

The future environment

– our common responsibility

Summary

**Final report of the
Committee on Environmental Objectives
Stockholm June 2000**

The Committee on Environmental Objectives (M1998:07) is a committee incorporating representatives of all the political parties in the Swedish Riksdag (Parliament). We have been assigned by the Government to present goals, targets and action strategies that will make it possible to achieve 14 of the 15 national environmental quality objectives adopted by the Riksdag in the spring of 1999. The Committee has presented its proposals in its report, 'The Future Environment? Our Common Responsibility'. The present publication is an English translation of the report's Introduction and Summary.

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Our common responsibility

Work on Sweden's environmental quality objectives is based on five fundamental principles: promoting human health, safeguarding biological diversity, protecting cultural heritage, preserving the long-term productive capacity of the ecosystem and ensuring that natural resources are properly managed. This is what we mean by ecologically sustainable development.

The costs associated with environmental problems are considerable. They stem not only from production losses and the destruction of materials but also from impaired health and the loss of both cultural heritage and biological diversity. We have sought to assess ongoing environmental damage in economic terms. The costs are not easy to estimate in detail but in our judgement they amount to well over SEK 20,000 million a year. We feel that it would be very unwise to postpone action any longer.

The Swedish Riksdag (Parliament) voted without reservation to adopt fifteen environmental quality objectives. In so doing, it enjoined the Government to present at one and the same time all the subgoals or targets required for the achievement of the fifteen objectives. Accordingly, we are now submitting a comprehensive set of proposals that include specified objectives, intermediate targets, strategies and policy instruments. We have adopted an integrated approach in our work, and issues relating to the cultural environment and to environmental health have been given greater emphasis than ever before.

The overall challenge facing us is to hand over to the next generation a dynamic but sustainable society in which the major environmental problems have been solved. To this end, the long-term goals must guide present-day decisions. Action must be taken now if our children and grandchildren are to have a tolerable environment to live in. If the objectives formulated here are to be achieved, everyone must contribute. This means that public authorities, companies, organizations and private individuals must take whatever action is necessary and that appropriate policy instruments must be introduced. All concerned must acquire a better understanding of what sustainable development involves.

In our opinion, environmental efforts must focus increasingly on the causes of environmental problems and not just the symptoms. Implementation of our proposals would entail a considerable intensification of Sweden's environmental endeavours. This implies working more actively to preserve biological diversity, clean up pollution and reduce emissions, and also to safeguard our cultural heritage and natural environment. Together with successful international efforts to limit airborne pollution and other problems, and a greater degree of interest among the general public and in industry, these proposals should lead to significant environmental improvements. We expect considerable progress in the fields of acidification and air quality. Areas of considerable natural, cultural and historical value will be protected. Hazardous substances will be stopped and clean-up work will be speeded up while at the same time emphasis will be placed on targeted efforts to prevent new environmental problems arising.

For several of the objectives, it will take more than a generation before we rid ourselves of the negative effects of environmental pollution. This underlines the need for measures that reduce the strain on the environment. The intermediate targets we propose are aimed at reversing negative trends and 'greening' the activities of society. Adaptation of societal activities is essential if we are to reduce environmental strain to such an extent that we are in a position to achieve a sustainable environmental state. Our estimates show that the costs of measures taken after the damage has been done are far higher than the costs of preventive measures.

It can take a very long time for the soil, water and atmosphere to recover from pollution that has been introduced into them over the decades. Problems with deficient environmental quality will persist as a result of the pollution and nutrients that have accumulated in the soil, water and atmosphere. This is due either to the fact that recuperation is sometimes a very slow process or that there is not enough time to clean up polluted areas. Global problems such as the depletion of the ozone layer and the enhanced greenhouse effect deriving from human activity cannot be solved within a generation. The Climate Commission has proposed targets for 2050, indicating that the task of adapting activities in society so that the objective 'Limited Influence on Climate Change' is achieved will take about two generations. Nor in the case of eutrophication, environmental toxins and acidification will it be possible within a generation to restore the environment to its previous condition to such an extent that damage to biological diversity and to both heritage and health can be avoided.

We cannot say with any certainty today what the future holds in the way of environmental problems. Nor do we know enough about certain

specific issues, and we will need to enhance our body of knowledge in these areas. We will also need to define new and more exact intermediate targets with regard to these issues later in the period.

Under our proposals, the Riksdag in adopting the subgoals below will be setting targets for the various steps along the way to sustainable development and in so doing will give substance to the national environmental quality objectives. Central government will assist in this endeavour via measures taken by its sectoral agencies, by providing economic incentives and by creating other beneficial conditions for environmental work. Its task is also to ensure that laws and regulations are enacted and properly implemented. Environmental monitoring and advanced follow-up systems are further responsibilities of central government. One of the most important prerequisites for the achievement of Sweden's environmental quality objectives is successful work in the EU and active participation in efforts by the international community to resolve environmental issues. The new Environmental Code will be another important tool in Sweden's bid to achieve its objectives. Central government must also provide targeted policy levers. Sound training in issues relating to sustainable development is a further prerequisite, partly in order to boost general levels of knowledge in society and partly to pave the way for university-level training in this field. High-class research is of decisive importance in discovering problems and following up effects on people and the environment, and thus for putting selected solutions and proposed objectives to the test. High-quality research is also crucial to Sweden's ability to be a driving force in international environmental efforts.

Government regulation alone cannot lead Sweden to sustainable development. Increasingly, it is a case of all concerned having to contribute – private individuals, companies, organizations and public authorities. It is a matter of new lifestyles and individual responsibility. But it is also a question of creating a social framework in which research and education go hand in hand with the kind of technological development that is ecologically sustainable. An environmental perspective must be woven into all politics, into everyday life and into official and public undertakings. We must ensure that environmental issues are not dealt with separately, but rather are linked to community development as a whole so that the opportunities become generally apparent.

Many companies are already using environmental management and certification systems and many private individuals are actively involved in recycling waste and making environmentally sound consumer choices. At local level, numerous people are working actively with Agenda 21, and the proposals that have emerged from this work are

currently being turned into practical action. Achieving a good future environment is the responsibility of us all. We urge local authorities, companies, organizations and private individuals to continue their successful efforts to protect the environment. Only through common endeavour can we achieve our goals.

The present report is based on the Government's Bill, Swedish Environmental Quality Objectives, and the Riksdag's decision in this respect. Proposals concerning subgoals and measures have been submitted by over 20 government agencies and from all of Sweden's county administrative boards. Over the past two years they have worked extensively to draw up proposals with regard to subgoals, sectoral goals, action strategies and policy instruments. Many of them have in turn consulted with trade and industry, local authorities, special-interest groups, organizations, etc, in their respective spheres, sectors or regions.

We have been in constant touch with these agencies throughout the work process. We have also conducted five hearings on the various objectives with government agencies, business representatives and trade organizations with a view to gaining endorsement for our proposals from those who have performed important groundwork and who will also have extensive responsibility for implementing them. Together with the Swedish Association of Local Authorities we have organized four regional seminars, and we have worked closely with the Climate Commission and the Committee on New Guidelines for Chemicals Policy over the composition of action packages and assessments as to the impact of our proposals.

Thus our proposals are the outcome of very wide-ranging discussions. We would like to extend our warmest thanks to all who have taken part in this process and who have thus ensured the progress of the work being done to achieve the environmental quality objectives. Thousands of individuals have been involved in the work in one way or another. For the first time, sectoral agencies have been given the opportunity to formulate proposals for the fundamental shaping of environmental policy. In a few cases, we have amended their proposals. When this has happened, we have made a point of seeking re-endorsement through dialogue and hearings. Our proposals are now due to be circulated for consideration. This is not enough, however. To ensure continued progress, the various agencies involved must as a matter of the greatest urgency be induced to follow up the discussions under way in their respective areas and to continue their collaboration to achieve the objectives in hand. Likewise, to ensure widespread acceptance of the objectives, local authorities, the business community, organizations and private individuals must all be invited to take part in

the continuing efforts on behalf of the environment. The work of formulating environmental objectives must not be seen as a one-off process. Each time an objective is to be reviewed, those who have been active today must again be given the opportunity to take part.

Our proposals provide for

- supplementary specification of the environmental quality objectives showing what quality levels are to be attained within a generation;
- intermediate targets, usually for 2010, showing what needs to be achieved by the halfway stage if the objectives are to be realized;
- action strategies and policy instruments to ensure that the objectives can be achieved;
- follow-up systems enabling us to determine whether we are on the right track;
- the division of responsibilities between national agencies, county administrative boards and local authorities.

In this way, the various measures can be adjusted and updated as we progress towards the generational goal. We have made considerable efforts to ensure that our proposed goals and target are as clear and accessible as possible. They should be possible to follow up in both the short and long term, they should prioritize the most important issues, they should be part of an all-inclusive structure and they should generally be possible to apply at regional level. The specified subgoals are more general in character while the aim has been to make the intermediate targets more detailed. To this end, we have incorporated the proposals we have received from the various public authorities into a uniform system. As we see it, the environmental quality objectives should point the way for us all while the specified subgoals and the intermediate targets should provide guidance in respect both of central political decisions concerning laws and policy instruments and of decisions at municipal, regional, company and organizational level. The various goals should govern both sectoral decision-making and decisions of an intersectoral nature. We also state in the report what will be required of various players if the goals are to be achieved. We suggest that the county administrative boards be given the task of providing the regional environmental data on which they themselves, local authorities and other players can base their environmental efforts.

We have sought as far as possible to consider the various proposals in relation to the consequences they would have for private individuals, companies, central government and the economy. Various levels of ambition have been analysed. Our aim has been to find a combination of the most effective and profitable measures leading to the desired outcome.

In many cases, Sweden's environmental quality objectives cannot be realized without active efforts in the international arena. The long-range transportation of airborne pollutants, marine discharges from various countries and the cross-border mobility of environmentally harmful products are some of the issues that must be resolved if Sweden is to achieve its environmental quality objectives. Within the EU, common rules apply in a large number of areas. Consequently, Sweden must continue its vigorous pursuit of anti-emission measures at EU level and its promotion of efforts to support the sustainable development concept in EU policies in the agricultural, fishery and regional development sectors.

Action strategies in three prime areas will be required if the environmental quality objectives are to be achieved. In each case, effective application of the Environmental Code will be of fundamental importance, as will research and education and the continued use of voluntary efforts, e g environment management systems and environmental certification.

- Improved efficiency in energy use and production and in transportation. We must arrive at an energy system that is sustainable in the long term. To reduce emissions and the need for expensive new production plant, we must conserve energy, make energy production more efficient and introduce renewable sources of energy. In the case of vehicles and industrial machines, the strategy will involve introducing new fuels and means of propulsion and making further progress on exhaust emission control. More traffic must go by rail and people must travel more by public transport and bicycle or walk. To accomplish the goals of this strategy, a combination of information and economic incentives will be required.
- Non-toxic, efficient ecocycles. Especially hazardous substances must be phased out and chemical substances in products must be labelled. The goods cycle must be streamlined and re-use and recycling made the rule. Stronger measures are needed to combat eutrophication in agriculture, with regard to both public sewage systems and private. To realize this strategy, a combination of legislation and information will be required.
- Improved management of soil, water and the built environment. Valuable areas are to be protected, biological diversity is to be preserved and consideration is to be shown towards natural and cultural assets in connection with land development. Agricultural subsidies should be directed towards providing greater protection for these assets. Natural and cultural assets must be preserved and cared for on a permanent, ongoing basis. Public planning and building must be carefully applied and environmentally compatible. For this

strategy to succeed, a combination of government subsidies and legally binding regulations will be required.

Further and more effective policy instruments will be needed to implement the strategies. In the short space of time at our disposal, this committee has not had the opportunity to make an in-depth study of potential policy instruments or to rank them in any final order of priority. We therefore propose that a number of supplementary inquiries be initiated.

In our judgement, there is a good chance of bringing about the desired changes in societal activities if the above strategies are fully implemented. In a number of instances, we have no finalized proposals. We suggest that further inquiries be initiated in these areas. These should be conducted with all due speed as the proposed measures need to be set in motion over the next few years and environment protection work needs to be stepped up in order to achieve a state where development is ecologically sustainable. We wish to emphasize that supplementary measures will also be required for the achievement of socially and economically sustainable development in Sweden. Proposing such measures has not been part of our brief, however.

There are a number of areas in which our proposals will be insufficient or where our inadequate knowledge of the issue means we cannot be sure they will suffice. In some cases, new or more closely specified intermediate targets will have to be defined later in the period. In our judgement, further measures and instruments over and above those we have proposed will be needed if Sweden is to succeed in its environmental endeavours. Considerable efforts will be required after 2010 to achieve the desired objectives. In the case of health, we estimate that toxic substances are likely to be one of the problems still outstanding, possibly along with indoor climate issues and noise. As regards biological diversity, it will still be threatened in one generation's time by eutrophication, toxins and soil acidification. In the case of the cultural environment, soil acidification and other factors will continue to degrade archaeological materials for a long time to come. As regards the productive capacity of land and water, the shift to environmental compatibility will take a long time for the land-based industries. In the case of natural resources management, there would seem to be a good chance of orientating planning and decision-making towards the kinds of decisions that lead to sustainable development and achievement of the environmental quality objectives. Each individual decision will be of importance. It should be emphasized, however, that major improvements will be achieved in respect of all five of the fundamental principles underlying the present work.

For activities in Swedish society to lead to sustainable development, measures will need to be taken throughout the community and work in many policy spheres will have to be directed towards achieving the environmental objectives. The measures must be designed in such a way as to avoid creating fresh environmental problems. New problems can have a highly adverse effect as many Swedish environments are particularly sensitive to degradation. Research aimed at analysing new health and environmental risks is an important part of the effort to achieve sustainable development.

To date, the work on Sweden's environmental quality objectives has been broadly based with the explicit aim of achieving the broadest possible agreement on the goals to be achieved. We appeal to those who will be dealing with our proposals to ensure that the same spirit will continue to be manifested in the future.

We must apply ourselves with great determination to the task of implementing the strategies for sustainable development. There are signs, however, that much of the work being done in the environmental field will prove profitable for companies and private households alike and that Sweden has every prospect of becoming a leading country in the environmental sphere. Many people feel a deep-rooted affinity with nature and are thus motivated to protect the environment. As many companies already do, a growing number of local authorities now view the environment as a strategic quality issue and not just as a cause of extra expense. We must work purposefully to maintain this momentum.

PROPOSED OBJECTIVES AND TARGETS

CLEAN AIR

NATIONAL OBJECTIVE ADOPTED BY THE RIKSDAG:

"The air must be clean enough not to represent a risk to health or to animals, plants or cultural heritage assets.

Specifically, the environmental quality objective implies that:

- The concentration of airborne pollutants must not exceed established low-risk levels for cancer, hypersensitivity and allergies, or for respiratory diseases.
- The levels of ground-level ozone must not exceed the limits established for the purpose of preventing damage to health, animals, plants, cultural heritage assets and materials."

SUBGOALS PROPOSED BY THE COMMITTEE

We propose that the two specifications in the national objective be changed to:

- The concentration of airborne pollutants must not exceed low-risk levels for cancer or other guideline levels for protection against respiratory diseases or negative impact on plants, materials and cultural heritage assets. Levels are to be set with due regard to hypersensitivity and allergies.

Pollutant	Levels not to be exceeded[micrograms/m ³]	Mean measurement period
Benzene	1	Year
Benzo(a)pyrene	0,0001	Year
Ethene	1	Year
Formaldehyde	10	Hour
particles < 10 micrometers, PM10	30 15	24 hours Year
Soot	10	Year
Sulphur dioxide	5	Year
Nitrogen dioxide	100 20	Hour Year
Ozone	80 50	Hour Summer months (Apr-Oct)

Proposed intermediate targets:

1. The target levels for sulphur dioxide and nitrogen dioxide shown in the table will have largely been attained in all local authority areas as early as 2005 and 2010 respectively.
2. The concentration of ground-level ozone will not exceed 120 microgram/m³ (8-hour mean) in any local authority area by the year 2010.
3. By the year 2010, emissions of volatile organic compounds (VOCs), excluding methane, in Sweden will have been reduced by at least 55 per cent from 1995 levels, to 220,000 tons .
4. By the year 2005 at the latest, an intermediate target will have been established for particles of less than 2.5 micrometres (PM 2.5). An initial review of the long-term goals for air quality will also take place at this time.

