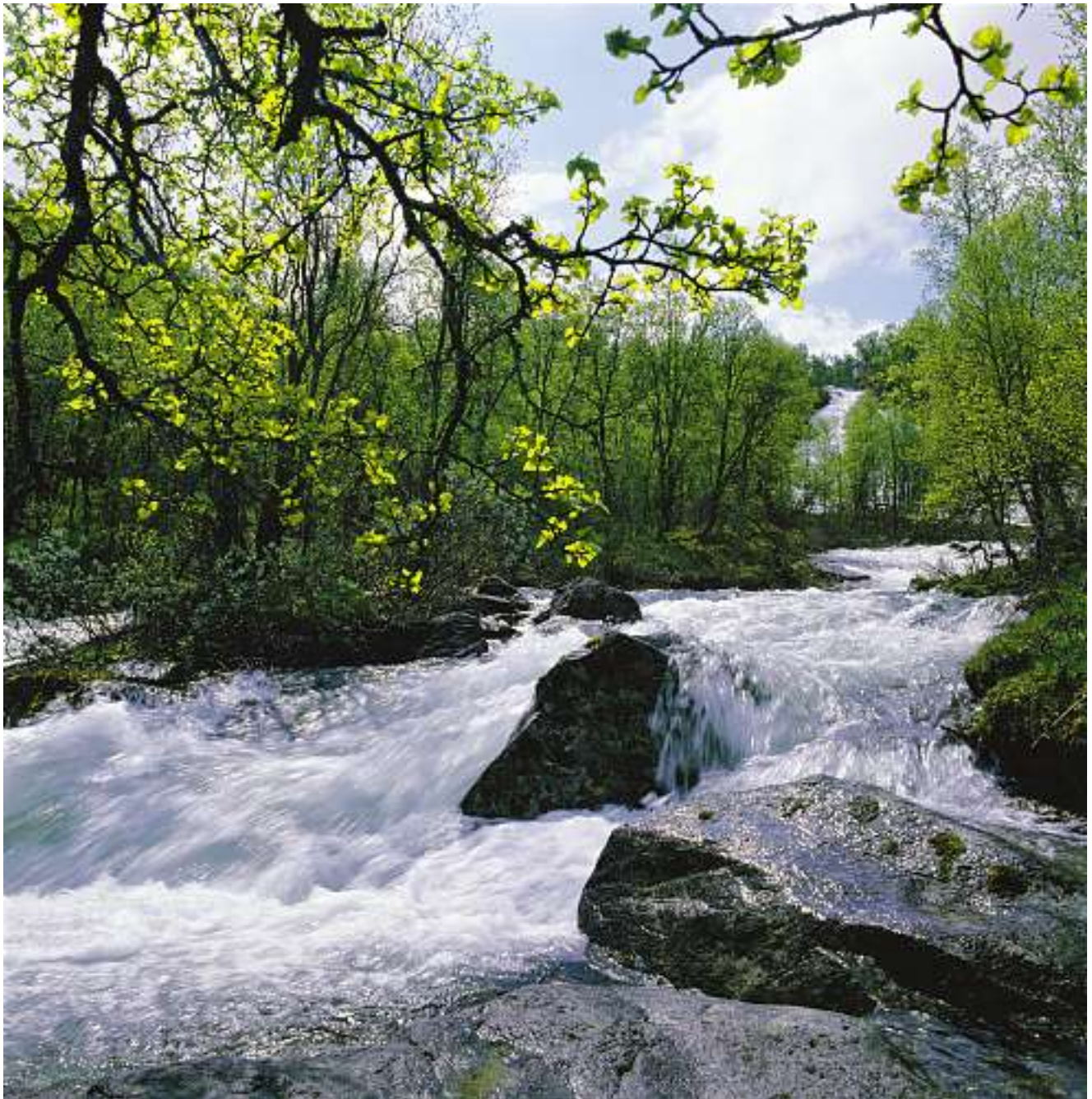


Tools for Sustainability





DEPARTMENT FOR RESEARCH COOPERATION, SAREC

Research Cooperation 2002

Tools for sustainability

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Tools for sustainability

“If we are earnest in our ambitions of supporting developing countries, and in regarding them as equal partners, support for the development of their research community is an important ingredient of the Swedish development cooperation.”

This quote from the 1985 evaluation of Swedish support for research cooperation with developing countries¹, is echoed in some of the central statements from the Johannesburg summit held in 2002. The summit underlined the intricate relations between environmental, economic and social conditions for sustainable development. The implementation plan pointed to research as one of the most central tools for understanding causes and mechanisms behind global and local problems and for finding constructive alternatives.

Research is needed for understanding the impact of unsustainable life styles, not the least in the North. Analysis is also needed in poor countries to find ways of handling the impact of such practices. Developing countries, as well, have to find ways of dealing with acute and immediate problems of poverty while preserving natural resources. In tackling such dilemmas it is not sufficient merely to access reports on published research findings. Only a fraction of international research deals with the specific conditions of the developing world. Developing societies must also have their own research community. They must be able to articulate and address issues of key concern to their development. Furthermore, they have to influence the agenda for international research, which otherwise tends to ignore the problems in developing countries.

This is why the Swedish development cooperation directs an increasing share of its research funding to strengthening systems for research. These investments enhance the potential impact of the thematic regional and international research programmes that ac-

count for two-thirds of the approximately SEK 800 million that Sida allocated for research in 2002.

Since 1995, research investments are planned as part of the Swedish country strategy for partner countries. The ambition to support the development of research communities in some of the poorest countries has guided the long-term investments towards strengthening the universities. They are the key institutions for research development. Sida supports research management, laboratory equipment, university libraries and ICT (Information and Communication Technology) connectivity as well as research training of university staff at Ph.D. level. Swedish support focuses on the build-up of structures for promoting and dealing with research as part of university life, not on specific research issues. With increasing capacity for independent formulation and selection of research projects, a focus on highly relevant issues has developed.

In this report on Sida-funded research in 2002, we give examples of research that contributes to the understanding and management of a sustainable environment. As emphasised in Johannesburg, this involves a combination of approaches and cross-fertilisation between disciplines.

At international level Sida supports organisations that retain an overview of ongoing research, identify knowledge gaps relating to development needs and promote relevant research. These organisations, with their mission of serving as links between decision-makers and research, operate within broad areas of research needs. They depend on functioning research communities in different parts of the world in order to be influenced by perspectives relevant to their orientation.

¹ Tio år med SAREC (Eng: Ten years with SAREC), an evaluation report on the Swedish Agency for Research Cooperation with Developing Countries. Ministry of Foreign Affairs Ds UD 1985:2.



A large part of the world's coral reefs died in 1998 after the massive bleaching caused by the warm ocean current El Niño.

Similar perspectives affect the efficiency of regional research networks. Some Sida-supported Asian networks dealing with research into energy policy and technologies for renewable energy have been successful in influencing policy decisions. They provide platforms for interaction among established research groups. However, the impact has been less evident in countries with comparatively weak research structures. The question is to what degree the potential advantage of research networks can be utilised by weak partners and to what degree such networks can contribute to basic capacity building.

In recent years two Asian networks have developed for economists interested in environmental issues. These networks have created a critical mass for professional exchange and comparative analyses. Several attempts to support similar networks in Africa have failed, in all likelihood due to weak research communities in economics at large and thus low capacity to address specific issues. New attempts to develop this important field will combine support at the national level

with resources for networking.

Such combined support has been applied in Central America. Regional programmes with an initial focus on research training have evolved into networks where graduated researchers who have progressed to university institutions in the region can continue their collaborative research activities.

In Nicaragua, early studies on occupational health and mapping of residual pesticides have led to comprehensive studies on health impact of pesticides and trials in the use of neem extracts as biodegradable pesticide alternatives. The research has been tied to regional networks on occupational health and toxic substances.

Some of the Sida-funded university programmes involve projects that address various aspects of a common theme and thus constitute "local research networks".

On the Andean High Plateau in Bolivia drought and intensive mining have seriously damaged the environment and livelihood of the Aymara people. Various



The CORDIO programme, Coral Reef Degradation in the Indian Ocean, was launched in 1999 as a consequence of the bleaching.

projects address the challenge of finding ways of remediation. Some examine ways to improve agrarian production. Biochemical methods are being developed to neutralise the impact of mineral waste products. Water technology is being developed to manage salinated waters.

Lake Victoria is the common denominator of projects supported at Makerere University in Uganda. Research there encompasses demography and health issues as well as energy and ecology. Great potential exists for further interaction in a planned East African research programme on Lake Victoria.

Among other examples of networks being formed by bilaterally supported researchers, the East African network on coastal zone research stands out. It was primarily formed to forge links between research into coastal zone management and policy-makers. A few years ago the network served as a vehicle for identifying and reporting on the coral bleach disaster. Today, it focuses on monitoring and evaluating the reparative capacity of the reefs.

These are but some of the examples of attempts to support research capacity in the least developed countries described in this report. We are convinced that the new challenges at the global level will require concerted efforts from research communities across the world. Climate change and the need to preserve natural resources for future generations will figure highly among these challenges.

True understanding of causes and potential areas of change will hardly be possible unless different perspectives are represented in the research. While some urgent research issues will continue to be addressed by development-oriented research, globally in the long run important investments must be directed towards securing a basis for research in the least developed countries themselves.

Stockholm, June 2003

Berit Olsson

Director, Department for Research Cooperation, SAREC

Sida research cooperation

Mandate

Research cooperation was introduced as part of Swedish development cooperation in 1975. In 1995, the Swedish Agency for Research Cooperation with Developing Countries, SAREC, became a department within Sida. Its mandate is to:

- Support developing countries in their efforts to create a research community, train researchers and develop methods for planning and indicating priorities for research, as well as allocating resources for such tasks.
- Contribute financial and scientific resources to support the production of new knowledge and utilisation of research findings of importance for development.
- Support scientific cooperation between researchers in Sweden and in developing countries and the participation of Swedish researchers in development-oriented research and research cooperation.

Modalities

Bilateral support

The main avenue for strengthening research capacity is within the umbrella of bilateral research cooperation with partner countries. In countries with

limited research, Sida normally focuses on support to research universities with a central position in the national system for research and education. In countries with established research capabilities, Swedish support may be directed towards producing new knowledge in line with thematic research priorities, and towards maintaining links with Swedish research.

Thematic research programmes

Sida may also support *regional research networks* formed to enhance national capacity and/or address thematic research priorities. Sida contributes to the core funding of some well-established and recognised *regional organisations* and supports *international research programmes* that address issues of high relevance for poverty reduction and development.

Activities in 2002 are presented by sector:

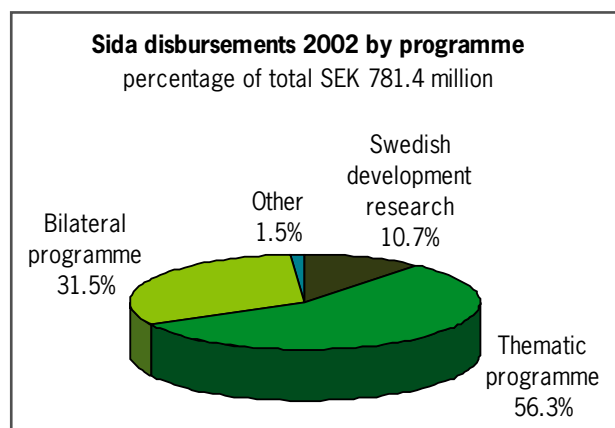
- Natural resources and environmental sciences
- Natural sciences and technology
- Social sciences and humanities
- Health research

Swedish development research

Around 10 per cent of Sida research funds go directly to Swedish development research. Grants are allocated to project proposals which once a year are submitted and subjected to peer review. The purpose of this support is primarily to maintain a Swedish resource basis for development issues and to contribute to international understanding in Swedish universities.

Swedish Research Links

Swedish Research Links is a comparatively new programme to which Swedish and developing country researchers may submit joint applications. Proposals are peer-reviewed and grants allocated for visits and joint work. The primary purpose of this programme is to promote relations.



Promoting national research and research training

The sustainable use of the local environment to alleviate poverty and drive development is a major challenge for the people and decision-makers of each nation. Locally generated knowledge about the close linkages between development and the environment are essential to meet this challenge.

Environmental risks are not always obvious to the human eye. In most cases they must be analysed using scientific methods and theories. Swedish development cooperation has identified the need to strengthen national universities. They are the most important focal points for research training and for producing and disseminating scientific knowledge about the environment.

However, low-income countries can rarely afford to prioritise scientific research. Sweden is one of few donor countries that support the development of local research capacity. Such capacity has a wide definition, comprising training of Ph.D. students in research projects, building laboratories and modern library facilities, setting up local research funds and mechanisms for allocating priority among research proposals, and dialogue on reform of universities and national research systems.

The aim is to arrive at a situation in which universities have gained credibility for managing governmental funds for basic research facilities, and are able to attract external funding from the private sector, from foreign donors and from foundations.

In 2002 Sida supported research capacity-building in nine countries and prepared for support to three new countries. Themes for research projects are set by the local researchers in dialogue with national stakeholders and via a selection process within the university management or a research council. Hence, themes for research on the environment are selected in accordance with specific problems and challenges in each country.

