# 6 Financial support and technology transfer

Financial support and transfer of technology to developing countries in the form of aid or development assistance, is an important aspect of international progress in the climate´field. Swedish development assistance aims to create the conditions for sustainable development, which will alleviate poverty in developing countries and help to achieve peace, democracy and sustainable use of natural resources. The Swedish parliament has laid down six main objectives for development assistance. One of these is to contribute to far-sighted conservation of natural resources and environmental protection.

Compared with other OECD countries, Sweden spends a high proportion of its gross national income (GNI) on development assistance. Sweden is also in the "Top 10" in absolute terms. Between 1997 and 2000, Sweden devoted just over 0.7 per cent of GNI to development assistance each year. About two-thirds of Swedish bilateral development assistance is channelled via Sida, the Swedish International Development Cooperation Agency. Table 6.1 shows the Swedish budget for development assistance administered by Sida and other bodies, including the Cabinet Office. Swedish aid will increase over the next few years, in relative as well as absolute terms. The aim is that aid in 2003 should represent 0.81 per cent of GNI, which is forecast to be approximately SEK 13 billion.

## 6.1 New and additional support

Swedish development assistance is long term; much of it takes the form of programmes for individual countries. It is therefore difficult to draw a clear distinction between new and ongoing support. A parliamentary decision was taken in the late 1980s to add a further objective of development assistance (the environmental objective), and to allocate funds in the form of a "Special Environmental Appropriation". These funds have been used to supplement other development assistance and to carry out environmental projects of strategic importance, such as methods development and trial and pilot projects. The appropriation is primarily used for bilateral assistance, but also for multilateral support to achieve the objectives laid down at the United Nations Conference on Environment and Development (UNCED).

Most new and additional Swedish support is provided via the Global Environment Facility (GEF).

[1] Exchange rates:
1997: USD 1 = SEK 7.6346
1998: USD 1 = SEK 7.9471
1999: USD 1 = SEK 8.2623
2000: USD 1 = SEK 9.1606

**Table 6.1**
**Sweden's government-funded development assistance, in total and as a percentage of GNI, also the "Special Environmental Appropriation"**

| | Total 1997 | Total 1998 | Total 1999 | Forecast 2000 |
|---|---|---|---|---|
| Total development assistance (SEK millions[1]) | 13,212 | 12,518 | 13,495 | 12,487 |
| Development assistance as a percentage of GDP | 0.79% | 0.72% | 0.70% | 0.72% |
| Special Environmental Appropriation (SEK millions) | 174 | 205 | 160 | 210 |

*Source: Sida*

**Table 6.2**
**Swedish financial contributions to the Global Environment Facility (GEF)**

| | Financial contributions (SEK millions) | | | |
|---|---|---|---|---|
| | 1998 | 1999 | 2000 | 2001 |
| Global Environment Facility (commitment): | | | 448 | |

*Source: Sida*

## 6.2 Support for developing countries particularly sensitive to climate change

Swedish development assistance generally concentrates on combating poverty. Most of Sida's "programme countries" have a low or very low GDP per capita. Many are among the least developed countries and, in addition to poverty, are struggling under a heavy debt burden. This makes it even more difficult for them to finance measures to reduce emissions, increase removal of greenhouse gases and take steps to adjust to climate change.

Table 6.3 shows Swedish support given to least developed countries (USD millions) and as a percentage of all development assistance and of GNI in 1998 and 1999. Swedish development assistance is fairly sizeable in comparison with other countries belonging to the OECD Development Assistance Committee.[2]

Sweden has long supported efforts to improve conditions in drought-affected areas of southern Africa, in the fields of sustainable agriculture and forestry and sustainable use of water resources. These projects mainly focus on the objectives of the "Deserts Convention" but also aim to assist adjustment to climate change. Similar work is also being done in India.

## 6.3 Financial support

### 6.3.1 Multilateral support

International organisations have increasingly contributed to the creation of various systems and methods for achieving sustainable development, particularly during and after the UN environment summit in Rio de Janeiro in 1992 (UNCED). By using their own networks and with the help of their partners, they also help to disseminate and improve knowledge of these methods.

Approximately one third of Swedish development assistance is channelled via multilateral organisations. Contributions are given in the form of regular payments and as support for specific projects or programmes. Funding supplied to multilateral institutions totalled SEK 13.184 billion between 1997 and 1999. Sweden is making a total contribution of SEK 448 million to the GEF between 1998 and 2001. Funding is also given to the UN Development Programme for general purposes, for specific projects and to support its efforts to implement environmental management systems. Table 6.4 summarises multilateral development assistance going via international institutions. Sweden is also working actively to fulfil the objectives set at the Rio conference on environment and development (UNCED) in 1992, and is also working on standardisation issues with a number of international organisations and fora in the field of multilateral development assistance.

Sweden also makes contributions via Sida to the International Union for the Conservation of Nature (IUCN), the World Resources Institute (WRI) and the International Institute for Environment and Development (IIED). The main purpose of this funding has been to enable these institutions to make an active contribution to inter-sectoral know-how development, and, secondly, to enable Sida to establish a greater dialogue on these issues so that it will eventually be possible to integrate this know-how in bilateral projects and programmes.

Sweden is also funding a number of of international research institutions in the agricultural and forestry sectors. These include the Consultative Group for International Agricultural Research (CGIAR), the International Council for Research in Agroforestry (ICRAF) and the Center for International Forestry Research (CIFOR). The areas bearing a relation to the climate issue are research and further education in the fields of of biodiversity, livestock production, land management, forest ecosystems and food crops.

[2] OECD DAC: Organisation for Economic Co-operation and Development, Development Assistance Committee

**Table 6.3 Total financial support for least developed countries in total per year and as a percentage of GNI, according to DAC**

| Net payments | 1998 USD millions | % of donor's total | % of donor's GNI | 1999 USD millions | % of donor's total | % of donor's GNI |
|---|---|---|---|---|---|---|
| Sweden | 446 | 28 | 0.20 | 407 | 25 | 0.17 |
| Total, DAC countries | 10,770 | 21 | 0.05 | 10,650 | 19 | 0.05 |
| including EU member states | 6,607 | 24 | 0.08 | 5,420 | 20 | 0.06 |

*Source: Sida*

**Table 6.4**
**Financial support supplied to multilateral institutions and programmes**

| | Financial support[7] (SEK millions) 1997 | 1998 | 1999 |
|---|---|---|---|
| ***Multilateral institutions*** | | | |
| **1.** World Bank | 966 | 1,000 | 865 |
| **2.** International Finance Corporation | 0 | 18 | 0 |
| **3.** African Development Bank | 0 | 0 | 0 |
| **3b** African Development Fund | 224 | 278 | 143 |
| **4.** Asian Development Bank | 115 | 180 | 188 |
| **5.** European Bank for Reconstruction and Development | 20 | 55 | 57 |
| **5b** Via the European Union | 707 | 707 | 741 |
| **5c** European Development Fund | 0 | 60 | 0 |
| **6.** Inter-American Development Bank | 17 | 15 | 12 |
| **7.** United Nations Development Programme | 460 | 474 | 490 |
| - specific programmes | 261 | 235 | 262 |
| **8.** United Nations Environment Programme | 20 | 20 | 20 |
| - specific programmes and funds | 28 | 34 | 28 |
| **9.** UNFCCC | 0.8 | 1.0 | 1.0 |
| - Supplementary Fund | 0.2 | 0.2 | 0.3 |
| - Trust fund for participation | 0.2 | 0.6 | 0.5 |
| **10.** Other (WFP, IFAD, UNCTAD, et al.) | 1,427 | 1,496 | 1,556 |
| ***Total, Multilateral institutions*** | ***4,245*** | ***4,574*** | ***4,365*** |
| ***Other multilateral research, technology and occupational training programmes (some examples):*** | | | |
| **1.** Consultative Group for International Agricultural Research (CGIAR)* | 42 | 43 | 66 |
| **2.** International Union for the Conservation of Nature (IUCN)** | 30 | 30 | 30 |
| **3.** World Bank Environment Fund | 10 | 2 | 4 |
| **4.** World Resources Institute (WRI) | 2 | 2 | 8 |
| **5.** UNEP-CEP | 2 | 0 | 2 |
| **6.** Global International Water Assessment (GIWA) | 0 | 0 | 3 |
| ***Total (examples of support for multilateral programmes, not exhaustive)***: | ***86*** | ***77*** | ***112*** |

* Non-tied support to the organisations; targeted support of SEK 5 – 15 million per year has also been paid.

** NB: SEK 15 million of 30 million for 1999 was not paid out until 2000 due to the cap on public spending. A total of SEK 45 million was paid out in 2000.

*Source: Sida*

### 6.3.2 Bilateral development assistance

Sida supports projects in almost 120 countries, including those in central and eastern Europe. Most of these resources go to the twenty or so countries with which Sida is engaged in long-term in-depth cooperation. Its efforts are based on the development projects the recipients themselves wish to implement and on which they are prepared to devote resources. Sida's role is primarily to supply competence and capital. This is provided via a network of some 1,500 partners including companies, popular movements, public authorities, colleges and universities. Some 300 Swedish NGOs receive government funding for development assistance projects each year.

Environmental issues are an important and integral part of Swedish foreign aid. Sida's sustainable development programme, entitled Omsorg om miljön[3] ("Caring for the Environment"), comprises a policy and an action plan. The programme describes the objectives of operations, approach, important principles, working methods and priority areas. Without the environmental dimension, development assistance will not contribute to sustainable development. Another key principle is to make environmental impact assessments of all Sida projects. The methods particularly emphasised are skills development and interaction between the state, municipality, NGOs and the private sector.

Swedish cooperation on the environment gives priority to the following sectors.

- Sustainable agriculture, forestry and land management
- Marine environment
- Urban environment
- Sustainable energy
- Water resources

Since 1998 all Swedish projects have been classified in accordance with the OECD DAC system for classifying the environmental relevance of projects. Table 6.5 shows the proportion of environmentally-related projects in which Sida was involved between 1998 and 2000. Environmentally-related projects have increased in absolute terms, although the proportion has remained constant at about 50 per cent.

A study was made in 1998[4] to identify and analyse the links between the Climate Convention and Sida's operations. The study describes the contents of the Climate Convention and objectives from Sida's perspective and also describes the ways in which Sida's operations relate to the convention. The study concluded that the content of several projects is an indirect result of, or is linked to, the Climate Convention, and that many aspects of operations are important from a climate viewpoint. However, only a limited number of projects make direct reference to the convention.

The tables in Appendix 5 include all projects linked to the convention. The figures shown represent total project funding, not only the portion relating to the objectives of Climate Convention.

### 6.3.3 Measures to reduce emissions and increase removals of greenhouse gases

Via Sida, Sweden funds projects in various sectors of importance for the reduction of greenhouse gas emissions and for increasing or maintaining carbon dioxide sinks in forests and soil. Efforts are primarily being made in the fields of energy, transport, industry, forestry and agriculture. Most of these projects do not have emission reductions as their main aim. In some areas, such as energy and transport, they are often included as a secondary aim or an integral part of activities. In others, eg, land management, forestry and agriculture, no mention is usually made of the project's contribution to reducing climate change. Several projects can nonetheless be considered to do so, eg, by increasing

[3] Omsorg om miljön ("Caring about the environment"), Sida 1998
[4] Sida and the Climate Convention, Sida 1998

**Table 6.5**
**Sida's development assistance and environmentally-related projects**

| Environ. classification – all Sida | 1998 | | 1999 | | 2000 | |
|---|---|---|---|---|---|---|
| (SEK millions) | Contribution | % | Result | % | Result | % |
| Primary environmental objective | 1,134 | 15% | 1,201 | 14% | 1,226 | 12% |
| Subsidiary environmental objective | 2,618 | 35% | 2,830 | 33% | 3,754 | 37% |
| Environment not relevant | 3,652 | 49% | 4,448 | 52% | 5,287 | 51% |
| Total | 7,404 | 100% | 8,479 | 100% | 10,267 | 100% |

*Source: Sida*

biological production and hence carbon sequestration, or indirectly by promoting an holistic approach to conservation of resources and long-term sustainable development.

### Energy

Sweden also supports measures intended to promote more sustainable energy sources and a transition to sustainable development. Some of this support takes the form of loans and credits. Direct action in the energy field taking place in cooperation with the Baltic States, such as the pilot phase of joint implementation, is described in the chapter on Objectives and Measures. Other support in the form of development assistance is described below.

Swedish development assistance in the energy sector is designed to improve the energy situation for the great majority of the world's population who do not have access to safe and efficient energy at present. Another important objective is to help in the development of efficient and sustainable energy systems. Assistance is designed on the basis of Sida's policy on aid for sustainable energy. An important principle is to encourage economically and environmentally sound energy systems.[5]

Sida's activities in the field include developing bodies of regulations, skills, energy efficiency and promoting new sustainable energy sources, such as solar energy and wind power. For example, support is given to the African Energy Policy Network (AFREPREN), from which several projects have received funding in areas such as energy efficiency, alternative energy sources and development of policies for reducing greenhouse gas emissions, among other things.