WHAT ARE THE PROBLEMS – AND HOW CAN THEY BE SOLVED?

An increased risk of cancer, cardiac and respiratory diseases, and greater problems for allergy and asthma sufferers are just a few examples of the effects on public health generated by the emission of various substances and by airborne pollutants, especially in urban areas. Elevated levels of ozone in rural areas result in smaller harvests and reduced plant growth. Elevated levels of ozone as well as of sulphur dioxide and nitrogen dioxide in urban areas gradually break down cultural artefacts and materials.

Air quality in urban areas has improved in recent decades; sulphur concentrations are now well below the environmental quality norm and nitrogen dioxide levels have also declined. Concentrations of ozone, particles and carcinogenics, however, are still excessive. One problem is that too little is known at present about the way in which particle emissions affect health, but a number of studies suggest that the concentration and number of small particles (PM 2.5 – less than 2.5 micrometers) have an adverse impact on health. There is as yet insufficient expert knowledge in this field to permit setting a long-term intermediate target with respect to low-risk levels for small particles.

Even if air quality has improved in pace with the decline in emissions, further measures are required if the generational objective for air quality is to be achieved. Action at a local level becomes more important, especially with regard to limiting emissions of nitrogen oxide, particles and carcinogenics. Research and development aimed at establishing the links between health risks and allergies is another important area.

How are the intermediate targets to be met?

See under this heading in the next section, which applies equally to Clean Air and Natural Acidification Only.

NATURAL ACIDIFICATION ONLY

NATIONAL OBJECTIVE ADOPTED BY THE RIKSDAG:

”The acidifying effects of acid depositions and land use may not exceed the limits that can be tolerated by soil and water. Depositions of acidifying substances must not increase the corrosion rate in technical materials or cultural artefacts and structures.

Specifically, the environmental quality objective implies that:

- Unnatural acidification of the soil must be combated in order to preserve natural productive capacity and biological diversity.
- Sweden should endeavour to ensure that depositions of acidifying substances in the long term remain below the critical load for soil and water.
- Airborne levels should be kept below 5 micrograms of sulphur dioxide/m³ and 20 micrograms of nitrogen dioxide/m³ (annual mean) in order to protect technological materials.”

SUBGOALS PROPOSED BY THE COMMITTEE

We propose that a new supplementary specification be added to the Riksdag decision:

- The contribution of land use to the acidification of soil and water must be countered by improved forestry practices that take into account the susceptibility of the habitat concerned to acidification.

Proposed intermediate targets:

1. By the year 2010, no more than 5 % of Sweden’s lakes and 15 % of all stretches of running water will be affected by acidification caused by human activity.
2. Prior to the year 2010, the trend towards increased acidification will have been halted in areas where the cause is human activity, and recovery will have begun.

3. By the year 2010, airborne emissions of sulphur dioxide in Sweden will have decreased by at least 25 per cent from 1995 levels, to 72,000 tons .
4. By the year 2010, airborne emissions of nitrogen oxides in Sweden will have decreased by at least 55 per cent from 1995 levels, to 155,000 tons .

WHAT ARE THE PROBLEMS – AND HOW CAN THEY BE SOLVED?

Acidified lakes and watercourses, acid groundwater and greater acidification in forest and farmland areas all stem from the deposition of acidifying substances. In addition, acidification threatens health and damages both buildings and other cultural heritage features, etc. The deposits come from a wide range of sources, including road traffic and haulage, manufacturing industry, agriculture and industrial machines. Some 80–90 % of the deposits come from other countries. Our acid emissions affect other countries in turn.

As a result of international agreements recently concluded, emissions on the European continent will be drastically reduced and there is reason to view future developments in relation to acidification with some optimism. But there is work to be done before the generational objective can be achieved. The goals cannot be realized unless Sweden participates in coordinated international efforts and the agreements that have been reached are properly fulfilled.

Even if emissions are reduced to sustainable levels, a lengthy period of recovery will be needed before the results are discernible in the environment, and special attention must be focused on the risk of biological acidification becoming dominant in forest soil as the deposits of acidifying substances decrease. Thus measures limiting emissions are not the only important ways of countering acidifying processes. Forestry must be adapted to take account of acidification-prone forest land. Full-tree harvesting is more acidifying than conventional whole-stem logging. Soil acidification can be reduced by the practice of blending in certain deciduous trees such as birch. Compensatory fertilization may be necessary in certain kinds of soil to reduce loss of nutrients when timber is cropped. When biofuels are harvested, the ash should be returned to the soil.

How are the intermediate targets to be met?

MEASURES

At present, about a third of the watercourses and almost 20 per cent of all lakes in Sweden (some 10 % of the total lake surface area) are estimated to be suffering the effects of man-made acidification. In order to achieve the subgoal by 2010, emissions in Europe must be limited in accordance with recently concluded international agreements in this area. We will also need to continue liming on the scale required to preserve biological diversity. It often takes longer than ten years before traceable changes in the chemical composition of forest soil can be detected, but revitalizing fertilization and liming will be needed in the long term. When the emissions and deposits have decreased, the liming can be reduced.

International cooperation aimed at limiting the release of acidifying substances will be a crucial factor in achievement of the proposed goals, especially in view of the fact that such a large share of the fallout comes from other countries. First and foremost, active international efforts are required to reduce ozone concentrations in both urban and rural areas.

Steps must be taken with regard to the scope and location of activities in the transport sector, and to the operational methods used. These measures may involve things like speed limits, smoother driving patterns, better coordination and efficiency in the freight sector, and more bicycle and rail traffic. Further technological development of vehicles with a view to lower exhaust emissions, cleaner fuels and in time other systems of propulsion is another imperative.

Emissions of benzene and other carcinogenics can be reduced by a number of means, such as the development of more efficient catalytic conversion, cleaner fuels and devices that prevent petrol from evaporating. New exhaust requirements for cold starts at low temperatures due to come into force in 2002 are expected to halve benzene emissions.

Improvements are needed with regard to all types of diesel- and petrol-driven industrial machinery as well as to tools and equipment (snow scooters, chainsaws, lawnmowers, etc), partly by introducing more stringent exhaust requirements for new machines and partly through the retroactive fitting of filtering systems on existing machines.

Energy usage in industry must become more efficient, and technical measures for cleaning nitrogen oxide and sulphur emissions are also important. Switching to other forms of heating or sources of energy, for instance replacing fossil fuels and electrical heating with bioenergy, is a

further requirement which is especially useful for reducing emissions of carbon dioxide.

POLICY INSTRUMENTS

Sweden's current taxation system for heating fuels, electrical energy and propellants has certain shortcomings. The tax rules vary for electrical power and heating production on the one hand and for the manufacturing industry and the district heating/household sector on the other. There is a tendency to move fuels between different sectors or areas of usage, thus failing to exploit the potential for rational energy use or technological development. Energy usage in multi-family dwellings must also be a focus of closer attention and the taxes on electricity and district heating should be based to a far greater extent on actual energy use.

The use of economic incentives is an important means of achieving sustainable ecological development. In framing such incentives, it is important to bear in mind that they should encourage technological development and efficiency and hasten the replacement of old technologies by new ones. The effects of policy controls need to be reviewed in a number of areas, such as the following:

- The overall energy taxation system needs to be brought into line with the national environmental quality objectives.
- Local authorities should be given the right to introduce road charges.
- Following the introduction of a charge on nitrogen oxides, emissions have decreased sharply. There is therefore reason to review the question of whether the charge – which has been fixed from its introduction and needs to be brought into line with the intermediate targets – should be extended to new sectors.
- Vehicle tax and purchase tax rates should be reviewed so as to steer users towards both vehicles and fuels that generate significantly lower emissions than those complying with current mandatory requirements. Care should be taken to ensure that policy levers do not cancel each other out. A committee reviewing such a move would also be in a position to formulate economic incentives that could be linked to the environmental classification of industrial machines.
- The variable cost for diesel-powered heavy traffic needs to be adjusted as soon as possible so that it becomes an effective environmental instrument. Sweden should actively press in the EU for a change in EC legislation that would enable the introduction of

an environmentally effective system of differentiated taxation per kilometre.

- Sweden should press for amendment of the Auto-Oil Directive to boost the permitted levels of renewable fuel.
- The competitiveness of renewable fuels in relation to fossil fuels must be enhanced.

In every sector, there is considerable scope for using energy more efficiently. The technology and know-how are available but implementation is poor. Government must make its intentions clearer, and information in this regard will only be effective if there is scope for energy conservation and the message enjoys popular support. One example is energy usage in multi-family dwellings.

We consider that heating in multi-family dwellings should be individually measured on a test basis in a number of areas. The National Board of Housing, Building and Planning together with the National Energy Administration should be jointly instructed to look into the matter and propose ways of encouraging developers and property managers. These two bodies together with relevant trade associations should also develop a system linking a property's energy usage and its environmental impact. A system whereby buildings are required to carry an environmental impact and energy use certificate should be introduced.

The tasks of Sweden's municipal energy advisers should be more long-term and be broadened to encompass municipal transportation as well.

It is also of the utmost importance that Sweden continues to maintain a high profile with regard to research and development in the acidification and air quality field. In addition, an intersectoral Swedish strategy is needed for further efforts in the international arena aimed at restricting emissions of acidifying substances. Such a strategy should consider health, environmental and climate aspects in a common perspective.

NO EUTROPHICATION

NATIONAL OBJECTIVE ADOPTED BY THE RIKSDAG

"Nutrient levels in soil and water must not be such that they adversely affect health, the conditions for biological diversity or the possibility for varied land and water use.

Specifically, the environmental quality objective implies that:

- Nutrient levels in the environment must not adversely affect health or jeopardize the conditions for biological diversity.
- Groundwater must not contribute to increased eutrophication in surface waters.
- Lakes and watercourses in forest and mountain areas must remain in their natural state
- The status of lakes and watercourses in agricultural areas should remain natural, i.e. nutrient-rich or moderately nutrient-rich.
- Nutrient levels in coastal and sea waters should be broadly similar to those pertaining in the 1940s, and releases of nutrients into the sea must not cause eutrophication.

The nutrient status of forest and agricultural soil should be such that it helps preserve the natural distribution of species.”

SUBGOALS PROPOSED BY THE COMMITTEE

Proposed supplementary specification of the environmental quality objective:

- Lakes and watercourses should comply with the definition of good ecological status contained in the forthcoming EC Water Framework Directive.
- Swedish coastal and sea waters should comply with the definition of good ecological status contained in the forthcoming EC Water Framework Directive.
- The fallout of airborne nitrogen compounds should not exceed the critical load for the eutrophication of soil and water in any part of Sweden.

Proposed intermediate targets:

1. By the year 2010, an action programme will be in place in accordance with the forthcoming EC Water Framework Directive describing how good ecological status is to be achieved in respect of lakes, watercourses and coastal waters.
2. By 2010, Swedish discharges of phosphorous compounds from human activity into lakes, watercourses and coastal waters will have steadily diminished from their 1995 levels.
3. By 2010, Swedish discharges of nitrogen into the Baltic south of the Åland Sea due to human activity will have been reduced by at least 25 % compared with 1995 levels, to 40,500 tons.

4. By 2010, Swedish discharges of ammonia will have been reduced by at least 12 % compared with 1995 levels, to 53,400 tons.
5. By 2010, Swedish emissions of nitrogen oxides into the air will have been reduced by at least 55 % compared with 1995 levels, to 155,000 tons. (See Clean Air and Natural Acidification Only)

WHAT ARE THE PROBLEMS – AND HOW CAN THEY BE SOLVED?

Depositions of nitrogen compounds such as nitrogen oxides and ammonia currently exceed the critical load for the eutrophication of soil throughout southern Sweden. Some 80-90 % of the fallout comes from other countries. Both biological diversity and human health are adversely affected, e.g. via nitrates in groundwater and wells.

Phosphorus is the main cause of eutrophication in lakes and watercourses. The problem is most widespread in southern Sweden, but has also grown in northern and central Sweden over the past 20 years. A sixth of all lakes and many watercourses in Sweden are eutrophied, which is adversely affecting biological diversity and productive capacity.

Both phosphorus and nitrogen give rise to marine eutrophication, resulting in oxygen depletion, reduced biological diversity and algal blooming, etc. Previously adopted intermediate targets for the environment have not been met. Phosphorus levels have remained unchanged in the 1981-95 period, and nitrogen levels rose initially but began to fall after 1995.

Problems with soil eutrophication vary considerably from place to place in Sweden, with the need for action and incentives particularly marked in the southern part of Sweden, Götaland.

The environmental quality objectives framed over the past fifteen years have not been met, and levels of ambition have therefore been set so that intermediate targets may be achieved within the allotted time. The basis for achieving these intermediate targets is primarily the Swedish Environment Code and the EU's impending Water Framework Directive. In addition, environmental subsidies will be required in the agricultural sector, but also programmes for improving private sewage treatment.

How are the intermediate targets to be met?

MEASURES

In order to deal with emissions via drains, a series of measures will be required at sewage treatment plants, and the current expansion of coastal facilities from Strömstad in the west to Norrtälje in the east should be completed. Households must improve private sewage systems by adding filtration or sand beds or replacing existing systems with separation facilities or other new technology producing similar results. Increased use of phosphate-free detergents is also needed, particularly in sparsely-populated areas. Local authorities must improve their sewage disposal systems and provide local solutions for the disposal of surface run-off.

In the case of agriculture, the trend currently discernible in this sector towards environmentally sound farming practices must be encouraged and turned to good account. As regards reducing emissions of nitrogen and phosphorus, one of several measures required in the agricultural sector is for farmers and agricultural companies to use fertilizer in appropriate amounts and avoid excessive spread. Others include avoiding the distribution of animal manure for autumn sowing, increasing the acreage of fields lying fallow and bearing vegetation for more than a year, increasing the proportion of break crops through seed inclusion in spring-grown grain. New wetlands in coastal regions, protected zones to reduce phosphorus leakage and a review of the provisions governing livestock density are further proposals.

To reduce ammonia emissions in agriculture, liquid manure and urine on open ground should be turned into the soil within four hours of being spread. Other conceivable measures include mandatory roofing on urine containers, the adapting of protein feeding to animal needs and the use of technology that reduces ammonia loss.

To reduce nitrogen and phosphorus emissions in industry, alternative technological solutions must be found in such sectors as pulp and paper, iron and steel, and the chemical and food industries. Better purification techniques are required to reduce emissions of ammonia. Sweden should contribute to the introduction of effective measures in other countries around the Baltic.

POLICY INSTRUMENTS

The Environmental Code is a major factor in combating eutrophication. It allows for such things as the introduction of general provisions and environmental quality standards, authorization procedures and

supervision. Important policy instruments for the maintenance of satisfactory water quality in lakes, watercourses and around the coasts are the EC directive on sewage treatment and the forthcoming EC Water Framework Directive.

A number of economic incentives will be required. Funding will be needed in agriculture, such as environmental subsidies for the establishment of wetlands and protected zones, for the planting of break crops and for passing up autumn tillage. Funds will also be needed for training, consultancy and information. The environmental steering effect of charges and taxes in agriculture should be reinforced to help achieve the target of reducing nutrient runoff. Various alternatives should be considered for the task of achieving the requisite environmental improvements in the most effective way at the lowest possible cost. The system should be designed in such a way that the financial position of agricultural producers is taken into account.

The possibility of introducing a grant for improving private sewage treatment should also be looked into.

On the training front, an important step is the provision of basic training for officials at river basin area, county and municipal level focusing on the EC's Water Framework Directive. This should be provided by such bodies as the Geological Survey of Sweden (SGU), the National Board of Housing, Building and Planning and Swedish Environmental Protection Agency, and be completed by the year 2004.

Further research is required to establish which nitrogen and phosphorus levels in water ensure long-term balance, an area that has been the subject of some uncertainty. A programme of experimental and development activities in agriculture is also needed with a view to developing ways of reducing nutrient loss.

