity with the EU Directives for harmonisation of radiation protection practice.

The results of the project will be collected on a database that will be connected to a project website and distributed through the Internet. Through this medium, the effects of radionuclides as well as the approaches for optimising current environmental protection and remediation practices in the wastes concerned can be made available both to the wider public and to decision makers.

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