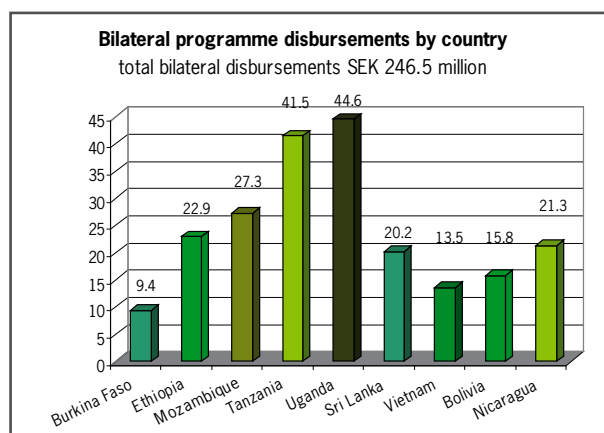
In Burkina Faso, a drought-prone country with severe degradation problems, research focuses on Sahelian eco-system management. In Ethiopia,

research is carried out in the fields of integrated water resources and environmental economics.

Collaboration with Uganda is focused on the Lake Victoria environment, while environmental research in Tanzania covers semi-arid and marine environments. In Mozambique, environmental aspects include the effects of mining and research on groundwater.

In Bolivia, multidisciplinary research on regional development also covers environmental aspects. In Nicaragua, which has long depended on cotton as a major export crop, research on the effects of pesticides on the environment and on humans has produced important knowledge.

Research has also contributed to improved management of marine resources in Sri Lanka and Vietnam.



Burkina Faso

Burkina Faso is a multi-ethnic and landlocked country mainly dependent on self-subsistence agriculture. Owing to a very dry climate, there are great challenges in terms of food security, land degradation and natural resources management.

In September 2001, a bilateral cooperation programme was launched with the overall aim of strengthening research capacity at Burkina Faso's institutes for higher education – l'Université de Ouagadougou, l'Université Polytechnique de Bobo-Dioulasso and Centre National de Recherche Scientifique et Technologique (CNRST).

Prior to launching the cooperation, Burkinan and Swedish researchers gathered around three questions, namely:

- a. the relationship between unsustainable management practices, land degradation and poverty;
- b. the environmental problems of dry areas and the continuous degradation of the Sahelian ecosystems; and
- c. the consequences of unsustainable management practices and dry areas on food security, migratory movements and the environment.

Burkinan and Swedish researchers agreed that a multidisciplinary approach would be crucial to tackling the issues at stake. As a result, a number of multidisciplinary research projects were formulated

for SAREC support. The following projects are currently being implemented:

- Adaptation of farming systems to land degradation in the context of climatic change,
- ecosystem regeneration,
- agroforestry,
- forest production, silviculture and remote sensing,
- agropastoralism and fodder production,
- improvement of traditional poultry farming,
- improvement of bovine dairy production,
- social stakes and local practices in forest, pastoral and tree usage,
- adoption of soil and water control technologies.

So far, it is too early to present any results from the projects. The first results are expected in about two years.

Ph.D. and staff training is a central part of the first phase of the cooperation. At the moment, 15 students are registered in various Swedish universities. Special efforts are made to recruit female candidates.

Sida commitment for current agreement period 2001-2003: SEK 23 million
Disbursed 2002: SEK 9.4 million

Supported areas: Agroforestry, Animal Husbandry, Econometrics, Forest Ecology, Natural Resources Management, Social Anthropology, Social Economics, Soil Sciences

Burkinan Institutions
OU - University of Ouagadougou
UPB - Polytechnic University of Bobo-Dioulasso
CNRST - Central National Research Institute, Ouagadougou

Collaborating Institutions
SLU - Swedish University of Agricultural Sciences, Uppsala and Umeå
UMU - Umeå University, Umeå
UU - Uppsala University, Uppsala

Ethiopia

Ethiopia has recognised access to higher education and research as an important cornerstone of societal development. Considerable resources have been invested to meet the political goal of doubling the enrolment of students in graduate programmes within two years. Institutions for higher education and research are being set up in each of the country's 11 regions.

Research in Ethiopia has for the last ten years followed a national policy. Its key objectives are to build national capability to generate and apply appropriate technologies for the realisation of Ethiopia's socio-economic objectives, and to rationally conserve and utilise its natural resources and human capital.

Swedish research cooperation attempts to provide a range of research components such as training, collaboration partners, equipment, etc. in a coordinated fashion. Sida supports the capacity for research coordination at the Ethiopian Science and Technology Commission and research and training at Addis Ababa University, Alemaya University and the Armauer Hansen Research Institute.

Most programmes involve cooperation between Ethiopian and Swedish institutions and researchers. Over the years, support has been concentrated to programmes in medicine, science, technology and agriculture.

A new agreement covering a three-year period was signed in 2002. At Addis Ababa University, new programmes encompass support to the veterinary faculty, pharmacy school and college of social sciences. The agreement also continues the extension of ICT (Information & Communication Technology) infrastructure. In addition to this, various training programmes have been included and eight new Ph.D. students have started their "sandwich training" in biology and chemistry at the faculty of science.

Alemaya University has a long term cooperation with the Swedish University of Agricultural Sciences (SLU). The new agreement will see an additional group of ten Ph.D. students successively starting their training towards doctoral degrees in collaboration with SLU and Uppsala University.

In 2002 the remaining Ph.D. candidates from the earlier group defended their theses. One thesis analysed the shallot requirements of nitrogen, phosphorus and potassium fertilisers under rain-fed and irrigated conditions in heavy clay soil. The result showed the significance of soil moisture for shallot production in sub-tropical climates.

Sida commitment for current agreement period 2002-2004: SEK 103 million
Disbursed 2002: SEK 22.9 million

Ethiopian Institutions

AAU - Addis Ababa University, Addis Ababa
Armauer Hansen Research Institute, Addis Ababa
AUA - Alemaya University of Agriculture, Dire Dawa
ESTC - Ethiopian Science and Technology Commission, Addis Ababa

Supported areas: Agriculture, Biodiversity, Environmental Economics, Health, Natural Products Chemistry, Solar Energy, Water Resources

Collaborating Institutions

GU - Gothenburg University, Gothenburg
ISP - International Science Programs, Uppsala
KI - Karolinska Institutet, Stockholm
KTH - Royal Institute of Technology, Stockholm
SLU - Swedish University of Agricultural Sciences, Uppsala and Svalöv
SU - Stockholm University, Stockholm
UmU - Umeå University, Umeå
UU - Uppsala University, Uppsala

Mozambique

The Eduardo Mondlane University (UEM) in Maputo has an increasing number of qualified staff, capacity to conduct autonomous research – and confidence. The faculty of education now has its own masters programme. Nevertheless, the university's academic base and resources are limited and research is largely dependent on donor support. Sida is a main contributor, together with Italy and the Netherlands among others.

Sida funds 30 research projects under the current agreement with UEM, as well as various forms of institutional support to improve research capacity, four faculty-based funds and one central research fund.

Most of the support goes to the science and engineering faculties. A project at the physics department involves environmental monitoring through atmospheric and satellite analysis (see the Green pages). This capacity has been built up over the last decade largely through support from Sida. Environmental degradation is of increasing concern in the region and such projects show the need for cutting edge technology at African universities.

Sida also supports research and training components for three projects at the faculty of arts, as well as a “small projects” fund. The socio-linguistic survey of Mozambican languages in collaboration

with Gothenburg University is an important area for study as Mozambique has many different language groups and needs to formulate policy on the use of indigenous languages. Only a minority of the population speaks Portuguese, the national lingua franca.

Another important project encompassing several disciplines concerns studies of the Zambezi Valley. The project, conducted in collaboration with Uppsala University, involves history and archaeology as well as anthropological studies of the current use of environmental resources, gender and socio-economic change.

“War, Economy and Transition in Mozambique 1964-1994” is a history project focused on regional archival research and on oral history and carried out in collaboration with the University of Witwatersrand in South Africa.

Sida commitment for current agreement period 2001-2003: SEK 79.1 million
Disbursed 2002: SEK 27.3 million

Supported areas: Anthropology, Archaeology, Biotechnics, Chemistry, Engineering, Geology, History, Informatics, Law, Linguistics, Mathematics, Marine Biology, Marine Science, Medicine, Veterinary Medicine, Physics

Mozambican Institutions

INIVE - National Veterinary Research Institute, Maputo
UEM - Eduardo Mondlane University, Maputo

Collaborating Institutions

CTH - Chalmers University of Technology, Gothenburg
GU - Gothenburg University, Gothenburg
KI - Karolinska Institutet, Stockholm
Kristineberg Marine Biological Station, Fiskebäckskil
KTH - Royal Institute of Technology, Stockholm
LTH - Lund University of Technology, Lund
LU - Lund University, Lund
SLU - Swedish University of Agricultural Sciences, Uppsala
UU - Uppsala University, Uppsala
University of Northumbria, Newcastle upon Tyne
University of Natal, Durban
University of Pretoria
Witwatersrand University, Witwatersrand

Tanzania

Research cooperation between Sweden and Tanzania started in 1976 and has gone through various phases. It currently is directed at strengthening research and research training at the University of Dar es Salaam (UDSM) and the Muhimbili College of Health Sciences (MUCHS). Funding is used for reform and management programmes, research-promoting activities and research collaboration involving Swedish universities. Most postgraduate education includes sandwich-based research training of university staff.

A central part of the research capacity-strengthening support is targeted at central university structures. Under the current agreement, funding is allocated for the development of the university research environment, including development of information and communication technology and libraries. In addition, competitive gender research grants from the gender programme on research, teaching and counselling and faculty funds are used to support small research projects in specific subject areas not already supported by SAREC.

In 2002, several Ph.D. and M.Sc. theses from the various research programmes at UDSM and MUCHS were successfully presented. At the Institute of Marine Sciences at UDSM studies were presented on “Nitrogen-fixing cyanobacteria in man-

grove ecosystems and the effect of pollution on nitrogen fixation in coastal areas of Zanzibar” and “The effects of fishing practices on growth and reproduction of fish communities on reefs of Mafia Island”.

At the prospective College of Engineering and Technology at UDSM three Ph.D. theses were presented, one of which addressed the topic “Renewable energy using bio-fuel from sisal waste” within the Engineering and capacity-building programme.

A Ph.D. thesis at MUCHS entitled “Anaemia in women of reproductive age in Tanzania” was presented from the reproductive health programme. This study showed that the prevalence of anaemia in pregnant women was high – 60 per cent – and that iron deficiency was the main underlying cause. In addition, it was shown that ante-natal care interventions achieved a significant reduction in the prevalence of severe and moderate anaemia.

An evaluation of Sida/SAREC support to the reproductive health and TANSWED HIV research programmes at MUCHS was finalised during 2002 and highlighted constraints related to health research. As a result, a series of meetings were initiated during 2002 to assess needs and constraints and shape the future support to faculties of medicine in Eastern and Southern Africa.

Sida commitment for current agreement period 2001-2003: SEK 38.1 million
Disbursed 2002: SEK 41.5 million

Supported areas: Architecture, Education, Energy and Engineering (Electricity, Electrotechnology, New Materials), Health (HIV/AIDS, Malaria, Reproductive Health), Information and Communication Technology, Languages, Law, Natural Resources and Environment (Agropesticides, Coastal Zone, Drylands), Social and Economic Development, Institutional Support

Tanzanian Institutions

UDSM - University of Dar es Salaam
UCLAS - University College of Lands and Agricultural Studies
MUCHS - Muhimbili University College of Health Sciences, Dar es Salaam

Collaborating Institutions

GU - Gothenburg University, Gothenburg
KI - Karolinska Institutet, Stockholm
KTH - Royal Institute of Technology, Stockholm
SMI - Swedish Institute for Infectious Disease Control, Stockholm
Swedish Environmental Research Group, Stockholm
SU - Stockholm University, Stockholm
Umeå - Umeå University, Umeå
UU - Uppsala University, Uppsala

Uganda

Swedish bilateral research cooperation with Uganda was initiated in 2000 and is concentrated on the oldest and most established institution, Makerere University.

Sweden's support aims to help strengthen the overall research environment through assistance to research administration, core facilities and the university library. Support is also provided via research collaboration with Swedish and international scientists. Those faculties receiving project funding are medicine, social science, technology and agriculture.

Research within the faculties focuses on "Lake Victoria and other water (re)sources". The theme provides an opportunity to address questions of importance to Uganda in a concerted way, as well as an opportunity for multi-disciplinary collaboration. In order to facilitate this, a demographic surveillance field site in the Lake Victoria area is being developed.

The collaboration has helped address shortcomings in research policies within Makerere. Cross-cutting courses open to all Ph.D. students have been planned and executed. Some included Swedish and Ugandan researchers/professors, while in some cases the Ugandan researchers have taken over the courses.

One such course was "Genes and genomes", funded jointly with Karolinska Institutet in Stockholm. Lectures covered topics such as genes of banana, elephants and warthogs as well as genes and genomes of various infectious microbes. Students from Africa, Europe (including Sweden) and Asia attended.

The investment in ICT (Information & Communication Technology) infrastructure and support to the library has made it possible for the University to subscribe to more than 5,000 full-text electronic journals, allowing access to up-to-date literature for students and lecturers alike. This access to electronic journals has been negotiated to allow country-wide access for all researchers in Uganda.

