

**Scientific information and knowledge  
for decision-making in international marine conventions,  
particularly in the Baltic Sea Area**

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## **1. Introduction**

The role of science for decision-making was discussed extensively already at the UN Conference on the Human Environment, held in Stockholm in 1972. The Action Plan adopted by the Conference very much reflects the views held at that time about the environmental and natural resources problems facing the world. It was firmly believed that through international co-operation on research, monitoring and assessment it should be possible to identify emerging problems at such an early stage that effective action could be taken before these problems had grown into real threats to human welfare and the environment.

This approach also characterized the global and regional conventions for the protection of the marine environment of different sea areas, which were negotiated and signed in the early 1970's. The 1972 London and Oslo Conventions on dumping of wastes, and the 1974 Helsinki Convention on the Protection of the Marine Environment of the Baltic Sea Area, are examples of such conventions.

However, the efforts made both globally and regionally during following decades have illustrated the difficulties in establishing sufficiently effective monitoring and assessment programmes, particularly at the global level. In order to be effective, such programmes need to include data collection, trend analysis, studies of ecological effects as well as socio-economic aspects of the problems, and appropriate action strategies.

As a result of 20 years of national efforts and international environmental co-operation, it was finally comprehended at the political level that in most cases the ecosystems are far too complex and slowly reacting for such an approach to be feasible. This 'new' insight lead to one major conclusion. It became clear that pollution prevention at source was the approach most likely to be successful. In other words, it was realized that one needed to apply what has become internationally know and accepted as the precautionary principle or precautionary approach. *'In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation'* (Article 15 of the Rio Declaration of the 1992 UN Conference on Environment and Development, UNCED).

## **2. About this study**

### ***2.1 Objective***

How can it be assured that representatives of Contracting Parties of international conventions have access to and base their negotiations on the best available, well founded and most widely accepted scientific and technical information? The objective of the present study is to try to identify these pathways of communication and knowledge transfer, and to discuss the practical impact of scientific and technical information on political negotiations within relevant marine conventions.

### ***2.2 Methodology***

All countries around the Baltic Sea participate in the co-operation within the Helsinki Commission (HELCOM), the executive body of the Helsinki Convention. HELCOM has existed for more than 25 years, and for most of this time well established and functioning

structures for co-operation, including monitoring and assessment programmes, have been in place. However, in recent years the Commission has been undergoing a modernization process. As part of that there has been a radical organizational restructuring, including a restructuring of the scientific-technical co-operation.

Focus in the present study is placed on an analysis of the elaboration, adoption and implementation of declarations and recommendations in the international co-operation on the marine environment of the Baltic Sea Area within the framework of the Helsinki Convention and its Commission. The study includes three components:

- An analysis of the flow of information/knowledge from scientists to delegates to the international meetings and negotiations within the HELCOM system;
- An analysis of a some of the major political (Ministerial) declarations adopted since the mid-1980's, and a limited number of recommendations, particularly dealing with nutrients and hazardous substances, in relation to the information available to the delegates;
- An analysis of the implementation at the national level of the internationally adopted HELCOM Recommendations.

### **3. International environmental negotiations**

There are some basic prerequisites for conducting environmental negotiations, and some basic mechanisms for decision-making. All parties of a negotiation have joint, significant interests; otherwise they would not have agreed to gather around a negotiation table. In order to remain in the negotiation a party will have to be convinced that no other course of action is more favourable for coping with the problem(s) in question than a negotiated agreement in, for example, the form of a new international convention. Those engaging in environmental negotiations often perceive these joint interests with particular clarity and strength, as the objective of the negotiation in most cases is to address an existing or emerging environmental problem which the participants view in essentially the same way. Negotiations are often not initiated until the environmental problem (or problems) has clearly manifested itself. The transboundary and/or regional dimension of environmental problems contributes strongly to forming the basis of the joint interest demonstrated by the participating actors.

It should be noted, however, that the existence of joint and clearly perceived interests does not guarantee that the parties can also smoothly come to an agreement. Firstly, they may evaluate the joint interests differently. Secondly, they could have diverging individual interests. Thirdly, they are not unlikely to arrive at quite different estimates of the costs necessary for an effective solution of the problem.

### **4. Decision-making in marine conventions**

The system adopted for decision-making within a convention is of crucial importance for the effective functioning of the agreement as such. The basic principle is that although countries have signed an international agreement to co-operate (the convention), they have not handed over the decision-making power or right to any supranational structure. In addition, there are no mechanisms according to which sanctions can be imposed on countries not complying with the decisions or recommendations adopted. This is fundamentally different to the system developing within, for instance, the European Union.