Sida supports two research networks in Asia: the Asian Regional Research Programme in Energy/ Environment and Climate (ARRPEEC), and Renewable Energy Technologies in Asia (RETsAsia). Research under the auspices of ARRPEEC is intended to develop scenarios, strategies and policies for reducing emissions of greenhouse gases and other air pollutants by improved energy efficiency and substitution of fossil fuels. The areas covered are transport, electricity generation, industry and biomass. Bangladesh, the Philippines, China, India, Indonesia, Malaysia, Sri Lanka, Thailand and Vietnam are involved in the programme.

The RETsAsia programme is intended to promote the use of sustainable renewable energy technology. The areas of research comprise solar cell systems for household use and small transformer stations, drying of agricultural products (solar heat and biomass fuel), manufacture of briquettes from agricultural residues and development of cookers. Institutions in Bangladesh, Cambodia, Laos, Nepal, the Philippines and Vietnam are participating.

Sida also supplies funding for increased dissemination of information in the field of renewable energy via the Stockholm Environment Institute (SEI). This includes funding for the SEI library, publication of newsletters, seminars and visits to developing countries by experts working in the field of renewable energy.

One way of promoting environmental awareness in the energy sector is to set up environment units at electricity companies. One such unit was established several years ago at the Zambia national electricity company (ZESCO), with the help of Swedish funding.

The first stage was to fund a technical adviser and some equipment for the unit. Phase two focused on integrating the work done by the environment unit with all operations at ZESCO, developing environmental impact assessment skills and improving environmental monitoring and inspection of existing energy plants. Following completion of the final phase (in 2000) the unit was considered to be working well and could serve as an example to other electricity companies in the region.

A project funded by the World Bank and Sida is in progress in Vietnam. It aims to improve efficiency and even out loads occurring in the national energy system. Rural electrification programmes are in progress in a number of countries receiving development assistance from Sida. Renewable energy production, particularly in the form of wind and solar power, constitutes a key element in these programmes. A study of solar and wind conditions for future investment in renewable energy is being conducted in Eritrea. A pilot project to find a model for rural electrification based on solar panels is under way in Zambia.

Funding provided by Sida for energy projects relating to the Climate Convention totalled SEK 1.007 billion between 1997 and 2000. This figure comprises aid and credits.

### Transport

The rapid increase in road traffic in many developing countries accounts for a large proportion of those countries' rising emissions of greenhouse gases. Sida gives support for intercity and urban transport.

Assistance in the field of urban transport is based on guidelines adopted in 1999.[6] The overall aim is to help to develop efficient and sustainable urban transport systems that promote economic and social development, improve the environment and reduce the hazards to human life and health.

[5] Policy för miljöanpassat energibistånd ("A policy for sustainable energy assistance"), Sida 1996

[6] Urban transport in Swedish development cooperation. Published by Sida, 1999

The priority areas are:

- reduced environmental impact and better land use, particularly by means of urban and transport planning, public transport, non-motorised transport, traffic safety and environmental monitoring;
- reduction of transport needs, eg, by improving public transport and city planning;
- traffic planning programmes to improve efficiency, reduce emissions and improve safety;
- and regulation and monitoring of fuels, vehicles and emissions to reduce harmful emissions.

Projects designed to improve public transport have been carried out in countries like Bangladesh, Chile, India, Jamaica and South Africa. An international course entitled "Environment and Public Transport Management" is arranged annually in Sweden by the Swedish Road and Transport Research Institute.

Funding for sectoral reform is an important area. Reform of this kind in Namibia involved raising fuel prices. This will probably reduce fuel consumption.

The feasibility of producing and using biomass motor fuels in African countries has also been studied more generally. The aim is to stimulate interest in using ethanol as a motor fuel instead of fossil fuels, and to thereby help to reduce carbon dioxide emissions.

Another example is funding for restructuring Zambia Railways Ltd with a view to improving and rationalising that company's operation.

Swedish government funding for transport sector projects in developing countries directly or indirectly designed to reduce greenhouse gas emissions totalled SEK 76.36 million between 1997 and 2000.

### Forests

The overall aim of development assistance in the field of forestry is to increase the contribution made by that sector to economic, social and ecologically sustainable development for people in less developped countries. Sustainable forestry improves human welfare by the products it supplies and the jobs it provides in the wood and pulp processing industries. Sustainable forestry also involves safeguarding the various ecological functions of forests, such as its role as a carbon dioxide sink.

Swedish development assistance for forestry has been increasingly integrated with agriculture and land management, which requires broad conservation programmes. The operational focus is influenced by international conventions and the "forest principles", as they are called. It is seldom explicitly stated that projects are intended to reduce the impact on climate, although several programmes are in fact increasing carbon removal and, in some cases, also aiding adjustment to climate change by focusing on sustainable development. The main forest programmes are in progress in Vietnam, Laos, India, Ethiopia, Tanzania, Bolivia and Nicaragua. Sustainable forestry and development of an efficient forest products industry are being supported in Bolivia. As a result, Bolivia is now one of the world's foremost producers of products from certified natural forests. One project receiving support in India is a programme designed to transfer responsibility for forest and land management to the local population.

An international course entitled "Development of National Forest Policies and Strategies", which is run each year by the National Board of Forestry, deals with the importance of forests from a climate viewpoint.

The projects included in the summary of support for the forest sector are mainly those involving extensive planting of trees, regeneration or projects to save forest under threat of destruction.

Funding totalled SEK 136.53 million during 1997 – 2000.

### Agriculture

At the same time as growing populations in Africa and Asia demand increased food production, climate change is expected to cause a deterioration in conditions for cultivation in a number of areas that are already severely affected.

Swedish development assistance supplied as part of the agricultural programmes is based on the aim of increasing productivity using sustainable methods. Increased biological production increases carbon dioxide removal. Important areas are integrated systems for sustainable agriculture, combined agriculture and forestry, land management, biodiversity in agriculture ("agrobiodiversity") and plant genetics.

Funding for climate-related projects in the agricultural sector totalled SEK 287.18 million during 1997 – 2000. Many of these projects involve lowering greenhouse gas emissions, promoting carbon sinks and adjustment to climate change.

### Waste management

Swedish assistance in the field of waste comprises projects to produce biogas from solid waste and improved waste management and processing. An international course entitled "Solid Waste Management" has been run each year. The course is intended for officials at national and local public authorities in developing countries who are responsible for environmental protection and waste management, central and local administrators in the waste sector and teachers of waste management. The aim of the course is to

improve efficiency, professional skills and solid waste management capacity in developing countries.

Swedish government funding for waste management intended to reduce methane emissions totalled SEK 42.07 million between 1997 and 2000.

**Trade and industry**

Sida's operations in the field of trade and industry are intended to create favourable business conditions in recipient countries and to make it easier for enterprises to break into the global market. Environmentally-related projects are in progress in all operational areas to varying degrees. Examples include development of institutional frameworks, skills development, alliances between enterprises and promotion of trade. Projects include supporting the introduction of environmental management systems, energy efficiency, environmental education and training, and sustainable production. A series of international courses are arranged in the field, including Energy Conservation in Industry (ISO 14000).

An action plan[7] on trade and the environment was completed in 1998. It focuses on four areas:

- strengthening negotiating capacity in developing countries;
- improving environmental awareness – sustainable consumption
- institutional infrastructure for sustainable production and eco-labelled products;
- and sustainable technology.

Examples of projects in trade and industry include support for the creation and development of environmental units at Bolivian chambers of commerce for the purpose of giving advice on environmental improvements in industry. A project is under way in Vietnam to reduce emissions from industrial companies in Ho Chi Minh City. Support for consumer interests has also been given in several countries, so as to put pressure on industry to produce more environmentally compatible products.

Funding for Swedish development assistance in this area totalled SEK 160.94 million between 1997 and 2000.

**Efforts to combat air pollution and other projects to reduce emissions of greenhouse gases**

Some Swedish development assistance that is wholly or partly intended to reduce emissions of greenhouse gases involves several sectors and is therefore difficult to categorise under any single one of the five sectors included in this account. This applies to efforts being made at policy level to improve air quality and capacity building and research on environmental economics, for example. Work of this kind is therefore described under a separate heading in the tables in Appendix 5 under "Air quality/other".

Examples of projects to improve air quality are Swedish funding channelled via the Stockholm Environment Institute (SEI) for development programmes for Regional Air Pollution in Developing Countries, which mainly relate to the situation in Asia. In India Sweden supports the Centre for Science and Environment (CSE), which is attempting to reduce air pollution in Delhi.

Another example is funding for the publication of a magazine called "Tiempo", which deals with issues on climate change and is mainly intended for scientists and others working in the climate field, particularly in the developing world. Tiempo has been published by the International Institute for Environment and Development (IIED) each quarter since 1991.

The periodical also has a very detailed homepage: **http://www.cru.uea.ac.uk/tiempo.**

Sweden also provides part-funding for the Economy and Environment Program for Southeast Asia (EEPSEA). This is a regional research network that aims to improve research into economic aspects of environmental change. In 1999 the institute published a report on the direct and indirect economic implications of Indonesian forest fires. The report had a great impact and was used in policy discussions on the environment in South-east Asia. Support is given in the form of technical assistance in the development of air quality monitoring in China, the Philippines and Chile.

### 6.3.4 Adjustment to climate change

Adjustment to climate change is rarely an explicit aim of Swedish aid. Several projects in the field of water resource management, agriculture, forestry, land management and rural development are designed to achieve sustainable development, and can thus be considered to be indirectly intended to aid adjustment to climate change. Important features are conservation of natural resources, water resource aspects and education, training and research into sustainable cultivation methods and crops adapted to a warmer climate.

**Capacity building**

Capacity building forms the basis of Swedish foreign aid. The action programme for sustainable development identifies development of recipient countries' ability to cope with their own environmental problems

[7] Trade, Environment and Development Cooperation. Published by Sida, 1998

as one of the most important elements. Capacity building constitutes the main aim in some programme areas, such as institutional development/environmental administration and environmental teaching/education.

The aim of environmental efforts in the administrative field is to support the ability of recipient countries to formulate policies, plan, implement and monitoring achievement of environmental action plans. Priority areas are environmental statistics, green national accounts, environmental economics and environmental impact assessments.

The aim of environmental efforts in the field of teaching, culture and media is to create greater awareness of environmental problems and their solution. In recent years, Sida's teaching unit has made strenuous efforts to integrate and develop the environmental dimension in its work. One result has been a policy and an action programme for environmental education. Priority is given to developing networks and donor coordination.

Sida has allocated funding for the development of environmental education networks in southern Africa; an international course in environmental education was held in spring 2001 in cooperation with these countries.

Capacity building is an important feature of Sida's programmes for conservation of natural resources, water resource management and land management. An important area from a climate viewpoint is education and research into sustainable cultivation methods and crops adapted to a warmer climate.

Swedish funding in this field totalled SEK 923.75 million between 1997 and 2000.

#### Adaption in coastal zones

A policy document on Sida's support for coastal zones and the marine environment, entitled "Sida's Marine Coastal Zone Initiative", was produced in 1997[8]. Activities in this field focus on:

- sustainable use of aquatic resources and conservation of biodiversity;
- regional coordination, establishment and implementation of legislation on water and the environment; and
- consideration of interplay/impacts in relationships between cities, towns and coastal areas.

Climate change is expected to considerably increase pressure on coastal zones; large areas will end up under water and people will be forced to move. The marine environment will also change, and aquatic resources will be affected by rising sea temperatures. It is essential to devote particular attention to activities concerning, on the one hand, development and use of natural resources and, on the other hand, protection of the marine and coastal environment. Most funding in this area goes to projects in Central America/the Caribbean, East Africa, southern Africa and South-east Asia.

Swedish funding in this field totalled SEK 126.19 million between 1997 and 2000.

#### Other efforts to reduce vulnerability

Specific vulnerability analyses represent a limited part of Sida's development assistance. On the other hand, action taken to reduce vulnerability, ie, the stage following a vulnerability analysis, constitutes a significant part of development assistance in the field of natural resources. One example is funding given to the Global Water Partnership (GWP), whose head office is at Sida's headquarters in Stockholm. The GWP is a network operating globally, whose overall aim is to further sustainable use of water resources, particular at local and regional level. The projects shown in the "other vulnerability projects" column in the tables in Appendix 5, include specific vulnerability analyses and other efforts directly or indirectly intended to achieve adjustment to climate change. Management of catchment areas ("watershed management"), is one area of importance in the process of adjusting to climate change, since it involves a study of the way physical management of water flows can even them out over the year so that both flooding and drought can be avoided.

### 6.3.5 Other climate-related activities

Indirectly, projects to achieve sustainable development, eg, local Agenda 21 projects, also play an important part in reducing greenhouse gas emissions and adapting to a warmer climate in the long term.