Continued efforts in the international field are of paramount importance and should concentrate on following up the outcome of international agreements and legislation in the EU, but should also encourage the development of an overall European strategy for keeping acidification and eutrophication levels below the critical load throughout Europe. In addition, Sweden should contribute to development efforts around the Baltic through the transfer of expertise and the provision of funding. Another important feature of international efforts in this area is continued cooperation with the Baltic States and Poland, including the provision of technical assistance for water purification.

A NON-TOXIC ENVIRONMENT

NATIONAL OBJECTIVE ADOPTED BY THE RIKSDAG

”The environment must be free from man-made or extracted substances and metals that represent a threat to health or biological diversity.

Specifically, the environmental quality objective implies that:

- The levels of substances that occur naturally in the environment must be close to background levels.
- The level of substances not occurring naturally must be close to zero.”

SUBGOALS PROPOSED BY THE COMMITTEE

Proposed supplementary specification of the environmental quality objective:

- Aggregate exposure in the work environment, the outdoor environment and the indoor environment must be close to zero in the case of particularly hazardous substances and not represent a threat to health in the case of other chemical substances.
- Polluted areas must be examined and remedial measures taken where appropriate.

Proposed intermediate targets:

1. By the year 2010, all deliberately manufactured or extracted chemical substances in the market will carry data corresponding to that required for new substances. In the case of substances handled in large or medium-sized volumes, such data should be available by 2005 and 2009 respectively.
2. By the year 2010, goods will be equipped with health and environmental information.
3. Newly-manufactured goods will be largely free from
 - substances that cause cancer, affect genes and adversely affect reproduction by 2007 at the latest
 - highly persistent and highly biocumulative substances by 2010,
 - persistent and biocumulative substances by 2015,
 - mercury by 2003 and cadmium and lead by 2010 at the latest.Nor will such substances be used in manufacturing processes in a way that jeopardizes health or the environment.

4. The health and environmental risks attached to the use of chemical substances will have been continuously reduced up until 2010 according to indicators/key numbers established by the relevant public authorities, as will the availability and use of chemical substances that impede the recycling of materials.
5. The relevant authorities will have established guidelines by the year 2010 for at least 100 selected chemical substances not covered by Intermediate Target 3.
6. Polluted areas will have been identified and examined and remedial measures will have been taken in the case of at least 30 % of the areas in the 'very extensive' and 'extensive' risk categories by 2010 at the latest.

Intermediate Targets 1 and 3 are based largely on the proposals contained in the report of the Committee on New Guidelines for Chemicals Policy (1998:09).

WHAT ARE THE PROBLEMS – AND HOW CAN THEY BE SOLVED?

One major obstacle to the achievement of a non-toxic environment is an inadequate knowledge of chemical substances. It is extremely important therefore that we fully analyse the properties of chemical substances, their interaction, their inclusion in products in particular, their flows and the impact they have on people and the environment, as well as the ways in which they should be managed and used in order to reduce the risks. Chemical substances can spread from other countries via air, water and goods.

Another problem is the pollution found in soil, groundwater, sediment, buildings and industrial plant. Most of it is a result of emissions, spillage or accidents occurring in the post-war period up until the 1980s. The number of polluted areas in Sweden is estimated at 22,000, of which about a half have been identified.

To achieve the desired goals, extremely vigorous efforts will be required both at national and international level and in the EU. Common systems and regulatory frameworks within the EU are extremely significant in this respect. In addition, polluted areas need to be cleaned up, but it is unlikely that this can be achieved within a one-generation time span. In our judgement, the goal of a non-toxic environment cannot be achieved within a generation. Further measures are required for this. It should be possible, however, to achieve an environmental state in which concentrations of hazardous substances are so small that they do not present any noticeable threat to health or biological diversity.

How are the intermediate targets to be met?

MEASURES

In order to achieve the first intermediate target, Sweden must press for the introduction of a common EU system by 2005 at the latest whereby industry is obliged to provide scientific data on existing substances. In the OECD, Sweden should actively encourage the development and standardization of test methods through which such things as the presence of substances created unintentionally could be detected. Another important area of work is the development of alternative testing methods and ensuring international acceptance of them – as a means of reducing testing on animals.

To meet Intermediate Target 2, Sweden must actively promote the development of a common EU system by 2007 at the latest for the formulation of health and environment information for goods that are not chemical products.

Pending the introduction of such a system, trade and industry should develop information about the properties of chemical substances and the lifecycles of products in order to include them in environment product certificates. By the year 2005, companies in sectors where goods are widely distributed throughout the community should voluntarily undertake to provide product certificates that include health and environment information.

To meet Intermediate Target 3, by 2010 newly manufactured products must be free from substances like mercury, cadmium and lead and man-made substances that are persistent and biocumulative, as well as substances that cause cancer, affect genes and adversely affect reproduction.

Intermediate Target 4 requires manufacturers, importers and other suppliers of chemical products and goods to assume responsibility for them throughout their lifecycle. Users must avoid utilizing products and goods that endanger health and the environment if these can be replaced by less hazardous ones. Users and others who handle such products and goods must also take steps to continuously reduce the exposure of both people and the environment to chemical substances. By 2005, environmental management systems and systems for relevant types of environmental work should include directions about chemical substances so that the health and environmental risks involved, as well as waste aspects, may be taken into account throughout a product's lifecycle.

The aim of the fifth intermediate target is to produce guidelines for those chemical substances that will still be permitted in the long term, such as metals occurring naturally in the environment. Certain kinds of

pesticides are another example. If the intermediate target is to be attained, the authorities concerned should by 2002 have worked out an effective system for developing assessment principles and guidelines. By the same year, an initial list of guidelines should be available for hazardous substances. Thereafter, guidelines will be produced on an ongoing basis.

A number of measures are required if the sixth intermediate target is to be achieved. By the end of 2002, for instance, all county administrative boards must have a regional programme in place dealing with the reclamation of polluted areas and land-use restrictions in this context. Each local authority must have supplemented its waste management plan with a reclamation programme for polluted areas specifying what land-use restrictions are required. Polluted areas must have been identified and classified according to risk, and a number of test projects must have been completed. By the end of 2005, local authorities must have specified polluted areas in their general plans and where appropriate laid down guidelines for land use. By the end of 2010, polluted areas previously deemed to belong in the high or very high risk category must have been subjected to a general survey. Some 7,000 areas belong in these risk categories, and the intermediate target implies that at least 30 % of them are to have been examined and dealt with.

POLICY INSTRUMENTS

Powerful policy instruments will be required, of both a normative and an informative nature. The involvement of market forces is important if efforts to reduce risk are to be pursued in a systematic way. Manufacturers' efforts to produce environment product certificates and positive environmental labelling are examples of this.

One very important policy instrument is Swedish participation in the work of the EU and in other international forums. Over the next few years, Swedish agencies will need above all to be involved in the efforts to create common EU systems and regulatory frameworks. Two important areas are the introduction of a requirement whereby goods must be furnished with health and environmental information under a common system, and a prohibition on the use of particularly hazardous chemical substances in consumer goods. In addition, information and training are important policy instruments for the task of reducing risks in the use of chemical substances.

Further work is also needed within current EU programmes on classification and labelling, and Sweden should also press for a phaseout of the use of certain specific substances. In addition, steps must be

taken to ensure that Sweden will not have to allow the use of previously banned substances as a result of EU harmonization, for instance with respect to pesticides. Other areas requiring international coordination are the efforts to reduce the spread of long-range airborne pollutants and to promote international standardization.

To the extent that measures are not taken sufficiently quickly at EU level to enable achievement of the environmental objectives in this area, Sweden should as far as possible point the way by imposing tougher national requirements. Economic incentives such as taxes and charges should be among the steps considered.

Research and training programmes will be required in a number of fields, e g with regard to the correlation between dosage and response, interactions between different substances and the development of alternative test methods to reduce animal experimentation.

There is also a need for research in the social science field, focusing for instance on the effectiveness of different policy instruments in the quest for a non-toxic environment and on the modification of attitudes and behaviour.

Greater collaboration is also essential, for instance between manufacturing companies but also between agencies, parties in the business sector and others. An important precondition is that the various players are able to agree on a common problem scenario in order to bring about successful action in the international arena. The responsible agencies – the National Chemicals Inspectorate, the Swedish Environmental Protection Agency, the National Board of Occupational Safety and Health, the Labour Inspectorate, and county administrative boards and local authorities – must also collaborate more effectively. This objective has been developed in harmony with the Committee on New Guidelines for Chemicals Policy, which is reviewing the criteria for hazardous substances.

A PROTECTIVE OZONE LAYER

NATIONAL OBJECTIVE ADOPTED BY THE RIKSDAG

”The ozone layer must be replenished so as to provide long-term protection against harmful UV radiation.

Specifically, the environmental quality objective implies that:

- Sweden must commit itself to measures that ensure that levels of chlorine, bromine and other ozone-depleting substances in the stratosphere do not exceed natural levels.”

SUBGOALS PROPOSED BY THE COMMITTEE:

Proposed supplementary specification of the environmental quality objective:

- The use of ozone-depleting substances should be phased out within a generation.

Proposed intermediate target:

1. Emissions of ozone-depleting substances will have largely ceased by the year 2010.

WHAT ARE THE PROBLEMS – AND HOW CAN THEY BE SOLVED?

As a result of legislation and information, the use of ozone-depleting substances has decreased significantly in Sweden. Efforts have born fruit and over the 1988-94 period 93 % of the use of ozone-depleting substances was phased out in Sweden. The problem remains, however, and both additional and supplementary measures are required.

A five per cent depletion of the protective ozone layer above the earth has taken place over the past thirteen years. The causes are many, among them continued use of ozone-depleting substances such as CFCs, HCFCs, halogens, chlorine, etc, due to the lack of less harmful alternatives. Also, too little is known about which products contain these substances, and the present systems for managing them after use are inadequate.

Another serious threat to the protective ozone layer is the prospect of increased air traffic in the stratosphere. The adverse effects on the ozone layer increase as altitudes and speeds increase.

The identification and analysis of goods and products in society that may contain ozone-depleting substances must continue, and in-depth study of the effects of air traffic on the ozone layer is urgently needed. International cooperation is of great importance in this area and Sweden must be active in the various forums.

How are the intermediate targets to be met?

MEASURES

To ensure the phaseout of ozone-depleting substances within a generation, a number of measures will be required in addition to the regulations already in place:

- The export of goods, products and equipment containing or dependent on CFCs or other ozone-depleting substances must cease.
- The use of HCFCs in existing refrigeration, deepfreeze and climate conditioning units must cease after a certain date.
- The use of CFCs/HCFCs, halogens and similar substances must also cease in sectors that are presently exempted, such as the military defence sector and civil aviation.

To prevent the release of ozone-depleting substances, we recommend that the Swedish Environmental Protection Agency be instructed to identify goods and products in wide use in society and produce a plan listing what needs to be removed and destroyed. On the basis of such a plan, local authorities, producers and other responsible parties should be required to dispose of and destroy ozone-depleting substances, such as waste from the industrial, transport and construction sectors.

We would particularly like to emphasize the risks attached to high-altitude flying. Preventive action should be taken as a matter of urgency and we recommend that the Civil Aviation Administration be instructed to investigate the matter. It should furnish proposals by 2001 at the latest as to how releases of pollutants affecting the ozone layer may be prevented from increasing so that they may be kept at a low level in the future as well. Its report should both present national strategies in this respect and describe how Sweden might pursue the matter internationally.

POLICY INSTRUMENTS

The most important policy instruments are continued vigorous legislation and information, and the following measures are needed if the use of ozone-depleting substances is to be reduced:

- A legislative ban on the use of HCFCs as a working fluid in existing plant and equipment.
- The reintroduction of exemption charges or sanction charges. The present Environmental Code does not permit exemption charges.
- A general ban on the export of goods/equipment containing or dependent on ozone-depleting substances.

To reduce releases of ozone-depleting substances, we recommend the following measures:

- A review or sharpening of present legislation to ensure that collected quantities of CFCs, halogens and other prohibited substances are dispatched for destruction.
- Legislation regarding halogens must be amended so that present quantities in existing plant are taken care of in an environmentally safe way.
- Local authorities, or producers, must be required to remove for disposal all equipment and products containing CFCs, HCFCs, halogens or other ozone-depleting substances in an environmentally safe way.

The research areas to which we attach special priority are the impact of air traffic on the ozone layer, the correlation between ozone-depleting processes and the greenhouse effect, and the effects of increased UV radiation on health and the environment.

International efforts will be crucial in the achievement of the environmental quality objective. Sweden has an important part to play in a number of spheres, both in the EU and as regards international efforts as a whole.

A SAFE RADIATION ENVIRONMENT

NATIONAL OBJECTIVE ADOPTED BY THE RIKSDAG:

”Health and biological diversity must be protected against the harmful effects of radiation in the external environment.

Specifically, the environmental quality objective implies that:

- Radiation doses must be as low as reasonably achievable.

- The annual level of intake (effective dose) for the general public from radiation-generating activities must be limited to 1 milliesievert a year per person.
- Serious incidents in nuclear installations must be prevented. If an incident occurs, the spread of radiation to surrounding areas must be prevented or controlled.”

SUBGOALS PROPOSED BY THE COMMITTEE

Proposed supplementary specification of the environmental quality objective:

- The risks attached to UV radiation and electromagnetic fields are to be limited as far as possible.
- Indoor radon levels in all housing, preschools, recreation centres and schools must be below 200 Bq/m³ by the year 2020. In the longer term, no individual should be exposed to radon levels in excess of 50 Bq/ m³. Radon levels in all private wells should be lower than 1,000 Bq/litre.

Proposed intermediate targets:

1. By the year 2010, levels of radioactive substances in the environment released from all activities will have declined to such an extent that health and biological diversity are protected. To this end, the additional dose to every person in the general public from each individual activity must not exceed 0.01 millisievert a year.
2. By 2020, the number of annual cases of skin cancer caused by solar radiation will be no larger than it was in the year 2000.
3. By 2005 at the latest, remedial action will have been taken in respect of all schools, preschools and recreation centres where radon levels in the indoor air exceed 400 Bq/m³ and half of all private wells with drinking water exceeding 1,000 Bq/litre. By the year 2010 all housing with radon levels above 400 Bq/ m³ will have been rectified.
4. The risks attached to electromagnetic fields will have been so thoroughly researched by 2010 that the authorities will be in a position to plan concrete remedial measures.

WHAT ARE THE PROBLEMS – AND HOW CAN THEY BE SOLVED?

People and the environment have always been exposed to natural background radiation, and the damage caused by radiation can never be eliminated entirely. However, elimination of the risks attached to emissions of radioactive substances, to radon levels in the indoor air and in drinking water, to UV radiation from the sun and to electromagnetic fields is both possible and imperative.

One of the most important aspects of environmental work is the prevention of radiological accidents and solving the problem of the final disposal of spent nuclear fuels. Safety at Swedish nuclear installations must be maintained at the same high levels as today and efforts to enhance safety precautions at nuclear power plants in the east must continue.

Radon in the indoor air and in drinking water constitutes a very serious health problem and is a cause primarily of lung cancer but also of other forms of cancer. We also need to get to grips with the sharp increase in the skin cancer rate caused by UV radiation from the sun. Less exposure to UV radiation and greater caution by sunbathers would seem the best approach.

In specifying the environmental quality objective in more detail, we have also chosen to focus on electromagnetic fields, the effects of which need to be identified and analysed. It is not possible to deduce from the present body of knowledge the health risks that electromagnetic fields might entail, but in our view the prudence principle should be applied immediately and research in this area should be stepped up.

How are the intermediate targets to be met?

MEASURES

To reduce radioactive levels in accordance with the first intermediate target, environmental monitoring must be improved and coordinated. A cohesive environmental monitoring programme is needed for the monitoring of radioactive substances in the environment, and it should provide the necessary basis for health and environment protection work in the radiation field. It should for instance provide the data needed to draw up measures aimed at limiting exposure doses to human beings as well as to establish criteria for the preservation of biological diversity.

The supervision of activities involving ionized radiation must also be maintained and intensified if the intermediate target is to be achieved,

and we must acquire greater knowledge through research and development relating to sources of radiation and the risks attached to emissions of radioactive substances.