As representatives of individual governments at the meetings of Contracting Parties make the decisions, no convention will be better than ‘allowed’ by those governments. The decisions will be based on the willingness of the countries to co-operate and to implement the internationally agreed measures at the national level. Decisions within the framework of international conventions are generally made according to two different principles:

#### *Consensus decisions*

Negotiations continue until all parties can accept and agree to the proposed decision. This method of decision-making often implies that the ‘least advanced’ country will constitute the lowest common denominator and, thus, set the pace for progress. At the same time, the system guarantees that a minimum level is adhered to by all countries involved, e.g., a minimum standard or maximum emission level.

#### *Majority decisions through voting*

Decisions are made with either a simple or a qualified majority (generally two thirds or three fourths of the votes). In these cases, the option to file a reservation against the decision (contracting out), either at the meeting or within a specified time frame, is almost always granted to countries which do not wish to follow the majority decision. By doing so, they are not obliged to comply with that decision. The advantage of this decision-making system is that it allows progressive countries to move forward at a quicker pace. Another advantage is that less progressive countries cannot ‘hide’ behind a consensus decision and claim that this is what everyone wants and believes is required. However, one disadvantage is that also countries that are important from an environmental perspective may join those filing reservations, and that will make international action programmes less effective. These countries may also gain economic advantages if their industries are not forced to invest in environmental control measures to the same extent as those in environmentally more progressive countries.

### **4.1 Decision-making in the Baltic Sea and Northeast Atlantic environmental co-operation**

The approaches described above are exemplified by three international conventions of relevance to the work within the MARE research programme:

- *Consensus decisions*: The Convention on the Protection of the Marine Environment of the Baltic Sea Area (the Helsinki Convention). The principle of consensus decisions has been applied with this convention ever since it was first signed, in 1974. The same decision-making system is used for the revised 1992 Convention.
- *Majority decisions through voting – if consensus cannot be reached*: The 1992 Convention on the Protection of the Marine Environment of the Northeast Atlantic (the OSPAR Convention). Consensus decisions are strived for, but if consensus cannot be reached a qualified majority system is applied.
- *Primarily majority decision-making*: The 1973 International Convention on Fishing and Conservation of the Living Resources in the Baltic Sea and the Belts (the Gdansk Convention). Decisions and recommendations by the International Baltic Sea Fisheries Commission (IBSFC) are taken by qualified majority vote – unless consensus can be reached.

#### **4.1.1 Decision-making within HELCOM**

The regulations on voting are set out in Rule 8 of the HELCOM Rules of Procedure. It is specified in Paragraph 8.1 that each Contracting Party shall have one vote in the Commission. However, according to Paragraph 8.2, Decisions of the Commission, the Heads of Delegation and the subsidiary bodies shall be taken unanimously in accordance with the Convention.

The unanimous decisions of HELCOM are made in the form of HELCOM Recommendations to the Contracting Parties. In practice, it is up to the Contracting Parties via national measures, such as legislation or discharge standards, to implement the substantive content (standards, regulations, etc.) of the Recommendations. It should be strongly emphasized that the HELCOM Recommendations are not formally legally binding on the Contracting Parties. On the other hand, a unanimous decision by all Contracting Parties, including an obligation to report on the national implementation, implies a strong political commitment to fulfil the obligations and commitments set out. Obviously, the same holds true for high-level political commitments made in the Declarations adopted at the HELCOM Ministerial meetings that have been held regularly since 1984. The drawback of the HELCOM consensus system was illustrated as late as in the year 2000, when one country blocked a decision on a new HELCOM Recommendation on nitrogen removal in municipal sewage treatment plants by maintaining a so-called study reservation.

#### **4.1.2 Decision-making within OSPAR**

Rules on decision-making within the OSPAR Convention are set out in Article 13 on Decisions and Recommendations of the Convention. According to Paragraph 1 of Article 13, decisions and recommendations shall be adopted by unanimous vote of the Contracting Parties. Should unanimity not be attainable, and unless otherwise provided in the Convention, the OSPAR Commission may nonetheless adopt decisions or recommendations by a three-quarters majority vote of the Contracting Parties.

However, paragraph 2 of Article 13 includes an option for contracting-out. It is specified that a decision is to be binding on the expiry of a period of 200 days after its adoption for those Contracting Parties that voted for it and have not within that period notified the Executive Secretary in writing that they are unable to accept the decision.

The OSPAR Commission also operates through non-binding recommendations. So far they have covered, for instance, recommendations concerning what should be regarded as BAT (best available technology) and BEP (best environmental practice) within different industrial branches or sectors.