Sida commitment for current agreement period 2002-2004: SEK 96.6 million
Disbursed 2002: SEK 44.6 million

Supported areas: Agriculture (Environment), Health (HIV/AIDS, Malaria, Mental Health, Reproductive Health, Pharmacology), ICT, Technology (Architecture, Energy, Engineering, Environment), Social Sciences (Gender, HIV/AIDS, Political Science, Sociology)

Ugandan Institutions
Makerere University, Kampala

Collaborating Institutions
GU - Gothenburg University, Gothenburg
KI - Karolinska Institutet, Stockholm
KTH - Royal Institute of Technology, Stockholm
Luth - Luleå University, Luleå
SLU - Swedish University of Agricultural Sciences, Uppsala
UU - Uppsala University



At field work. Luis Sawadogo from Burkina Faso received his Ph.D. in sylviculture at the University of Agricultural Sciences in Umeå in northern Sweden. He now works with the Sweden-Burkina Faso development cooperation. This project, which is one of 15 included in the programme, seeks to assess the impact of for example fire, livestock

grazing or tree cutting on the reproduction of the main tree species in the savannah woodland. It also aims to analyse what management regimes are the most suitable for increasing production and securing reproduction of the different species, and to design the best management plans for the different stakeholders of the forest.

Sri Lanka

In 2002 Sri Lanka took significant steps towards achieving peace and reconciliation. This development partly changes the aim and direction of the Swedish support. Sida will now focus also on conflict research projects and assimilation of socially marginalised groups. The role of universities as centres of culture and intellectual exchange of opinions must be strengthened.

Swedish support to Sri Lankan research began in 1976, since when the main contributions have been to natural sciences and technology. Development of social sciences and information technology (ICT) was added under the agreement for 2000-2002.

An ICT project was designed to improve network infrastructure at the universities of Colombo, Ruhuna and Peradeniya, the National Science Foundation, and the NARA research institute. Through Sida support, the University of Peradeniya has been able to install the most modern and largest computer network in the country. Also, computer networking and connectivity to the Internet are to be implemented at the University of Jaffna.

The Sri Lankan environmental research con-

ducted during 2002 showed results that were highly productive, even by international comparison. A few examples are:

- Progress in genetic classification of important crops, and the diseases affecting them, made it possible to develop methods to increase production.
- Biochemical methods to control pests on various crops were elaborated and have helped solve related problems.
- In order to provide better foundation for policies related to coastal management, coral reefs and common reef fish were monitored and analysed in relation to environmental change and fisheries.
- Regional studies analysed agriculture-related policies and innovations to measure their impact on the rural poor.

Sida commitment for current agreement period 2000-2002: SEK 63 million
Disbursed 2002: SEK 20.2 million

Sri Lankan Institutions

NARA - National Aquatic Resources Agency, Colombo
NSF - National Science Foundation, Colombo
UGC - University Grants Commission, Colombo
UoC - University of Colombo, Colombo
UoJ - University of Jaffna, Jaffna
UoK - University of Kelaniya, Kelaniya
UoP - University of Peradeniya, Peradeniya
UoR - University of Ruhuna, Matara
UoSJ - University of Sri Jayawardenepura

Supported areas: Biotechnology (Medicine, Chemistry), Biochemical Pest Control, Electrical Engineering, Marine Biology, Regional Development/Poverty Alleviation, University Staff Development, ICT & Postgraduate Studies in ICT

Collaborating Institutions

CTH - Chalmers University of Technology, Gothenburg
GU - Gothenburg University, Gothenburg
ISP - International Science Programs, Uppsala
KU - Kalmar University, Kalmar
KTH - Royal Institute of Technology, Stockholm
SLU - Swedish University of Agricultural Sciences, Uppsala
SU - Stockholm University, Stockholm
UU - Uppsala University, Uppsala
INASP - The International Network for the Availability of Scientific Publications, London

Vietnam

The Vietnam-Sweden research cooperation programme has to be seen within the context of Vietnam's policies on research and development. The past decade has seen important policy changes. Scientific institutes have received increasing autonomy and engage in more commercial and contract-based relationships.

The Sida-supported research programme has so far been planned in three-year agreement periods between Sida and Vietnam's ministry of science and technology (MOST) in Vietnam. The funds have been used for research collaboration in the health, natural sciences, agricultural/forestry and social science sectors. Support has also been given to infrastructure (laboratories, libraries and information technology).

The agreement from 2000-2002 emphasised research and training components at M.Sc. and Ph.D. levels. Several shorter training courses were conducted at most of the Vietnamese institutions.

Several studies within the health systems research programme have had an impact on policies in

health, primarily regarding the utilisation of health services and in respect of administrative processes involved in managing pharmaceutical supplies.

The study of pharmaceutical supplies was presented in a Ph.D. dissertation during the year. Research on gender and tuberculosis has also affected policy. Knowledge generated through the epidemiological field laboratory (Fila BaVi) has led to new information on the prevalence of disease, health service usage patterns and related issues.

A programme on forest tree improvement was motivated by the alarming decrease in forest coverage. To reach the government's reforestation target of five million hectares of plantations required faster-growing species. Some of the results from the research cooperation were hybrid clones of acacia and eucalyptus, as well as pine species, which grow faster and produce better timber. (Read more on the Green pages).

Sida commitment for current agreement period: 2000-2002: SEK 54.3 million, ICT Support SEK 20 million
Disbursed 2002: SEK 13.5 million

Supported areas: Agriculture, Health, Biotechnology, Oceanography, Social Sciences, Technology and ICT (Information & Communication Technology)

Collaborating Institutions

ISP - International Science Programs, Uppsala
KI - Karolinska Institutet, Stockholm
KTH - Royal Institute of Technology, Stockholm
Skogforsk - The Forestry Research Institute, Uppsala
SLU - Swedish University of Agricultural Sciences, Uppsala
SSE - Stockholm School of Economics, Stockholm
SU - Stockholm University, Stockholm
UmU - Umeå University, Umeå
UU - Uppsala University, Uppsala
CMC - Coastal Management Centre, Manila

Vietnamese Institutions

CLST - Central Library for Science and Technology, Hanoi
CTU - Can Tho University, Can Tho
Hué University, Hué
University of Agriculture and Forestry, Ho Chi Minh
Institute of Material Sciences, Hanoi
Institute of Oceanography, Nha Trang
Institute of Oceanology, Haiphong
MoST - Ministry of Science and Technology, Hanoi
NCSSH - National Centre for Social Sciences and Humanities, Hanoi
NIAH - National Institute for Animal Husbandry, Hanoi
NISTPASS - The National Institute for Science and Technology Policy and Strategy Studies, Hanoi
RCFTI - Research Centre for Forest Tree Improvement, Hanoi
Hanoi Medical School, Hanoi
Agricultural Genetics Institute, Hanoi

Bolivia

Swedish support to strengthen research capacity and research management at Universidad Mayor de San Andrés (UMSA) in La Paz and Universidad Mayor de San Simón (UMSS) in Cochabamba began in September 2000. During 2002, more than 40 academic staff were registered for Ph.D. degree programmes in Swedish and Latin American universities along the lines of the “sandwich model”. The two Sida-supported universities in Bolivia both design research programmes on a thematic basis and relate the problems to their own districts.

Students at UMSA investigate conditions around the Uru-Uru and Poopó lakes on the Andean High Plateau. Here, drought and intensive mining have caused vast damage to the environment. New bacteria from Bolivian saline deserts were discovered and proved to be members of new species. Another strain was found to produce biodegradable plastics.

Their colleagues at UMSS focus on Carrasco National Park, which has several climatic zones and great ecological diversity. The socio-cultural situation is characterised by traditional rural communities with deep roots in the ancient Andean culture, as well as by settler communities of a more recent age.

The research training programme is making

good progress. In 2002, UMSS elaborated its first comprehensive master plan for research management. This provides a framework for UMSS’ scientific policy, including research policies and priority areas and a system for selection, evaluation and follow-up of research projects.

The work is based on internal studies of the current research situation and assessment of research quality at UMSS and is carried out with assistance from external experts. Plans have also been prepared for the modernisation of the UMSS’s research management organisational structure.

At UMSA, a network infrastructure has been planned in collaboration with Lund University to satisfy high requirements of information and communication technology. The network will be installed in 2003 and interconnect all the UMSA faculties, libraries and administrative buildings. Internet access will be available for staff and students.

The first agreement signed between the universities and Sida ended in December 2002 and new agreements for continued cooperation were prepared. At UMSA, a new area within this programme – health research – is now being planned.

Sida commitment for current agreement period 2000-2002: SEK 41 million
Disbursed 2002: SEK 15.8 million

Collaborating Institutions

LU - Lund University, Lund
FLACSO - Latin American Faculty of Social Sciences (network), Peru
UU - Uppsala University, Uppsala

Supported areas: Biotechnology, Chemistry, Food Science, Water Resources Engineering, Regional Planning, Social Economics, History, Anthropology, Archaeology, Linguistics (Aymara)

Bolivian Institutions

CERES - Center of Studies of Economic and Social Reality, Cochabamba
CEBEM - Bolivian Center of Multidisciplinary Studies, La Paz
CERES - Center of Studies of Economic and Social Reality, Cochabamba
UMSA - San Andrés University, La Paz
UMSS - San Simón University, Cochabamba
Vice Ministry for Higher Education, Science and Technology, La Paz

Nicaragua

The main objective of present research support to Nicaragua is to contribute to the modernisation of state higher education institutions. A further aim is to strengthen research and research infrastructure, including training of university lecturers in co-operation with Swedish universities. Research is focused on natural sciences in four thematic areas: health, engineering, natural resources and agriculture. Environmental issues play a central role.

Nicaragua is essentially an agricultural country. Bananas, coffee, sugar cane and cotton are cultivated on large-scale plantations for export. Pesticides are used extensively, causing serious environmental problems with associated health hazards. Research related to pesticides and sustainable agriculture is addressed by all four SAREC-supported universities.

One example of health sector research is the occupational and environmental health programme in which UNAN-León University cooperates with Karolinska Institutet in Stockholm. More than 200,000 deaths due to acute pesticide poisoning occur in the world each year – almost all in countries in the South. It has been established that the causes are not only to be found in poverty, but also in culturally-based relationships to crops, for example.

The group also studies acute poisoning and permanent nerve damage, and examine injuries caused by skin exposure. Jamilet Miranda submitted her doctoral thesis “Neurotoxicity after poisonings with organophosphate pesticides in Nicaragua” at the end of 2002. This work is also linked to a regional network on pesticides. (Read about IRET on the Green pages).

UNAN-Managua runs a multidisciplinary programme whose main objective is to assess the environmental impact of pollutants, including pesticides and heavy metals. The subproject “Evaluation of the environmental impact of pesticides and fertilisers in the groundwater of the León Chinandega plains” shows that excavated wells contain significant levels of pesticides, while drilled wells have low levels.

At UNI, researchers in the chemical engineering programme are trying to produce a biodegradable pesticide from seeds of the Neem tree, and at UNA the overall objective of the research cooperation is sustainable use of natural resources through sustainable agriculture and forestry.

Sida commitment for current agreement period 2001-2003: SEK 70 million
Disbursed 2002: SEK 21.3 million

Nicaraguan Institutions

UNA - National University of Agriculture, Managua
UNAN-León - National Autonomous University of Nicaragua, León
UNAN-Managua - National Autonomous University of Nicaragua, Managua
UNI - National University of Engineering, Managua

Supported areas: Agriculture, Health, Engineering and Environmental Sciences

Collaborating Institutions

HS - Huddinge University Hospital, Huddinge
KI - Karolinska Institutet, Stockholm
KTH - Royal Institute of Technology, Stockholm
LU - Lund University, Lund
SLU - Swedish University of Agricultural Sciences, Uppsala
SMI - Swedish Institute for Infectious Disease Control, Stockholm
UmU - Umeå University, Umeå



Land degradation is a threat to food security in Burkina Faso. To stop the degradation of the farm land, a project aiming at finding the best fodder for cattle is included in the development cooperation with Sweden. Exclosure of livestock is assumed to

improve re-growth by less browsing of woody species. At the same time milk production is hoped to improve through a more efficient use of local feed resources. The cattleman is supervising the fodder experiments.

Other countries

The group of countries with which SAREC cooperates bilaterally changed somewhat during 2002. Research cooperation was for the first time prepared with Rwanda, Laos and Honduras. For political reasons, Sida withdrew from cooperation with Zimbabwe and support for university development in Eritrea was phased out.

In **Rwanda**, preparations concerned cooperation with the National University of Rwanda in Butare and research programmes focusing on the specific situation of this conflict-ridden, landlocked country and the pressure on its environment. The Rwandan government wants to use information and communications technologies (ICT) to find development paths beyond smallholder agriculture. For this reason, ICT is a key aspect of research cooperation, along with research on the environment and conflict resolution.

Laos is a country largely dependent on forestry. The initial idea for research cooperation was to buttress Sida's development cooperation on natural resources and environment. Then the National University of Laos was consolidated, and the prepared cooperation was assigned the wider aim of strengthening the entire university's research capacity.

Shortly after Central America was hit by hurricane Mitch in 1998, Sida recognised that research cooperation with **Honduras** would contribute significantly to natural disaster prevention. However, studies of Honduras' higher education and research system revealed serious weaknesses that could hamper the implementation of research cooperation.

A huge need exists for reform of governance and

management of the system. Preparations include a number of consultancies on how to prepare for such reforms. The Honduran government is supportive of reform and so are groups within the university. However, strong resistance among some teachers and students to relinquishing autonomy makes the preparation process difficult.

Thematic Research

In an increasingly globalised world it is often not possible to separate local from global problems. All result from a complex system of causes and all need to be looked upon with respect to a global dimension.