The production of spent nuclear fuel and other active waste is being reduced as nuclear power is phased out. Achievement of the present objective, too, is highly dependent on energy being used more efficiently and the development of renewable energy sources. The phaseout of nuclear power must not lead to an increase in the use of fossil fuels. Swedish government support for the phaseout of nuclear power in Eastern Europe and for technical improvements and the introduction of new technology there is also important for boosting safety levels, and in this connection international collaboration via the EU and the IAEA can add momentum to the work in hand. In Swedish nuclear power plants, safety systems should be modernized and improved on an ongoing basis. Greater measures are also required for the purpose of improving national emergency preparedness in the event of a nuclear accident. Reactor proprietors have full responsibility for finding locations for the final disposal of spent nuclear fuels. The Swedish Radiation Protection Institute and the Swedish Nuclear Power Inspectorate have important parts to play in scrutinizing the work under way in this area and providing information, etc. Spent nuclear fuel is our own responsibility and should not be transported beyond Swedish borders, either for final disposal or for reprocessing. The aim should be for nuclear power to bear its own costs. An inquiry should be conducted into how this might be achieved.

If skin cancer is to be reduced to the extent described in Intermediate Target 2, information efforts will be needed, partly in the form of special campaigns and partly through a major endeavour in educating the public. The preventive work being done in this area is discussed under A Protective Ozone Layer. Continuous measurement of UV radiation and communication of the results to the general public will also be required.

A precondition for reducing radon levels and attaining Intermediate Target 3 is a greater awareness of the health risks involved. Here, too, wide-ranging information efforts will be needed as well as other measures aimed at motivating homeowners and property owners to take action. Local authorities have an important part to play, for instance in tracking down buildings and wells with high radon levels. Their involvement in this process is all-important, and further training for both municipal officials and councillors will therefore be necessary.

The fourth intermediate target involves knowledge acquisition, and to learn more about the effects of electromagnetic fields a national interdisciplinary research programme will be needed. The problem area

encompasses issues relating to biology, physics, medicine, the behavioural sciences and technology, and we propose therefore that a special body be set up within the new government research organization to coordinate this line of research.

POLICY INSTRUMENTS

Adequate policy instruments for the achievement of Intermediate Target 1 already exist in the form of legislation. The environmental monitoring of radioactive substances needs to be improved, however, and appropriate resources need to be allocated for this work as well as for research and development focusing on the effects of radioactive substances. In our view, funds should also be made available to public authorities so that they may complete their duties with regard to the final disposal of spent nuclear fuels.

To reduce the incidence of skin cancer, we consider that efforts to educate public opinion and bring about a change in people's attitude to sunbathing should be pursued by the National Board of Health and Welfare in consultation with the relevant agencies. Such efforts can be modelled on previous information campaigns to reduce tobacco use and smoking.

The question of what regulatory framework and other instruments might be needed in order to bring down radon levels is currently being dealt with by a separate committee of inquiry, 'Radon in Housing and Certain Premises, etc: the Need for Reforms'. Its report is due by 1 November 2000 at the latest.

Besides the coordinated national research effort on electromagnetic fields proposed above, international cooperation is needed in this area.

HIGH-QUALITY GROUNDWATER

NATIONAL OBJECTIVE ADOPTED BY THE RIKSDAG

"Groundwater must provide safe and sustainable supplies of drinking water and contribute to viable habitats for flora and fauna in lakes and watercourses.

Specifically, the environmental quality objective implies that:

- The quality of groundwater must not be adversely affected by human activities such as land use, gravel extraction, discharges of pollutants, etc.

- The quality of leaking groundwater must be conducive to a viable habitat for flora and fauna in lakes and watercourses.
- Consumption or other human activities affecting groundwater must not lower the water table so as to jeopardize supplies and quality.

SUBGOALS PROPOSED BY THE COMMITTEE:

Proposed supplementary specification of the environmental quality objective:

- Pollution levels should be so low that groundwater meets the requirements for high-quality drinking water as defined in the drinking water regulations of the Swedish National Food Administration and in the requirements regarding high-quality groundwater status in the forthcoming EC Water Framework Directive.

Proposed intermediate targets:

1. Geological formations containing groundwater of importance for present and future water supplies will have acquired long-term protection by 2010 at the latest against forms of exploitation that limit the use of the water.
2. Long-term changes in the water table will not affect water supply, ground stability or flora and fauna in adjoining ecosystems in the year 2010.
3. By the year 2010, groundwater supplying more than 50 people or distributed in quantities of more than 10m³ a day will meet the drinking water requirements of the Swedish National Food Administration.
4. By 2010, action programmes will be in place in accordance with the forthcoming EC Water Framework Directive which will indicate how high-quality groundwater status is to be achieved.

WHAT ARE THE PROBLEMS – AND HOW CAN THEY BE SOLVED?

Compared with the rest of Europe, the quality of Sweden's groundwater is excellent, but further measures are required if the targets are to be met. Eutrophication, for instance, has caused high levels of nitrate to appear in agricultural areas, and metal concentrations in drinking water

have increased as a result of corrosion in supply pipes due to acid groundwater.

Supplies of drinking water are relatively good, but problem areas do exist, as for instance in south-eastern Sweden and the southern coastal regions. There, building development and other forms of exploitation in areas with a limited supply of water may lead to water shortages and there is also a risk of salt water intrusion. Further, there is a risk that geological formations of potential future use as sources of drinking water may be exploited by commercial interests as the formations lack legal protection.

The prospects for meeting the targets in respect of drinking water quality and groundwater supply are good. Meeting the target in respect of a good ecological groundwater status will be more difficult. In some of the agricultural areas of Skåne and south-western Sweden, very extensive measures will be needed to reduce nitrate levels.

Decisions at national level will be sufficient to meet the targets, and both the technology and the normative policy instruments needed to implement the measures are available. The measures will however be costly for both county administrative boards and local authorities.

How are the intermediate targets to be met?

MEASURES

To assure local authorities of a proper supply of groundwater in the future, geological formations must be protected, and a number of initiatives are required up until 2010 when legal protection should be in place. For instance, geological formations of importance for future water supplies should be surveyed and selected by 2003 at the latest. By 2005 at the latest, local authorities must report on the findings of their water surveys, specifying water requirements, water supplies and any shortcomings in water provision.

These municipal water surveys will also be of considerable use in attaining the second intermediate target.

With their help, county administrative boards should draw up regional water conservation programmes by 2007 at the latest. Further, local authorities should be required to draw up water provision plans by 2010 at the latest, i.e. include water resources and geological formations of importance for water supply in their general plans. To assist them in this, the National Board of Housing, Building and Planning, the Geological Survey of Sweden (SGU) and the Swedish Environmental Protection Agency should produce by 2003 at the latest a national handbook detailing water planning methods and the requisite data.

To ensure that the majority of groundwater sources used for water supply in Sweden meet the drinking water requirements of the Swedish National Food Administration by 2010, the authorities must be provided with better material on which to base their decisions. This means that the Swedish Environmental Protection Agency will have to revise its general guidelines on protected zones and protection regulations to bring them into line with documents such as the forthcoming EC Water Framework Directive and the Swedish Environmental Code. Local authorities are to identify the areas where 'good groundwater status' will not be achievable within the stipulated time despite action being taken. Together with county administrative boards they will also be required to determine before 2005 the siting of protected zones for public water sources, based on hydrogeological assessment. In addition, local authorities will be charged with the task of surveying private water sources and of revising protected zones and protection regulations that do not ensure full protection.

The responsibility for framing an action programme for the purpose of achieving good groundwater status rests with the relevant river basin area authority. Programmes are to be based on material such as that proposed above, including the water supply plans and the protection of water sources. Further, a large number of measures will need to be introduced up until 2010 with a view to reducing agricultural pollutants, leaking drains, polluted soil, acid emissions, etc. The measures are described in the sections headed No Eutrophication, A Non-Toxic Environment, Natural Acidification Only and A Good Urban Environment.

POLICY INSTRUMENTS

The Swedish Environmental Code and the Planning and Building Act already contain adequate instruments for attaining the target of high-quality groundwater, including regulations on environmental quality standards. These will be supplemented by the constitutional amendments required for the incorporation of the forthcoming EC Water Framework Directive. This will be one of the most important instruments for ensuring that all the subgoals can be met. The Swedish Environmental Protection Agency's general guidelines on protected zones and protection regulations should therefore be adapted to provide county administrative boards and local authorities with the requisite guidance for their action programmes.

Some changes will need to be made in the Environmental Code if the first intermediate target is to be met. We would also like to emphasize the opportunities contained in the Environmental Code but which are not

being fully exploited. It provides for instance for the introduction of limits on groundwater extraction rates where shortages and salt water intrusion may occur. The Environmental Code also allows for the imposition of constraints on land and water use, including restrictions on numbers of livestock and the imposition of precautionary levels for fertilizer dosage and pesticide use.

At present, wells may be drilled by anyone at all without prior experience, and we wish to emphasize the importance of the programme currently being developed by the Geological Survey of Sweden (SGU) in cooperation with professional drillers' trade organizations and others. It aims to ensure that water and energy drilling is performed by accredited drilling operators by 2005 at the latest.

Basic training programmes for officials at river basin area, county and municipal level focusing on the EU's forthcoming Water Framework Directive should be completed by 2004 (see also No Eutrophication).

Research and development is required in a number of areas. Models need to be developed for such purposes as analysing the effects of measures in respect of land use. Another area of research is how the extraction of rock and earth and the cleaning up of polluted soil affects the status of ground water.

As official responsibility for groundwater is highly fragmented, we also recommend that the Geological Survey of Sweden be given constitutional responsibility for the natural resource of groundwater, which implies special responsibility for ensuring that progress towards ecologically sustainable development also extends to the natural resource extraction sector. The Geological Survey's activities in the groundwater field should also serve as support for the Swedish Environmental Protection Agency's cross-sectoral responsibility for environmental and conservancy issues. The Swedish National Food Administration is to be responsible for issues relating to the quality and provision of drinking water.

SUSTAINABLE LAKES AND WATERCOURSES

NATIONAL OBJECTIVE ADOPTED BY THE RIKSDAG

”Lakes and watercourses must be ecologically sustainable and their variety of habitats must be preserved. The natural productive capacity, biological diversity, cultural heritage assets and ecological and water-conserving function must be preserved at the same time as recreational assets are maintained.

Specifically, the environmental quality objective implies that:

- The load of nutrients and pollutants must not impair the conditions for biological diversity.
- Non-indigenous species and genetically modified organisms (GMOs) that may jeopardize biological diversity must not be introduced.
- The great value of lakes, shores and watercourses as sources of recreation and scenic beauty, cultural heritage, bathing and outdoor activities must be protected as far as possible.
- Conditions must be conducive to viable stocks of fish and other species that live in or are directly dependent on lakes and watercourses.”

SUBGOALS PROPOSED BY THE COMMITTEE

Proposed supplementary specification of the environmental quality objective:

- Natural water flows and water levels are to be retained in remaining unexploited and largely untouched watercourses.
- Cultural and ecological habitats that demonstrate the importance of lakes and watercourses for human settlement, supply and transportation are to be preserved.
- Endangered species are to be given a chance to spread to new locations in their natural area of distribution so as to ensure viable populations in the long term.
- Lakes and watercourses are to be kept in a satisfactory state as regards distribution of species and chemical and physical conditions in accordance with the forthcoming EC Water Framework Directive.
- Unique biotopes are to be protected.
- No genetically modified fish may be planted.

Proposed intermediate targets:

1. By 2010 at the latest, long-term protection will have been provided for at least 50 % of lake and watercourse habitats requiring protection, as well as for surrounding areas of substantial ecological and cultural value.
2. By 2010 at the latest, at least 25 % of valuable or potentially valuable watercourses will have been restored.
3. By 2010 at the latest, municipal water supply plans will have been drawn up detailing water conservation zones and protection regulations for all public surface water sources as well as for important private ones
4. By 2005 at the latest, the planting of fish, crayfish and molluscan populations will be conducted in such a way that biological and genetic diversity will not be adversely affected.
5. By 2005 at the latest, action programmes will have been initiated on behalf of endangered species and fish populations in particular need of targeted measures.

WHAT ARE THE PROBLEMS – AND HOW CAN THEY BE SOLVED?

The problems involving acidification, environmental toxins and eutrophication raised in previous sections have a considerable impact on the biological state of lakes and watercourses, and measures taken in these areas will be crucial for biological diversity, productive capacity and the possibility of using surface water for drinking.

The exploitation of shores and watercourses reduces opportunities for recreation and fishing and often has an adverse effect on ecosystems and biological diversity. Hydroelectric power generation also has a profound effect on the environment, partly due to the regulation of water levels and flows and partly due to dams impeding migration. The planting of fish and crayfish may threaten wild species and populations, and there is a risk that certain commercially attractive species will be overfished. Inadequate maintenance of historical structures is another problem, and canals, channels, bridges and harbours risk falling into disrepair.

The prospects for attainment of the intermediate targets, as well as the generational objective, are good. It may be necessary to revise the intermediate targets when more is known about the assets at risk, and new intermediate targets will be specified for the period after 2010. Considerable responsibility lies with government agencies and local authorities. The largest items of expenditure will be the establishment of

nature reserves, the restoration of watercourses and the framing of water supply plans incorporating protection regulations for water sources.

Agriculture and the energy and transport sectors as well as forestry and fisheries will also be required to assume their share of responsibility. In addition, water areas and their related human and natural ecosystems must be properly surveyed and studied.

How are the intermediate targets to be met?

MEASURES

If we are to avert the exploitation and inappropriate use of land and water in areas of ecological and recreational value and protect environments that are valuable from a cultural heritage viewpoint, the first step is to determine exactly which areas possess these values. The Swedish Environmental Protection Agency has begun producing a list of biotopes and species particularly worthy of protection. When this undertaking is complete it should be followed up by a preservation strategy developed by the national agencies. The National Heritage Board should elaborate a similar development strategy for environments of cultural and historical value. Active support for existing or new undertakings that seek to preserve cultural environments is needed if our lakes and watercourses are to continue to provide culturally enriching experiences along their shores.

Survey and preservation strategies should also be developed in respect of valuable watercourses that are damaged. The damage may have been caused by minor local roads, for instance, but may also be due to major undertakings such as hydroelectric power development. One or two research projects centring on technology and the environment in relation to hydroelectric power are currently under way and are expected among other things to facilitate a shift to environmentally compatible power generation. Environmental improvements in regulated watercourses should begin as soon as possible. One way of bringing about change would be for central government to seek a review of the water-rights rulings for river and watercourse development.

Only 60 % of municipal drinking water sources, and scarcely any private sources at all, are currently encompassed by zone protection and protective regulations. All sources of drinking water should be protected and water supply plans should therefore be drawn up and water protection zones established. Currently operative zones and protective

regulations should also be reviewed. The responsibility for this lies with county administrative boards and local authorities.

The utmost care should be taken when planting non-indigenous species and populations into lakes, watercourses and the sea so that this does not negatively affect biological and genetic diversity. The prudence principle relating to fish planting should be observed and the National Board of Fisheries' policy rules and regulations applied. In addition, further data on water protection is required before planting decisions are taken. In our view, the planting of genetically modified fish should be prohibited altogether.

What action programmes will be needed on behalf of endangered species and fish populations depends on how successful the above measures are. Programmes should only be developed for species that are unable to survive without special support and that risk becoming extinct.

POLICY INSTRUMENTS

Current legislation, primarily the Environmental Code and fisheries legislation, are on the whole sufficient for achieving the desired goals. One proposal is that the Environmental Code be augmented with regulations identifying important areas for Sweden's water supply.

The committee assigned to follow up the implementation of the Environmental Code should make a point of analysing the procedure for reviewing water-rights rulings and submit proposals as to how it might be facilitated. It should also look at the question of how protected water zones are established in practice.

The EC's forthcoming Water Framework Directive will be an important policy instrument. County administrative boards and local authorities should place special emphasis on supervisory work in this respect, and the supervisory organizations must be properly funded if the goals are to be achieved.

More information and guidance will be needed with regard to the planting and movement of fish as well as to cultural heritage and nature conservancy considerations in agriculture, forestry and fishing.