A number of Ministerial meetings, producing Ministerial Statements and Declarations, have also been held within the OSPAR framework. For example, at the 1998 Ministerial Meeting of the OSPAR Commission the Sintra Statement was adopted, setting out the political impetus for future action by the Commission with a view to ensuring the protection of the marine environment of the North-East Atlantic.

#### **4.1.3 Decision-making within the IBSFC**

The International Baltic Sea Fisheries Commission provides a Baltic example of majority decision-making. According to the Rules of Procedure for the Commission, each Contracting

Party has one vote in the Commission. The six Contracting Parties are: the European Community (representing Denmark, Germany, Finland and Sweden), Estonia, Latvia, Lithuania, Poland, and the Russian Federation.

Like most other fisheries management organizations, the IBSFC has a system by which, in the absence of consensus, decisions and recommendations of the Commission are taken by a two-third majority of votes. According to Article XI of the Rules of Procedure, there is an objection period of 90 days from the date of the notification of a recommendation. If a Contracting Party objects during this period, it is not bound by this recommendation. However, it should be noted that in recent years all IBSFC recommendations have been adopted unanimously.

## **5. Changing perceptions and approaches in international agreements and conventions for the protection of the marine environment**

The work within the framework of the international conventions and agreements for the protection of the marine environment has changed drastically during the last 10–15 years. Reflecting not least the general acceptance of the ecological complexity of marine ecosystems, and the difficulties to predict where negative effects of different pollutants might manifest themselves, the new preventive approach was introduced and widely accepted in the mid- to late 1980's.

At the global level this was reflected in Chapter 17 of the global Agenda 21. Chapter 17 deals with protection of the oceans and all kinds of seas, including enclosed and semi-enclosed seas. States commit themselves to *'apply preventive, precautionary and anticipatory approaches so as to avoid degradation of the marine environment, as well as, to reduce the risk of long-term or irreversible effects on the marine environment.'*

### **5.1 The OSPAR Convention and the North Sea**

In Article 2.2.a of the new 1992 OSPAR Convention, it was stated that Contracting Parties shall apply:

- *'the precautionary principle, by virtue of which preventive measures are to be taken when there are reasonable grounds for concern that substances or energy introduced, directly or indirectly, into the marine environment may bring about hazards to human health, harm living resources and marine ecosystems, damage amenities or interfere with other legitimate uses of the sea, even when there is no conclusive evidence of a causal relationship between the inputs and the effects';* and
- *the polluter pays principle, by virtue of which the costs of pollution prevention, control and reduction measures are to be borne by the polluter.*

The importance of these principles was also recognized in the 1992 OSPAR Ministerial Declaration, adopted on the occasion of the signing of the new Convention. The importance of the formal adoption in the Convention of the precautionary principle; the polluter pays principle; the concepts of best available techniques and of best environmental practice, including, where appropriate, clean technology; was stressed, thus, giving these concepts further political weight.

Already in the Declaration adopted by the First (1984) International Conference on the Protection of the North Sea it is *'recognized that the environment is best protected against*

*pollution through timely preventive measures.*’ In the Declaration of the Second (1987 International Conference on the Protection of the North Sea, the Environment Ministers from the North Sea States made a significant expansion of this concept. In Article VII they ‘*accept that, in order to protect the North Sea from possibly damaging effects of the most dangerous substances, a precautionary approach is necessary which may require action to control inputs of such substances even before a causal link has been established by absolutely clear scientific evidence.*’

Furthermore, in Article VIII it is recognized that ‘*to this end, simultaneous and complementary action is called for:*

- (a) to reduce pollution at source by:*
  - (i) for point sources, the use of best available technology; and*
  - (ii) for diffuse sources, restrictions on the manufacture, marketing and use of such substances and products containing such substances; and*
- (b) to establish strict quality objectives as a guide to control decisions and as reference points for assessing environmental quality.’*

This commitment was further specified in the section on inputs via rivers and estuaries of substances that are persistent toxic and liable to bio-accumulate. The Ministers ‘*accept the principle of safeguarding the marine ecosystem of the North Sea by reducing polluting emissions of substances that are persistent, toxic and liable to bioaccumulate at source by the use of the best available technology and other appropriate measures. This applies especially when there is reason to assume that certain damage or harmful effects on the living resources of the sea are likely to be caused by such substances, even where there is no scientific evidence (the principle of precautionary action).*’

The precautionary principle was again endorsed in the Declaration of the Third (1990) International Conference on the Protection of the North Sea. The Ministers confirm that the North Sea countries will ‘*continue to apply the precautionary principle, that is to take action to avoid potentially damaging impacts of substances that are persistent, toxic and liable to bioaccumulate even where there is no scientific evidence to prove a causal link between emissions and effects.*’

In the full OSPAR context – the Northeast Atlantic, including the North Sea, the Skagerrak and the Kattegat – these principles were endorsed in the Declaration adopted by 1992 Ministerial Meeting (see below).