Development assistance in the climate field is expected to become more important. In 2001 Sida initiated an internal project and strategy development process designed to increase the number of climate-related projects within the scope of development assistance.

## 6.4 Activities related to technology transfer

Technology transfer is an important part of Swedish development assistance. It is a particularly important element in some of Sida's operational areas, eg, energy and industry.

Operations described under the heading "Efforts to

[8] Marint Kustzons Initiativ ("Marine Coastal Zone Initiative"). Published by Sida, 1997

combat air pollution and other projects to reduce emissions of greenhouse gases" above largely comprise technology transfer.

One way of transferring technology, and also developing capacity, are the international courses attended by participants from developing countries and eastern Europe. Climate-related courses are run on topics such as improving energy efficiency, renewable energy, sustainable transport, industrial environment and waste management. The course entitled "Architecture, Energy & Environment – Tools for Climatic Design" focuses on energy-efficient building design and architecture that does not require air conditioning.

Other examples of technology transfer are "Start Syd" and "Start Öst". Sweden supports joint operations between Swedish companies and companies in developing countries via these programmes. The aim is to initiate productive operations in the recipient country and contribute to effective transfer of skills and know-how.

Sweden is making great efforts to introduce more energy and resource efficient technology nationally, which may also influence the kind of development assistance it is able to offer developing countries.

**The Swedish Trade Council and voluntary organisations**

In addition to government-funded development assistance administered via Sida, Sweden supplies support via other organisations. This support is often funded partly via government grants, guarantees and loans. However, it is difficult to quantify the amount of this support that is of significance in relation to all climate-related aid. Important organisations involved are voluntary and government-run organisations, such as the Church of Sweden, the Swedish Trade Council and the Swedish Export Credits Guarantee Board.

With the help of government funding (SEK 12 million in 1999), the Swedish Trade Council, whose task is to promote Swedish export, has designed a specific programme for export of goods and services involving the use of environmental technology. This programme ("Export of Swedish Environmental Technology"), has been created to increase the export of environmental technology for applications such as water treatment, waste management, recycling and treatment of emissions to air, all of which have a bearing on climate. An important feature of the programme has been to create a forum where Swedish companies can establish contact with companies and public authorities abroad. A comprehensive homepage has therefore been created on the Internet, which gives access to almost 650 Swedish companies engaged in developing and producing environmental technology.

The task of the Swedish Export Credits Guarantee Board is to promote Swedish export by offering guarantees protecting against the risk of losing money on transactions abroad. Its sphere of operations is global and includes many developing countries (non Annex-I-countries). The Board has an environment policy, with guidelines to ensure that environmental issues are considered when credits are issued. Major projects must have an environmental impact assessment. This environmental policy is intended to promote ecologically sustainable Swedish exports and boost the export of Swedish environmental technology and know-how. The environmental policy has been in place for only a short time and its effects cannot yet be quantified.

## Examples of projects for transfer of environmental technology

An outline description is given below of four projects/ programmes to promote measures to facilitate and/or fund the transfer of, or access to, environmental technology.

**Table 6.6**
**Sugarcane resources for sustainable development: a case study in Luena, Zambia**

**Project/programme title: Sugarcane resources for sustainable development: a case study in Luena, Zambia**

**Purpose:**

**To examine the feasibility of establishing a new sugar cane and/or ethanol factory in an underdeveloped region of Zambia, the focus being on sustainable development.**

| Recipient country | Sector | Total funding | Number of years |
|---|---|---|---|
| Zambia | Energy/transport | SEK 2.2 million | 2 |

**Description:**
The study shows that there are many relevant scenarios having a positive effect on the environment and the Zambian economy (particularly in terms of saving foreign currency). Ethanol and co-generation from biomass fuels (based on a plant called bagasse) offers environmentally compatible resources that can be used as a tool of sustainable development. But sizeable investment is required and implementation is complicated, so effective cooperation between various state agencies and between the government and the private sector will be needed.

**State factors contributing to the successes of the project:**
Funding is the most important factor, although trends in the market for sugar, ethanol and electricity also have a bearing. The study itself was innovative in that it integrated social, economic, technical and environmental aspects.

**Technology transferred:**
Combined power and heating and ethanol production

**Impact on emissions of greenhouse gases/sinks (voluntary):**
Carbon dioxide emissions will be reduced if a new sugar cane and ethanol factory is built and ethanol is substituted for petrol.

*Source: Sida*

Table 6.7
**PAIB – Protección en la Industria Boliviana (Environmental protection in Bolivian industry)**

**Project/programme title:**
**PAIB – Protección en la Industria Boliviana (Environmental protection in Bolivian industry)**

**Purpose:**
National programme for theoretical and practical training in industrial environmental protection.
Practical training at a number of key factories, which are thus able to benefit from its results.

| Recipient country | Sector | Total funding | Number of years |
|---|---|---|---|
| Bolivia | Industrial environment | SEK 14.3 million (PAIB+F) | 1998 – 2001 |

**Description:**
The training programme was conducted in two phases in Bolivia's four largest cities: La Paz, Santa Cruz, Cochabamba and Oruro. 13 trainers were trained in the first phase. They then helped to carry out the main training programme involving a total of 120 people in the four cities.

As part of their training, participants performed tasks in the field of environmental auditing, supervision and environmental protection, and environmental management systems at a total of 15 key factories in various sectors.

A supplementary project entitled "PAIB-F" was conducted between September 2000 and April 2001. 25 PAIB participants received further practical training at five additional factories so as to gain the necessary experience to begin working as independent environmental consultants.

**State factors contributing to the successes of the project:**
Practical application of theoretical studies. This has twin advantages: (i) participants gain practical experience of environmental protection in industry; (ii) the key factories participating can derive benefit from the results of the practical exercises.

**Technology transferred:**
Environmental auditing methods, gas and water monitoring technology, environmental protection in industry, use of environmental management systems and risk analysis.

**Impact on emissions of greenhouse gases/sinks (voluntary):**
Only indirect impact as a result of improved combustion technology at some key plants, and an interest shown at some factories in replanting forest in the surrounding area to improve their environmental image.

*Source: Sida*

Table 6.8
Solar cells pilot project

**Project/programme title:**

**Providing electricity services using photovoltaic solar systems through energy service companies in rural areas of Zambia**

**Purpose:**
To supply 400 rural households with an ecologically sustainable energy source in areas not on the national grid.

| Recipient country | Sector | Total funding | Number of years |
|---|---|---|---|
| Zambia | Energy | SEK 4.8 million | 1998 – 2000 (2 years) |

**Description:**
Photovoltaic panels are an alternative way of supplying rural areas not on the national grid with electricity. The problem is not the technology; it is methods and systems enabling users to afford the equipment and have it maintained. This project is testing a method where users rent the panels.

**State factors contributing to the successes of the project:**
Many people living in rural areas cannot afford to invest in photovoltaic panels. Instead, the project is trying out a system of renting panels to local inhabitants.

**Technology transferred:**
Developing methods of supplying photovoltaic panels to rural areas.

**Impact on emissions of greenhouse gases/sinks (voluntary):**
The areas involved had no electricity supply before the project began. The project may help to avoid future electrification based on fossil fuels.

*Source: Sida*

Table 6.9
**Environmental Protection Training and Research Institute (EPTRI), Hyderabad, India**

**Project/programme title:**
**Environmental Protection Training and Research Institute (EPTRI), Hyderabad, India**

**Purpose:**
Overall aim: To increase knowledge and awareness of environmental issues in Indian industry by training and consultation.
Aim of project: To establish the EPTRI as a leading and self-supporting industrial environmental protection institution in india by offering training and consultancy services in demand in the market.

| Recipient country | Sector | Total funding | Number of years |
|---|---|---|---|
| India | Industrial environment | SEK 15 million | 1997 – 2001 (4 years) |

**Description:**
The following areas are to be developed during the project with the help of Swedish know-how:

1. An information centre
2. A laboratory for physical, chemical and microbiological tests
3. Business skills
4. Know-how for certification under ISO 14 001
5. The ability to manage hazardous waste
6. The ability to survey environmental profiles to locate hazardous industrial plants using the GIS method
7. Proper planning and financial accounting and control systems

Swedish assistance includes a certain amount of equipment.

**State factors contributing to the successes of the project:**
To some extent, know-how has been transferred by Swedish consultants working together with EPTRI staff in joint projects, ie, commercial projects. This has enable EPTRI to become more businesslike in its consulting capacity.

**Technology transferred:**
See above.

**Impact on emissions of greenhouse gases/sinks (voluntary):**
No information available.

*Source: Sida*

# 7 Research and systematic observation

## 7.1 Overall objectives of research and systematic observation

The aim of Swedish research policy is that Sweden should be a leading research nation.

Important areas are environment and sustainable development, in which climate is one of the central elements. Both these research areas require long and quality-assured observations. The systematic observations of climate variables and the state of the environment form the basis for research into climate processes and the impact of climate on ecosystems. In the same way, systematic observation of central societal activities is the foundation for research into impacts on societal systems and is used to produce material on which to base measures of various kinds. Several of the important projects presented below contain elements both of research and of systematic observation.

A key field of research is technological development to improve energy efficiency and develop energy systems based on renewable natural resources. This research and development has received increasing support in Sweden over the past decade.

### 7.1.1 Research and development

#### Swedish research policy

Sweden conducts approximately one per cent of global research and development. For several years in succession, Sweden has been the country spending the greatest proportion of its GDP on research. Research funding totalled almost 4 per cent of GDP in 1999, ie, SEK 75.8 billion. Most funding comes from trade and industry, which accounts for 68 per cent of funding. The public sectors provides about 26 per cent. The remainder comes from private research funds and foundations, as well as foreign financiers. The major foreign financiers are companies, although contributions under the EU framework programme for research and development also represent a significant source of funding.[1]

The basic principles governing Swedish research policy and the role of the state were laid down by parliament in 1999 when debating the bill entitled "Certain Research Issues"[2]. The aim of government research policy is that Sweden should be a leading research nation.

Achieving this will require further strenuous efforts and sizeable investment by the government as well as trade and industry. The Research and Renewal Bill[3] emphasises that knowledge is the foundation stone of modern society and that research shares society's democratic ideals and fundamental values. Government policy is designed to reinvigorate Sweden and pave the way for "the know-how society".

Swedish research on transboundary and global environmental issues has been given high priority and maintains high quality, which will enable Sweden to press for action and take initiatives in these areas. This research comprises basic scientific research as well as technological and socio-economic research to influence developments and limit environmental impacts. In other words, it has breadth as well as depth. One of the most obvious transboundary environmental issues is the threat of climate change engendered by man's activities.

#### The research system

Climate-related research takes place in the form of basic research and also in the form of applied research and research on remedial measures. Swedish research has been funded from a large number of mutually independent sources during the period 1997 – 2001. In addition to departmental funding made available for basic research by universities and colleges, this kind of research, most of which is conducted at universities and colleges, receives funding from research councils. Sectoral authorities fund a large proportion of research and development in specific areas, the main sources being the National Energy Administration. The main foundation providing funding for climate research is the Foundation for Strategic Environmental Research (MISTRA). At Sida (the Swedish International Development Cooperation Agency), which is responsible for Swedish foreign aid, there is a research body known as SAREC, which supports competence development projects and development of environmental monitoring in developing countries. In addition to government research councils, foundations and public authorities, private research funds

[1] Statistics Sweden

[2] Gov. Bill 1998/99:94

[3] Gov. Bill 2000/2001:3

and foundations also provide funding for research on climate. The Royal Swedish Academy of Sciences provides funding for logistics for polar expeditions, many of which have a climate dimension. The Wallenberg Foundation has helped to fund a station on the island of Svalbard for monitoring atmospheric gases and particles. In addition to these Swedish sources of funding, the EU provides a great deal of funding for Swedish research taking place via participation in EU projects.

#### Coordination

Since Swedish research has had many sources of funding over the last 15 years, coordination has been achieved by the financiers dividing responsibility for research among themselves every three years. This joint approach has been described in a strategy document entitled "Research and development for a better environment". The most recent document (1998:13) was produced as a sub-project in connection with a government- initiated study entitled "Research to support sustainable development" (1998:21). The seven topic areas identified include a certain amount of basic research, but focus on applied research and research on remedial measures. Climate-related research is included in all topic areas from the perspective of sustainability, but is not treated as a separate area.

Swedish research has been organised differently since 1 January 2001. The aim is to concentrate resources on important scientific areas, promote cooperation between research fields and improve the dissemination of information about research and its findings. The new organisation of Swedish research and development, in which a number of funding bodies have been amalgamated, will help to improve coordination of research programme design and funding. In the field of climate research, FORMAS, the newly-established Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning, is responsible for coordination. The National Energy Administration has the task of coordinating research and development relating to remedial measures in the field of energy.