FLOURISHING WETLANDS

NATIONAL OBJECTIVE ADOPTED BY THE RIKSDAG

”The ecological and water-regulating function of wetlands in the landscape must be maintained and valuable wetlands must be preserved for the future.

Specifically, the environmental quality objective implies that:

- There must be different kinds of wetlands with well-preserved biological diversity throughout the country.
- Wetlands must be protected as far as possible against drainage, peat extraction, roadbuilding and other development.
- Non-indigenous species and genetically modified organisms that may jeopardize biological diversity are not introduced.
- Peat extraction must take place at appropriate sites taking into account both environmental considerations and biological diversity.
- Wetlands’ recreational assets and historical sites must be preserved.”

SUBGOALS PROPOSED BY THE COMMITTEE

Proposed supplementary specification of the environmental quality objective:

- Endangered species should be given a chance to spread to new locations in their natural areas of distribution so as to ensure viable populations in the long term.
- Wetlands of various kinds should be found throughout the country, with their biological diversity and their historical assets intact.

Proposed intermediate targets:

1. A national strategy for the protection and management of wetlands and wet forest will have been developed by the year 2005 at the latest.
2. By 2010, at least 95 % of wetland areas in the national mire protection plan will have been accorded long-term protection.
3. By 2005, forest roads will no longer be built across wetlands of ecological or cultural value or so as to adversely affect such wetlands in other ways.
4. At least 10,000 hectares of wetland and pond will have been established in agricultural areas by the year 2010.

5. By 2005 at the latest, action programmes will have been initiated on behalf of endangered species in particular need of targeted measures.

WHAT ARE THE PROBLEMS – AND HOW CAN THEY BE SOLVED?

Compared with the rest of Europe, and by global standards as well, Sweden has a high proportion of relatively untouched wetlands, but in agricultural areas cultivated wetlands have largely disappeared. Of semi-natural wetlands regularly mown for hay, only an insignificant number remain in southern Sweden today. This is a habitat and a practice that is in danger of disappearing in many places, and unless further action is taken, landscape depletion and the adverse effects of previous drainage and water-regulation schemes will persist. Many of the wetlands have been drained and turned into farmland or forest.

Drainage in forestry remains a problem at regional level, as does peat extraction. Another problem is the poor maintenance of mowable bogs.

The outlook for meeting the intermediate targets is promising and it should also be possible to achieve the generational objective. A closer understanding is required of which wetlands have been cultivated and of how much terrain needs to be restored. Agriculture and forestry must shoulder their responsibilities in this respect. In fact, great environmental care must be taken in general when wetlands are used or exploited, for instance when roads and railways are built.

How are the intermediate targets to be met?

MEASURES

Further knowledge is required if a proper strategy is to be worked out for Sweden's wetlands and wet forests. A step in this direction would be to make the national wetlands survey available online as a data bank and to supplement it with new information, especially with regard to cultural heritage assets. Local authorities should also incorporate information about wetlands requiring protection into their general plans. Another important measure is to give the National Board of Forestry and the Swedish Environmental Protection Agency the task of producing a strategy for the protection of wet forests.

Augmenting the national wetlands survey is also a prerequisite for revising the national mire protection plan, the purpose of which is to

identify wetlands in need of long-term protection. More extensive targeted funding is required so that the tending of wetland fields may be maintained or resumed.

The responsibility for building forest roads in an environmentally considerate way lies first and foremost with the forest owners. This activity is not affected by the Environmental Code's general prohibition on land drainage and usually does not require a licence. Roads must be routed in such a way that valuable wetlands are not affected and environmentally sound construction methods must be employed.

To achieve the greatest possible environmental benefit, preservation of at least 10,000 hectares of new wetlands and ponds will be required by 2010. To this end, a plan will be needed describing priorities and the factors to be taken into consideration when wetlands are restored or created. We believe wetlands should primarily be created in areas where they have largely disappeared. In order to reduce nutrient leakage to the sea, it is also important to create wetlands in coastal areas.

In our view, a dozen or so endangered species associated with wetlands will need special support over the next ten years. Measures in respect of all the intermediate targets will be important for the survival of these species, and action programmes need to be developed for those species which are unable to survive without special support or which are expected to vanish from the Swedish countryside within the near future.

POLICY INSTRUMENTS

On the whole, present legislation will suffice for the achievement of the desired goals. We would however like to underline the threat to wetlands posed by the construction of forest roads, and we recommend that the committee of inquiry studying the implementation of the Environmental Code pay particular attention to the system whereby consultation with all parties affected is mandatory and how the system works in cases of this kind.

We also feel there is a need for special provision of information, guidance and training in the agricultural and forestry sectors. Grants via the government programme for the rural environment will be needed so that the intermediate target concerning the creation of wetlands and ponds in cultivated areas may be met.

A BALANCED MARINE ENVIRONMENT, SUSTAINABLE COASTAL AREAS AND ARCHIPELAGOS

NATIONAL OBJECTIVE ADOPTED BY THE RIKSDAG:

”The North Sea and the Baltic Sea must have a sustainable productive capacity, and biological diversity must be preserved. Coasts and archipelagos should be characterized by a high degree of biological diversity and recreational, ecological and cultural heritage assets. Industry, recreation and other usage of the seas, coasts and archipelagos must be compatible with promotion of sustainable development. Especially valuable areas must be protected against exploitation and other damaging activities.

Specifically, the environmental quality objective implies that:

- The impact of nutrients, pollutants and physical damage must not be allowed to affect the conditions for biological diversity and the productive capacity of the marine environment.
- Fishing, shipping and other uses of the seas and water areas, as well as settlements and other development of coastal and archipelago areas, must take into account the productive capacity of water areas, biological diversity, ecological and cultural assets and recreational assets.
- Unique marine biotopes must be protected.
- Aquaculture, agriculture, forestry and tourism in the archipelagos must be conducted with due regard for the physical and cultural environment and biological diversity, thus helping to preserve the countryside’s natural beauty, cultural and historical value and variety.
- Non-indigenous species and genetically modified organisms that may jeopardize biological diversity must not be introduced.
- Massive accumulations of phytoplankton due to human activity should not occur.
- The area of distribution and number of plant and animal species must not diminish as a result of human activity.
- The seaweed communities in the North Sea and the Baltic Sea archipelagos must be restored to their former depth.
- Lack of oxygen due to eutrophication must only be allowed to occur very rarely.
- The noise levels from boat traffic must be acceptably low.
- Ecological and cultural environments, recreational needs and the appearance of the landscape must be taken into account in connection with the location of wind power generators.”

SUBGOALS PROPOSED BY THE COMMITTEE

Proposed supplementary specification of the environmental quality objective:

- Endangered species and populations should be able to spread to new locations within their natural areas of distribution so that viable populations may be ensured in the long term.
- The characteristic development patterns for settlement and agriculture found in coastal and archipelago areas should be maintained.
- All coastal waters should have high-quality surface water status as regards composition of species and chemical and physical properties, in accordance with the forthcoming EC Water Framework Directive.

Proposed intermediate targets:

1. By 2010, at least 35 % of marine environments requiring protection and at least 70 % of coastal and archipelago areas of substantial ecological and cultural value will have been provided with long-term protection.
2. By 2005 at the latest, a strategy will have been developed for preserving and cultivating cultural heritage assets and arable land in coastal and archipelago areas.
3. By 2010, action programmes will have been initiated on behalf of endangered species and fish populations in particular need of targeted measures.
4. Incidental catches of marine mammals, seabirds and unwanted fish will have been minimized by 2010.
5. By 2008, extraction rates in Swedish waters, including incidental catches of juveniles, will not exceed reproduction rates, so that fish stocks may endure and, where necessary, recover.
6. By 2010 at the latest, noise and other disruptions caused by boat traffic will have reached negligible levels in particularly sensitive archipelago and coastal waters identified as such.
7. Oil and chemical spills from shipping will have ceased by 2010 at the latest.

WHAT ARE THE PROBLEMS – AND HOW CAN THEY BE SOLVED?

Fishing is the human activity that has the greatest biological impact on the marine environment. Among the threats are overfishing, e.g. of Baltic cod, and incidental catches of mammals, seabirds, unwanted fish species and juveniles. Oil and chemical spills are another major problem that has not disappeared despite strict rules and prohibitions.

The problems of eutrophication and toxic emissions must be solved and the measures described for achieving the targets of No Eutrophication and A Non-Toxic Environment are necessary to preserve biological diversity as well as long-term productive capacity in the Baltic and the North Sea.

Sweden's coastal culture has given rise to special cultural environments. Certain coastal and archipelago areas must be afforded long-term protection as the threats to protection-rated environments are numerous. They include exploitation through land development, tourist activities and the siting of wind generation plant. To safeguard the special character of coasts and archipelagos, greater awareness is needed of the assets that are at risk there. Low profitability and structural change in traditional undertakings such as fishing, coastal shipping and coastguard operations are causing declines in population. This in turn may lead to impoverishment of the cultural environment, and buildings may fall into disrepair or be put to inappropriate uses.

If our recommendations are followed, there is a good chance that the environmental objectives will be achieved within a generation. National agencies and local authorities as well as Sweden's fisheries have a major responsibility in this respect. Funding may be needed for the development of new equipment, administrative planning, etc.

How are the intermediate targets to be met?

MEASURES

An increase in the number of national parks, nature reserves and historical reserves is the best means of protecting not only areas of unique natural and cultural interest but also submarine environments in coastal and archipelago areas. Building monuments and biotopes should enjoy this type of protection. Local authorities have a great deal of responsibility, for maintaining shore protection, ensuring the quality of development and settlement and ensuring that shallow bays and inlets are not exploited.

Making an inventory of fishing hamlets, lighthouses, pilot stations, boatyards, bathing spots, etc, would be a first step in devising a strategy for the preservation and development of cultural heritage assets and the cultivated environment in coastal and archipelago areas. A national preservation and development plan for coasts and archipelagos should also be drawn up. This task should be entrusted to the National Heritage Board in collaboration with the relevant national agencies and county administrative boards, and should build on what has been learned from the regional environment and management programmes for the development of coastal areas.

Knowledge of marine species and threats to them is limited. Research, survey and analysis will therefore be needed. Action programmes are needed with regard to at least a dozen marine and littoral species. In our opinion, however, the need for action is more urgent than is generally thought, and we believe that work in this respect should begin and be completed without delay.

The National Board of Fisheries and the fishing industry have a joint responsibility for ensuring that incidental catches of for instance seals, porpoises and seabirds are minimized. The most important step to this end is the development and use of suitably selective fishing gear. The same parties are responsible for ensuring that action is taken to stop overfishing. Administrative plans must be developed and implemented and the size and composition of fishing fleets must be kept appropriate. Further, international efforts are required along with research and development work in this field.

Ways in which marine resources might be regionally administered in coastal zones should also be developed. County administrative boards, local authorities and representatives of commercial undertakings engaged in fishing should be among those taking part in this work, as well as trade organizations.

To achieve the intermediate target concerning noise and other nuisance from boat traffic by 2010, we propose that the county administrative boards in coastal and archipelago areas, together with representatives of boating organizations, be assigned to examine the possibility of setting up special noise-free zones where motor boat traffic could be either banned or limited, and to propose suitable areas for this purpose.

The Swedish Environmental Protection Agency and the Swedish Maritime Administration should follow up the question of what measures have been taken to reduce noise disturbance from powerboat traffic. An extension of the present regulations prohibiting water scooters to other marine craft of a similar kind should be considered.

Despite international regulations prohibiting the release of oil and chemicals, some 400 spills a year are reported and the actual number is thought to be at least twice that. Sanctions resulting from breaches of the regulations are one important measure, while another is surveillance, which will require the allocation of more extensive resources. If the goal is to be achieved, all countries in Sweden's vicinity must be equipped with facilities for receiving contaminated water. Receiving stations are presently to be found in all Swedish ports, but are still wanting in a number of other Baltic ports.

POLICY INSTRUMENTS

Present legislation – the Environmental Code, fisheries legislation and the provisions contained in EU directives – are on the whole adequate for the task of achieving the desired goals. Proper funding supervision in this area is crucial to this end.

To reduce incidental catches dumped overboard, we propose that the National Board of Fisheries be assigned to investigate how a ban on dumping might be framed and what the consequences might be from both a biological and an economic/financial viewpoint.

Another policy lever we propose is a review of national interests in respect of cultural environment conservancy, recreational activity and fishing.

Those examining the possibility of setting up noise-free zones (see above) should in our view also be required to report on what kind of supervision may be required and how compliance is to be monitored. We would also like to emphasize the need for research and more detailed knowledge of biological diversity in the marine environment.

To enhance conditions for living and working in coastal and archipelago areas, other instruments of a regional policy nature may be required in addition to the instruments we have proposed.

SUSTAINABLE FORESTS

NATIONAL OBJECTIVE ADOPTED BY THE RIKSDAG

"Forests and forest land must be protected for the purpose of biological production at the same time as both biological diversity and recreational and cultural heritage assets are safeguarded.

Specifically, the environmental quality objective implies that:

- The natural productive capacity of forest land must be preserved.

- The natural functions and processes of forest ecosystems must be maintained.
- Domestic flora and fauna must survive in natural conditions and in viable stocks.
- Endangered species and types of countryside must be safeguarded.
- Non-indigenous species and genetically modified organisms that may jeopardize biological diversity must not be introduced.
- Historical monuments and cultural environments must be safeguarded.
- The value of forests for recreation and outdoor activities must be recognized.”

SUBGOALS PROPOSED BY THE COMMITTEE

Proposed supplementary specification of the environmental quality objective:

- Endangered species should be given a chance to spread to new locations in their natural areas of distribution so as to ensure viable populations.
- Particularly valuable forest requiring management should be tended in such a way that its assets are preserved and enhanced.
- Forest with a varied mix of old and new growth and a wide variety of tree species should be safeguarded.
- The natural hydrology of forests should be safeguarded.
- The ecological effects of forest fires should be retained.
- Natural regeneration should be practised on land that is suitable for the purpose.

Proposed intermediate targets:

1. By the year 2010, a further 800,000 hectares of protection-rated forest will have been exempted from production.
2. By 2010, the overall amount of deadwood, mature deciduously-rich woodland and old forest will have been maintained or increased, as follows:
 - the overall area of hard deadwood will have increased by at least 25 % in the country as a whole and significantly more in areas where biological diversity is particularly in jeopardy.
 - the overall area of mature deciduously-rich woodland will have increased by at least 10 %

- the overall area of old-growth forest will have increased by at least 5 %.
 - the overall amount of land with regenerated deciduous tree species will have increased.
3. By 2005 at the latest, forest land will be managed in such a way that ancient monuments remain undamaged and damage to other known features of historical interest is negligible.
 4. Action programmes will have been initiated by 2010 at the latest on behalf of endangered species in special need of targeted measures.

WHAT ARE THE PROBLEMS – AND HOW CAN THEY BE SOLVED?

Forestry in Sweden has become more sensitive to environmental needs in recent years. An important principle has been the introduction by the Riksdag of parallel production and environmental goals for the forestry industry. More remains to be done, however. The problems in most urgent need of attention are the depletion of biological diversity and of the forest's cultural heritage. There are several causes. Forests embodying continuity and selective cutting, for instance, are becoming fewer. Certain types of forest, such as old-growth forest and mature deciduous woodland, have become rare. Inadequate amounts of deadwood, fewer fires, ditching and other drainage are some of the reasons why many species are now threatened both regionally and nationally.

If the remaining areas of primeval natural forest are not exempted from forestry practices, they risk being cut down and in time disappearing. The forests' cultural heritage is being jeopardized by the decline in the number of cultural remains, by the reduced variety of tree species and by age.

Forestry is still damaging ancient monuments to a considerable extent, often due to inadequate levels of knowledge. Action must be taken to ensure that this kind of damage, caused for instance by soil scarification, ceases.

If the goals are to be achieved, sustainable forestry practices that are more sensitive to the biological diversity and cultural heritage found in the forest must be developed as a matter of priority. Natural and cultural environments of particular value must be taken out of forestry production.