## **5.2 The Baltic Sea and HELCOM**

In the international Baltic Sea co-operation within the framework of HELCOM, the precautionary approach was included for the first time in the 1988 HELCOM Ministerial Declaration. The Environmental Ministers from all the Baltic Sea States express their conviction that ‘*damage to the marine environment can be irreversible or remediable only in a long term perspective and at considerable expense and that, therefore, the Contracting Parties to the Convention must adopt a precautionary approach and not wait for full an undisputed scientific proof of harmful effects before taking action to prevent and abate pollution.*’

Commitment to apply the precautionary principle was further elaborated upon and confirmed in the Baltic Sea Declaration, adopted by the first Baltic Summit, in 1990. The Heads of

Government and High Level Representatives from the Baltic Sea States, Norway, the Czech and Slovak Republic, and the European Commission, expressed the following determination: *‘To apply the precautionary principle, i.e., to take effective action to avoid potentially damaging impacts of substances that are persistent, toxic and liable to bioaccumulate even where there is lack of full scientific certainty to prove a causal link between emissions and effects. This applies especially when there is reason to assume that certain damage or harmful effects on marine ecosystems are likely to be caused by such substances.’*

The Declaration also introduced the concept of best environmental practice as an instrument and tool to promote the reduction of nutrients and other harmful substances entering the Baltic Sea from diffuse sources.

The need to ‘modernize’ regional conventions originally signed in the early or mid-1970’s became obvious towards the end of the 1980’s. The changing perceptions and approaches in binding international law had to be included and codified in these regional conventions.

Within HELCOM such a process was initiated at the Commission meeting in 1990, when an *ad hoc* working group for revision of the Convention was established. According to its Terms of Reference, the Group should consider amendments in order to bring the Convention and its Annexes in line with the development since 1974 and in particular to consider:

- the implementation of best available technology to reduce land-based pollution;
- the introduction of the commitment to the precautionary principle;
- the development of instruments to meet the commitment to reduce pollution from diffuse sources.

As a result of the subsequent negotiations of the new Convention, the precautionary approach or principle was included in the text of the 1992 Helsinki Convention (the Convention for the Protection of the Marine Environment of the Baltic Sea Area) as legally binding. According to Article 3.2 of the Convention, the Contracting Parties shall *‘apply the precautionary principle, i.e., to take preventive measures when there is reason to assume that substances or energy introduced, directly or indirectly, into the marine environment may create hazards to human health, harm living resources or marine ecosystems, damage amenities or interfere with other legitimate uses of the sea, even if there is no conclusive evidence of a causal relationship between inputs and their alleged effects.’*

This provision was supplemented with a further commitment in Article 3.3. There it is specified that *‘in order to prevent and eliminate pollution of the Baltic Sea Area the Contracting Parties shall promote the use of Best Available Technology (BAT) and Best Environmental Practice (BEP).’* It is further expressed that *‘if the reduction of inputs, resulting from the use of BEP and BAT does not lead to environmentally acceptable results, additional measures shall be applied.’* And in Article 3.4 it is stated *‘that the Contracting Parties shall apply the polluters-pays principle.’*

These provisions were given further political strength when they were endorsed at the 1992 HELCOM Ministerial Meeting, where the revised 1992 Helsinki Conventions was signed. According to the Baltic Sea Declaration, the Ministers agreed to *‘apply the Precautionary Principle and take all necessary steps to ensure the use of Best Environmental Practice and Best Available Technology when designing measures to eliminate pollution and improve environmental management.’*

## 6. HELCOM priorities

Based on these general obligations, principles and commitments, there has been a strong move to produce more results than just general messages, declarations, and recommendations about the need to reduce the discharges of various types pollutants and other measures. There has been a strive to reach concretely defined decisions about reductions, phasing out of certain substances, products or groups of products, setting limit values on discharges/emissions from various types of industries.

This is particularly the case in international co-operation for the protection of the Baltic Sea Area. In addition to the above, the region has also benefited from the dramatic geopolitical and economic changes in the late 1980's to early 1990's. These changes paved the way for a more open dialogue about the environmental issues in general, and about the common sea area in particular. New options have been given for priority setting and the formulation of concrete goals, long-term plans and action programmes. This new broader approach is perhaps best exemplified by the HELCOM Strategy to phase out hazardous substances. It was adopted in 1999 and has a truly long-term perspective, to the year 2020.