Climate change-induced environmental changes are an example of such global problems. They are to a large extent influenced by external factors beyond the control of individual countries.

Trade patterns, armed conflicts and social upheavals are other examples. Since the problems are not constrained by national borders, regional cooperation is often crucial for solving them.

Sida supports thematic research addressing issues of key concern to meet the challenge of poverty alleviation. In 2002, support was directed to some 30 international organisations and 35 networks and groups acting as nodes for regional collaboration.

The support aims to facilitate cooperation between scientists and organisations in various regions (such as southern Africa, Central America etc), thereby contributing as well to strengthening of research capacity in collaborating institutions. Efforts are concentrated to solve common themat-

tic research problems in health, social science, natural resources and environment, natural sciences and technology.

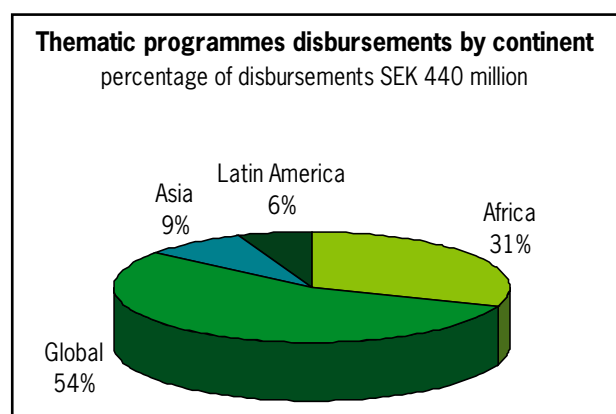
Programmes related to HIV/AIDS and malaria are examples of research that addresses problems of wide dimensions in developing countries. Conflict research, biotechnology and agricultural research, as well as policy studies related to energy and the use of genetically modified organisms, are other high-priority areas.

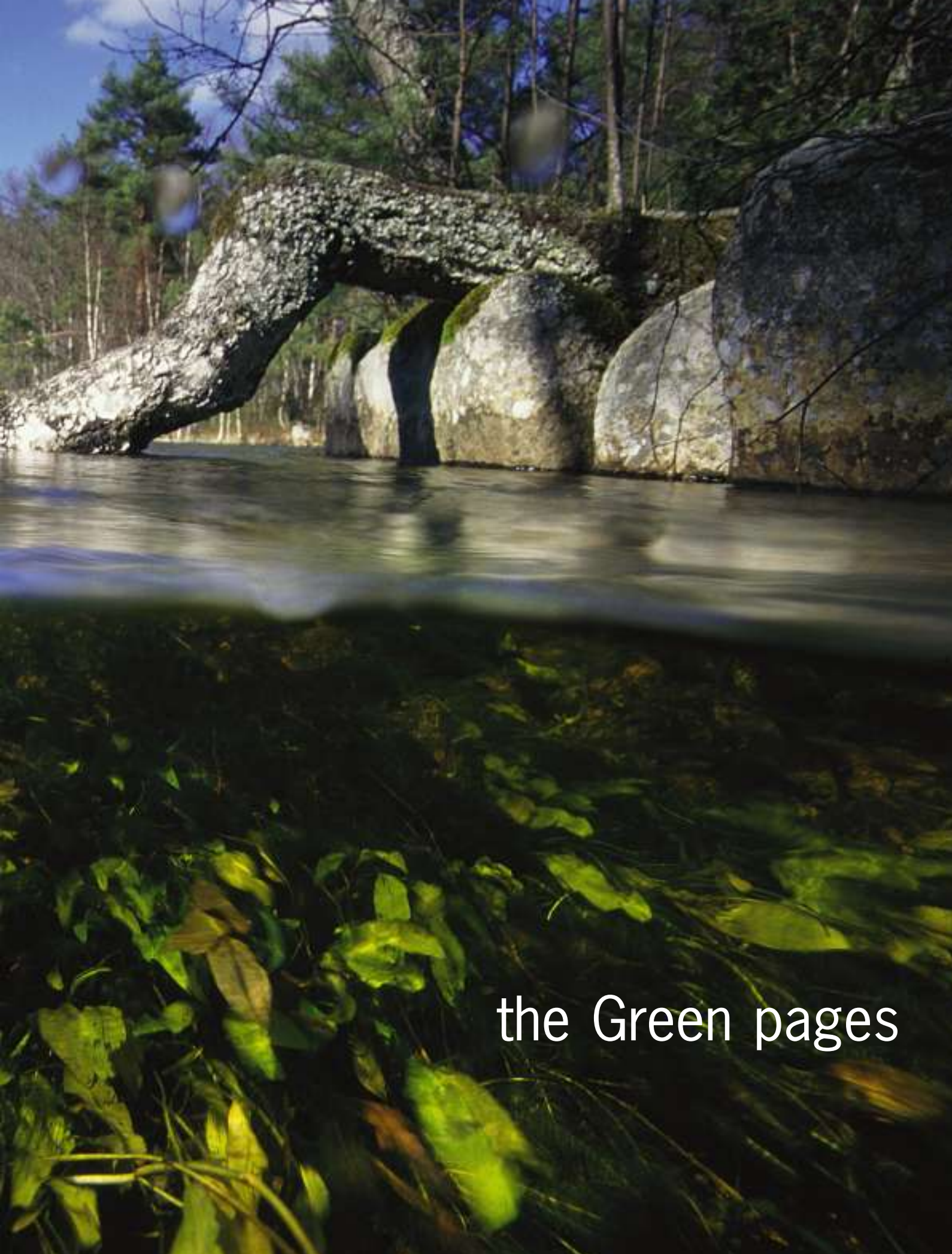
The constantly growing awareness of environmental changes has been met by support for environmental research. Environmental issues span a wide field, including climate change, energy, transportation, use of land and water, terrestrial and marine biodiversity, and others. Social factors linked to environmental change include poverty, population growth and urbanisation. Poverty also contributes to environmental degradation and is a common denominator among the issues to be tackled.

Sida accords high priority to environmental issues and allocates support to a wide range of international and regional programmes. In the case of all projects that receive funding, environmental effects have to be considered and plans produced showing how these effects are to be tackled. Capacity building is also a prerequisite for sustainable development.

Sida's support has led to a number of solutions to environmental problems, such as systems to reduce energy consumption and greenhouse gas emissions, new species to improve reforestation, bio-safety manual for regulations, waste systems for livestock farms, reduced use of pesticides in agriculture, etc. (see the Green pages).

Swedish scientists also conduct environmental research in developing countries through financing from the Sida Development Research Council. (See page 42).





the Green pages

Contaminated water causes disease and infant deaths?

Bangladesh Close to 30 million people in Bangladesh drink arsenic-contaminated water every day. As a result they contract serious diseases such as cancer, diabetes and respiratory illnesses. The arsenic is also suspected of causing miscarriages, foetal deformities and higher infant mortality rates. In 2002, Sida expanded its collaboration with the Centre for Health and Population Research (ICDDR,B) in Dhaka. Sida provides funding for the centre's research into the effects of arsenic intake on reproduction and into ways of reducing its deleterious effect on health.

ICDDR,B is optimistic of success in these projects since conditions for researching the effects of arsenic are notably good. For example, the centre will be able to draw on a joint study by the Swedish embassy in Dhaka and the WHO that looked at the same subject in the same area – Matlab outside Dhaka. The study examined arsenic levels in 15,000 wells, considered the impact of long-term arsenic exposure on health and also identified alternative sources of drinking water.

SAREC has provided funding to ICDDR,B since 1981 through a basic support programme and also via a project involving three institutions at the Gothenburg University and Karolinska Institutet in Stockholm. This funding is ongoing and is aimed at developing medicines and vaccines for diarrhoea-related diseases.

Further information available at www.icddr.org.

Fast-growing Acacia gives timber and higher incomes

Vietnam Hybrid clones of acacia, eucalyptus and certain pine species are helping Vietnam slow an alarming decrease in its forest cover. The Vietnamese government's reforestation programme has established a target of 5 million hectares for forest plantation on land adversely affected by the war with the USA and by uncontrolled exploitation and erosion. SAREC has supported this programme since 1987.

Acacia and eucalyptus were chosen because they are fast-growing and considered to yield superior timber. The pilot plantations have proven highly productive and the new species possess good potential for planting on the plains and low hill areas of central Vietnam.

The improved planting materials have also increased the general income level of farm families in the area.

Developing biotechnology to safeguard the environment

East Africa Benefits and development – or risks and unexpected effects?

Questions concerning genetically modified crops are constantly voiced. The East African Regional Programme and Research Network for Biotechnology, Biosafety and Biotechnology Policy Development (BIO-EARN) builds national capacity in biotechnology.

The current phase involves 16 institutions in Kenya, Ethiopia, Tanzania and Uganda and 11 in Europe (of which eight are in Sweden). The programme aims to use biotechnology in a sustainable manner to help improve liveli-

hoods, ensure food security and safeguard the environment.

The programme has built a significant research capacity in biotechnology and biosafety and is now working on implementing it. Twenty Ph.D. students divide their time between East African and Swedish institutions. Substantial procurement of research equipment has also taken place.

More than 120 regulatory scientists and policy-makers from the region have been trained in biosafety risk assessment/management workshops. Biological background information supporting local biosafety assessment has been compiled, as has a first draft of a biosafety manual for regulatory authorities in Eastern Africa.

Overall coordination is carried out by the Biotechnology Advisory Centre of the Stockholm Environment Institute (SEI) in Sweden, while the Uganda National Council for Science and Technology in Kampala acts as regional coordinator.

More information about the programme can be found at www.bio-earn.org.

Clean and efficient combined Urban transports improving

Asia Will it be possible to meet future demands for urban transport services in developing countries with energy-efficient and clean solutions?

The transport sector project of the Asian Regional Research Programme in Energy, Environment and Climate (ARRPEEC) is trying to answer the question by examining eight Asian cities – Beijing and Hangzhou in China, Bandung and Jakarta in Indonesia, Delhi

and Mumbai in India, Manila in the Philippines and Ho Chi Minh City in Vietnam.

The project focuses on assessing the cost-effectiveness and environmental and greenhouse gas implications of energy-efficient and clean transport technology options in the eight cities. It also aims to identify key barriers to the adoption of promising transport technology options in the cities.

The project's findings clearly demonstrate that besides climate-related benefits, significant gains will accrue in the form of reduced emissions of local pollutants.

Work is ongoing and is designed to assist in formulating practical policies for the development of cleaner and more climate-friendly urban transport systems in the eight cities.

ARRPEEC focuses on policy-oriented research aimed at mitigating greenhouse gas emissions from the use of fossil fuels, and at substituting fossil fuels with biomass energy.

Information about the programme can be found at www.arrpeec.ait.ac.th.

Too much pig waste caused a change of local legislation

The Philippines A farmer-centred approach to cleaning up pig waste has resulted in cleaner rivers and healthier inhabitants in the Philippine province of Laguna. The level of awareness of livestock raisers, as well as of local politicians and government officials, has been considerably heightened.

The research was conducted by a team from the University of the Philippines with support from the Economy and Environment Pro-

gramme for Southeast Asia (EEPSEA). A substantial share of EEPSEA's budget comes from Sida. EEPSEA's goal is to strengthen local capacity for the economic analysis of environmental problems so researchers can provide sound advice to policy-makers.

The research team encountered a host of environmental problems in Laguna, where pig and poultry production was increasing. Rivers and creeks were polluted, and a lack of waste treatment facilities was causing severe diseases. Inhabitants suffered from asthma, bronchitis, pneumonia, diarrhoea and skin allergies.

The team suggested a number of waste control options, including reduction at source, construction of lagoons, installation of biogas digesters and construction of an organic fertiliser/pelleting plant. Laguna's local government in 2002 passed legislation based on the research team's recommendations.

This, combined with a campaign to raise awareness, has helped curb the pollution rate substantially.

More information available at www.eepsea.org.

Greenhouse gases – go! Asia

- A tea factory in India has reduced its carbon dioxide emissions by 120 tonnes a year by improving energy efficiency in an air heater cum drier.
- A dome-type brick kiln introduced in Sri Lanka for coconut shell carbonization has reduced the environmental impact of conventional open pit burning.

- Natural withering using solar energy in Vietnam's tea processing sector has reduced energy consumption by about 10 per cent.
- Soft flow dyeing in the textile sector in India saved 43,650 kWh of electrical energy and 9,845 m³ of water per year.

These are just some of the impacts of the Small and Medium Scale Industries in Asia project in 2002. SMI in Asia is run by the regional network ARRPEEC (Asian Regional Research Programme in Energy, Environment and Climate). ARRPEEC involves 18 research institutes in eight Asian countries. It is funded by Sida and coordinated by the Asian Institute of Technology in Bangkok (AIT).

ARRPEEC aims at mitigating greenhouse gas emissions from the use of fossil fuels in urban transport and the power and industrial sectors. It strives to play a leading role in substituting fossil fuels with biomass energy and to mobilise and enhance research capacity, as well as provide input to national policy processes.

Information about the programme can be found at www.arrpeec.ait.ac.th.

Banana peel – not just packaging any longer

Uganda Banana peel, banana stems and corn waste: these food waste products have become a major problem in Uganda's capital, Kampala. With Sida support, the University of Makerere has launched a research project that aims to reduce the waste mountain by treating the food residues as a resource.