In our proposals, we have focused on protection of forested areas and on the environmental considerations incumbent on the forestry industry. Sustainable forestry is largely achievable within a generation if the forestry industry and the community at large comply with the

proposed subgoals. In the longer term, however, greater quantities of deadwood will be required. As it takes quite a time for modified practices to produce results in the forestry sector, not all forest land will have become sustainable within a generation.

How are the intermediate targets to be met?

MEASURES

By 1998, some 865,000 hectares of productive forest land in Sweden was protected by law. In order to permanently set aside a further 800,000 hectares by 2010, compared with 1999 levels, a number of measures will be required. Voluntary removal from production has proved its worth and there is reason to expect further gains in this respect. A fresh assessment of progress will be carried out in 2005 to see whether the relevant target is having the desired effect. The establishment of nature reserves and historical reserves via land purchase or compensation for restriction of rights is another important measure. Responsibility in this area lies with the county administrative boards, the Swedish Environmental Protection Agency and the National Heritage Board. In addition, protected biotope zones must be established and more nature conservancy agreements should be concluded in civil law between the state and Swedish landowners. Protection should first and foremost be extended to primeval forest and other natural woodland of a similar character.

To increase the overall quantity of hard deadwood, mature deciduously-rich woodland and old-growth forest, greater environmental consideration will be needed in forestry – leaving deadwood and ‘dying’ trees when felling, sparing deciduous trees when weeding, cleaning and thinning, and restricting clear-cutting in mature forest. Further, regeneration should involve more deciduous trees.

The best way of preventing damage to ancient monuments and other historical remains is to institute appropriate forestry practices. In addition, all forest land must be included in the national inventory of ancient monuments and the results made available in digital form. The surveys being conducted by the National Board of Forestry and the National Heritage Board must be completed. Restrictions of scale, constraints and environmentally appropriate techniques of soil scarification must be introduced. Training and information will also be necessary. In addition, we have noted a need for greater funding in respect of environmentally compatible forest management.

For the purpose of preserving biological diversity and eliminating the threats to certain endangered species, the most important task is to

ensure that various spheres of public activity show consideration for the environment and that protected zones and biotope protection are established. Also, in our opinion, action programmes should be initiated in the case of some 30 species.

POLICY INSTRUMENTS

On the whole, current instruments found in the Environmental Code, the Ancient Monuments and Finds Act, the Real Property Code and the Forestry Act should suffice. The Forestry Act with its provisions and guidelines may need revising, however, to promote the leaving of deadwood. But for the targets to be achieved, a substantial voluntary commitment will be required of the forestry industry and private owners, supplemented by central government measures.

Bearing in mind the importance of voluntary action, consultative guidance, information and training will be vital instruments. The forestry industry's own levers, such as environmental management, certification, in-service training, green forestry planning, etc, will also be important components.

Research and development is required in a number of areas. Intermediate Target 2 – an increase of at least 25 % in the overall amount of deadwood – should be reviewed by 2005 at the latest. In time, the level of ambition for this target should be raised in order to enhance biological diversity. Insect damage and deadwood levels should be followed up and evaluated on an ongoing basis.

A VARIED AGRICULTURAL LANDSCAPE

NATIONAL OBJECTIVE ADOPTED BY THE RIKSDAG

”The value of agricultural regions and arable land must be protected for the enhancement of biological and food production at the same time as biological diversity and cultural heritage assets are preserved and strengthened.

Specifically, the environmental quality objective implies that:

- The nutrient status of arable land must be balanced, with a good soil structure and humus content and pollutant levels that are sufficiently low so as not to threaten the functioning of ecosystems or human health.
- Agricultural land must be cultivated in such a way as to minimize adverse environmental effects and promote biological diversity.
- The genetic variation of domestic flora and fauna must be preserved.

- Non-indigenous species and genetically modified organisms that may jeopardize biological diversity must not be introduced.
- Biological and cultural heritage assets in the agricultural landscape, which are the result of traditional methods applied over a long period of time, must be preserved or improved.
- Endangered species and nature types must be protected and preserved.”

SUBGOALS PROPOSED BY THE COMMITTEE

Proposed supplementary specification of the environmental quality objective:

- The habitats and dispersal patterns of wild flora and fauna in agricultural regions should be safeguarded.
- The buildings and farm environments found in agricultural areas should be sufficiently preserved and maintained so as to preserve the character of the region and enable its cultural heritage to be experienced and understood.
- An open, varied agricultural landscape should be sustained in areas with mixed forest and farmland.
- The agricultural landscape in the plains should be richly varied, with numerous biotopical pockets and aquatic environments.
- Land should be cultivated in such a way that long-term productive capacity is maintained.

Proposed intermediate targets:

1. The present acreage (year 2000) of mown meadows and grazed pasture is to be preserved and appropriately managed. By 2010, particularly valuable types of grazing land will have increased by at least 25 % (approx. 13,000 hectares) and mown meadows by at least 100 % (approx. 5,000 hectares).
2. The number of biotopical pockets in or adjoining arable land is to be preserved or increased from present levels throughout the country, and by 2005 a strategy will have been developed for increasing the number of biotopical pockets in the plains.
3. The number of maintained rural features of historical and cultural importance will have increased by 70 % by 2010.
4. Old farm buildings of cultural and historical value will be preserved to the extent required to maintain the character of the region. By

2004 at the latest, a programme will be in place detailing the scale and orientation of this endeavour.

5. By 2010 at the latest, the national programme for plant genetic resources will have been fully developed. By the same year, there will be enough individuals to guarantee the long-term survival of most indigenous livestock species in Sweden.
6. By 2010, action programmes will have been initiated on behalf of endangered species in particular need of targeted measures.

WHAT ARE THE PROBLEMS – AND HOW CAN THEY BE SOLVED?

The agricultural landscape is being transformed at an ever-increasing pace, due in part to the extensive changes in farming practices that have occurred in the 20th century but also to the increase in international competition and to low profitability engendering structural rationalization and the abandonment of agricultural holdings. Mown meadows have almost disappeared altogether, pasturage has been severely reduced and many farm buildings have become redundant. In mixed forest and farming country, wide areas of arable land are being planted with forest or left to grow wild. In the plains in particular, ditches, ponds and biotope remnants in cultivated fields are disappearing due to agricultural restructuring.

Buildings and farm environments are important for the character of agricultural regions and for cultural identity. Such environments often contain a rich biological diversity that is culturally conditioned. Financial support will also be needed to maintain mountain pastures and the culture of summer grazing (transhumance) as a whole. The national rural development programme and previous forms of compensation such as the NOLA grant have had a favourable effect on the agricultural landscape. Greater public funding will be required for agriculture, not least for the management and preservation of land, of historically and culturally valuable rural features and of characteristic old farm buildings. With increased funding, the prospects for meeting the intermediate targets are in our opinion good.

In parallel with the measures described below, research and development must also be pursued.

How are the intermediate targets to be met?

MEASURES

The most important measure for the preservation of biological diversity and agrarian cultural heritage is the continued upkeep of those meadows and pastures still maintained today. The maintenance of pastures, sea meadows, limestone grasslands on Öland and Gotland and other semi-natural grazed land is essential. This applies both to the plains and to areas of mixed forest and farmland.

The management of such lands must focus on the areas classed as important in the national preservation plan drawn up by the Swedish Environmental Protection Agency. Supplementary analysis will be needed, for instance in order to provide a better picture of the cultural and historical assets present in meadows and pastures and to determine the total extent of such land. This inventory should lead to a review of the national preservation plan. Adequate numbers of grazing livestock will also be needed for the first intermediate target to be achieved. Certain kinds of land have become so rare that restoration and development will be required. This applies in particular to natural pasture in northern Sweden, heather moorland and wooded, mountain and limestone grassland, and to hay meadows.

In the plains of Sweden in particular, there is a need for more smallscale biotopes, such as aquatic environments and ditch and field verges for wild flora and fauna. We propose that the Swedish Board of Agriculture together with other relevant agencies be assigned to produce a strategy for how such niches may be increased in this type of countryside. We would also like to emphasize the value of old roads and roadsides for preserving our cultural heritage and biological diversity, and of the value of parks and gardens for the cultural landscape and as habitats for plants and animals.

Historically significant features of the Swedish countryside include ancient monuments, country avenues, stone walls, mountain tracks, biotope remnants in fields and top-cut trees, to name but a few. In our opinion, the conditions for the preservation of such special cultural assets need to be improved. Information and competence development are important in this respect, and we recommend that the Swedish Board of Agriculture, the National Heritage Board and the Swedish University of Agricultural Sciences be given joint responsibility for taking the requisite measures.

The number of old farm buildings adding to the character of the countryside but no longer required or used for agricultural purposes is increasing rapidly. Barns and cowsheds in particular are a threatened category. Government support should be provided to facilitate the

continued use of such buildings. In order to preserve threatened farm buildings, investment funding is needed for structural alterations as well as grants for the maintenance of valuable properties no longer in use. It is not clear at present how extensive the requirements are in this respect, i e what is needed to prevent depletion of the countryside. A new intermediate target should be formulated when this becomes clear, as of 2005.

To ensure the long-term availability of pure-bred breeding stock in sufficient numbers, in accordance with the fifth intermediate target, livestock owners keeping such breeds should receive environmental compensation. Voluntary organizations can also make an important contribution in this respect. The implementation of the national programme for plant genetic resources is another important area.

The preservation and proper management of the agricultural habitats is crucial to the survival of the 15 to 80 endangered species in farming areas in need of special targeted support. The need for action programmes in this area will depend on how successful the above measures prove to be.

POLICY INSTRUMENTS

Publicly financed grants and subsidies via the environmental and rural development programme are the best policy levers in the quest for A Varied Agricultural Landscape. With regard to funding for the creation of smallscale biotopes in the plains and the care of old farm buildings, the environmental and rural development programme will need to be reviewed prior to the next programme period. Other important policy instruments are training, the provision of information, and experimental and development activities.

Policy instruments of a regional nature may be needed when it comes to providing support for farmers on small and medium-sized holdings in mixed forest and farming country.

Another major requirement is a research programme seeking to show which measures best preserve biological diversity and which are the most cost-effective. We need to find out more about the contribution that ecological farm production can make to achievement of the target, and about the risks of genetically modified organisms. The relevant environmental quality objective as adopted by the Riksdag states that GMOs must not be planted if this threatens biological diversity. The matter is currently being investigated by the Committee on Biotechnology in Swedish Society. This objective should be reviewed in the light of what is proposed by that committee, too.

A MAGNIFICENT MOUNTAIN LANDSCAPE

NATIONAL OBJECTIVE ADOPTED BY THE RISKDAG:

”The mountain environment’s pristine character must be largely preserved in terms of biological diversity, recreational value, cultural heritage and natural assets. Activities in mountain areas must respect these values and assets in order to promote sustainable development. Particularly valuable areas must be protected from encroachment and other disturbances.

Specifically, the environmental quality objective implies that:

- Sweden’s majestic mountain scenery with its character of grazed land and continuous tracts of open countryside must be preserved.
- The biological diversity of the mountain region must be preserved.
- Non-indigenous species and genetically modified organisms that may jeopardize biological diversity must not be introduced.
- The cultural heritage of the mountain region, particularly that of the Sami people, must be preserved and developed.
- Reindeer husbandry, tourism, hunting, fishing and other development must be compatible with nature’s sustainable productive capacity, biological diversity and its ecological, cultural and recreational value.
- Noise levels must be kept low.”

SUBGOALS PROPOSED BY THE COMMITTEE

Proposed supplementary specification of the environmental quality objective:

- Local fish populations in mountain lakes and watercourses should be such that reproduction and growth is assured and that genetic diversity and functional ecosystems are maintained.
- Endangered species should be given a chance to spread to new locations in their natural areas of distribution so as to ensure viable populations.
- Vegetation cover in treeless mountain terrain should not be allowed to diminish.
- The total area of quiet zones should be extended.

Proposed intermediate targets:

1. By 2010, damage to soil and vegetation caused by human activity will have been reduced to negligible levels.

2. Noise from motor-driven vehicles and aircraft in mountain areas will be reduced so that the following targets can be met by 2010:
 - aircraft noise will be negligible both in Class A scooter regulation zones and in at least 90 % of national park areas,
 - at least 50 % of snow scooters will fulfil stringent anti-noise requirements (below 73 dBA).
3. By 2010 at the latest, a majority of mountain areas with representative cultural and ecological assets will have been accorded long-term protection, including land management and restoration where necessary.
4. By 2005 at the latest, action programmes will have been initiated on behalf of those endangered species in particular need of targeted measures.

WHAT ARE THE PROBLEMS – AND HOW CAN THEY BE SOLVED?

Continued reindeer husbandry is essential if the mountain region is to maintain its character of grazing country. Unless special measures are introduced, however, the number of enterprises will decline. At the same time, reindeer husbandry must be pursued in a sustainable manner and the number of reindeer must be adapted to the limits imposed by nature. The restructuring of Sami communities has also meant that old, traditional cultural environments such as temporary gathering places, pasture areas and other remnants of reindeer husbandry are falling into disrepair. To avert impoverishment of the mountain region, the conditions must be created for both reindeer husbandry and agriculture to continue operating and for valuable habitats to be preserved and maintained. Any new activities are to be conducted in harmony with the current environment.

Greater surface deterioration and the risk of erosion is one of the problems encountered in the sensitive environment of the mountain region. The causes include cross-country driving, intensive grazing and the passage of reindeer, as well as tourism. Due to factors like infrastructural development, energy generation plant, mineral extraction and tourist facilities, the overall amount of continuous undeveloped countryside is declining and the character and enjoyment value of the mountain region is being adversely affected. Noise from air traffic and cross-country driving are further problems. Activities in mountain areas must take account of both the cultural environment and the ecosystem there.

If the proposed subgoals are complied with and greater consideration is shown towards the environment, sustainability can in our opinion be

achieved within a generation. The committee reviewing government policy towards reindeer husbandry has an important task to perform in such respects as the development of environmental sector objectives for this branch of activity.

How are the intermediate targets to be met?

MEASURES

If treeless mountain terrain is to preserve its unbroken cover of vegetation and avoid erosion damage, protection against cross-country vehicles will need to be enhanced. In particularly sensitive areas, the use of such vehicles will have to be restricted. A strategy is required for avoiding soil and vegetation damage, and this will mean both adjusting reindeer herds to environmentally appropriate sizes and limiting the driving of vehicles on terrain without a snow cover. Alternative methods of reindeer husbandry must be developed further. The final report of the committee reviewing reindeer husbandry policy, due in 2001, should provide more detailed information about what action is needed in this sector.

Today there are some 140,000 snow scooters and their number is increasing. In our opinion, all current scooters should gradually be replaced by quieter models in order to reduce noise. Most of them have two-stroke engines and a switch to four-stroke engines with catalytic converters would substantially reduce both noise and emissions of hydrocarbons and particles. To reduce noise from air traffic, air routes and landing grounds in mountain regions will have to be brought into compliance with national parks and scooter regulation zones.

For the purpose of safeguarding natural and cultural assets associated with and dependent on reindeer husbandry and montane agriculture, traditional types of enterprise must be possible in the future as well. Some areas may need special protection, for instance the last remaining environments providing historical links to former resource management practices based on fishing and hunting. A review of the overall cultural and natural assets in the region and a review of cultural heritage items of national interest under the Environmental Code should be undertaken. There is also a need for continuing the current systematic inventory of ancient monuments and historical finds in mountain areas. County administrative boards and local authorities have an important part to play in the current undertaking. The county administrative boards in the mountain area should be instructed to develop regional environment and resource management programmes,

while local authorities should detail the requirements for sustainable development in their physical plans.

In our judgement, action programmes are required in the case of a small number of endangered species in the mountain region.

POLICY INSTRUMENTS

Further technical development of cross-country vehicles is needed and in order to hasten and finance moves in this direction, a higher tax rate for older models should be considered. A previous proposal for a differentiated system of purchase tax with tax exemption for Environment Class 1 vehicles should also be taken into consideration.

The new EC directive on noise from industrial machines and equipment does not stipulate any limits for snow scooters, and we are of the opinion that Sweden should once again raise the issue of noise requirements with the Commission with a view to obtaining harmonized regulations throughout the EU. We propose that the Swedish Environmental Protection Agency be instructed to investigate the question of economic incentives in reference to the environmental classification of industrial machines and to future exhaust and noise requirements for snow scooters. They should also examine the idea of introducing a scrapping premium for older scooters and assess ways in which environmental certification and voluntary measures might contribute to achievement of the objective in hand.