### 6.1 Priorities in the 1974 Helsinki Convention and the period until the early 1980's

Priorities were established already in the 1974 Helsinki Convention. According to Article 5, the Contracting Parties '*undertake to counteract the introduction, whether airborne, waterborne or otherwise, into the Baltic Sea Area of hazardous substances as specified in Annex I to the Convention.*' Substances listed in Annex I include DDT and its derivatives, PCBs and PCTs (included in 1983).

The commitments concerning land-based pollution are set out in Article 6. The Article focuses 'only' on '*the obligation to take measures to control and strictly limit pollution by noxious substances listed in Annex II comprising heavy metals such as mercury and cadmium, persistent halogenated hydrocarbons, polycyclic aromatic hydrocarbons, persistent pesticides (not covered by Annex I) but nutrients were not included.*' In the same way, only pollution by noxious substances (not nutrients) is mentioned in Paragraph 8 of Article 6 on air pollution.

Nutrients and the risks of harmful changes in the oxygen content, as well as the risks for harmful eutrophication, are only dealt with in Annex III, which sets out goals, criteria and measures for the prevention of land-based pollution. Accordingly, municipal sewage should be treated in an appropriate way so that the amount of organic matter does not cause harmful changes in the oxygen content of the Baltic Sea Area, and the amount of nutrients does not cause harmful eutrophication of the Baltic Sea Area (Annex III).

This reflects the prevailing priorities of the early 1970's. In this respect, the 1974 Helsinki Convention and its Annexes were structured according to the same principles as the 1972 Oslo and London Conventions on the dumping of wastes, and the 1974 Paris Convention on land-based sources of pollution. All these conventions comprise a black list with substances requiring urgent action, and a grey list with substances which required strict control but which at that time were regarded as less noxious and more readily made harmless by natural processes.

Today the diffuse sources are believed to be the dominating pollution sources in the region, particularly in relation to eutrophication. Against that background it is important and

interesting to note that diffuse sources of pollution, e.g., agriculture and transport, were not specifically dealt with in the first Helsinki Convention. One exception was DDT, used as a pesticide. Intensive agriculture is, however, mentioned in one of the pre-ambular paragraphs but presumably only referring to the restrictions on the use of pesticides later introduced in Article 5 and Annex II, not referring to eutrophication.

Technical reduction measures in the early years (1977–84) were focused on individual hazardous substances. Recommendations on the elimination of PCBs and DDTs were adopted already in 1982, stipulating a total phase-out of production, marketing and use of these substances in the Baltic Sea countries, and established requirements for cautious handling and disposal of remaining products and articles containing the substances. In 1983, PCTs were added to recommendation on elimination of PCBs.

However, relatively soon after the Convention had entered into force in 1980, things started to change. In 1984, in the Medium-term Plan of the Commission, the branch-wise approach was adopted as a basic principle in the work of the Scientific-Technological Committee (STC). The work on specific harmful substances and branches was to be co-ordinated by lead countries, and for sectors of major importance (the pulp and paper industry, municipalities, agriculture) special projects were often established.

The *HELCOM Assessment of the effects of pollution on the natural resources of the Baltic Sea 1980*, was the very first of the assessments on the state of the environment in the Baltic Sea. It was later to be followed by the *HELCOM Periodic Assessment of the State of the Marine Environment of the Baltic Sea Area* (the First in 1987, the Second in 1990, the Third in 1996 and the Fourth in 2001; see 7.3.1).

In that 1980 Assessment, there seemed to have been no total consensus among the experts about eutrophication as regards its seriousness and consequences for the Baltic Sea marine ecosystem. *‘One of the unresolved issues concerns the degree, causes and effects of eutrophication and its relation to the oxygen depletion in the deep basins and that another unresolved issue concerns the nitrogen cycle in the Baltic Sea, which is very complicated and only poorly understood. Denitrification and nitrogen fixation are mentioned as such processes.’*

Despite this lack of consensus, the 1984 Ministerial Meeting decided that further action was warranted concerning land-based pollution by, e.g., nutrients. In HELCOM Resolution 5/A, containing the HELCOM Medium-term Plan, the Commission stated its awareness that the trends as regards the contents of nutrients in the Baltic Sea, and the oxygen conditions in its deep basins, were still discouraging.