On the international plane, scientific research on global climate change is coordinated via two international programmes: the International Geosphere-Biosphere Programme (IGBP) and the World Climate Research Programme (WCRP). The IGBP is mainly concerned with geological, biological and chemical processes, whereas the WCRP focuses on physical processes related to climate change. In Sweden this research is coordinated via the Swedish National Committee for IGBP/WCRP at the Royal Swedish Academy of Sciences. The international secretariat for the IGBP is also based at the academy.

#### Research bodies

Government-funded research is primarily conducted at universities and colleges. Some research is carried out at public authorities and independent research institutions, funded wholly or partly by the government.

The Swedish Meteorological and Hydrological Institute (SMHI) funds research and also carries out research itself. Its research unit is divided into four sections: Meteorological analysis and forecasting, Atmospheric research, Oceanography and Hydrology. Research on environmental problems spans all disciplines. The Rossby Centre is a separate research unit specialising in regional climate modelling, and belongs to the SWECLIM programme.

The Environmental Research Institute (IVL Svenska Miljöinstitutet AB) performs research integrated with application, often funded both by the government and by trade and industry (joint funding). One of its fields is climate analysis. IVL produces data to describe the contribution to the greenhouse effect derived from energy, transport, forestry and agriculture, and also individual companies. Its analyses involve producing emission data for various scenarios and assessing the contributions these emissions make to the greenhouse effect.

The Atmospheric Research Programme (MRI) was established in 1996 with the help of EU and Swedish government funding. MRI is currently running three programmes, all of them more or less climate related: the Climate Impact Research Centre, the Atmospheric Physics Programme and the Spatial Modelling Centre.

### 7.1.2 Systematic observation

#### Climate monitoring

Responsibility for systematic observation in Sweden is shared by a number of agencies. The Swedish Environmental Protection Agency has overall responsibility for environmental monitoring; the Swedish Geological Survey is responsible for monitoring of groundwater status. An important part of SMHI's main responsibility for supplying data for planning and decision making in relation to weather-dependent activities is monitoring of climate variables. The Swedish National Space Board is responsible for developing satellite systems for systematic observation and research using remote analytical methods. The National Land Survey is responsible for systematic observation of the land mass.

#### The Swedish Environmental Protection Agency and coordinated environmental monitoring

The Swedish EPA has overall responsibility for coordinating all environmental monitoring in Sweden. This includes national and regional sub-programmes.

Responsibility for the various sub-programmes is shared by a large number of central and regional authorities. Large quantities of data are also generated by municipalities, non-profit organisations and other activities at county administrative boards. The overall aim of environmental monitoring is to ascertain the extent to which the national environmental quality objectives are being achieved and provide coherent information about the state of the environment.

A further primary aim is to examine the impact on society of phenomena that are significant in relation to sustainable development. A subsidiary objective of environmental monitoring is to monitor achievement of the environmental quality objective termed Reduced climate impact.

More funds have been allocated to monitoring; funding in 2000 for all environmental monitoring totalled SEK 84 million, of which SEK 53 million was spent on national monitoring and SEK 18 on its regional counterpart.

Climate-related environmental monitoring mainly consists of monitoring emissions/concentrations of greenhouse gases, although national forest inventories and forest biotope surveys are important sources of information showing changes in the soil's mor layer, carbon content, tree growth etc. Long-term data series are needed to validate climate models, as a basis for research into impacts and to produce vegetation scenarios.

### SMHI

The task of the Swedish Meteorological and Hydrological Institute (SMHI) is to supply meteorological, hydrological and oceanographic data on Sweden and surrounding marine areas. This responsibility includes producing data for society's general needs, for research, education and training, for national and international partners, as well as for commercial processing and operations.

SMHI also has a long-term responsibility for developing and operating the national meteorological, hydrological and oceanographic databases, and acting as an expert body on climate issues.

It has an extensive production of data, products and services, including the gathering and storage of terrestrial and satellite climate observations. Important end products are analyses of status, trends and extremes for climate variables.

SMHI's climate operations follow the guidelines developed by the WMO. Its observation operations are closely linked to its real-time forecasting. Observation operations are developing rapidly, particularly in the field of remote analysis and automation. Efforts are made to maintain long-term continuity, since this is essential to the identification of climatological trends. It should be noted that it is fairly difficult to maintain continuity. It is often difficult to find suitable observers in rural areas and stations must be moved to inhabited areas. On the other hand, development of housing and infrastructure of various kinds in areas of growing population has a great effect on local climate, and thus also on monitoring results.

**Table 7.1**
**Allocation of funds for climate-related environmental monitoring**

| Year | Total allocated (SEK) |
|---|---|
| 1998 | 500,000 |
| 1999 | 500,000 |
| 2000 | 650,000 |
| 2001 | 950,000 |

*Source: Environmental Monitoring Board, Swedish Environmental Protection Agency*

## 7.2 Research

A wide range of climate-related research is conducted in Sweden, covering everything from basic scientific research to research on remedial measures. In the interests of increased efficiency, much research is integrated with other issues, particularly other aspects of sustainable development, cost-effective use of renewable energy etc. Responsibility for conducting and managing climate-related research is shared by a large number of actors at universities, colleges, foundations, companies, central agencies (including research councils and administrative authorities). The largest programme is the long-term adjustment programme for energy, which covers research, development and funding the introduction of new technology (see also Chapter 3).

It is no simple matter to draw a line between climate research and other research. The inventory presented here is based on assessments made by funding sources and by project managers and scientists. Research on specific climate issues is conducted in all five research areas, along with research and development of relevance to climate but primarily focusing on other areas such as energy or the environment, eg, research on sustainable development. All climate-related research is presented here, ie, specific climate research and research relevant to climate.

Funding of climate-related research in Sweden during the period 1998 – 2001 (not including the long-term adjustment programme for energy) totalled just over SEK 600 million (see Table 7.2). Research councils, foundations and public authorities provided

**Table 7.2**
**Total funding of climate-related research and development 1998 – 2001, not including the long-term adjustment for energy. SEK millions (figures rounded up or down)**

| Source of funding | Specific research | Research relevant on climate | Total to climate |
|---|---|---|---|
| EU, foreign funding | 30 | 28 | 58 |
| University faculties | 1.1 | 3.5 | 4.7 |
| Research councils | 154 | 141 | 294 |
| Public authorities | 89 | 139 | 228 |
| Funding source unknown | 0.3 | 1.1 | 1.4 |
| Private companies/foundations | 1.2 | 17 | 18 |
| Total | 275 | 329 | 604 |

*Source: Swedish Environmental Protection Agency*

most of this funding. Funding from EU projects is about SEK 10 million.

Most funding of climate research is provided in the form of government appropriations (including funding from MISTRA – the Foundation for Strategic Environmental Research).

Funding from the EU, private enterprise and foundations, as well as funding supplied by universities themselves, totals approximately SEK 75 million, ie, just over 10 per cent of total funding.

The five main areas of climate-related research are:

- Climate processes and climate systems, including paleo-climatological studies.
- Modelling and projections, including general circulation models.
- Research into the environmental impact of climate change.
- Socio-economic analyses, including analyses both of the impact of climate change and possible remedial measures.
- Research and development of technology capable of reducing emissions and increasing removals of greenhouse gases, and for adjustment.

Funds allocated to the five research areas are shown in Table 7.3. Three of the research areas have a major bearing on climate. The area most closely related to climate is research on climate processes and climate systems, including paleo-climatological studies. Research into the environmental impact of climate change has a pronounced primary climate dimension. A large number of programmes involving study of environmental impacts, relevant to climate, have been included. The research area in receipt of least funding is Socio-economic analyses, including analyses both of the impact of climate change and possible remedial measures, to which only slightly more than SEK 11 million has been allocated during the period.

**Table 7.3**
**Funding of Swedish climate research 1998 – 2001, broken down into fields of research, not including the long-term adjustment for energy. SEK millions (figures rounded up or down)**

| Source of funding | Specific research | Research relevant on climate | Total to climate |
|---|---|---|---|
| 1) Climate processes | 97 | 5.1 | 103 |
| 2) Modelling | 72 | 2.4 | 74 |
| 3) Environmental impacts | 89 | 120 | 209 |
| 4) Socio-economic analyses | 8.6 | 2.3 | 11 |
| 5) Remedial measures/adjustment | 59 | 148 | 207 |
| Total | 326 | 279 | 604 |

*Source: Swedish Environmental Protection Agency*

### 7.2.1 Climate processes and climate systems, including paleo-climatological studies

A total of some SEK 100 million has been allocated to research on climate processes and climate systems, including paleo-climatological studies during the period. Research councils, foundations and public authorities fund most of this research, which is primarily climate related. The majority of the research itself is carried out at universities and colleges.

The Baltic Sea Experiment (BALTEX) is an important hydrological-oceanographic- meteorological project, whose geographical area covers the Baltic Sea and its catchments.

The project is intended to describe the role of the Baltic in the interplay between land and sea, since this catchment is a unique area, characterised by complex low pressure activity, which sometimes results in extremely large inflows of water from other parts of the area.

The Baltic is typically brackish, with complex hydrography and highly variable ice conditions. The net outflow of water each year via the Great Belt and Öresund is equivalent to the quantity discharged by the Mississippi river into the Gulf of Mexico. The BRIDGE project has been in progress since 1999. It is an attempt to bridge the gap between the participating disciplines and between a large number of research teams in some ten countries bordering the Baltic. The EU is funding campaigns to improve monitoring quality.

### 7.2.2 Modelling and projections, including general circulation models

The other main area of climate research is somewhat smaller. As may be seen from Table 7.2, funding for research in this area totalled just over SEK 74 million during the period.

Here too, research councils, government foundations and public authorities provide most of the funding.

The largest single Swedish project in this category is the Swedish Climate Modelling Programme (SWECLIM), which is administered by SMHI and includes SMHI itself, Stockholm University and Gothenburg University. SWECLIM began in 1997 and will run until 2003, with a total budget of just under SEK 90 million. The main purpose of the project is to interpret global climate change scenarios using regional climate models for atmosphere, land and soil, watercourses and the Baltic Sea. Account is taken of particular regional features of the climate system. Some research is being conducted into atmospheric, oceanographic and hydrological climate processes. Studies are also being made of the impact of climate change on water resources. To date, SWECLIM has produced considerably more detailed regional climate scenarios for the potential situation in a 100 years' time than those produced by global models. The progress made in this field has improved our knowledge of the regional climate system and also given specific indications at various levels of the way climate change may affect various sectors of society. The results are stored in simulation databases and are available for impact research in various areas.

Access to these detailed databases with their high temporal and spatial distribution gives those conducting impact research great scope for making quantitative studies of possible consequences and vulnerability. The databases are also used to produce information material for various target groups.

### 7.2.3 Research into the environmental impact of climate change

Research into the environmental impact of climate change is fairly extensive, receiving funding of just over SEK 200 million between 1998 and 2001. Unlike the two areas described above, much of the research being conducted in this area is relevant to the climate issue, but does not address it directly. Specific research on climate is mainly funded by research councils and public authorities, and is conducted at universities and colleges.

In practice, much of this research comprises energy research projects having a bearing on the climate issue.

The Climate Impact Research Centre (CIRC) is a central institution. The centre conducts research into the fundamental links between climate and various aspects of the northern environment, such as ecology, glaciological and vegetative dynamics over time. Environments and biotopes preserved in glaciers, marine sediments and tree rings are examined, and experimental and analytical studies are carried out to attempt to determine the interrelationship between current climate impact and ecological and glaciological processes.

This basic understanding of the interrelationship between climate and the northern landscape and its ecology will be used to estimate the probability of future rapid climate change in the north. CIRC's objectives are essentially scientific, although there is also a desire to develop and infrastructure for research in the region.

### 7.2.4 Socio-economic analyses, including analyses both of the impact of climate change and possible remedial measures

This is the area of Swedish climate research that receives least funding (approximately SEK 11 million). Specific climate-related research in this field at universities and colleges is funded by research councils, foundations and public authorities. Most of this goes to two projects. Little research of relevance to the climate issue has been conducted. Most of this research has been carried out at two government institutions: the National Defence Research Establishment[4], where there is research on building development and energy systems, and at the Transport and Communications Research Institute.

A new concerted research effort on the instruments of climate policy has been initiated in 2001. The aim is to study the way various external factors influence the potential for introducing and using various instruments when implementing the Swedish climate strategy.

### 7.2.5 Research and development of technology capable of reducing emissions and increasing removals of greenhouse gases, and for adjustment

Overall, the main area of Swedish climate-related research is research and development of technology capable of reducing emissions and increasing removals of greenhouse gases, and for adjustment. This research is conducted at more places (trade organisations, public authorities and private enterprise) than is other climate-related research. During the period in question, Sweden has spent just over SEK 1.5 billion on research and development in six areas as part of its strategy to create a sustainable energy system (the long-term adjustment programme for energy (see also Chapter 3).