Further regulation of the use of vehicles on mountain terrain not covered with snow should be considered. Another question to be considered is what legal means could be used to regulate the take-off and landing of aircraft in sensitive areas.

Guarantees under the Planning and Building Act and the Environmental Code as well as environmental funding and other financial input will be required if substantial areas of traditional montane settlement and of the natural and cultural environment in these regions are to survive and develop.

A GOOD URBAN ENVIRONMENT

NATIONAL OBJECTIVES ADOPTED BY THE RIKSDAG:

"Cities, towns and other built-up areas must provide good, healthy habitation and contribute to improvement of the regional and global environment. Natural and cultural assets must be protected and developed. Buildings and amenities must be located and designed in accordance with sound environmental principles and in such a way as to promote sustainable management of land, water, energy and other natural resources.

Specifically, the environmental quality objective implies that:

- The built environment should be aesthetically and socially attractive and offer a range of housing, workplaces, services and culture so that its inhabitants may lead rich and rewarding lives and so that the volume of day-to-day transportation may be reduced.
- Cultural, historical and architectural heritage in the form of buildings, urban environments and places and landscapes of particular value must be preserved and developed.
- Areas of unspoiled nature and open spaces close to built-up areas must be protected so as to satisfy local needs of play, recreation, cultivation and a healthy climate.
- Biological diversity must be preserved and developed.
- Transport and transport facilities should be designed in such a way as to limit harmful impact on the urban or natural environment and so that they do not constitute health or safety risks or otherwise disrupt the environment.
- High-quality environmentally sound public transport systems should be available, and there should be good facilities for pedestrian and cycle traffic. People must not be exposed to harmful air pollution, nuisance from noise, harmful radon levels or other unacceptable risks to health and safety.
- Land and water areas should be free from toxic and harmful substances and other pollutants.
- Energy, water and other natural resources must be used in an efficient, economical and environmentally compatible manner, and the main sources should be renewable.
- Gravel must only be used where appropriate substitutes are not available.
- Gravel deposits of considerable value for water supply and for natural and agricultural countryside must be preserved.
- The total amount of waste and the extent to which it represents a hazard must be reduced.

- Waste and residues must be graded at source so that they may be processed by category and returned to the ecocycle in a balanced interplay between town and surrounding countryside.”

SUBGOALS PROPOSED BY THE COMMITTEE

Proposed supplementary specification of the environmental quality objective:

- A building development structure should be promoted that is sustainable in the long term, with regard to both the siting of new buildings and undertakings and the transformation of existing ones.
- The housing and recreational environment – both indoor and outdoor – should meet stringent requirements as to noise, access to sunlight and clean air.

Proposed intermediate goals:

Planning and noise

- By 2010 at the latest, central and local government planning will be based on programmes and strategies for:
 - the development of a traffic system stipulating how environment-friendly, low-energy forms of transport are to be promoted and how fossil fuel powered transport is to be reduced;
 - ways in which cultural, historical and aesthetic assets may be preserved and developed;
 - ways in which green open spaces and water zones may be preserved and developed in urban areas and surrounding countryside, and how the proportion of hardened surfaces may be kept from increasing;
 - ways in which renewable energy sources and the conditions for developing production facilities for district heating, solar energy and wind power may best be utilized.
- The number of people exposed to disturbance from traffic noise over and above the levels determined by the Riksdag for noise in the home will have fallen by 10 % by the year 2010 and by 80 % by 2020 compared with 1998 levels.

Buildings

- Old buildings of cultural and historical value will have been identified by 2010 and a programme will be in place to protect them.
- By 2015 at the latest, indoor environments in buildings will be in a satisfactory state, which means that:
 - negative effects caused by damp and mould damage will have been remedied. Annually recurring damage losses will have been reduced to 1/10 of present levels (year 2000).
 - indoor air will be of excellent quality and ventilation will serve its purpose.
- In new buildings, energy use in 2010 will not be allowed to exceed 90 kWh/m² a year. In new construction, direct electrical heating will only be used in holiday homes by 2005. Energy use in the total stock of buildings in Sweden – housing and non-residential premises – will decline and will be lower in 2010 than in 1995, and will subsequently be halved by the year 2050. The proportion of fossil energy sources used in housing and other premises will also decline, to no more than 20 % by the year 2010.

Resource management and ecocycles

- By 2010, gravel extraction in Sweden will not exceed 12 million tons a year and the proportion of pure recycled material will comprise at least 10 % of ballast use. By 2020, gravel extraction will not exceed 3 million tons a year and the proportion of pure recycled material will be higher than in 2010.
- All waste depositories in the country will be of uniform standard by 2008 and will satisfy stringent environmental requirements in accordance with the EU's Waste Disposal Directive.
- The total quantity of landfill waste (excluding mining waste) will have been reduced by at least 50 % by 2005 compared with 1994 levels, and the total quantity of generated waste (excluding mining waste) will have declined over the same period.
- By 2010, at least 75 % of phosphorus from waste and drains will have become recyclable and can be restored to agricultural soil or other productive land without hazard to health.
- The total quantity of materials and energy used by goods and services (functions) during their lifecycle will be lower in 2010 than in 2000.

The above targets apply to the built environment in both urban and rural areas and also affect other quality objectives.

WHAT ARE THE PROBLEMS AND HOW CAN THEY BE SOLVED?

The built environment – i.e. buildings, communication routes, plant and technical infrastructure – has undergone major changes during the industrial era and particularly in the latter part of the 20th century. The strain has become considerable on both the environment and the people who occupy it, and the list of problems is extensive: air pollution impairing health and damaging buildings, noise causing health and sleep problems, damp and mould in ‘sick buildings’, poor-quality indoor air, etc.

Technological advances, noise abatement, balanced ventilation and heating, quality assurance certification and the environmental certification of housing and of construction materials are some of the measures being used to tackle these problems. Also, many of the measures correspond to the national environmental quality objectives.

The urban environment is also grappling with a series of other problems. One is the adverse effect of motor traffic. Changes must be introduced in this sphere with a view to boosting public transport and developing environmentally compatible, low-energy forms of transport. Another problem is the threat to valuable cultural environments from development and structural transformation. This may apply for instance to harbour areas, railway yards or old industrial environments, or to buildings like schools and hospitals. Greater consideration must be shown towards such cultural assets and be introduced at an early stage in planning to prevent impoverishment of the urban environment.

New planning and administrative models must also be developed in the case of green open spaces and water zones. An increasing amount of park land is being turned over to construction and the development of traffic facilities. A further problem is the excessive and inefficient use of power current. It will therefore be necessary to make power use more efficient and promote renewable sources of energy.

In the section on resource management, we discuss the risk of gravel reserves being exhausted unless action is taken. We also look at such problems as waste depositories that leak pollutants and occupy large areas of land, the need for reduced emissions of chemicals, and the unacceptably high consumption of both finite and renewable resources. Finite resources such as phosphorus and metals are areas of priority. Much remains to be done before the ecocycles can be consummated.

How are the intermediate targets to be met?

MEASURES

Planning and noise

It is important for us to use land and build houses, roads and other amenities in such a way as to favourably affect our habitats and health as well as the natural and cultural environment around us. The present environmental quality objective has a strong bearing on community planning as a whole and presupposes coordination between different sectors in society and collaboration between the relevant players. The issues concerned fall largely within the local authorities' sphere of responsibility and are often dealt with as part of municipal planning programmes. An important task for both local authorities and national agencies is the development of programmes and strategies for the various areas discussed in the first intermediate target.

In the quest for an environmentally compatible, low-resource traffic system, we offer a number of examples of how suitable programmes and strategies might be developed, for instance with regard to environmental impact assessments when unexploited land is to be built on, to the preferential siting of new housing, public administration and private services in places where public transport already operates, and to the expansion of public transport infrastructure in order to reduce the need for motor traffic. Other examples include the prioritizing of pedestrian, bicycle and public transport traffic in town or city centres and the levying of road charges and creation of green zones as a means of reducing motor traffic and making it environmentally compatible.

On the question of how cultural, historical and aesthetic values are to be safeguarded and enhanced, planners should proceed from a position of respect for them when new buildings and facilities are erected, maintained and managed.

In large urban areas in particular, uninterrupted and varied green zones and water zones should be preserved and developed, and amenities like recreational areas should be part of a conscious structure at the planning stage.

Programmes and strategies for the utilization of renewable sources of energy, district heating and wind power might well be based on the promotion of construction siting that allows for district heating plant with very efficient particle removal and siting that takes into account local climatic conditions in order to make better use of alternative energy sources.

With respect to noise, motor traffic is the chief source of nuisance. A more extensive national action programme for the reduction of traffic

noise should therefore be developed and augmented by guidelines for various environments. Such a programme should be coordinated with a national action programme for other kinds of noise as well. Work must continue on reducing noise at source, e g through the modification of vehicles, tyres and road surfaces and through redirecting traffic. Technical advances will also be important, along with the means for imposing anti-noise requirements on vehicles, machines, buildings, etc.

Buildings

We need to increase the body of knowledge relating to old buildings of cultural and historical importance. Property owners should be better informed about the requirements concerning careful management. We suggest that the National Heritage Board be instructed to work with this.

Too little is known about the correlation between a good indoor environment, the degree of ventilation and chemical substances present in both building materials and the indoor environment. We feel that greater importance should be attached to such issues so that appropriate action may be taken. There are now cost-effective methods in new construction for improving the indoor climate without increasing energy use. These include mechanical ventilation systems, demand-controlled ventilation, solar screening, etc.

To obtain good air quality indoors and a healthy climate, buildings must be properly insulated and draught-free so that both intake and waste air can be properly controlled. The presence of construction materials, fabrics and furniture, etc, that emit chemical substances should be studied. New single-family houses and multi-family housing need to be insulated more thoroughly so that the energy use target may be met. Windows with extra insulation, for instance, are able to reduce energy loss dramatically. Better enforcement of current building standards is also important, as are consumer choices with regard to things like low-energy lighting, ventilation and white goods. Individual measurement of heating consumption in multi-family housing is an important tool for boosting energy conservation.

Resource management and ecocycles

Gravel extraction should be reduced by stages and alternative materials should be increasingly substituted. More knowledge must be obtained concerning gravel availability and needs and the prospects for recycling and for using substitute materials.

The regional surveys performed by the Geological Survey of Sweden in cooperation with county administrative boards and local authorities often need to be augmented with quality classification and information about conflicting interests.

On the basis of these surveys, local authorities together with county administrative boards should also develop supply plans for materials. These plans should describe stocks of materials of different quality, conflicts of interest, current production levels and estimates of future needs.

The intermediate target concerning waste depository standards and environmental requirements is governed by the EC directives issued in this respect, and will become law in 2001. The following year, a conversion plan for each facility must be submitted to the supervisory authority, and during the period up until 2008 operators will have to apply for authorization, termination and conversion of their depositories in order to meet the requirements. Proposed measures for reducing the overall quantity of landfill waste have already been adopted by the Riksdag and we recommend that the present intermediate target be reviewed prior to 2005.

For the purpose of completing the phosphorus cycle as far as possible, a number of initiatives will be required: new technology for creating clean, effective phosphorus cycles, for instance, and powerful constraints on the use and leakage of chemical substances that pollute organic residue. A new specification of requirements, supplemented by a further range of metals and organic environmental toxins, should be prepared jointly by the Federation of Swedish Farmers, the Swedish Water and Wastewater Association, the Swedish Environmental Protection Agency and others.

As regards the target concerning the reduction of energy and materials usage for goods and services throughout their lifecycle, we wish to direct attention to the reports on material flows compiled by the group of experts attached to the present committee, and to the reports of the commission studying the effective use of Sweden's resources, where these issues are also discussed.

POLICY INSTRUMENTS

Planning and noise

In our view, current legislation – primarily the Environmental Code and the Planning and Building Act – will suffice for implementation of the proposed measures.

Economic incentives should be used to promote environmentally compatible, low-energy means of transport and to limit fossil fuel powered transportation. Forms and methods for traffic cost estimates and various kinds of financial support such as government subsidies, employment funding and local investment programmes should be reviewed and amplified so as to take into account the consequences for cultural, ecological and other environmental assets.

National agencies such as the National Board of Housing, Building and Planning, the National Heritage Board and the Swedish Environmental Protection Agency should assist in the work of developing programmes and strategies by providing guidelines and advice.

Training needs among those responsible for looking after green structures in urban environments are considerable. A programme should be developed offering both basic training and more specialized training for planners, architects and engineers. Research, too, is needed in a number of fields, focusing for instance on urban ecology but also on the correlation between green and cultural environments, health and children's development, etc.

To meet the target concerning noise abatement, the possibility of introducing environment-related road charges and green zones for private cars as well should in our view be assessed. Environmentally-related noise charges on tyres is another possibility. Yet another is quieter and more environment-friendly driving techniques – and training will be needed in this respect. Guidelines and action programmes for traffic noise and other noise in various environments will need developing. The Swedish Environmental Protection Agency should be given an unambiguous position of responsibility for the coordination and follow-up of anti-noise measures. The traffic agencies and the military should continue to be given explicit responsibility for their respective sectors as regards noise abatement efforts in existing environments, in cooperation with regional authorities, local authorities and others.

Buildings

Building conservation centres are needed in all parts of the country, and training within the construction sector in the principles and techniques of building conservation needs to be improved.

Better coordination of control systems is required with respect to ventilation, the indoor environment and energy conservation, and we propose that the National Board of Housing, Building and Planning in consultation with the Swedish National Energy Administration and the National Board of Health and Welfare be instructed to propose measures for improving coordination and legislation in this field. In this connection, the question of whether radon should be introduced into the work should be considered, and study should be made of the scale of current problems relating to the indoor environment, ventilation and damp and mould damage in buildings.

The National Board of Housing, Building and Planning should also be instructed to draw up programmes for various initiatives in the information field, partly directed at the general public in reference to ventilation issues and partly at universities, technical colleges, vocational colleges, consultancy and construction companies, etc, in relation to the effects of damp on health.

The Swedish Building Standards are from 1992 and need to be brought into line with developments in recent years with respect to materials and technology. We also feel that the construction industry must be encouraged to focus more on integrated solutions than on specific technology for different subsystems.

More stringent energy conservation requirements are needed in the national building regulations, and developers and property owners need above all to be encouraged to invest in technology that makes for more efficient energy use, both in new production and maintenance. The National Board of Housing, Building and Planning and the Swedish National Energy Administration should jointly investigate the situation in this field and propose suitable measures. Together with the relevant trade associations, they should also investigate the introduction of a system whereby developers could guarantee the 'climate shell' functionality of their buildings via environmental and energy certification and enhanced producer liability. Such certification should refer to conditions relating to the indoor environment, healthy materials, noise levels and quality assurance of the construction process.

Further research into the correlation between the indoor environment and health is needed and should encompass medical, chemical, structural engineering and behavioural aspects. Sweden must also take an active part in the work being pursued by the EU and various international bodies in this field, and focus in particular on issues like the

causes of allergies and oversensitivity, coordination of environmental and energy certification and the phasing out of chemicals in construction materials and the indoor environment.

Resource management and ecocycles

We propose that the various interested parties and sectoral agencies cooperate and by means of voluntary agreements divide responsibility for achieving the intermediate target concerning gravel by the year 2010. The Geological Survey of Sweden should be assigned to develop such agreements and evaluate the outcome by 2005 at the latest. This evaluation should also deal with the issue of whether additional economic incentives will be needed to reduce gravel extraction and stimulate the use of substitute materials. The Geological Survey of Sweden should also develop guidelines for the establishment of materials supply plans together with the relevant agencies and the industry. Training programmes focusing on gravel conservation for member companies in the trade association are another important tool, as are research and development.

The new laws, provisions and regulations aimed at reducing the quantity of waste and enacted in the late 1990s are an important instrument that will be very useful in achieving the intermediate target for waste. Another means of reducing the amount of waste is the use of variable charges for refuse collection, whereby local authorities can charge less to households that practise composting and grading at source. Research and development are needed both as regards design and with a view to developing products that are more recyclable than current ones. In addition, a further extension of producer liability should be considered.