In the operative section of the Plan (section 2) the following was stated: *‘In order to enable the Contracting Parties to identify practical measures to reduce the land-based pollution of the Baltic Sea, high priority will be given by the Commission to the following tasks:*

- *evaluation of effects of and elaboration of proposals for appropriate action against:*
- *discharges of nutrients and oxygen consuming substances into the marine environment of the Baltic Sea, including input of nutrients from diffuse sources, i.a., agriculture and forestry; and*
- *other contaminants, especially from pulp and paper industries and airborne substances.’*

Thus, one might argue that the political level was, for once, ahead of the recommendations from the scientific community in taking action. This political urgency and willingness to act may have reflected the quite alarming reports on eutrophication and its effects from various regions also outside the Baltic Sea region. For example, heavy algal blooms in the German Bight had forced the German government to invite the North Sea States to the first (1984) International Conference on the Protection of the North Sea.

As expressed in the Medium-term Plan, the consensus on the need for a broader approach in tackling the environmental problems facing the Baltic Sea marine environment resulted in shift from the previous endeavours to tackle the issues on a substance-by-substance basis to a branch-wise approach. Consequently, the Commission endorsed the branch-wise approach suggested by its Scientific-Technological Committee. The process started by initiating two projects on agriculture and on sewage treatment in urban areas, with Sweden and Denmark acting as lead countries

Already in 1985, the Commission adopted its first Recommendation (6/7) concerning the treatment of municipal sewage and industrial wastewater with special emphasis on the reduction of discharges of nutrients. However, one can note that the increasing nutrient concentrations were still regarded mainly as a local problem '*causing negative effects on local ecosystems including eutrophication and oxygen depletion*' (paragraph 3 in the preamble of the Recommendation). The following year, the Commission adopted its first Recommendation on agriculture – Recommendation 7/2 on measures aimed at the reduction of discharges from agriculture.

These two recommendations were supplemented in 1988 by two more detailed ones. Recommendation 9/2 deals with measures aimed at the reduction of discharges from urban areas by the use of effective measures in waste water treatment, whereas Recommendation 9/3 is about measures aimed at the reduction of nutrient discharges from agriculture.

These decisions were well supported by the conclusions and proposals on actions presented in the *First Periodic Assessment of the State of the Marine Environment of the Baltic Sea Area, 1980-1985*. It was explicitly stated that: '*Efforts should be further continued to reduce the nutrient load and thus the eutrophication of the Baltic Sea Area.*'

The prospect of recommending nitrogen removal in sewage treatment plants was raised for the first time in Recommendation 9/2. There it is stated that each Contracting Party should, as a start and as soon as possible, initiate research and evaluation projects with the purpose to provide a basis for further recommendations on nitrogen removal within three years.

## **6.2 Changes in priorities from the late 1980's, reflected in the 1992 Helsinki Convention, the 1998 Ministerial Declaration, and the Extraordinary session 1999**

As mentioned above, the changes in the late 1980's and early 1990's in the priorities and overall approach to the tackling of the serious environmental problems of the Baltic Sea marine environment were clearly reflected in the revised 1992 Helsinki Convention.

A further review of the HELCOM Ministerial Declarations from 1988, 1990, 1992, 1994, and 1998, as well as the decisions at the 1999 Extraordinary Meeting of HELCOM, confirms these changes of priorities. This would, in turn, seem to indicate a broad political and scientific consensus on what are the most important environmental problems that need to be

addressed through international co-operative efforts. Consequently, it would be more a question of major changes and developments regarding the ways to address these problems, and these changes can be summarized as follows:

- Moving from addressing the problems substance-by-substance, via lists of hazardous and noxious substances, to tackling the issues branch-wise and sector-wise;
- Introducing a more preventive and precautionary approach to the protection of the marine environment by requiring the use of best available technology and best environmental practice;
- Broadening the work on land-based sources of pollution by placing higher priority on diffuse sources, such as agriculture and transport.

Some major substantive changes were made in the structure of the annexes to the 1992 Helsinki Convention. It is particularly noteworthy that an ‘upgrading’ of nutrients was made. Nutrients, previously only mentioned in the 1974 Convention in relation to municipal sewage and industrial wastewater treatment, were given much higher priority. Nitrogen and Phosphorus were specifically listed in Annex I to the 1992 Convention together with, and thus having the same priority as, hazardous substances (heavy metals, toxic and persistent organic compounds). The requirements concerning municipal sewage set out in Annex III, Regulation 2, were also strengthened compared to the provisions in the 1974 Convention. It was now stated that *‘municipal sewage water shall be treated at least by biological or other methods equally effective with regard to reduction of significant parameters. Substantial reduction shall be introduced for nutrients.’*

The increased emphasis on diffuse or non-point sources of pollution (agriculture and rural settlements, as well as transport) was further stressed in the report *Recommendations for Updating and Strengthening of the JCP*, endorsed by the 1998 HELCOM Ministerial Meeting.