## 7.3 Systematic observation

The Global Climate Observing System (GCOS) was established in 1992. Its central activities are funded jointly by the WMO, IOC (UNESCO), UNEP and the ICSU. GCOS is intended to be a long-term user-controlled system supplying the basic collected observations necessary to monitor climate systems, to identify and prove climate change, to estimate sensitivity to climate variations and change, and to provide data for supportive research for understanding, modelling and forecasting of the climate system. GCOS covers the entire climate system, including

- physical, chemical and biological characteristics;
- atmospheric, oceanographic, hydrological, cryospherical (snow, ice and glaciers) and terrestrial processes.
- GCOS plays no direct part in making observations or producing material; its role is to stimulate, coordinate and in various ways help international and national organisations to achieve their own and the common objectives. GCOS is based on cooperation between existing and new observation systems. These systems include GSN, GUAN, EUMETSAT, ECMWF and ERA (see below).

### 7.3.1 Systems for observation of atmospheric climate, including composition of the atmosphere

The WMO body World Weather Watch (WWW) forms a central element of GCOS and is developing as monitoring and analytical techniques are refined. The GCOS Surface Network (GSN), which should comprise at least 1,000 stations worldwide, is a special network providing reference for various climate studies, and offering particular quality, continuity and homogeneity.

Sweden has a long tradition of weather and climate observations. Six stations were originally designated for inclusion in the GSN. However, the list has been altered somewhat as of 2001:

1. Kvikkjokk – Årrenjarka (replacing the original proposal of Jokkmokk)
2. Haparanda
3. Holmögadd
4. Frösön
5. Malung (replacing the original proposal of Karlstad Airport)
6. Gotska Sandön.

Karlstad and Jokkmokk are continuing to report. Metadata (ie, information on data series in existence) and other information are reported. The GCOS Upper-Air Network (GUAN), GSN's counterpart, comprises 150 high-quality radiosonde stations worldwide. No Swedish stations have been designated. Reporting quality is good from our part of Europe. However, Swedish aerological monitoring of various kinds under WWW are an important part of GCOS, and data is stored nationally and internationally.

### The European Meteorological Satellite system (EUMETSAT)

EUMETSAT is an important part of the WMO World Weather Watch. The USA, Japan and Europe share prime responsibility for this; Europe's responsibility is steadily growing.

The EUMETSAT monitoring satellite (METEOSAT) has been in geostationary orbit over the earth since 1978. The programme, which is now more than 20 years old, will be replaced by a more advanced satellite (Meteosat Second Generation) in 2002. The aim is to assure continuity and development of satellite data from EUMETSAT. The new satellites contain new sensors, partly using monitoring methods identical to those used by the previous programme. Raw data and data processing methods will be saved to allow reanalysis. Sweden is a member of EUMETSAT and is represented by SMHI. Swedish contributions are coordinated with those across areas of Europe via EUMETSAT. When the existing programme is replaced by new ones, a sufficient overlap will be created to allow necessary cross-calibration. Sweden is also a member country of the European Space Agency (ESA), which created EUMETSAT in 1986 to perform the then technically and operationally mature application of meteorological remote analysis. ESA and the Swedish space industry are heavily involved in developing the new space and terrestrial segments for EUMETSAT.

### The ECMWF[5] and the reanalysis projects

Under the Climate Convention, one of the central tasks of GCOS is to encourage the development of special observation databases. These comprise quality-assured data compilations of long time series, which serve as a foundation and reference source for climate monitoring, as well as very extensive data compilations serving as a basis for detailed analyses of the entire climate system. Recurrent analyses of this data using the latest technology is perhaps the most important means of characterising and understanding climate variability and change. For example, with regard to the meteorological component of GCOS, 150 radiosondes have been defined as a reference system, whereas the entire World Weather Watch, with, for example, terrestrial monitoring, merchant vessels making voluntary observations, buoys, aircraft and, in particular, satellite observations, belongs to the wider system. These recurrent analyses also provide important data for further observation network planning.

Sweden contributes indirectly to development and analysis by its membership and contribution of expertise to the ECMWF in the first place, and secondarily via EUMETSAT. Over a period first of 15 years (the earlier reanalysis project – ERA15), and then 40 years (the current project – ERA40), the ECMWF has demonstrated the importance of, and potential offered by, a leading global institution using the latest technology combined with scientific cooperation. The ERA40 analyses are used to validate models and forecasts, including general circulation models, as well as climate impact models, eg, models describing vegetation in relation to meteorological and hydrological parameters. ERA40, which is an EU project within the Fifth Framework Programme for Research and Development, will enhance understanding of various components of the observation systems and involve an evaluation of new components, particularly the importance of satellite observations. The latter are central to the planning and development of new, costly, satellite systems. ERA40 is also intended to reinforce the European role in the global organisations under which GCOS and GOOS operate.

### Radiation – ozone

SMHI possesses unique observation material and know-how in the field of aerosol optical depths (AOD). Some data series go back a very long time. Fairly simple observations are currently being made in the solar station network (at 12 sites in Sweden) and monitoring of AOD for three wavelengths in Norrköping. SMHI is actively engaged in climatological studies of AOD characteristics. This is crucial for atmospheric corrections of satellite observations of various terrestrial features, since erroneous assumptions when making corrections may result in erroneous conclusions as to impact on the climate system.

The radiation climate is directly linked to the composition of the atmosphere, and radiation is a significant part of the energy balance. Monitoring of radiation is often the only continual, physical and quantifiable measurement of cloud. Cloud types, cloud quantities and cloud base are more descriptive measures. Moreover, long climatological series of these parameters often incorporate subjective elements from the observers. SMHI's direct radiation monitoring is therefore an important element for use in climate studies and as verification for "parameterisation" of cloud and energy balance, among other things. Direct monitoring of radiation at ground level is also the backbone of radiation climate surveys, in which satellites are the main source of spatial data. Data is reported to the World Radiation Data Centre (WRDC) in St Petersburg, which operates under the auspices of the Global Atmospheric Watch (GAW). Data is regularly reported to the World Ozone and UV-radiation Data Centre.

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[4] Now the Swedish Armed Forces Research Institute
[5] European Centre for Medium-Range Weather Forecast

**Monitoring of carbon dioxide and particles in the air on Svalbard**

Sweden has been monitoring carbon dioxide and particles on Svalbard since 1990. The Department of Meteorology at Stockholm University is responsible for the Swedish monitoring programme. This monitoring station is part of an international carbon dioxide monitoring network. Sweden is president country of the WMO Scientific Advisors Group for Greenhouse Gases, which decides the form of WMO global environmental monitoring. Funding of SEK 950,000 was allocated for environmental monitoring in 2001, including SEK 200,000 for particle monitoring. The station's most important task is to help us to gain a better picture of global dispersal of carbon dioxide. This requires monitoring in different regions.

Readings taken at Ny Ålesund on Svalbard provide important information in relation to the debate on sources and sinks.

The station provides important data for research into the feedback between the technosphere, the biosphere and the atmosphere. Data shows winter episodes with high carbon dioxide concentrations, probably resulting from industrial emissions in northern Russia (emitted from the Taiga). Spring and summer episodes, with rapid falls in carbon dioxide concentrations, are caused by carbon dioxide removals in the northern seas.

The intention is to attempt to quantify these sources and sinks.

The monitoring station has produced annual 24-hour data on carbon dioxide and particles since 1990.

**Monitoring of ground-level ozone and particles**

Systematic observations of ground-level ozone have been made under the Environmental Monitoring Programme since 1984/85. To start with, the observation network comprised five rural stations (Aspvreten, Norra Kvill, Rörvik, Vavihill and Vindeln). The Grimsö and Esrange stations have since been added to the network. The annual cost of the current network is about SEK 600,000. Ozone data is reported each year to international bodies such as the EU, EEA and EMEP.

Swedish municipalities take ground-level ozone readings in the urban environment. There were 19 urban stations doing this in 1999. Nitrogen oxide emissions, among other things, mean that ozone concentrations are always lower in urban areas than in the countryside.

From a climate viewpoint, data from rural stations is likely to be more representative, since they cover larger terrestrial areas.

Particles have been monitored since the mid-1970s as part of the Swedish Environment Monitoring Programme (EMEP) (Rörvik). Monitoring has been gradually extended and has been conducted at five stations since the mid-1980s, all of them in rural areas. Particle monitoring involves measuring soot particles, ie, the proportion of black particles that can be linked to emissions from human activities (including the burning of fossil fuels).

Monitoring soot using the EMEP method is inexpensive (approximately SEK 30,000 per year).

A shift towards monitoring of various particle fractions (eg, PM10 and PM2.5) occurred in the 1990s. To put it simply, this means measuring the mass of particles less than 10 or 2.5 um, often termed inhalable particles. Monitoring of PM10 and PM2.5 in rural areas of Sweden is relatively new. The first readings were taken in 1990. There are currently (2001) two EMEP stations (Aspvreten and Vavihill) monitoring PM10 and PM2.5, at an annual cost of SEK 300,000. Particles (PM10) in the urban environment have been monitored in Stockholm, Gothenburg and Malmö since the early 1990s. A further 10 or so PM monitoring stations have been established in 2000/2001.

A major PM10/PM2.5 inventory project was carried out between 1999 and 2001. It covered five urban areas, four streets, with two background stations. Levels recorded and interpretation of the data will be published shortly.

## 7.3.2 Marine observing systems

The most important oceanographic monitoring programme is conducted by SMHI in cooperation with the Swedish Environmental Protection Agency. There is a network of 25 main stations and 68 stations for special surveys. The main stations, at which hydrographical, chemical and biological parameters are recorded, are usually visited each month. The survey stations are visited once each winter to monitor nutrient and/or oxygen conditions. A brief description of the conditions in the seas around Sweden, based on monitoring at the main stations and survey stations, is given in the form of expedition reports, annual and quarterly reports, and also climatological reports. SMHI also performs marine monitoring for a number of regional coastal monitoring programmes. Regular expeditions are also made jointly with the National Board of Fisheries.

Exchange of data and other information takes place nationally and internationally. The Swedish Environmental Protection Agency has appointed SMHI the national oceanographic data centre for hydrographical and hydrochemical data. SMHI receives data from the National Environmental Monitoring Programme via the Umeå and Stockholm Marine Research Centre.

The data centre also receives hydrographical data from expeditions made by National Board of Fisheries vessels and from the coastal monitoring programme.

Most international exchange of marine environmental data is channelled via SMHI, which acts under the Intergovernmental Oceanic Commission (IOC) and other international bodies such as ICES, HELCOM and OSPARCOM.[6]

The data bank used for data exchange is called SHARK. This is the largest oceanographic data bank in Sweden and is based on observations gathered from Swedish and foreign research vessels, coastguard vessels, icebreakers, ferries, caissons, lightships and other platforms. SHARK also contains catalogues and expedition reports. The data available from many stations goes back 30 – 50 years. This makes the database an important tool in climatological studies. In the case of some stations, it is possible to go back to the beginning of last century and find data on temperature, salinity and oxygen conditions.

- **Wave measurement data:** There is data from six stations going back to 1978. Only three stations are still operational.
- **Water level:** Hourly observation data over long time series from the late 19th century.
- **Current data:** Caissons fitted with SMHI transmitters. There are only two at present. There are gaps in the data series.
- **Surface water temperatures:** Gathered via observations and ferries. Records go back to 1969.
- **Ice observations:** Made in a number of shipping lanes along the Swedish coast. There are observation series from 1931 and later, as well as some older data.

The above monitoring has been subject to funding cuts and interruptions over the past decade as a result of general changes in shipping infrastructure. A Swedish and international review of the observation system in the light, among other things, of current environmental and climate issues is currently in progress. Each winter, SMHI produces a daily map of ice conditions based on ice observations and satellite data. These observations are stored in national databases in cooperation with other institutions around the Baltic.

The Arctic and Antarctic Research Institute (AARI) has assumed responsibility for developing and maintaining a data bank for Baltic sea ice as part of the WMO Global Digital Sea Ice Data Bank. SMHI participates in this work, one purpose of which is to fill in the gaps in existing digital data series.

### 7.3.3 Terrestrial observing systems

Just as data bases and data series of atmospheric and marine data are being established for comprehensive analysis of climate for monitoring, research and other purposes, extensive monitoring of terrestrial areas is to be conducted in the form of systematic observations. There is not yet as much national and international exchange of terrestrial monitoring data as is the case with atmospheric and marine monitoring. This is partly because, historically speaking, there has not been the same need for global data exchange as within the field of meteorology and oceanography. The relevant terrestrial data and monitoring is that describing soil types, land use, vegetation, biomass, groundwater, water levels in lakes and watercourses, flow rates in watercourses, snow, glaciers, permafrost etc.

**Hydrology**

SMHI is the Swedish authority responsible for data on water flow and level in lakes and watercourses. The basic network currently comprises just over 300 stations. Most of these record both water level and flow, but six stations on large lakes only record water level.