New methods need to be developed to prevent sludge being contaminated by heavy metals and organic environmental toxins. The development of separating systems for sewage must continue. Further development of techniques for purifying contaminated sludge is also needed. For the proper purification of sludge and sedimentation residue, etc, sewage treatment plants need to be developed further, and one way of reducing costs in this respect is for local authorities to collaborate with one another. Regional waste management plans can provide the necessary background planning material.

For the development of goods and services that save materials and energy, soft policy levers such as technology procurement, environmental certification, greater environmental information and environmental management systems will be required.

THREE STRATEGIES

Several of our environmental problems have common causes: emissions from transportation and energy use in all areas of society, flows of goods and materials whose impact on health and the environment are often unknown, and non-sustainable utilization of land, water and the urban environment. Coordinated joint action will be required, therefore, if the various environmental quality objectives are to be achieved. One single measure can result in several objectives being achieved and one single policy instrument can stimulate the introduction of many different measures in a variety of sectors.

For this reason, we propose three main strategies – an efficiency enhancement strategy, an ecocycle strategy and a resource management strategy.

The efficiency enhancement strategy will aim for greater efficiency in the use of energy and transportation and will seek to promote renewable energy sources and new technology for the cleaning of harmful emissions. The national objectives of Clean Air, Natural Acidification Only, Limited Influence on Climate Change and to a certain extent No Eutrophication and A Good Urban Environment can all be achieved through this strategy. It mainly comprises a combination of information and economic incentives.

The country's energy taxation system should be endowed with a long-term perspective based on the concept of sustainable development, so that taxes can contribute for instance to the achievement of the environmental quality objectives. Further, traffic taxation should be revised in such a way that low-fuel technology and renewable fuels benefit. Nitrogen oxide charges, the environmental policy effects of transport subsidies, instruments promoting the introduction of renewable fuels and alternative propulsion systems, etc, should also be reviewed. The introduction of road charges must become a feasible policy alternative.

To accomplish the efficiency enhancement strategy, we propose inter alia that the Swedish National Energy Administration be instructed to develop information campaigns and background material for energy consultancy in housing and premises. The National Board of Housing, Building and Planning should be given such tasks as preparing systems for individual heating measurement in multi-family dwellings and developing systems for the provision of energy and environmental certification in buildings. The National Road Administration, the Swedish Maritime Administration, the Civil Aviation Administration, the National Rail Administration and the Swedish Environmental Protection Agency

will have other important tasks to perform in the efficiency enhancement strategy.

The ecocycle strategy will focus on the creation of low-energy and low-material ecocycles and reductions in the emission of environmental toxins and nutrients. This strategy will primarily concern the objectives of A Non-Toxic Environment, No Eutrophication and A Protective Ozone Layer, and the targets relating to waste and resource management in A Good Urban Environment. Accomplishment of the strategy will primarily require a combination of laws, regulations and information.

The Environmental Code, the EC directive on the purification of waste water and the impending Water Framework Directive are appropriate instruments for the regulation of eutrophication in Sweden, along with environmental subsidies for the agricultural sector.

In the case of waste, a number of regulations have either been introduced recently or are planned, and we consider these to be adequate for the purpose of achieving the intermediate targets. They include new EC directives concerning the combustion and deposition of waste as well as the Environmental Code and its provisions, for instance those contained in the Refuse Collection Ordinance. A prohibition on the landfill deposition of graded combustible waste will apply from 2002 and on the deposition of organic waste in general from 2005. These instruments should be augmented by information aimed at achieving a non-toxic, low-resource flow of materials.

The question of which new and amended environmentally-related taxes, charges and deposits are needed in order to enhance efficiency in the flows of goods, products and materials in society should also be investigated. In addition, the possibility of introducing grants for the improvement of private sewage treatment should be considered, as should the possibility of making greater use of local investment programmes to fund municipal efforts to recycle phosphorus. The levying of taxes and charges on manure usage should be reviewed with the aim of increasing their environmental policy impact.

Particularly hazardous substances should be banned altogether and the use of substances that lack the requisite minimum of specification data should be prohibited from the year 2010. Efforts to combat eutrophication must be stepped up. We propose inter alia that the National Chemicals Inspectorate and Swedish National Board for Industrial and Technical Development be instructed to coordinate and support the environmental efforts of small and medium-sized companies. The Swedish Environmental Protection Agency should be given the task of investigating ways in which the manufacture of goods with low-

resource lifecycles might be stimulated. In the case of work to achieve common EU systems, an all-out effort will be required, partly with respect to specification minimums for chemical substances and partly with respect to health and environmental information for goods.

The resource management strategy will aim to bring about good management practices in relation to soil, water and the urban environment. We must emphasize careful utilization and the type of environmentally compatible community planning and construction that leads to the conservation of existing assets and protects vulnerable features. This strategy primarily affects the objectives of High-Quality Groundwater, Sustainable Lakes and Watercourses, Flourishing Wetlands, A Balanced Marine Environment (incl. Sustainable Coastal Areas and Archipelagos), Sustainable Forests, A Varied Agricultural Landscape, A Magnificent Mountain Landscape and A Good Urban Environment. It is based on current legislation and various economic incentives, etc.

The resource management strategy will focus on broadening and deepening present knowledge and be based on both current legislation and current environmental subsidies in the agricultural sector, in combination with such measures as information campaigns to land-based industries from the relevant agencies. The preservation of biological diversity and valuable natural and cultural environments must also feature more strongly in rural development funding and in fisheries policy. Further efforts to protect valuable groundwater and surface water supplies will be necessary. In addition, the possibility of preventing overfishing needs to be reviewed, as do ways in which legislation may be used to create and maintain noise-free zones.

The connection between the national environmental quality objectives and legislation should be rendered more distinct. We are proposing changes to both the Environmental Code and the Planning and Building Act.

THE CONSEQUENCES FOR TRADE AND INDUSTRY, PRIVATE HOUSEHOLDS AND PUBLIC SECTOR ACTIVITIES

TRADE AND INDUSTRY

Manufacturing and commerce

The business sector as a whole will need to adjust to efficient energy use, a lower level of transportation and travel needs, ecocyclic waste management and the minimization of emissions of toxic and environmentally destructive substances. In addition, the products that are manufactured and sold need to be non-toxic and low on resource consumption throughout their lifecycle.

This process is already under way, largely through voluntary efforts, but needs to be expedited. In this context, dialogue with the business community is of great importance. Companies' environmental efforts can give them a head start and in time strengthen their competitiveness.

Initially, trade and industry may be adversely affected by the need to spend more on things like investment and training, but once the changes have been made operating costs will in many cases be unaltered and in others be lower than before. Relatively small companies, with their limited amounts of time, competence and capital, will probably be the ones affected most by the changes. This is the case for instance in the engineering industry, which will principally need to make transportation more efficient and will have to phase out and replace hazardous chemical substances.

The forestry industry is very energy-intensive and here, too, development and innovation will be required. The pulp and paper industry accounts for almost half of total energy use in Swedish manufacturing and a third of overall electricity use. Heavy transportation in the forestry sector also requires a great deal of energy, and in the food industry, too, transportation levels are very high and new solutions are needed.

In the retail trade and other service businesses, more efficient use of both energy – e g in ventilation, heating and lighting – and transportation will be required. The reuse of materials and the use of chemicals must be adapted to ecocycles. Finance companies have a very important part to play in this as indirectly, via capital investment and the provision of loans and insurance, they can make demands that will speed up pro-

environment moves. To increase awareness among finance company staff, training and information will need to be provided.

The environment industry, finally, extends across a broad spectrum and the number of employment openings here should increase. The industry includes such spheres as recycling, trading in waste products and waste management, but also consultancy work, companies focusing on renewable energy, ecotourism, cultural tourism, building conservation, etc. We have studied some of the likely effects on trade and industry but these need to be analysed in more detail in order to determine the effects in individual cases.

Energy production

Incorporated in our definition of the energy-producing sector are companies operating independent power generation plants, cogeneration plants and district heating plants. They all bear direct responsibility for achieving the targets in hand, such as the restoration of watercourses, the emission of radioactive substances and the release of nitrogen oxides.

A further decline in nitrogen oxide emissions from power production is necessary. Safety precautions at nuclear power plants should be maintained at the same levels as at present. Research and development are needed for the development of safe methods for the final disposal of spent nuclear fuel.

The restoration of protection-rated watercourses may be an additional expense for power companies. The climate objective, however, is the one that will have the greatest repercussions for this sector.

Construction

Incorporated in our definition of the construction sector are developers and property owners, architectural companies, technical consultants, the construction materials industry and the construction industry/building contractors.

One of the most pressing needs in this sector is for measures to make energy use more efficient in both old and new buildings. For developers, this means extra costs both for building materials offering lower energy use and better insulation and for more thorough quality assurance. Improved exhaust emission controls for machinery will also raise costs.

For property owners, the consequences may involve having to obtain better-qualified staff for operation and maintenance, and costs may increase as a result of new heating systems and radon removal. Increased costs, however, may well be offset by reduced expenses for energy use. Another important task for the construction sector is the development of skills and know-how in the field of building conservation.

Overall, we envisage a growth in employment in the building sector as a result of the measures proposed in this report.

Land-based industries

In the agricultural sector, the trend towards environmentally compatible farming practices must be welcomed and encouraged. Further measures are needed to bring down nitrogen and ammonia emissions. Almost 90 % of all ammonia emissions come from agriculture. Technological improvements are needed so that ammonia emissions may be limited, and action must be taken with regard to manuring and manure management, break crops and wetlands, etc, with a view to reducing nitrogen leakage. Improved control of exhaust from tractors and other machinery is needed to reduce nitrogen oxide emissions. In addition, the hazards associated with pesticide use must be reduced.

Agriculture also has a duty to ensure that various types of land and local environments as well as structures of high ecological or cultural value are preserved. It already receives special grants for this purpose and the additional consequences are likely to be small. In areas with valuable natural and cultural assets, landscape conservation grants may help agricultural producers to survive.

All in all, we expect the consequences to be highly varied for different agricultural producers, depending partly on their location and partly on the size and focus of their farms.

In the case of forestry, ultimate responsibility lies with the landowners and voluntary undertakings are of considerable importance. Environmental awareness is widespread in the forestry sector, but greater consideration needs to be shown for the cultural environment. Setting aside land containing valuable natural and cultural assets costs money in the form of production loss. In the case of relatively small forest properties containing valuable natural assets, the consequences may be serious. As in agriculture, reducing emissions of nitrogen oxides from machinery and vehicles is an important task.

Reindeer husbandry will bear a heavy responsibility in that it will be required to reduce soil damage and pollution, etc, from cross-country vehicles and protect and preserve valuable natural and cultural

environments. Many of the proposed targets and measures are intended to protect and preserve the productive capacity of land and water, and the consequences for reindeer husbandry should on the whole be favourable. Tougher requirements with regard to cross-country vehicles may however entail extra costs.

The survival of the fishing industry depends on the long-term productive capacity of the seas and lakes. Thus it has much to gain from the environmental quality objectives being achieved. The situation in the fishing industry is that business conditions with regard to certain types of fish have been deteriorating for quite a time while other types of fishing companies have been turning a good profit. The imposition of constraints on overfishing would improve the financial position of more fishing companies. Restrictions on fishing will have to be introduced before long-term benefits can be reaped, however, which will cause financial problems for certain types of operators.

HOUSEHOLDS

Compared with many other countries, the level of environmental awareness is high in Sweden's private households. We have made considerable progress as regards things like waste management and the purchasing of eco-labelled products, and are already contributing to the implementation of the ecocycle strategy. Much greater efforts will be required, however, in relation to the efficiency enhancement and resource management strategies.

Travel, for instance, is on the increase and falling electricity prices have hardly contributed to a more efficient use of energy. Noise in general and wear and tear in popular natural areas are two other problems that have increased. Changes in our lifestyles will therefore be needed, primarily in relation to our housing, the way we travel and the food we eat.

A number of measures will be required in housing, not least for the purpose of reducing energy use and making heating systems environmentally compatible. This may involve individual heating measurement in multi-family dwellings, measures aimed at reducing heat loss from windows, extra insulation and the replacement of inefficient wood-fired boilers with more environment-friendly systems. Radon removal is another area of importance. In the case of transportation, we must direct our efforts at driving in a more energy-saving way, reducing speed, switching as far as possible from private motoring to public transport and promoting more bicycle and pedestrian traffic.

Changes in food consumption patterns are part of the environmental effort and households can contribute here by increasing their consumption of cereals, legumes, fruit and vegetables while at the same time reducing meat consumption, buying eco-labelled products, and buying outdoor produce grown nearby, etc. Other kinds of action that will be required of households include the continued grading and recycling of waste, the purchasing of environmentally sound goods and produce, and improvements in private sewage treatment.

Household expenses will not necessarily increase as a result. More environment-friendly driving and greater emphasis on vegetable consumption are cost-cutting measures. Our proposals will not mean that energy-conserving measures in housing necessarily lead to an overall increase in the cost of accommodation. In financial terms, small households, single householders without children and old-age pensioners will find it hardest to undertake all the proposed steps. Economic incentives may be required for some of the more costly measures relating to housing. Funding for radon removal and improvements in private sewage treatment will be needed if the targets are to be achieved. If the measures we propose are implemented, the general quality of life will increase and there is every chance that public health will improve.

PUBLIC SECTOR ACTIVITIES

The public sector – the Riksdag, the Government, national agencies, county councils and local authorities – bear considerable responsibility as both producers and consumers on the road to a sustainable society. This sector can serve as a model in various ways, both internally within its own organizations and in its contacts with the outside world.

Imposing environmental requirements on public procurement is one of the most important instruments available. They can be applied in such areas as transportation, cleaning, hotel accommodation and the organizing of conferences. They can also be applied to the procurement of a great variety of goods. Activities in the public sector have become increasingly attuned to the environment and we must ensure that environment management systems/environmental programmes continue to develop. Business trips, transportation and premises can be made environmentally compatible to a greater extent, and as in the case of private households the public sector must strive for such things as a larger proportion of ecologically-grown produce in its purchasing, greater use of renewable resources as opposed to finite ones, and a high degree of waste grading and reuse.

In our opinion, environmentally compatible public sector activities can in the longer term often entail unchanged costs or reduced costs.

FOLLOW-UP AND REVIEW

Regularly following up the environmental quality objectives and revising them when necessary is one of the preconditions for achieving the generational goal. To this end, a simple and easily accessible system is required focusing on the most vital issues. For each of our environmental quality objectives, therefore, we have outlined a proposed follow-up procedure with the aid of indicators and ecological key numbers.

We recommend the use of indicators as a basis in ongoing follow-up work, but they should be supplemented by such aids as interim analysis to determine whether the objectives can be achieved. Forecasts as to future environmental trends will also be important.

The Government should make a point of identifying the agencies that are to assume overall responsibility for each and every one of the environmental quality objectives. Their task should be to report on how the implementation work is progressing, to propose supplementary measures, new or revised policy instruments, new or amended intermediate targets, and so forth. During the work on the environmental quality objectives currently under way, a division of responsibilities has emerged. We propose that it be retained and that each of a total of seven agencies be allocated principal responsibility for one or more of the 15 environmental quality objectives. Four agencies are to be made responsible for intersectoral aspects linking the goals relating to cultural environment issues, health, planning and the natural environment.

We also propose that a special advisory council for environmental objectives be set up and based at the Swedish Environmental Protection Agency, *inter alia* for the purpose of coordinating reporting on follow-up and revision. The responsible agencies and authorities should be represented on this council, along with a number of sectoral agencies, county administrative boards and local authorities. The Government should consider the question of whether trade and industry, too, should be represented.

Via the special advisory council, each agency with responsibility for an objective, as well as agencies with intersectoral responsibilities and county administrative boards, should be required to report on their follow-up work and on measures that have been taken.

Thereafter, the advisory council on environmental objectives should in turn provide annual progress reports to the Government. Between

elections, i e once every four years, the Government should present an overall assessment of progress so that the Riksdag can decide whether any policy instruments or objectives need revising.