Priorities for the future work of HELCOM was most recently agreed in a Decision made at the Commissions Extraordinary meeting in September 1999. The Commission decided that priority areas for the work within HELCOM should be, among others:

- eutrophication (especially the contribution of agriculture);
- hazardous substances;
- relevant issues from the land transport sector; and
- implementation of the Joint Comprehensive Environmental Action Programme (JCP).

## **7. Scientific and technical knowledge and co-operation as a basis for negotiations and decision-making**

In principle, sound science should be the starting point of all environmental policy. Without science there is no way of fully knowing what is happening in the natural environment, beyond what we can tell with our senses. Science makes the environment speak, and all policy-making is based on interests that have a voice. However, the scientific methods available do not always generate precise information adapted for policy-making – scientific knowledge is rarely neither certain nor complete. This is particularly the case for complex marine systems.

Thus, the framing of issues, as well as the search for feasible solutions to them, is unusually dependent on the supply of best available scientific-technical knowledge and information. Discharge statistics, ecological effects, and current technical development, could be examples

of such information. This kind of supposedly objective input into the negotiating process will often contribute to reducing uncertainty in an authoritative way. In the ideal case, problems and options for solutions are explained in a manner perceived as objective, and in a language and an analytical way that cannot be easily manipulated by the negotiating parties themselves.

Hence, the input from the scientific-technical community is essential, but that input represents different types of contributions to a negotiation and decision-making process. In addition, these elements are often produced in different phases of the process:

- Attention is drawn to a new problem (e.g., new contaminants in the marine environment);
- The scientific issues are structured;
- Consolidated scientifically projected outcomes into the future are provided (e.g., scenarios on the effects on eutrophication of measures taken);
- Policy and negotiation advice is provided (e.g., how to design the most ecologically efficient and cost-effective combination of measures).

This is, of course, a very schematic model. In the practical work, the four phases cannot always be clearly separated or distinguished from one another. The relationship between the phases may differ across issue areas, as well as within particular cases of negotiation. Still, a simple model may be useful as a conceptual framework for an overview assessment of how the scientific community contributes knowledge and information to a political process (negotiations of a new international agreement, or decision-making within an already existing convention).

The potential tension between science and policy is a constant theme of all international environmental regimes. They all have some method of reviewing new scientific evidence, often through their Conference of Parties, sometimes through their own subsidiary bodies.

Research for policy-making is special. In addition to the use of traditional research criteria, there is also a need to present the results in forms and ways that are comprehensible to non-scientists. Scientists must also accept the fact that the ultimate judgement on the contents and future use of the research lies not with the academic-scientific community but with policy-makers. In other words, reducing uncertainty and/or disagreement is of little or no use if the improved message is not conveyed to the decision-makers in a comprehensible way.

Also, no matter how legitimate, certain or understandable the scientific message is, decision-makers may decide to ignore it all the same. They may, for instance, find its economic implications unacceptable, or fear implications for negotiations in other issue areas. Thus, it can be argued that research rarely leads directly to policy conclusions. Even when research results seem clear and unambiguous, it should be realized that evolving policies may reflect the process of weighting many and often conflicting priorities, and that this weighting can turn out very differently in different societies.

Experience from the highly successful efforts within the 1979 UN ECE Convention on Long-Range Transboundary Air Pollution (LRTAP) strongly emphasizes the importance of creating a common scientific platform and critical mass of commonly agreed knowledge as a basis for negotiations, development of strategies and decisions. Such platforms can be developed and built via, for instance, international seminars/workshops, joint monitoring and assessment programmes, and other mechanisms with the objective to create a common understanding about what the real problems and possible solutions are.

## 7.1 The role of ‘independent’ scientific international organizations

Many international conventions and agreements make use of other ‘independent’ or ‘semi-independent’ international scientific or technical organizations to provide advice on scientific/technical matters. The International Institute for Applied Systems Analysis (IIASA) has had this role for many years in relation to the LRTAP Convention. As part of this work, the experts at IIASA developed the RAINS model, which has been widely used to calculate the deposition of acidifying substances in Europe under different emission scenarios.

Similarly, the International Council for the Exploration of the Sea (ICES) has a long tradition of providing scientific advice to the marine commissions (OSPAR and HELCOM), as well as to the regional fisheries regulatory bodies (IBSFC and the Northeast Atlantic Fisheries Commission, NEAFC).

The potential need and possibilities of the executive bodies of the marine conventions to seek the advice of ‘independent’ scientific-technical organizations were included in the text of the original Conventions. According to OSPAR, Annex IV article 3, the Contracting Parties should *‘seek, where appropriate, the advice or services of competent regional organizations and other competent international organizations and competent bodies with a view to incorporating the latest results of scientific research.’* According to Article 16 of the 1974 Helsinki Convention, the Contracting Parties undertook directly, or when appropriate through competent regional or other international organizations, to co-operate in the fields of science, technology and other research, and to exchange data and other scientific information for the purpose of this Convention.