There are continual data series dating back to the 19th century from six stations. Lake Vänern (1807) and Faggeby on the Dalälven river (1852) are the oldest. Water flow observations along many watercourses began between 1900 and 1919. Hence, there has been a fairly comprehensive network since some time around 1920. The number of water flow monitoring stations continued to increase up to the 1980s.

**Snow**

Systematic observations of snow began in the first decade of the 20th century. Snow depth is now monitored at some 400 sites in the SMHI network of climate stations. Most observations are made daily, with a minimum frequency of twice a month. The water content of snow is not recorded systematically; instead it is estimated on the basis of various meteorological data and developed validated procedures. Satellite-based snow surveys are currently being developed at SMHI and one or two other Swedish institutions.

### 7.3.4 Support supplied to developing countries to establish and maintain observing systems

A limited proportion of development assistance comprises support specifically designed to establish and maintain observing systems for reporting under the Climate Convention.

[6] ICES: International Council for the Exploration of the Sea; HELCOM: Helsinki Commission; OSPAR: Oslo and Paris Commissions

However, Sida (the Swedish International Development Cooperation Agency) does give fairly extensive assistance for institutional development and administrative development in the environmental field, which is indirectly relevant to the climate issue. Much of this support is included in the column headed "capacity building/research as displayed in appendix 5. Other important areas in this context are support for local Agenda 21 projects and support for inventories using remote sensing and geographic information systems, which represent a more direct form of support given to developing countries to establish and maintain observing systems.

## References

Government Bill 2000/2001:3
Government Bill 1998/99:94
Sweden's communication on GCOS, November 2001

# 8 Education, training and public awareness

## 8.1 Public awareness of the climate issue

The Swedish public were fairly well aware of the implications of the climate issue as long as ten years ago. But people knew little about the cause and effects of climate change. The climate issue was often confused with ozone depletion. Since then, the Climate Convention has been negotiated and signed and coverage of the various negotiations has become a regular feature in the media. The reason people had some idea about the climate issue even ten years ago was probably that public awareness of environmental issues had been fairly high since the late 1960s. Generally speaking, Swedes have become more knowledgeable about the environment and more environmentally aware, although there are few studies testing public awareness in this field.

A survey performed in 2000 revealed that the Swedish public were well acquainted with the climate issue. The majority of people know about the link between higher temperatures and climate change and know that we need to use less oil and petrol. People also know that technological development and public transport are the solution to the problem. Most Swedes also think that the rise in temperature is already measurable.[1]

## 8.2 Treatment of the climate issue in the media

The media plays an important part in passing on information to the public. A study of the last two years' articles in Swedish newspapers has been made to gain an impression of the way the climate issue is presented in the media.[2] The study revealed an increasing awareness in society about the need for various actors to be more actively engaged in the climate issue. The issue is generally seen as a global problem that must be dealt with in international fora. It is also perceived as a political issue, requiring decisions as to objectives and targets to be achieved. It may be said that articles fail to make clear the link between international negotiations and domestic commitments. Few articles discuss what action is necessary and how it is to be implemented. There is no shortage of articles about new technology and renewable fuels. Articles about fuel cells, ethanol-driven cars, flexible fuel cars, energy-efficient cars, biomass fuels and wind power are common.

Taxes are often discussed by the Swedish media. A number of articles highlight the problem of high fuel taxes, particularly motor fuel taxes. But there are also articles emanating from political parties and articles drawing conclusions from government reports, which emphasise the need to raise taxes to reduce carbon dioxide emissions.

There are few articles discussing whether or not there is a climate problem at all. The number of articles indicating the need for "action" rather than "more evidence" would suggest that the climate debate has moved away from discussing doubts and towards discussing objectives.

## 8.3 The government's general standpoint

The government has highlighted the importance of consumer policies in a number of documents dealing with ecologically sustainable development. Among other things, the government's position is based on studies showing that Swedish consumers are responsible for about half of all emissions of harmful substances to air and water. It is also emphasised that consumer demand determines the industrial agenda. The purpose of an active consumer policy in the environmental field is to reduce household emissions, energy consumption and waste. Goods, transport, housing and societal planning are all involved.

The government places importance on the following:

- Increasing public awareness about consumption and the environment, among other things by ensuring that they have access to relevant information.
- Pressing for more information about the environmental impact and energy requirements of products.

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[1] SIFO (2000)

[2] No study has been made of the way radio and TV have presented the climate issue, or whether their approach differs from that of newspapers. But abundant radio and TV coverage of severe flooding in parts of Sweden in 2000 ensured that all Swedes were aware of the situation. Events of this kind in Sweden and abroad are usually accompanied by discussions on radio and television as to whether they are a result of climate change.

- Supporting efforts to change patterns of consumer behaviour.

The government also stresses the need for better information to use as a basis for deciding measures and monitoring achievements in relation to consumer issues in the field of ecological sustainability. The following are among the areas where more information is required:

- The relationship between consumer behaviour and environmental impact, including the most effective ways of reducing the burden placed on the environment by consumers.
- The conditions necessary for consumers to act pro-environmentally.
- Conflicts of aims from a consumer perspective.
- Consumer priorities.

### 8.3.1 The Commission for Measures against Climate Change

The parliamentary Commission for Measures against Climate Change, appointed by the government in May 1998, identified information as an important instrument in its final report published in April 2000.[3] Among other things, the commission suggested that informative instruments be used to achieve the proposed objectives. The commission emphasised the importance of information to increase awareness of the risks associated with climate change and make people more aware of what they could do about them.

Information campaigns were proposed as a means of persuading people to accept the use of various instruments to reduce greenhouse gas emissions. The government will bring a Climate Bill based partly on the commission proposals before parliament in autumn 2001.

### 8.3.2 Agenda 21

As instructed by the government, the Swedish Environmental Protection Agency has drawn up a proposed national strategy for the supply of information and know-how about Agenda 21 and sustainable development. The aim has been to formulate a strategy capable of making people more aware of their own lifestyles and thereby helping to comply with the aims of Agenda 21. The strategy deals with national efforts to distribute integrated information via various media. It is essential to meet with representatives from industry and other actors to give accounts of lessons learned and examples of information about the environment and sustainable development. These efforts have been made in cooperation with the National Agency for Education and the Secretariat of the Agenda 21 Committee.

### 8.3.3 The Aarhus Convention

The EU members states and a further 35 countries within the Economic Commission for Europe (UNECE) have signed the Aarhus Convention, thus making a number of commitments as to greater openness, access to environmental information and public participation in the decision-making process on environmental issues. The EU member states, which signed the convention on 25 June 1998, are already taking steps to harmonise their legislation and are also expected to ratify the convention soon.

As a result of the convention, the public will have a greater say in decisions on planning, projects and strategies. The aim is that the public should be able to exert a greater influence over the decisions made at various levels in society. To do so, people must be aware of the issues and understand them, and also know what is needed to solve the problems and the part they can play in that process. Environmental education and training, information (eg, indicators and maps) and initiatives to raise awareness will be key elements in the process. Education and training lies mainly within the sphere of competence of the individual member states, although they are encouraged to incorporate environmental issues in their school curricula.

Even before the Aarhus Convention is ratified, the Swedish principle of public access to official information and proceedings already gives people in Sweden a good measure of access to various public decision-making processes.

## 8.4 Education and training

### 8.4.1 Basic education

Incorporation of the environmental dimension in Swedish schools is under constant development. All environmental issues are covered. The express aim is to ensure that everyone undergoing a school education gains an understanding of the need for a good environment and how the actions of the individual can contribute to this. The climate issue is part of this.

Overall school education is governed by curricula, which are set by the government. The education system comprises three curricula: one for pre-school (ages 1 – 5), one for compulsory school, the pre-school class and after-school centres (ages 6 - 16), and one for voluntary upper secondary school education (17 years and

upwards). The responsibility of each school to provide education on environmental issues in general is expressed in approximately the same way in each curriculum. One of the curricula states:

"*It is essential in all teaching to provide certain overall perspectives. An environmental perspective allows students to take responsibility for the environment they themselves are able to influence directly, and to acquire a personal attitude towards general and global environmental issues. Teaching must illustrate the ways in which the functions of society and the way we live and work can be adapted to create sustainable development.*"

The curriculum governs the syllabuses produced for each subject. Syllabuses are also set by the government.

The National Agency for Education has created an additional incentive – "the Green School Award" – for schools wishing to become actively engaged in environmental issues.

To receive the award, a pre-school or school must make an inventory of its activities from an environmental viewpoint, draw up an action programme and make efforts to develop its teaching and activities to achieve sustainable development. The award is granted for a maximum of three years. After that, the preschool/school must present new results. The purpose of the award is to encourage teaching on the subject of ecological sustainability. Pupils/students must be involved in planning and have a say in their learning.

Twenty-three school have so far received the Green School Award. A further 60 are working to achieve it.

The Keep Sweden Tidy Foundation also has a scheme for schools wishing to become actively engaged in environmental issues. The scheme is called "the Green Flag", and is the Swedish branch of Eco Schools, run by the Foundation for Environmental Education in Europe (FEEE). Just over 600 Swedish schools now belong to the Green Flag scheme.

One Swedish company uses an unusual method of disseminating information. The teaching pack, entitled "Natur & Miljöpärmen" ("the Nature and Environment File"), is distributed to schools free of charge. This is achieved by way of sponsorship by trade, industry and municipalities. The material explains how man affects nature and the environment and what we can do to adapt to the natural ecocycle. The material is intended to cement an interest in nature and the environment among pupils at an early age, so that they are better able to understand nature's terms and act pro-environmentally in the future. Some 80,000 information packs are distributed to each year of intermediate school annually.

The Swedish EPA instigated a survey in 2000 to find out how the climate issue was dealt with in school teaching. 1,200 teachers at secondary and upper secondary school level were interviewed. The results show that school and education are considered to be the issue of greatest importance for Sweden's future (31 per cent). The environment comes second (27 per cent). The climate issue ranks high among environmental issues. Some 70 per cent consider that the climate issue is included in their science and social science subjects. Many secondary school teachers think that the climate issue really belongs with the social sciences, whereas most upper secondary school teachers place it with the natural sciences.

The climate issue is mainly dealt with in teaching of science subjects, as well as social sciences and geography. A lack of time was given as the main obstacle to teaching on the climate issue. The teachers also felt that they needed better teaching materials and to improve their own knowledge.

### 8.4.2 Higher education

Universities and colleges are not subject to the same requirement that students should possess general environmental knowledge as that stipulated in the curricula for the compulsory school system. However, universities and colleges are included in the government's efforts to incorporate environmental management systems throughout public administration. Some 26 universities have so far been instructed to do so.

"Svenska Ekodemiker" ("Swedish Ecodemics") is an association for students interested in the environment and sustainable development. Its aims are ambitious: the idea is to influence activities at universities and colleges so that Swedish seats of learning become world leaders on environmental issues and Swedish graduates become the most environmentally aware, regardless of discipline.

There are currently 25 universities and colleges offering courses on the environment. There are a total of 63 courses with various environmental components. The climate issue is probably included to varying degrees in these courses.

## 8.5 Campaigns

### 8.5.1 Klimat.nu

Five Swedish organisations have received government funding of SEK 10 million to conduct a public information campaign on the climate issue. The campaign is being run under the name "Klimat.nu", after the

[3] Swedish Government Official Report SOU 2000:23: Förslag till Svensk Klimatstrategi ("Proposed Swedish Climate Strategy")

website of the same name, and involves a number of activities during 2001 – 2002. The National Federation of Adult Education Associations, the UN Association of Sweden, the Church of Sweden, the Swedish Society for Nature Conservation and the Swedish Red Cross are the participating organisations. The campaign aims to show that swift action can reduce carbon dioxide emissions; its target is to reduce Swedish emissions by two per cent in two years. This will also demonstrate a will on the part of the Swedish people to reduce emissions and that the national reduction targets could be raised. The campaign makes use of adult education classes, lectures, radio, TV and the Internet.

The first step has been to train about 500 people internally at the participating organisations. Study materials are also being developed.

Some 500 – 1,000 "climate and lifestyle ambassadors" will be trained in the autumn of 2001.

These people will then lead adult education classes or provide information at workplaces.

A radio series will also be broadcast in the autumn. These activities are designed to encourage individuals or groups of people to commit to reducing their greenhouse gas emissions. The campaign website will be used to announce the commitments, to publicise identified obstacles in society standing in the way of a healthy climate and to encourage people to do more to influence decisions having a bearing on climate. The campaign will be regularly evaluated by the Swedish Institute for Ecological Sustainability.

### 8.5.2 "SparKraft" – Improving Energy Efficiency

The government created the Energy Supply Committee of Southern Sweden (DESS) in autumn 1997. Its task is to develop energy supply in the region.

A DESS initiative – "SparKraft" – Improving Energy Efficiency – began in 1999 as a four-year information project in cooperation with three regional energy offices. It is aimed at the industrial, property and household sectors. The idea is to support efficiency improvements and energy saving, and to limit the use of fossil fuels and electricity by changing over to energy from renewable sources. This is to be achieved by means of various pilot projects, public information and energy information.