First results from the project, entitled Utilisation of urban market

crop waste on crop/livestock production systems, will be available after one year. The study encompasses four sub-projects, one of which is a study of the suitability of banana skins as cattle fodder. Cows on 16 farms are fed varying quantities of banana skins and have their milk volume and quality measured. On some farms, milk quality has improved by up to 10 per cent.

The project, being conducted in collaboration with the Swedish University of Agricultural Sciences, involves four Ph.D. students at the University of Makerere (three of them female and one male), each with responsibility for a specific sub-project.

The second sub-project focuses on how soil fertility can be improved through use of composted banana and corn residues. The aim is to find the optimum time during the growing season in which to add compost.

The third sub-project is based on the hypothesis that compost use improves pest-resistance in crops and increases the presence of natural pests, while the fourth examines the socioeconomic potential of plant waste use.

Networking in Asia gives sustainability a chance

Asia To achieve a sustainable environment in Asia, networking is essential. ARRPET, the Asian Regional Research Programme on Environmental Technology, is dedicatedly undertaking research on environmental issues relevant to Asia. The goal is sustainable development in the whole region.

The issues addressed under ARRPET include wastewater treat-

ment and management, sustainable landfill management, improving air quality in developing Asian countries, and the treatment and management of industrial and hazardous waste.

ARRPET is funded by Sida and coordinated by the Asian Institute of Technology (AIT) in Bangkok. Twenty national research institutions from eight Asian countries are involved.

During 2002, ARRPET held workshops in the eight Asian countries participating in the network. The view was to provide a common platform for researchers, industry representatives and government policy experts.

Information about ARRPET can be found at www.arpet.ait.ac.th.

Shrimp, seagrass, swamps – marine research held high

Mozambique At the Faculty of Biology at Eduardo Mondlane University in Maputo, Mozambique, priority is given to the basic marine sciences in order to increase the academic qualifications of the teaching staff.

The support has contributed to improving research capability in marine sciences and will probably play an important role for coastal management in Mozambique in the future. The scale of effort in coastal management is rapidly increasing in Mozambique, as is the parallel need for scientific input.

Research areas include ecology of marine species such as marine shrimp, intertidal crabs and dolphins, and studies of marine ecosystems such as mangrove forests,

swamps and seagrass-beds.

Most of the research is conducted at the Inhaca Marine Research Station. The station was refurbished and reactivated during the first marine programme, in the beginning of the 1990's. It is still an important component in Sida's support to marine research in Mozambique.

Toxic or non-toxic farming – is that the only question?

Central America Almost every farmer in Costa Rica uses pesticides. These may prevent damage by insects but they also harm sensitive ecosystems and poison farm workers. SAREC supports educational programmes for researchers in Costa Rica in order to study the problems and find solutions.

These efforts began in 1990 when students from Central America who had trained in Sweden went back home and started a programme. Cooperation is ongoing with the Central American Institute for Studies on Toxic Substances (IRET) at the Universidad Nacional in Costa Rica. IRET studies problems related to pesticides and other toxic substances in Central America, searches for solutions and supports proactive policymaking.

The programme has enabled researchers in Central America to learn more about the acute and long-term effects of pesticides. A doctoral programme and master of sciences programme have been developed in a three-way collaboration between the region, the Swedish Karolinska Institutet in Stockholm and Stockholm University.

More information on IRET can be found at www.una.ac.cr.

Dry climate tough to thrive in Impact of wind is examined

Burkina Faso The sun and the wind, termites and parasites – all imply threats to the extremely important shea-nut tree in Burkina Faso. With support from Sida, the country is now finding out how the tree is affected by its environment.

The shea-nut tree is grown for its oil rich fruits. The oil is used for cooking, and also to make soap, etc. However, the significant fluctuation in fruit production due to the dry climate, soil fertility and biological factors like pollination by insects and tree parasites constitutes a problem.

The project is one of 15 supported by Sida since 2001, when the cooperation programme between Burkina Faso and Sweden was signed. All projects focus on the environmental problems of dry areas and address the continuous degradation of the Sahelian ecosystems. In Burkina Faso, successive droughts and human pressure threaten food security and also cause migratory movements.

The shea-nut tree project seeks to answer questions about the impact of wind force on fruit production, the survival rate of transplanted seedlings and the extent to which light and nutrient deficiency affect seed regeneration.

Equity improves fishing

Kaohsiung, Taiwan Scientists are finding that improving women's involvement in the fishing industry also is key to improving the health of the world's fisheries. The first

ever Global Symposium on Women in Fisheries was held in Kaohsiung in Taiwan in the end of November, 2001.

The symposium was organised by the World Fish Center, ICLARM, and supported by Sida. ICLARM is based in Malaysia and one of 16 Future Harvest centers funded by the Consultative Group on International Agricultural Research, CGIAR. Sweden became a member of the CGIAR in 1971, and was one of the group's original investors.

The researchers at the Kaohsiung symposium indicated that it is essential to address gender issues in fishing. Setting a focus on these problems will improve the impoverished livelihoods of most women fishers, as well as ensure the survival and well-being of the fishing industry – a critical element in the world's food supply chain.

Further information available at www.worldfishcenter.org.

Wellbeing of poor while sustaining biodiversity

East Africa Coastal and marine resources can increase food production, alleviate poverty and help bring about a sustainable environment. That is the conviction of Marine Science for Management (MASMA), a new East African programme supported by Sida. Research performed through MASMA aims to enhance the wellbeing of poor people in the coastal region and sustain the environment and its biodiversity.

MASMA is coordinated by the Western Indian Ocean Marine Science Association (WIOMSA) and the Coastal Management Re-

search Centre (COMREC) of the University College of South Stockholm. It encompasses subjects such as the value of mangroves and sea-grass ecosystems, incentives for sustainable use of coral reefs and the culture of fish and seaweeds.

MASMA has set up research funds to allow already established researchers to conduct independent research in collaboration with colleagues from neighbouring countries in the western Indian Ocean and Sweden. The MASMA programme complements bilateral support to marine scientists in Tanzania, Mozambique and Sri Lanka by providing opportunities for scientists to remain at their universities and to continue conducting relevant research.

For more information, see www.wiomsa.org.

Research network saves threatened coral reefs?

The Indian Ocean Can alternative livelihoods be found for peoples dependent on coral reefs? Is it possible to restore and rehabilitate reefs to accelerate their ecological and economic recovery?

These are examples of problems studied by the research network CORDIO, or Coral Reef Degradation in the Indian Ocean. CORDIO brings together coral reef experts from 11 countries around the Indian Ocean and was founded in 1999 in response to the exceptionally severe effect of El Niño – the warm ocean current – on the world's reefs. Sida has supported CORDIO since its inception.

The Indian Ocean was particularly badly affected by El Niño,

which caused most of the coral in East Africa and the northern Indian Ocean to bleach and die.

CORDIO investigates the bio-physical and socio-economic impacts of coral bleaching and studies prospects for restoration and rehabilitation.

For more information, see www.cordio.org.

Environmental linkages about to be revealed?

Mozambique Sida's support to research capacity-building in Mozambique has made it possible for Eduardo Mondlane University in Maputo to participate in the international regional scientific programme SAFARI 2000. Support has consisted of the establishment of a research team, a well-equipped laboratory and an atmospheric aerosol sampling station.

Due to large-scale social, economic and political changes in southern Africa the region's atmosphere is also experiencing significant change. The burning of fossil fuels in mining, industrial and domestic activities is partly responsible for rising levels of atmospheric aerosols and trace gases.

SAFARI 2000 aims at developing a better understanding of the southern African earth-atmosphere-human system. The goal is to identify and understand the relationships between the physical, chemical, biological and anthropogenic processes that underlie bio-geophysical and bio-geochemical systems in the region. Researchers from ten universities in southern Africa, Europe and the US are involved in SAFARI

2000. The programme is supported by NASA, among others.

Mozambique's contribution to the SAFARI programme is the sampling and analysis of aerosols and is carried out at the sampling station on Inhaca island. Mozambican researchers, M.Sc. graduates and Ph.D. students are currently working on data validation and modelling of regional and global environmental change in southern Africa.

High water is examined

Bolivia After many years of mining, most water in lakes and rivers of the Andean Altiplano is highly contaminated. Two new research projects supported by SAREC and carried out by the local university could benefit the whole region.

The projects both deal with the watershed of the Bolivian lakes Uru-Uru and Poopó – one with hydraulics and hydrology, the other with hydrochemistry of water and sediments of the river basin. The project's main purpose is to strengthen the research capacity in hydrochemistry and hydrology at Universidad Mayor de San Andrés, UMSA, in La Paz.

During recent years many mines have shut, but high contamination of water and sediments in the lakes persists. The hydrochemistry project determines the heavy metal pollution, while the hydraulic and hydrology project instead focuses on the lakes' water and material balances. Their dependence on climate and on the regulation of Lake Titicaca is also studied, as well as pollution in inflowing water.

The projects are scientifically

supervised by the University of Lund, Sweden, and a total of three qualified Ph.D. researchers who are undergoing training at the university.

Livestock – or no livestock?

Burkina Faso What if you let livestock in? Or fire? What if you exclude both? In Burkina Faso, a forest production project supported by Sida aims to determine plant and soil response to different livestock intensities and human activities. The initiative was launched in 2001 and the first results are expected two years from now.

The project is one of 15 in Burkina Faso that Sida supports. All address the continuous degradation of the Sahelian ecosystems. The forest production project seeks to assess the impact of, for example, fire, livestock grazing or tree cutting on the reproduction of the main tree species in the savannah woodland.

Another goal is to analyse the most suitable silvicultural methods for increasing production and securing reproduction of the different forests. The project also aims to design forest management plans that have optimal benefits for all forest stakeholders.

A further expected outcome is a better utilization of rangeland.

Different types better for the environment

Yunnan, China Four to six rows of high-yielding hybrid rice, one row of traditional rice, four to six rows of high-yielding hybrid rice, one row of traditional rice ...

In the southwestern Chinese

province of Yunnan thousands of farmers have embraced crop diversity to improve their livelihoods while protecting the environment and their health. The latest research shows that by planting different types of rice alongside each other, the fungal disease "rice blast" can almost completely be controlled.

Most farmers plant the common rice varieties because these are high-yielding and resistant to rice blast. But the traditional rice types are more popular with the consumers but difficult to grow and therefore more profitable. This way, yields and incomes are improved and the farmers' reliance on chemicals reduced.

The agricultural experiment is led by scientists from the International Rice Research Institute, IRRI. The institute is based in Manila in the Philippines, and is the world's leading international rice research and training center. IRRI is one of 16 Future Harvest centers funded by the Consultative Group on International Agricultural Research, CGIAR. Sweden became a member of the CGIAR in 1971, and was one of the group's original investors.

The research team plans to extend the approach to more provinces in China and to other rice-producing countries, including the Philippines, Indonesia, Laos and Vietnam.

For more information and publications, see www.irri.org or www.cgiar.org.

Grassroots benefit from marine research

Tanzania In Kinondoni, close to Dar es Salaam in Tanzania, a new

programme is attempting to tie research to municipal planning of water and land, and to political life and grassroots projects for local people. The Kinondoni Integrated Coastal Area Management Programme (KICAMP) has been receiving Sida support since 2000.

Sida's Regional Marine Science Programme in East Africa has amassed substantial knowledge of marine biology and marine coastal zones since its inception in 1989. Experience from the region makes clear that institutions and activities that put the development of local communities first will achieve the greatest improvements in integrated coastal zone management (ICZM) projects. However, scientific research results seldom feed directly into these projects.

KICAMP is implemented in close collaboration with the inhabitants of Kinondoni municipal commission. Scientists from the University of Dar es Salaam are involved to ensure that management decisions and land-use plans are based on a scientific understanding of natural and human resources.

KICAMP informs local people about the connection between environment, poverty and development. It raises their awareness about the sensitive environment in their midst, helping them to see its possibilities and its vulnerability. Mangrove trees are being replanted, while fishing with dynamite and the destruction of coral reefs has decreased.

Three departments at Sida support KICAMP:

- SAREC – Research Cooperation

- NATUR – Natural Resources and the Environment
- INEC – Infrastructure and Economic Development.

Renewable technology helps Asian smallholders

Asia The sun has proven to be of good help in protecting the environment and promoting sustainability. Through assistance from Renewable Energy Resources (RETs) in Asia, farmers in Nepal have been able to use solar dryers in the traditional ginger drying process. The dryers save considerable quantities of fuel wood, and thus arrest deforestation.

RETs in Asia is funded by Sida and coordinated by the Asian Institute of Technology in Bangkok, Thailand. It is a regional programme aimed at decreasing energy-poor countries' dependency on fossil fuels. The research network involves 13 national research institutions in six countries – Bangladesh, Cambodia, Laos, Nepal, the Philippines and Vietnam.

Sida's funding for research on renewable energy has a clear focus on poverty alleviation. Smallholders have to optimise their limited resources so that these are not exhausted. Replacement of fossil fuel lamps by solar home systems and battery charging stations has already contributed significantly to protecting the environment of the six countries. An important part of RETs in Asia's research is also to establish efficient channels for spreading and implementing the results.

Information about RETs in Asia can be found at www.retsasia.ait.ac.th.



Natural Resources & Environmental Sciences

The reduction and ultimate eradication of global poverty is linked inextricably to sustainable systems for agriculture and natural resource use. Of the estimated 1.2 billion people who subsist on less than US\$ 1 per day, nearly three-quarters live in rural areas and support themselves mainly through use of natural resources including agriculture.