Analyses are being performed at factories and in commercial and industrial premises.

Inventories are made and remedial measures proposed. Information is then distributed in various ways and the analyses serve as an example to others.

A nationwide campaign entitled "Släck efter dig!" ("Lights out before you leave!") is aimed at households in the region. The 2.2 million inhabitants of southern Sweden have received an information brochure and various adult education associations and municipal energy advisers are also involved. Special educational material for schools has also been produced. The aim is to create awareness of energy and environmental issues among the broad mass of people so as to ensure a long-term impact.

An initial evaluation a year into the campaign showed that 56 per cent of "the general public" had put one or more of the energy-saving tips in the "Släck efter dig" brochure into practice. The target of 15 per cent has been achieved with a vengeance.[4]

It is thought that the success of the campaign to date is due to the emphasis on simple and concrete energy-saving tips that do not cost much money.

## 8.6 Industry and the environment

Since the climate negotiations in Kyoto in 1997, the Confederation of Swedish Enterprise (formerly the Federation of Swedish Industries and the Swedish Employers' Confederation) has been distributing information to its member companies (chief executives and environmental directors), as well as to politicians, decision makers, journalists and schools.

"Klimatboken" ("the Climate Book"), which was published in 1999, describes the characteristic features of Swedish industry, the need for a "level playing field" and other aspects of its basic view of the climate issue. 15,000 copies of the book were distributed to these target groups. The Climate Book describes the scientific aspects of the climate issue and the international climate negotiations. It also describes the changeover from fossil fuels to other energy sources, the change from coal and oil to natural gas, and the reduction in energy use as three of the main ways of reducing emissions.

An easy-to-read climate brochure was also produced and distributed to all 7,000 or so member companies. The brochure gave a more general account of the scientific aspects of the climate issue and drew particular attention to the potential impact on companies of the international negotiations and various political decisions. A further publication has also been produced entitled "Klimatpolitik efter Kyoto" ("Climate policy after Kyoto"), in which the implications for Sweden of the Kyoto Protocol are described and analysed. The material has been used for a seminar for journalists and several thousand copies have also been distributed to decision makers and others.[7]

# 8.7 Municipalities

## 8.7.1 Agenda 21

Agenda 21 requires as many people as possible to participate to achieve the changes that will bring about sustainable development. For this reason, the local level has been given particular prominence in Agenda 21. The idea is that local people and municipalities should together produce a local action plan adapted to the needs and wishes in the area.

There has been a great response to Agenda 21 in Sweden. Efforts to formulate local Agenda 21 programmes have been, or are being, made on a broad front in most municipalities. In a study made in 1997, virtually all municipalities (97 per cent) said they were taking specific steps to involve local inhabitants. The most common methods of reaching the public include information material, exhibitions and marketing events, as well as advertising or articles in the local press. The emphasis has been placed on one-off activities, although regular campaigns are also common. Two out of three municipalities have also initiated educational and training activities in the form of courses and seminars, and have invited local inhabitants to attend public meetings. Adult education classes or environmental teams have been started in half the municipalities. Information and other activities relating to the greenhouse effect are a common feature of Agenda 21 projects.

## 8.7.2 The "Challenger Municipalities"

A project involving five "Challenger Municipalities" (Lund, Säffle, Uppsala, Växjö and Övertorneå) is running from 1998 to 2000 at the instigation of the Swedish Society for Nature Conservation. Five municipalities operating under differing conditions were selected from those applying to participate. The participants then set targets and drew up programmes to minimise their use of fossil fuels over time. Each municipality has set a target of a 50 per cent reduction in carbon dioxide emissions by 2020 or 25 per cent by 2010, with some variations. Local inhabitants have been informed of these commitments. The Challenger Municipalities wanted to show that it is possible to achieve a substantial reduction in fossil fuel use. There was also a joint advertising campaign in 2000, with full-page advertisements in Svenska Dagbladet and Dagens Nyheter, Sweden's two national daily newspapers. The campaign urged the Commission for Measures against Climate Change, which had been instructed by the government to review Swedish climate objectives, to set more far-reaching national targets along the lines of those set by the participating municipalities. The Challenger Municipalities project has received ample radio and TV coverage.

## 8.7.3 Local Investment Programmes (LIP)

Government funding for local investment programmes has two purposes: (i) to substantially increase the pace at which Sweden transforms into an ecologically sustainable society; and (ii) to increase employment. The programme gives municipalities and local companies and organisations the opportunity to make a joint application for investment grants to increase ecological sustainability. Grants are to be allocated to the municipalities whose investment programmes best contribute to the process of ecological adjustment.

Some of the SEK 7.2 billion that has been allocated for local investment programmes during the period 1998 – 2003 is being invested in supportive measures, including public information. Many projects focus on several environmental aspects, but projects often increase awareness of environmental issues.

## 8.7.4 A municipal project

The municipality of Vetlanda ran a project between 1997 and 2000 to reduce the environmental impact of road traffic. The project was run as a Community Intervention Program (CIP). The idea was that just over 100 "resource persons" would help people to become interested in the issue and accept a greater responsibility for the environment by discussing it with others in their daily lives. This is based on the belief that more is achieved when people are able to realise something they themselves have planned on the basis of their own thoughts and ideas.

As a result of the work carried out by the resource persons, in combination with other information activities, 70 per cent of municipal inhabitants knew about the project after three years, of whom 76 per cent considered it to be important. The motor car is still the commonest way of getting to work, but one positive effect of the project was to increase the amount of

[4] 28 per cent of people said that they had read the entire contents of the 52-page brochure distributed to Swedish households. As many as 80 per cent of those who had read the brochure said that it contained interesting information, and 56 per cent had saved it. The campaign also reached younger people (up to the age of 30). 79 per cent of them were aware of the brochure, and 83 per cent of these said that they had leafed through it or read some or all of it. The brochure was also sent to targeted categories, including the retail trade (mainly white goods). Here too, the campaign had a significant impact. 76 per cent of retailers said that they had noticed the brochure; 90 per cent of these had read or leafed through it and 67 per cent had saved it. 73 per cent of schools said that they intended to use the study materials produced for schools.

[5] The impact of the information campaigns has not been evaluated.

[6] In addition to the five municipalities, local branches of the Swedish Society for Nature Conservation participated in each municipality.

car-sharing. Similarly, more people have begun to walk and cycle to work.

On the other hand, the spare-time travel habits of the people of Vetlanda have deteriorated somewhat from an environmental viewpoint over the past year. Results show that 12 per cent of those who had begun car-sharing, cycling or walking in 1999 started to use their own car again in 2000.

The project has been continuously evaluated by researchers at Lund University.

## 8.8 Resource and information centres

Several central government agencies share responsibility for information on climate, often clearly linked to their own sector. A number of other organisations also play an important part in the climate issue and in efforts to disseminate information about the issue to their target groups and members. These are described in section 8.9.

### 8.8.1 The Swedish Environmental Protection Agency

The role of the Swedish EPA is to produce and disseminate information and knowledge about the environment, to take initiatives and to ensure that all actors assume responsibility for the environment. The Swedish EPA does not deal directly with the public. Its interface is mainly with sectoral authorities, regional and local authorities, and its role is to help formulate objectives, provide guidance and coordination and to monitor achievement of environmental objectives.

The EPA's conclusions are similar to those of the Commission for Measures against Climate Change with regard to information as in instrument of climate policy. The EPA considers that information alone is a weak instrument in relation to an environmental problem as complex as climate change. The agency is also of the view that information can cement and to some extent influence attitudes, but more powerful means are required to change behaviour. At the same time, the agency considers that information can help to change attitudes to the need for action, powerful instruments, and thereby also the need for political decisions.

The EPA is carrying out an information project on the climate issue during 2000 – 2002.

The primary targets of the project are municipalities, schools and trade and industry. The purpose of the project is to change attitudes about the need for measures and instruments and to make the public more receptive to information about what people can do to help reduce greenhouse gas emissions.

The EPA intends that the project should help

- to create the necessary conditions so that our actions increasingly take account of the impact on climate they cause;
- to attempt to create a positive perception of a sustainable Sweden in 50 years' time, with a better quality of life, a good standard of living and continuing Swedish competitiveness;
- to show that those who successfully manage to adjust to a sustainable society manufacture and use products that consume little fossil fuel;
- to develop information and education materials for the target groups.

Priority will be given to supporting municipalities that pursue the climate issue, developing various information material for exhibitions, developing the Swedish EPA website (www.environ.se), making an information pack on the third IPCC evaluation, identifying industry's climate information needs and producing teaching materials in the climate field for secondary and upper secondary schools. A number of seminars are also being arranged within the framework of the project, and a national climate conference is planned. The Swedish EPA conducts many other projects and activities in which the climate issue is very much a part and which involve the supply of various kinds of information. This applies to both the transport and the energy sector and more generally within the scope of sustainable development.

The Swedish Environmental Protection Agency is the public authority responsible for statistics on greenhouse gases and produces annual data for Sweden's communications under its UNFCCC and EU commitments. The statistics are available to the public at the EPA website and greenhouse gas emissions are also published by Statistics Sweden.

### 8.8.2 The Swedish Meteorological and Hydrological Institute

The task of the Swedish Meteorological and Hydrological Institute (SMHI) is to supply data for planning and decision making in activities dependent on the weather and climate.

SMHI is the expert body in the fields of meteorology, hydrology and oceanography, and is a resource in environmental protection.

Important SMHI products are its summaries and analyses of status, trends and extremes of climate variables. Information reports are published each month, annually and for longer periods. Standard climate reporting uses 30-year mean values. Special reports are produced in addition to these periodical reports. These may be in-depth analyses of specific

variables of interest in relation to periods of heavy rain or drought. Information is made available in various publications and, increasingly, on the Internet (www.smhi.se).

SMHI is also under a duty to maintain and develop databases containing climate variables.

These are made available for research and commercial operations at SMHI and elsewhere.

In addition to its role as a public authority, SMHI performs special consultancy work/climate analyses on a commercial basis for individual customers. This may be for planning housing or industry, or for companies in the energy sector etc.

SMHI data is intended to help Sweden derive economic, environmental and safety benefits from the general and specific climate information it supplies. Properly managed planning and use of resources that is correct from various perspectives will enable us to influence factors impacting on climate and the environment and reduce our vulnerability.

SMHI is an important source of know-how and information on climate issues for the government, public authorities and society as a whole. It is clear in Sweden, Europe and around the world that the question of climate and climate change is growing in importance.

Consequently, SMHI has been instructed by the government to intensify its efforts in the climate field.

#### SWECLIM

The Swedish Regional Climate Modelling Programme (SWECLIM) is a project mainly funded by the Foundation for Strategic Environmental Research (MISTRA) and SMHI.

Its purpose is to increase our knowledge of the impact of climate change in Sweden and the Nordic region. The main aim is to supply decision makers, public authorities, trade and industry and other researchers with reliable assessments of future climate trends using the best possible methods. Information is also supplied to the public. SWECLIM works in close association with SMHI. The information they supply is largely coordinated.

The programme regularly reports on progress at SWECLIM in the form of articles and seminars of various kinds. The programme has also become a source of information for the public by responding to enquiries and requests for material made by various groups, and by participating in various seminars. SWECLIM's work has also attracted media coverage, which helps to increase public awareness. Some 40 lectures/presentations and a further 40 or so radio and TV interviews were given in the second half of 2000. SWECLIM's work was mentioned is approximately 100 newspaper and magazine articles during the same period.

### 8.8.3 The National Energy Administration

Within its terms of reference, the National Energy Administration runs information and communication projects about the energy system. These heighten public awareness of the impact of the energy system on climate. National Energy Administration information projects may be divided into five sub-areas, as described below.

#### General energy information

Information is distribution to broad target groups in the energy sector, such as energy producers, energy distributors, energy users, municipalities, energy experts, architects, installation firms, other public authorities and the media. Traditional information channels are the administration's website (www. stem.se) and periodicals, as well as the annual energy conference: "Energitinget". The administration disseminates information and know- how about the energy system, analyses and forecasts, as well as information and changes in the regulations governing the energy system. Particular emphasis is placed on the interrelationship between energy, economics and the environment.

#### Targeted information about improving energy efficiency and renewable energy sources

Targeted information is intended to provide specific information and a basis for decisions for one or more well-defined target groups. As well as technical information, it may be a question of information engendering acceptance and awareness. The information is largely based on know-how and information produced at the National Energy Administration and other agencies, as well as international experience.

A great deal of information has been distributed to consumers. It has included facts about different heating systems and different ways of saving energy. Brochures, publications and fact sheets are often produced in cooperation with the Swedish Consumer Agency.

Material is also targeted at architects, builders, consultants, installation firms and retailers.

Each year for the last three years, an exhibition has toured Sweden, with two trailers demonstrating alternative energy systems for home heating, eg, pellets, heat pumps and district heating. 200 – 300 people have visited the exhibition in each town it has stopped at. A "wind power tour" was undertaken in 2000, with a view to supplying local/regional authorities and municipal energy advisers with information about research, development and implementation of wind power in Sweden.