Sida supports research in natural resources and environmental sciences to generate new knowledge and build capacity about sustainable agricultural production systems and natural resources.

International research centres, regional research organisations and university departments in developing countries receive support from Sida for this research. Areas include agriculture, forestry, animal husbandry, production systems in semi-arid areas and coastal ecosystem management. Policy research related to the international debate on biodiversity and use and ownership of plant genetic resources are also covered.

International agricultural research

Sida's largest research allocation is to 16 autonomous international research institutes under the aegis of the global Consultative Group for International Agricultural Research (CGIAR) network. CGIAR's 62 members, which include developing and industrialised countries, foundations, and organisations, provide financing, technical support and strategic direction. Sweden is one of the original investors. Co-sponsors are the Food and Agriculture Organisation of the United Nations, the International Fund for Agricultural Development (IFAD), the United Nations Development Programme (UNDP), and the World Bank.

The 16 institutes have individual mandates for a specific crop, agro-ecological zone or production system. In 2002 Sida provided core support to all the institutes and also participated in the CGIAR reform process. Inside and outside the network, Sida has supported genetic resources policy work, such as membership of the Crucible Group which

develops policy options for the management of genetic resources and intellectual property rights.

CGIAR institutes employ 8,500 scientists and staff in more than 100 countries. Since it was founded in 1971, it has provided educational opportunities to around 85,000 scientists from developing countries, thereby contributing to strengthening national scientific capacity.

The research addresses virtually every component of the agricultural sector – agro-forestry, aquaculture, biodiversity, biotechnology, crops, agricultural extension services, farming techniques, forestry, livestock, natural resources, food policies and enhancement of national agricultural research systems capacity. The advances made through the research are freely available internationally.

Some CGIAR achievements are:

- Production of improved varieties of agricultural products.
- Collection of more than 600,000 germplasm accessions of more than 3,000 species which are held in CGIAR gene banks.
- Contribution to increasing productivity and halting land degradation through research on resource-efficient technologies.
- Has helped to reduce pesticide use in developing countries by introducing biological control and developing disease-resistant plant varieties.
- Has helped communities conserve and protect marine resources by introducing locally-based conservation practices for e.g. protecting mangrove forests or preventing destructive fishing practices.

The achievements have benefited the poor and at the same time ensured sustainable use of land and other natural resources. The land saved from cultivation is some 300 million hectares – equivalent to all arable land in the US, Canada and Brazil. The biodiversity of the “saved” lands, an invaluable part of human heritage, has also been conserved.

Marine and coastal research

Sida has been engaged in the development of marine science in the western Indian Ocean since 1989. The region is renowned for the attractiveness of its coastal zones, its high marine biodiversity and rich resources. Mangrove forests, sea-grass beds and coral reefs are essential for the development and even survival of the coastal communities. Effective management is a prerequisite for long-term production of goods and services from these ecosystems.

Development cooperation aims at strengthening the research capacity on sustainable use and management of coastal and marine resources. Sida is one of the main founders of Coral Degradation in the Indian Ocean (CORDIO), which was set up after the catastrophic mass bleaching and death of corals in 1998. (See the Green pages).

CORDIO focuses on the biophysical and socio-economic impacts of coral degradation and on prospects for rehabilitating the stricken reefs. It is linked to the International Coral Reef Initiative (ICRI), whose coordination and planning committee secretariat was co-chaired by Sweden and the Philippines in 2001 and 2002. Focus was put on capacity-building, research and monitoring and the sustainable use of coastal ecosystems. Support to ICRI has now ended.

On the regional level Sida provides support to the Marine Science for Management (MASMA) programme. During its first three years, 2001-2003, MASMA has the following goals:

- To contribute to the knowledge base on coastal and marine environments of the western Indian Ocean region.
- To raise awareness on important issues.
- To conduct and coordinate research activities of national and regional importance.
- To disseminate information and data for the sustainable use of coastal and marine resources.

The Western Indian Ocean Marine Science Association (WIOMSA) and the Coastal Management Research Centre (COMREC) of the University College

of South Stockholm collaborate within this programme. MASMA was inaugurated in January 2001 and has approved six research proposals for funding. Among these are the ecological economics of mangrove-associated fisheries, evaluation of sea-grass ecosystems, incentives for sustainable use of coral reefs, and integrated pond culture of finfish, shellfish and seaweed.

In 2002 WIOMSA founded the Western Indian Ocean Journal of Marine Science, which provides a medium for the publication, dissemination and sharing of high-quality research generated in the western Indian Ocean region.

Regional research on East African drylands

Sida's support to three regional programmes – the Pastoral Information Network Programme (PINEP), Dryland Husbandry Programme (DHP) and Research Programme on Sustainable Use of Dryland Biodiversity (RPSUD) – represents a joint effort to strengthen research and capacity development in livelihood systems in Africa's dryland areas. The overall objective of the programmes is an interdisciplinary, problem-oriented focus on the effects of people on the environment and vice versa.

RPSUD is a consortium of university institutions from Kenya, Tanzania and Ethiopia coordinated by the national museums of Kenya. PINEP is located at the department for range management at the University of Nairobi. DHP focuses on locally-based field trials and extension methodology in pastoral systems.

Regional forestry research in Africa

Forestry scientists have formed a pan-African network, the African Forestry Research Network (AFORNET), which encourages collaboration between countries and across disciplines. It is essentially a funding mechanism for grants for collaborative research in forestry. The proposal themes cover research into insect-pest problems related to mahogany, the edible mushrooms of miombo woodlands, biomass production on acid soils and the African breadfruit (*Treculia africana*).

Collaborating Institutions

Regional marine research programmes:

Western Indian Ocean Marine Science Association, WIOMSA, Zanzibar, Tanzania
 Coastal Management Research Centre, COMREC, Södertörn's University College, Stockholm, Sweden
 Coral Reef Degradation in the Indian Ocean, CORDIO, Kalmar University, Kalmar, Sweden
 University of Dar es Salaam, Institute of Marine Science, Zanzibar, Tanzania
 National Aquatic Resources Agency, NARA, Colombo, Sri Lanka
 Gothenburg University, Gothenburg, Sweden
 Stockholm University, Stockholm, Sweden
 University of Ruhuna, Matura, Sri Lanka

Dryland projects:

African Research Programme on Sustainable Use of Dryland Biodiversity, RPSUD, Nairobi, Kenya
 Regional Dryland Programme in Eastern Africa: training and research for sustainable livelihoods (REDPA),
 Dryland Husbandry Programme, DHP/Pastoral Information Network Project, PINEP, Nairobi, Kenya
 Organisation for Social Science Research in Eastern and Southern Africa, OSSREA, Addis Ababa, Ethiopia
 Research Programme for Environmental Policy and Society, EPOS, Linköping University, Linköping, Sweden

Regional forestry research:

African Academy of Science, AAS, Nairobi, Kenya

International agricultural research, food security and genetic resources:

Consultative Group for International Agricultural Research, CGIAR:

- International Potato Center, CIP, Lima, Peru
- International Centre of Insect Physiology and Ecology, ICIPE, Nairobi, Kenya
- International Food Policy Research Institute, IFPRI, Washington, USA
- International Rice Research Institute, IRRI, Manila Philippines
- International Maize and Wheat Improvement Center, CIMMYT, Mexico City, Mexico
- International Institute of Tropical Agriculture, IITA, Ibadan, Nigeria
- International Center for Tropical Agriculture, CIAT, Cali, Colombia
- International Crops Research Institute for the Semi-Arid Tropics, ICRISAT, Andhra Pradesh, India
- International Center for Agricultural Research in the Dry Areas, ICARDA, Aleppo, Syria
- International Livestock Research Institute, ILRI, Nairobi, Kenya
- International Plant Genetic Resources Institute, IPGRI, Rome, Italy
- International Service for National Agricultural Research, ISNAR, the Hague, the Netherlands
- West Africa Rice Development Association, WARDA, Bouak, Ivory Coast
- International Centre for Research in Agroforestry, ICRAF, Nairobi, Kenya
- Center for International Forestry Research, CIFOR, Jakarta, Indonesia
- International Center for Living Aquatic Resources Management, Inc., ICLARM, Makati City, the Philippines
- International Irrigation Management Institute, IMWI, Colombo, Sri Lanka

ACTS - African Centre for Technology Studies, Nairobi, Kenya

International Foundation for Science, IFS, Stockholm, Sweden

World Bank/ESDAR - Environment Sustainable Development and Agricultural Research, Washington, USA

National Biodiversity Institute of Costa Rica, INBio, Costa Rica

National Botanical Institute of South Africa, Cape Town, South Africa

National Herbarium and Botanic Gardens of Malawi, Malawi

Regional Farming Systems in Asia, Ho Chi Minh, Vietnam

Natural Sciences & Technology

Sida stresses the importance of strengthening knowledge in engineering and environmental sciences in developing countries and has decided to strongly increase support to engineering faculties.

Already, the strengthening of research capacity makes up a major part of Sida's support within the natural sciences and technology sector. Another important part is directed towards solving different types of technical environmental problems through applied research.

When it comes to producing scientific results, Sida supports regional networks involving both scientifically strong and less experienced institutes.

Participation in these networks provides the participating countries with competences through South-South collaboration and adds to the pool of academic expertise.

Extended support for engineering faculties

In 2002 Sida prepared an extension of its current support to the faculties of technology at three African universities – Eduardo Mondlane University in Mozambique, University of Dar es Salaam in Tanzania and Makerere University in Uganda. At workshops with representatives of universities, ministries and the productive sector, the most important technological growth areas in each country were identified.

Among five identified priority areas for research, water resources engineering and renewable energy focus on the use of environment-friendly technologies and technologies that can mitigate pollution problems.

Environmental considerations are also stressed in construction technology, which focuses on domestic building materials and quality requirements. The other identified priority areas are food technology and information and communication technology.

These programmes primarily focus on training of faculty staff members to Ph.D. level but also provide possibilities to produce results for use by local industry or other stakeholders. The majority

of the research projects will be conducted with direct participation by industry, making it likely that the skills acquired and the results produced will contribute to the development of small and medium-sized enterprises.

Considering the very high running costs of modern engineering education and research, the three universities have engaged in a regional collaboration project that has considerable development potential. In the long term this might result in a division of labour whereby faculties specialise in different scientific topics.

Energy, environment and climate

The threat of climate changes is one of the most difficult problems faced by man. All countries are affected and all contribute to creating the problem.

A strong link exists between environment, energy and climate changes. So far, emissions of greenhouse gases calculated per capita in developing countries are only a fraction of those in industrial countries. However, economic growth and population growth, together with industrialisation and urbanisation, lead to increased energy consumption.

The importance of internationally-based climate protection and emission restrictions require broad research contributions at global and national level. Therefore it is necessary also for developing countries to have sufficient knowledge and access to climate policy expertise. That enables them to participate on equal terms in global climate research and in the development of necessary protective measures.

Involvement of developing countries in regional research initiatives generates better understanding of climate variability and its prediction. Mitigation of climate change and adaptation to its adverse effects on human and natural systems requires knowledge and ability for analytical interpretation of the different climate change scenarios.

The Asian Regional Research Programme in Energy, Environment and Climate (ARRPEEC)

focuses on policy-oriented research aimed at mitigating emissions of greenhouse gases from the use of fossil fuels in urban transport, power and industry sectors, as well as on substituting fossil fuels with biomass energy. In 2002, preparations began for developing extended support to this vitally important area.

The ARRPEEC network and the Asian Regional Research Programme on Environmental Technology (ARRPET) are coordinated by the Asian Institute of Technology (AIT) in Bangkok. ARRPET conducts research into technological solutions for various environmental problems, such as solving energy problems in rural households and developing solar dryers for drying agricultural products.

Biotechnology and biosafety

The East African Regional Programme and Research Network for Biotechnology, Biosafety and Biotechnology Policy Development (BIOEARN) is strengthening research capacity in several fields related to biotechnology and in issues related to biopoly and biosafety. The participating countries share a similar biodiversity and all have to assess questions related to trade agreements, ownership of plant material, environment, etc.

The build-up of regional research capacity and joint policy discussions related to biotechnology are of crucial importance when decision-makers and civil society are confronted with the growing importance of biological resource management.

Capacity building in a “sandwich” model is a joint effort between Swedish universities and their African counterparts. It means that Ph.D. students from Africa study their own countries’ problems but divide their time between their home university and a Swedish institution.

The Natural Science Council of Uganda and the Stockholm Environment Institute (SEI) coordinate the programme. (For examples of results from research on energy, environment and biotechnology, see the Green pages).

African Energy Policy Research Network (AFREPREN)

AFREPREN is Africa’s only network dealing with studies of energy and energy-policy related issues. Eleven eastern and southern African countries are members of this network, led by a steering committee in Nairobi, Kenya. Central to AFREPREN’s approach is the bringing together of energy policy researchers and energy policy-makers in the region. That way they can jointly identify problems as being important and work on them together.

External experts in 2002 evaluated the activities of AFREPREN, the policy impact of its studies, and capacity strengthening in the region (period 1999-2002). The results of the evaluation were predominantly positive and the evaluators recommended continued financial support to the network.

AFREPREN is now an established African institution. It is recognised, inside and outside the region, as having made an important contribution to the empowerment and mobilisation of African researchers and as having lent a much-needed African voice to international debates. The AFREPREN network has arranged a number of regional seminars and is clearly proficient at distributing information, which is also published on its website.

AFREPREN’s activities do have an impact on energy policy-making in eastern and southern Africa. Recommendations from the studies have been included in national policy documents in Botswana, Eritrea, Tanzania, Uganda and Zimbabwe.

There is not yet a critical mass of researchers in energy policy in Africa – much capacity building is still needed. However, the evaluators estimate that AFREPREN’s potential to encourage informed energy policy debate in Africa will increase in the future.



The Delhi air has improved considerably since green fuel was introduced a few years ago. The clean, natural gas is today highly demanded and particularly popular among the city's taxi- and busdrivers.

Facts – Natural Sciences & Technology

Collaborating Institutions

Basic Sciences:

International Science Programs, ISP, Uppsala, Sweden
 Third World Academy of Sciences, TWAS, Trieste, Italy
 International Centre for Theoretical Physics, ICTP, Trieste, Italy
 Third World Organisation for Women in Science, TWOWS, Trieste, Italy

Biotechnology, Biosafety and Biopolicy in East Africa (BIOEARN):

Ugandan National Council for Science and Technology, UNCST, Kampala, Uganda
 Stockholm Environment Institute, SEI, Stockholm, Sweden

Energy:

African Energy Policy Research Network, AFREPREN, Nairobi, Kenya
 Food Woodstove Dissemination, FWD, Kilimani, Kenya
 Asian Institute of Technology, AIT, Klongluang Pathumthani, Thailand
 Asian Regional Research Programme in Energy, Environment and Climate (ARRPEEC), administered by AIT
 Renewable Energy Technologies in Asia (RETS in Asia), administered by AIT

Geoscience in Central America - Seismology Research and Research Training (SERCA):

Universidad Nacional, Heredia, Costa Rica
 Uppsala University, UU, Uppsala, Sweden
 Bergen University, Bergen, Norway

Social Sciences & Humanities

At the World Summit on Sustainable Development in Johannesburg in August-September 2002, sustainable development was given three dimensions – environmental, economic and social. This extended definition of sustainability reinforces the role of social sciences and the humanities.

The need for greater involvement of social sciences in research on environmental issues was raised in many forums during the year, alongside the need to establish stronger links between scientists and policy-makers. The importance of including researchers from the South in solving world environmental challenges was also emphasised in Johannesburg. Independent research in the South is of central importance, as is joint research through participation in international research teams.

Sida support for research in the social science and humanities field focuses largely on these dimensions and is mainly directed towards strengthening research and problem formulation.

Social science research often leads to policy recommendations. The support to broad-based social science research has been concentrated to large regional cooperation bodies such as CLACSO – the Latin American Council of Social Sciences, FLACSO – Latin American Faculty of Social Sciences, and CODESRIA – the Council for Development of Social Science Research in Africa. They have gained international acceptance and their visibility and size enable researchers to pursue projects that may produce politically controversial results. Another important role of these networks is to strengthen national research and the status of social science.

Environmental economics

Sida supports two research networks in Asia that address environmental economics. Environmental Economics and Policy in South East Asia (EEPSEA), was established in 1993 with a mission to strengthen local capacity to perform economic analysis of environmental problems. It successfully supports research and training of young scientists.

The researcher is encouraged to establish a research team representing different disciplines, based on the problem he or she identifies.

The research funded by EEPSEA is generally policy-oriented and the organisation has managed the difficult task of disseminating research results to policymakers. Examples of research where impacts on society were reported during 2002 address areas such as livestock waste in the Philippines (see the Green pages), electricity pricing in Vietnam, timber permits in Sri Lanka, protection of marine areas in Vietnam, and overfishing in the Philippines and in Vietnam.

The South Asian Network for Development and Environmental Economics (SANDEE) works to strengthen capacity in South Asia for conducting research on the linkages between economic development, poverty and environmental change. The network, now in its third year of activities, finalised its first research projects in 2002 and these look at forest user groups in Nepal, air pollution in Dhaka, irrigation tanks in Tamil Nadu and dryland migration in Gujarat.

Current support to environmental economics in Africa is channelled through the African Economic Research Consortium (AERC), which provides M.Sc. training in economics. Environmental economics is among the elective courses. In December 2002 the AERC Ph.D. programme was launched, based on the same training model as the M.Sc. programme, which has proved successful in building a critical mass of African-trained economists.

Peace and conflict research

Sida supports research in the field of peace and conflict studies through its collaboration with research institutions and networks (in Africa through AAPS, CODESRIA and OSSREA, in Asia through SEACSN and in Latin America through CLACSO).

Over the years, interest in peace and conflict studies has increased, both in policy and academic spheres. In 2002 Sida supported an initiative to

establish closer collaboration between research institutions and networks in Africa, Asia and Latin America in this field of research, i.e. South-South-South collaboration.

The research relates to various dimensions, factors and issues of direct or indirect relevance to environmental issues. A number of conflict situations involve competition for natural resources, for example water or crude oil.

Archaeology and environment

Human Responses and Contributions to Environmental Change (HRAC) is an African archaeological network that studies different types of landscapes in relation to development of ancient settlements. Initial studies involved the regions of eastern and southern Africa, such as the Shashi-Limpopo River in Zimbabwe, where settlements situated on natural mounds have a strong orientation towards rivers and floodplains. A similar development was noted on the Swahili coast in Tanzania during periods of wet climate.

In 2002, surveys and excavations took place in West Africa. The circular city of Old Oyo in Nigeria, with its 13 gates, was mapped and subjected to an environmental study to understand the relation between earlier populations and their botanical environment. In Mali, settlement mounds and relic valleys in dried parts of the Niger valley show the evolution of climatic conditions from Neolithic times to the period of the great empires. This region, almost unexplored until now, fills a gap in the knowledge on human occupation of the Middle Niger and also gives indications on the formation of the great Songhai empire and the development of trans-Saharan trade.

Gender – urban environment and living conditions

Southern Africa's urban growth rate is among the highest in the world, which has resulted in reshaped spatial orders and living conditions for people. The GRUPHEL IV project aims to study the interaction

between gender and different generations of people from a spatial-environmental viewpoint. The project aims to show how gender and generation status is expressed by explicit or implicit regulation of access, use and occupation right to living space within a house, a neighbourhood or a town. This research has resulted in a new gender-sensitive policy formulation for southern Africa that was needed by local authorities, NGOs, etc.

United Nations Research Institute for Social Development – UNRISD

UNRISD's work in connection with the 1992 Rio Conference focused on social development issues related to deforestation, biodiversity protection, desertification, grassroots environmental management, urban sustainability and corporate environmental responsibility.

The UNRISD report for Rio+10 drew on this work and addressed four principal questions:

- How do market forces, government policies and other factors influence the way different social groups use and manage natural resources?
- How are these social groups affected by environmental degradation?
- How, and to what extent, can people manage natural resources on a sustainable basis at local level?
- What impacts have mainstream conservation initiatives had on patterns of natural resource use and people's livelihoods?

UNRISD highlights the need for integrated approaches to environmental problems at local, sub-national, national and international levels. Grassroots environmental action is considered important in promoting sustainable development. The role of institutional and policy contexts in effectively curbing social and environmental degradation is emphasised.

Collaborating Institutions

Social Sciences:

United Nations Research Institute for Social Development, UNRISD, Geneva, Switzerland
 Council for Development of Social Science Research in Africa, CODESRIA, Dakar, Senegal
 Organisation for Social Science Research in Eastern and Southern Africa, OSSREA, Addis Ababa, Ethiopia
 African Association of Political Science, AAPS, Pretoria, South Africa
 Union for African Population Studies, UAPS, Dakar, Senegal
 Consejo Latinoamericano de Ciencias Sociales, CLACSO, Buenos Aires, Argentina
 Facultad Latinoamericana de Ciencias Sociales, FLACSO, San José, Costa Rica
 Facultad Latinoamericana de Ciencias Sociales, FLACSO, Guatemala City, Guatemala
 Facultad Latinoamericana de Ciencias Sociales, FLACSO, San Salvador, El Salvador

Economy:

African Economic Research Consortium, AERC, Nairobi, Kenya
 The Beijer Institute of Ecological Economics, Stockholm, Sweden
 Economy and Environment Program for Southeast Asia, EEPSEA, Singapore
 Environmental Economics Unit, Gothenburg University, Gothenburg, Sweden
 Network of Social Economics Centres in Latin America, NOSECLA, Montevideo, Uruguay
 South Asian Network for Development and Environmental Economics, SANDEE, Kathmandu, Nepal
 Department of Human and Economic Geography, Gothenburg University, Gothenburg, Sweden

Democracy and Human Rights Programme:

Birzeit University, Birzeit, West Bank
 Jawaharlal Nehru University, New Delhi, India
 Utkal University, Bhubaneswar, Orissa, India
 University of Witwatersrand, Johannesburg, South Africa
 Centre for Research and Documentation, Kano, Nigeria
 Institute for Free Flow of Information, Jakarta, Indonesia
 Institutt for Statsvitenskap, Oslo University, Oslo, Norway
 Centre for East & Southeast Asian Studies, GESEAS, Gothenburg University, Gothenburg, Sweden
 Peace & Development Research Institute, PADRIGU, Gothenburg University, Gothenburg, Sweden
 Department of Political Science, Stockholm University, Stockholm, Sweden
 Department of Peace & Conflict Research, Uppsala University, Uppsala, Sweden
 Department of Government, Uppsala University, Uppsala, Sweden
 Cambodian Researchers for Development, CRD, Phnom Penh, Cambodia
 Institute for Malaysian and International Studies, IKMAS, National University of Malaysia, Bangi, Malaysia
 Research and Education for Peace Unit, University of Science of Malaysia, REPUSM, Penang, Malaysia
 The Centre and Programme for Southeast Asian Studies, Indonesian Institute of the Sciences, PSEAS/LIPI, Jakarta, Indonesia
 Department of Sociology, Uppsala University, Uppsala, Sweden

Archaeology Programme:

Department of History, Archaeology Unit, University of Dar es Salaam, Tanzania (Pan African Association, PAA)
 Department of Archaeology and Ancient History, Uppsala University, Uppsala, Sweden

Gender Research:

Institute of Southern Africa Studies, ISAS, University of Lesotho, Roma, Lesotho

Health Research

Sida's support to research in the health sector covers a broad field. It spans biomedical research and social science studies investigating the classic poverty-related health problems. The support covers research into infectious diseases, tropical parasite diseases, malnutrition, sexual and reproductive health, epidemics such as HIV/AIDS, resistant malaria and tuberculosis.

Health problems caused by environmental factors are gradually receiving more attention. One example is Sida's support to environmental health research in Latin America. Problems related to pesticides and other toxic substances are studied and solutions sought, both at a regional level (read about IRET on the Green pages) and within bilateral cooperation frameworks. According to the WHO, some 2-5 million people suffer pesticide poisoning every year.

Health research policy

Planning and prioritising research and developing research capacity are important components of stable infrastructures that facilitate research and research training. Sida supports aspects of capacity building at a national level and also several global initiatives to aid the development of health systems and health research policies. Among the latter are the Global Forum for Health Research (GFHR), the Council on Health Research for Development (COHRED) and the Alliance for Health Policy and Systems Research (AHPSR).

The GFHR was founded to help correct the uneven distribution of resources for research into low-income countries' problems. Only about ten per cent of the world's health research funding is today targeted to the diseases which account for 90 per cent of the global disease burden. The forum's annual international meeting, held in Arusha, Tanzania, brought together a large number of researchers, decision-makers and NGOs to exchange research results and experiences from health research.

The international network INDEPTH, also supported by Sida, currently consists of 31 demographic surveillance system field sites in 17 low-income

countries. Together, these monitor more than 1.8 million households with the aim to provide a better, empirical understanding of health and social issues and to apply this to alleviate the most severe health and social challenges. In 2002 INDEPTH held important workshops on subjects that included cause-specific mortality and linking research to policy and practice.

Sida's bilateral programmes with Nicaragua and Vietnam also support health research policy. In Vietnam, the results have had an impact on health policies, primarily with respect of health services, pharmaceutical supplies, gender, and tuberculosis. A study on pharmaceutical supplies was presented in a Ph.D. dissertation during the year.

Tropical diseases research

Sida channels its support to research on tropical and other infectious diseases primarily through the WHO's Tropical Disease Research programme (TDR). The programme has developed new and improved methods for control and treatment, and changed the orientation towards product development and field studies of practical relevance. The most recent strategy includes intervention research.

The programme has been extended to cover research into tuberculosis and dengue. In addition, the focus on malaria research has recently increased, due largely to the WHO Roll Back Malaria initiative and the Multilateral Initiative on Malaria (MIM). Swedish research groups are active in several of the areas covered by TDR, and are to a great extent funded through the Swedish Development Research programme. In 2002 Sida supported a review of malaria research and a MIM conference in connection with the GFHR meeting in Arusha, Tanzania.

Research related to HIV/AIDS

Research aiming at prevention and mitigation of HIV/AIDS is given top priority. Given the actual situation, it may prove necessary to support initiatives that can contribute to the development of vaccines suited to the African situation.

Sida's special programme for research into HIV/AIDS mainly supports research on vaccines and on mother-to-child transmission (MTCT). Research funded by the programme and by the TANSWED bilateral programme has shown that HIV is transmitted from mother to child not only during the perinatal phase but also during the breast-feeding period. As a result, the mother-child pair is these days treated during both periods. This regimen both allows HIV-infected mothers to breast-feed their babies and helps them avoid being stigmatised. Previously, an HIV-infected mother was easily identified because she did not breast-feed her baby.