The National Energy Administration has developed guidelines for procurement of high-energy equipment, taking account of aspects such as quality requirements,

occupational health and safety, operation and economics. Information has so far been produced for procurement of pumps, fans, lighting, ventilation, refrigeration compressors and compressed air. These guidelines are intended to help purchasers and, among other things, have been based on calculation formulae for life-cycle energy costs. The administration has distributed brochures and fact sheets to broad target groups as part of the technology procurement procedure, the purpose being to stimulate the market launch of the winning product.

Voluntary agreements with some ten Swedish municipalities were concluded in 2001. The agreements concern conversion of energy systems and improving energy efficiency so that carbon dioxide emissions are reduced to their 1990 levels.

**Grants for information projects and municipal energy advisory services**

The National Energy Administration gave grants for specific information and education projects between 1998 and 2000 in order to increase awareness of more efficient energy use. 69 projects received funding. Grants have mainly been given to regional energy offices, trade associations and other organisations. Grants during the period totalled just over SEK 10 million.

Government funding for municipal advisory services in the energy field was authorised for the first time between 1977 and 1986, and has been reinstated for the period 1998 – 2002.

The aim is to disseminate information about sustainable energy supply and improved energy efficiency via municipalities to the public, companies and local organisations. The grant can be used by municipalities to fund energy advisory services in their own municipality or for supply of these services in cooperation with other municipalities. The grant to each municipality is SEK 150,000 a year, plus a supplement related to the number of inhabitants in the municipality. 285 municipalities received this grant in 1999 and 2000.

**Information about municipal energy planning and dissemination of information about the interrelationship between energy, economics and the environment**

The National Energy Administration works to support municipal energy planning, which is supposed to help achieve local economically and ecologically sustainable energy systems.

This is done by commenting on draft municipal energy plans and by disseminating information and know-how about the interrelationship between energy, economics and the environment. A considerable number of publications have been produced jointly with the Swedish EPA. A book entitled "20 grader – men hur" ("20 degrees – but how?") was published in 1996 and compares factors such as the cost-effectiveness, environmental burden and energy efficiency of various heating systems for individual houses, apartment buildings, office buildings and schools. Practical examples are also given of settings for heating systems. The target group comprises property owners, building operators, heating, ventilation and sanitation engineers, officials at municipalities and energy companies, local Agenda 21 groups and educational institutions, including colleges, universities and those engaged in training heating, ventilation, sanitation and electrical engineers.

Several books along the same lines have followed. For example, "Ekonomi, energi och miljö på lokalnivå" (Economics, energy and environment at local level") deals with the links between these areas at local level using a new methodical approach. Examples are also given of measures or projects that are cost-effective and profitable, while reducing energy consumption and the burden borne by the environment. The target group consists of local and regional actors. "Lokala Uppvärmningsstrategier" ("Local Heating Strategies") gives ideas on converting heating systems, eg, strategies for new district heating and local heating. A publication entitled "Miljöanpassade lokala energiplaner – Exempel" ("Sustainable local energy plans – examples") complements this by giving good examples of sustainable municipal energy plans, eg, planning processes, objectives, strategies, environmental impact assessments and ideas for specific projects.

**Information in connection with EU initiatives**

During the period 1998 – 2001, the National Energy Administration ran a white goods campaign called "Stoppa elätarna – köp elsnålt" ("Stop the energy eaters – buy energy-efficient"), funded jointly by the industry. The aim was to persuade consumers to choose energy-efficient alternatives when they replace their white goods. The campaign complemented the EU energy labelling of refrigerators, freezers, dishwashers, washing machines and tumble driers.

Information activities are also conducted to encourage individual metering and charging of heating and hot water etc, which is governed by EC Directive EEC/93/76. OPET is a network of organisations in the EU, whose main task is to communicate research findings in the field of new technology. The National Energy Administration runs the office. Sweden has two offices: OPET Sweden and OPET Arctic, which began operating in 1997. Total funding in 2000 was SEK 2.5 million. The purpose of OPET is to promote energy technology by accelerating the market launch of new innovative energy technology.

**Monitoring results**

The aim of the above information activities is to improve public awareness and knowledge.

This will in turn result in action, which will help to improve energy efficiency and greater use of renewable energy sources. Monitoring focuses on determining the extent to which awareness has arisen among the target groups and the extent to which this has resulted in action. However, monitoring of this kind is costly, and has therefore been largely confined to major activities such as campaigns.

Monitoring of results has shown that over 23 per cent of consumers saw the white goods campaign during 1998 – 2000, and that 50 – 54 per cent of consumers think that energy efficiency is an important factor when buying a refrigerator, freezer, washing machine or tumble drier. A slight increase has been noted in the ability to interpret EU labelling among those planning to buy white goods. A comparison of sales statistics between 1997 and 2000 (ie, the campaign period) reveals a sharp move away from less energy-efficient appliances to energy-efficient class A and B devices. It is estimated that this may increase energy efficiency by just over 0.12 TWh.

Around 40 per cent of consumers were aware of the campaign for low-energy light bulbs.

Sales of these in 1998 – 1999 are estimated to have reduced energy consumption by about 5 GWh. According to participating installation firms, the "vatten-värmer-bättre" ("water warms better") touring exhibition had a great impact. They said that orders for waterborne heating systems had increased as a result of the tour. The effect to 2000 of the "Eko-energi-projektet" ("the eco-energy project") in industry (based on the companies reporting) is an energy saving of 33 GWh, including just over 10 GWh of electricity.

Information on procurement of new technology is considered to have made a major contribution to the introduction of the 17 products covered by technology procurement between 1998 and 2000. New heat pump technology has met with a particularly positive response; these pumps have replaced both oil-fired boilers and electric heating systems. A rough estimate of the effect of new heat pumps is that oil consumption has fallen by 0.4 TWh and that electricity consumption for heating has fallen by 0.13 TWh. However, it is not possible to distinguish between the effects of information distribution and the effect of the technology development projects. But if all types of energy efficiency project are taken together, energy consumption is estimated to have fallen by 0.4 TWh. This figure is based on sales statistics.

It is fairly hard to determine the effect of grants for municipal energy advisory services, and to measure the effects in terms of KWh or carbon dioxide emissions is virtually impossible.

However, 40 per cent of advisers feel that energy advice has raised public awareness of energy issues. Just over 200 consumers who had received energy advice were interviewed.

Their responses show that almost all recipients of advice are householders who either wanted some general advice on how to save energy or who wanted to ask questions about changing over to a different heating system, eg, to heat pumps or pellets. 86 per cent thought the information they had received was very or fairly useful. Following energy counselling, about half of them made an investment or changed their behaviour; the other half said that they planned to improve their energy efficiency in some way.

## 8.8.4 The National Road Administration

The National Road Administration, which is the sectoral agency for the road transport network, works to achieve two-way communication via a large number of activities.

At present, the administration has two major projects in progress at national level:

"Kvalitetssäkring av transporter" ("Transport Quality – TQ"), and "Sparsam körning - SPARK" ("Green Driving"). Local departments of the National Road Administration also run their own projects jointly with county councils, private enterprise and organisations.

The Transport Quality project is being run as a two-pronged traffic safety and environ- mental project. The aim is to create an effective market for safe and environmentally compatible transport. Both purchasers and sellers of transport are targeted by the project.

Trade and industry is also participating, mainly in the form of companies and trade associations in the retail, food, engineering, steel, mining, pulp and paper and transport sectors. The contribution made by the National Road Administration has been to provide a systematic approach, give examples of effective demands that can be made and of what the carrier can do.

The "Sparsam körning – SPARK" ("Green Driving") project is intended to make people more aware of how their approach to driving impacts on the environment. Important elements of the project are Eco-driving and Heavy Ecodriving (for truck drivers), which are practical and theoretical training courses on which people learn to drive in an environ- mentally compatible way. Some 3,400 people have completed the Ecodriving course.

The National Road Administration also conducts and/or supports and number of regional projects, in which information/communication are important elements. The Vetlanda project, described in greater

detail in section 8.7.4, is one such project. The administration has also taken part in the "Challenger Municipalities" project, described in section 8.7.2.

The administration also publishes information about traffic and the environment at its website (www.vv.se). Examples are information about ways of driving, choice of car, energy- efficient engines and engine heaters.

### 8.8.5 The Swedish Consumer Agency

The Swedish Consumer Agency is the central government agency dealing with consumer affairs. Its main task is to help consumer to use time, money and other resources in the best way, and to strengthen their position in relation to sellers and manufacturers. The agency also scrutinises marketing methods and participates in eco-labelling projects. Its primary objective in the environmental area is to ensure the development of patterns of production and consumption that reduce the burden on the environment and contribute to sustainable development. The agency distributes information via publications such as its "Råd&Rön" consumer product testing magazine, by training consumer advisory officers and via its website (www.konsumentverket.se).

Each year, the agency produces a brochure on the fuel consumption of new automobiles and their carbon dioxide emissions. The latest brochure had a print run of 175,000 copies.

It was distributed free to prospective purchasers at car showrooms. The information it contains is also available at the agency's website, where the figures can also be used to make cost calculations prior to purchase. Under EC Directive 1999/94/EC, all EU countries must provide information about fuel consumption and carbon dioxide emissions for new automobiles as from 2001.

The Swedish Consumer Agency also give advice on how to save energy in daily life and at home. The Råd&Rön consumer magazine provides information about eco-labelling of white goods, travel and cooking. The magazine currently has some 135,000 subscribers and is read by an average of 520,000 people.

The Swedish Consumer Agency considers that awareness of the negative impact of consumption on the environment has increased among consumers and in trade and industry. It is also considered that the agency's efforts have definitely made it easier for consumers to reduce the burden they place on the environment by regularly reminding them to consider environmental factors, by sending consistent messages, adopting an overall approach and giving specific advice.

### 8.8.6 The Swedish Institute for Ecological Sustainability

The Swedish Institute for Ecological Sustainability (IEH) is a national focal point for know-how, research findings, ideas and experience concerning the issue of ecological sustainability.

The institute's main task is to support Swedish municipalities in their efforts to develop and implement local investment programmes by facilitating contact between municipalities, researchers, trade and industry, organisations and other actors. IEH should also inspire and inform by spreading information and experience from completed investment programmes.

The climate issue is part of this. Information is disseminated through newsletters, conferences, the website (www.ieh.se) and face-to-face contact.

### 8.8.7 The Swedish International Development Cooperation Agency (Sida)

Sida administers foreign aid given to developing countries. For example, Sida funds local Agenda 21 projects in a number of countries. It also provides environmental organisation and network support for individual organisations in developing countries via the Swedish Society for Nature Conservation. This support has made it possible to conduct information campaigns about patterns of consumption and lifestyle issues in industrialised nations that have an adverse impact on the environment. Sida also runs education and training projects and funds the periodical "Tiempo" and its accompanying website, which deals with the climate issue. More information about Sida's work in developing countries is given in Chapter 6 under "Financial support and technology transfer".

### 8.8.8 Ekocentrum

The Ekocentrum know-how and resources centre in Gothenburg runs a large permanent environment exhibition. Ekocentrum is an independent foundation originating from the green movement, and contributes to sustainable development by spreading knowledge and inspiration concerning environmental technology and successful environmental projects. Its activities consist of a permanent exhibition on various themes, with training courses and seminars. Some 70 per cent of visitors to the centre are from trade and industry and Swedish municipalities; 30 per cent come from the schools system. At present there is an exhibition entitled "Sustainable Energy and Transport". The exhibition demonstrates good examples from a global, national, regional and local perspective. The focal point of the transport exhibition is a detailed presenta-

tion of available environmentally compatible fuels, vehicle types, alternative solutions and the potential contribution of IT to sustainability. The climate issue is dealt with thoroughly as part of the transport exhibition. Some 15,000 people visit the exhibition each year.

## 8.9 Involvement of the public and non-governmental organisations

Most NGOs are involved in climate issues and take an active part in the public debate. They include established international non-profit organisations, as well as less formal networks and representatives of specific lobby groups in trade and industry and other sectors of society. Agenda 21 has involved a very large number of local organisations in the climate issue. These include farming associations, sports clubs, youth organisations, adult education associations etc. Several organisations have already been described above under other headings.

The Swedish Society for Nature Conservation is very actively involved in the climate issue. It instigated the "Challenger Municipalities" project described above. The society is one of the organisations involved in the Klimat.nu campaign, which has also been described above.

The society also distributes information to its members via newsletters, the magazine for members, seminars and its website. The society also plays an active role in public debate, participating in discussion programmes on TV and radio. The World Wildlife Fund conducts international campaigns, but also operates nationally in Sweden. Its Swedish activities include its magazine for members (WWF Eko), seminars and lectures. WWF activities in Sweden have attracted a certain amount of media coverage.

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