The special programme extends also to social science research, which is appropriate considering the social and economic consequences of HIV/AIDS, particularly in Africa. In 2002 Sida supported four African social science research networks in developing proposals in four main areas:

- Research aiming at protecting young people and future generations,
- health care research,
- research on policy,
- research on social and economic consequences of the pandemic.

Vaccine research

Vaccine research is another high-priority area, receiving support partly through grants for research competence as part of the WHO vaccination programme.

The Centre for Health and Population Studies (ICDDR, B) receives core support from Sida. In addition, Sida supports projects aimed at acquiring knowledge of diarrhoea diseases caused by the *Shigella* bacteria, cholera and *E. coli*.

Further development of malaria vaccines is supported through the European Malaria Vaccine Initiative (EMVI). The EMVI supports mechanisms that accelerate the development of vaccines, contributes to the evaluation of vaccine research and development and facilitates clinical trials together with the African Malaria Vaccine Testing Network. In Latin

America, Sida supports NeTropica, a Central American cooperation network for biomedical research and training that focuses especially on tropical diseases.

Reproductive and child health research

In recent years the high level of ill-health and mortality in connection with pregnancy and childbirth has attracted considerable attention. This problem also applies to young people's exposure to sexual abuse and prostitution. Sexually transmitted diseases are another major health problem among men and women. Sida has financed the WHO Human Reproductive Programme (HRP) since its beginning.

Children are extremely vulnerable to poverty-related diseases. For instance, diarrhoea and respiratory infections, combined with malnutrition, still comprise the largest direct cause of child mortality. Simple and inexpensive treatment methods exist but more research is needed into preventive measures and their application in primary healthcare. Sida supports the research side of the WHO Child and Adolescence Health programme.

Occupational and environmental medicine

Sida supports a regional Central American network coordinated by the Institute for the Studies on Toxic Substances (IRET) in Costa Rica (read more on the Green pages). The programme has enabled researchers to expand their knowledge about the effects of pesticides on human health and ecosystems.

In 2002, Sida expanded its collaboration with the Centre for Health and Population research (ICDDR, B) in Dhaka to include environmental health. Close to 30 million people in Bangladesh drink arsenic-contaminated water every day. Sida provides funding for the centre's research into the effects of the intake on reproduction and into ways of reducing its deleterious effect on health (read more on the Green pages).

As part of the bilateral research collaboration Sida supports the Occupational and Environmental Programme in Nicaragua, where the rates of acute poisoning caused by pesticides are among the highest in the world.

Collaborating Institutions

Health research policy:

Global Forum for Health Research, Geneva, Switzerland
 Council on Health Research for Development, COHRED, Geneva, Switzerland
 Alliance for Health Policy and Systems Research, AHPSR, Geneva, Switzerland

Child health:

Child and Adolescent Health and Development, World Health Organization, Geneva, Switzerland

Sexual and reproductive health:

UNDP/UNFPA/WHO/World Bank Special Programme on Research, Development and Research Training in Human Reproduction, World Health Organization, Geneva, Switzerland
 East, Central and Southern African Organisation for Obstetrics and Gynaecology, ECSAOG

Tropical and other infectious diseases:

UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases, World Health Organization, Geneva, Switzerland
 Mekelle University College, Mekelle, Ethiopia
 International Centre for Diarrhoeal Disease Research, ICDDR.B, Dhaka, Bangladesh
 Department of Medical Microbiology and Immunology, Gothenburg University, Gothenburg, Sweden
 Department of Immunology, Microbiology, Pathology and Infectious Diseases, Karolinska Institutet, Stockholm, Sweden
 Vaccines and Biologicals, World Health Organization, Geneva, Switzerland
 European Malaria Vaccine Initiative, EMVI, Copenhagen, Denmark
 International Vaccine Institute (IVI), Seoul, Korea

HIV/AIDS and related sexually transmitted diseases:

National Public Health Laboratory Bissau, Bissau, Guinea-Bissau
 Muhimbili University College of Health Sciences, Dar es Salaam, Tanzania
 Department of Medical Microbiology and Immunology, Gothenburg University, Gothenburg, Sweden
 Swedish Institute for Infectious Disease Control, Stockholm, Sweden
 Microbiology and Tumour Biology Centre, Karolinska Institutet, Stockholm, Sweden
 International Aids Vaccine Initiative (IAVI), New York, USA

Research training and networking in biomedicine in Central America:

Fundación para el Desarrollo Económico y Social de Centroamérica, FUNDESCA, Panamá, Panamá
 The Karolinska International Research and Training Committee, KIRT, Karolinska Institutet, Stockholm, Sweden

Network for Research and Training in Parasitic Diseases at the Southern Cone of Latin America, RTPD, Porto Alegre, Brazil

Regional programme for environmental and health research in Central America:

Central American Institute for Studies on Toxic Substances, Heredia, Costa Rica
 Department for Systems Ecology, Stockholm University, Stockholm, Sweden

Other:

Non Communicable Disease Surveillance, World Health Organization, Geneva, Switzerland
 Research, Policy and Co-operation, World Health Organization, Geneva, Switzerland
 International Network of Field Sites with continuous Demographic Evaluation of Populations and their Health in Developing Countries, INDEPTH, Accra, Ghana



Malacochersus tornieri (pancake tortoise).

Too popular for its own good – pancake tortoise threatened

Kenya The small, soft-shelled pancake tortoise, *Malacochersus tornieri*, is a popular pet the world over. But in certain areas in its natural habitats in East Africa its survival is threatened.

In Kenya, researchers see community awareness of the tortoise's importance as the key to its conservation. A pancake tortoise team within the Research Programme on Sustainable Use of Dryland Biodiversity (RPSUD), has surveyed the tortoise's habitat. RPSUD was launched in 1995, is supported by Sida and is hosted by the National Museums of Kenya in Nairobi.

The pancake tortoise is found in rock

crevices in scattered rocky hills in the dry savannas of Kenya or Tanzania. After the wildlife trade, the major threat to the species is slash-and-burn agriculture. The tortoises get burnt during bush clearing and burning. Charcoal burning and rock slab and ballast extraction also harm the tortoise.

The project has produced several proposals on how to conserve the tortoise. Breeding or nature reserves are two suggestions, while the establishment of sustainable community-based pancake tortoise management programmes also could enhance the species' existence on private lands.

Further information can be found at www.museums.or.ke/resdry.html.

Swedish Development Research

Approximately 10 per cent of Sida's appropriation for research cooperation is allocated to development research in Sweden. The figure for 2002 is SEK 103 million.

Sida has a special responsibility for stimulating interest in development issues among Swedish research institutes. The Sida Development Research Council provides grants for research projects or support for Ph.D. students, post-doctorate researchers or guest lecturers. Proposals are evaluated by scientific advisory groups. Support is mainly given to research themes defined by the academic community, but Sida also invites applications for specific themes of particular interest to Swedish development cooperation.

Funding is divided into five areas: natural resources and environment; health research; science, technology and industrialisation; economic, social and political dimensions of development; and the humanities, education and culture. Project applications related to environmental problems can be found in most of these areas.

In 2002, Sida received 406 funding applications for projects dealing with development issues, of which it accepted 126.

An example of a research project in the environmental area is Environmental Contamination from Obsolete Stocks of Pesticides in Developing Tropical Countries, a case study carried out at Vikuge Farm in Tanzania and coordinated by the Swedish University of Agricultural Sciences.

In natural resources and environment, issues related to marine sciences dominate. Other subjects include the way tenure and other socio-economic conditions affect the use of natural resources and food distribution.

In health, studies on tropical diseases dominate. Other focus areas include research into mental health and HIV and reproductive health, mother/child health and nutrition.

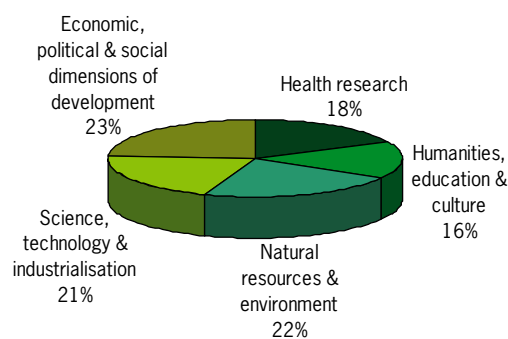
The major themes in science, technology and industrialisation are water, energy, urban issues

and pollution and industrialisation in developing countries.

With regard to the economic, social and political dimensions of development, political science and economics are the main focus areas. Sida-supported Swedish economic research covers a wide range of issues, including micro-finance, globalisation, regional integration, national production systems and the effects of HIV/AIDS on economic performance. Poverty alleviation and equity issues are essential components of most studies.

In humanities, education and culture, the main areas are anthropology and archaeology. Related to this are studies in human geography and analysing the history of cultural landscapes. In similar fashion, language studies contribute to knowledge about mental landscapes.

The research grants distributed by research area
percentage of 2002 total allocation, SEK 103 million



Swedish Research Links

With the aim to encourage cooperation between Swedish researchers and researchers in South Africa, the MENA region (Middle East and Northern Africa) and Asia a special programme, Swedish Research Links, has been launched. Joint applications for funding of collaborative activities can be submitted annually.

South Africa

The first research link programme, the South African-Swedish Research Partnership Programme, was initiated in early 2000 and solicited its fourth round of proposals in 2002.

Out of 39 joint applications for three-year grants, 14 were approved for the period 2003-2005. The awarded applications covered all disciplines, with an emphasis on natural sciences and technology. One of the environmental projects was Sustainable control of major insect pests of wheat, a collaboration between the University of Pretoria and the Swedish University of Agriculture.

The reviewing process took place both in South Africa, through the National Research Foundation's (NRF) advisory panel, and in Sweden, through Swedish research councils FORMAS (the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning) and Vetenskapsrådet.

Forty-one joint projects are currently in operation and 34 universities in South Africa and Sweden are involved in the partnership programme.

Sida commitment for current agreement period, 2001-2004: SEK 30 million.

Supported areas: Agriculture, Architecture, Biotechnology, Botany, Chemistry, Ecology, Economy, Education, Engineering, Geography, Geology, Information Technology, Music, Oceanography, Pharmacology, Physics, Psychology, Public health, Sociology, Zoology.

Middle East and Northern Africa – MENA

The MENA-Swedish Research Partnership Programme solicited its first round of proposals in May

2002. The submitted joint applications for three-year grants represented all disciplines, but the majority concerned medicine and most applicants came from Iran.

The reviewing process also engaged researchers from the MENA region and took place both at the Swedish Institute in Alexandria and in Sweden. Out of 24 applications, 17 were approved for 2003-2005.

Inter-regional joint projects in geology, water resources and environment were among those that ranked highest. One example was a project dealing with sustainable management of marginal water in arid and sub-arid regions in Tunisia. Allocations for the first year (2003) amounted to SEK 3.6 million.

Supported areas: Agriculture, Biotechnology, Botany, Chemistry, Engineering, Forestry, Geology, Health, Mathematics, Oncology, Pharmacy, Physics, Public Zoology.

Asia

The Asian-Swedish Research Partnership Programme solicited its first round of proposals together with the MENA programme in 2002. The majority of submitted applications were in natural sciences, technology and environment. Out of 68 joint applications, ten concerned inter-regional collaborations. The counterparts came mainly from China, India, Vietnam and Thailand.

The reviewing process was carried out by a Swedish advisory panel and 41 applications were approved for 2003-2005. Projects like Environmentally acceptable control of pests infesting vegetable plots in tea areas in Sri Lanka and a Chinese collaboration on pollution studies, were among the highest ranked projects. Allocations for the first year (2003) amounted to SEK 6.5 million.

Supported areas: Agriculture, Biotechnology, Botany, Chemistry, Dentistry, Ecology, Economy, Education, Engineering, Epidemiology, Forestry, Linguistics, Nutrition, Peace & Conflict, Physics, Public Health, Technology, Veterinary Science.



Atacama Desert, Chile

Climate research can help minimize greenhouse effects

Chile Scepticism still persists over human contribution to climate change but dissenting voices are becoming quieter as droughts, floods, the spread of disease and the melting of glaciers all become more prevalent and evident – on every continent and in most nations. Chile's Atacama Desert, is expanding into once arable land. The desert has practically no vegetation and some localities virtually lack precipitation.

Our planet is warming faster than at any time in the last 10,000 years. It is driven by the build-up of warming gases that have reached their highest concentration in 420,000 years.

The most recent scientific assessments made by the Intergovernmental Panel on Climate

Change, IPCC, estimated that the globally averaged surface temperature will increase by 1 to 3.5°C (about 2 to 6°F) by the year 2100. The associated rise in sea level will be between 15 and 95 centimeters (about 6 to 37 inches).

Weather and climate play an important role in the socio-economic development of poor nations. Climate changes may lead to a number of potentially serious consequences for these already vulnerable societies which lack structures and capacity to handle the problems efficiently.

Sida supports climate research to help counteract and minimize the emissions of greenhouse gases. The aim is also to reduce the vulnerability of poor countries and poor people and to strengthen their capacity to adjust to climate changes.

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In September, the Division for the Sida Council for Development Research and Information Technology was closed and personnel moved to either the Division for Thematic Programmes, the Division for University Support and National Research Development or formed a new division, the ICT Secretariat, with the Department for Infrastructure and Economic Cooperation.



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