The role of ICES has changed significantly since the co-operation between ICES and the marine conventions (environment and fisheries, respectively) started in the mid-1970’s. This is particularly the case in relation to the marine environmental convention. ICES played an essential role during the initial phase of the international co-operation of the protection of the marine environment. During this period, ICES had a number of working groups in both the Northeast Atlantic and Baltic Sea regions. These groups provided important advice to the Contracting Parties meeting within the framework of OSPAR and HELCOM during the development phase of the joint monitoring and assessment programmes envisaged in the Conventions.

There is also a fundamental difference in the kind of advice that ICES provides to the environmental conventions as compared to the fisheries conventions. Environmental advice has to a large extent been focused more on methodology than on management, whereas the advice given to the fisheries organizations has been concentrated on management issues (recommendations on catch quotas for different fish stocks, TACs, etc.). In recent years the work of ICES in the Northeast Atlantic region has, however, moved towards management related issues, as ICES has been asked by OSPAR to develop ecological quality objectives for marine mammals and birds.

However, since several years there is a marked trend that the marine commissions and their subsidiary bodies ask for less and less advice from ICES. This has been particularly obvious in the Baltic Sea region, where ICES has received increasingly fewer requests from HELCOM, despite the fact that ICES is managing the HELCOM hydrochemical and biological contaminants databases. One result of this development may be that ICES will in

the future focus more on its core scientific work, for instance, integrated ecosystem studies. ICES has already set up a special Advisory Committee on Ecosystems.

The independence of these organizations has been frequently debated over the years. The main issue has been whether governments have tried from time to time to influence the scientific work and assessments by sending experts with ‘a political instruction and mandate’ to the meetings of working groups and committees. This debate was particularly intense in the 1970’s and early 1980’s when some countries were accused of using every available scientific argument to delay international management decisions to control the emissions of air pollutants on a European scale.

It might be assumed that the risk of political interference in the scientific work is greater in the fisheries sector than in the environmental field. Comparatively large economic interests are at stake every year in the scientific discussions about the status of fish stocks and the subsequent development of the recommendations concerning management, including agreed TACs.

In the case of ICES, the organization was accused during the 1970’s and early 1980’s of being dominated by British scientists and interests. Obviously, this affected the ICES work, particularly in relation to OSPAR, whereas the ICES Baltic working groups were more independent. However, this situation has changed gradually during the 1990’s when the Netherlands and Germany have played stronger roles and thereby created a more balanced picture.

One serious problem for the ICES work in the Baltic Sea region in recent years has been the economic constraints facing the countries in transition (Estonia, Latvia, Lithuania, Poland, and the Russian Federation). As a result, these countries have had to restrict their participation in many international organizations, including those dealing with marine science and environment. In the Baltic context, they have a clear tendency to put the highest priority on their participation in the fisheries co-operation, where immediate economic interests are at stake.

## **7.2 Scientific-technical co-operation within the HELCOM framework**

All marine conventions are expected to base their decisions and recommendations on the best available scientific and technical advice. In order to build broad consensus among the Contracting Parties, all conventions include mandatory provisions for scientific and technical co-operation. This has been the case for both the 1974 and 1992 Helsinki Conventions, as well as for the original 1974 Oslo and Paris Conventions and the 1992 OSPAR Convention. It could, for instance, concern the state of the marine environment of a region; the pollution load; or what should be regarded as Best Available Technology and/or state-of-the-art for reducing or eliminating discharges of pollutants from a specific industry or sector.

### **7.2.1 *Legal obligations of the 1974 Helsinki Convention***

The commitments concerning scientific and technical co-operation were set out in Article 16 to the Convention:

- *‘The Contracting Parties undertake directly, or when appropriate through competent regional or other international organizations, to co-operate in the fields of science, technology and other research, and to exchange data and other scientific information for the purpose of this Convention.’*

- *The Contracting Parties undertake directly, or when appropriate through competent regional or other international organizations, to promote studies, undertake, support or contribute to programmes aimed at developing ways and means for the assessment of the nature and of polluting, pathways, exposures, risk and remedies in the Baltic Sea Area, and particularly to develop alternative methods of treatment, disposal and elimination of such matter and substances that are likely to cause pollution of the marine environment of the Baltic Sea Area.*
- *The Contracting Parties undertake directly, or when appropriate through competent regional or other international organizations, and, on the basis of the information and data acquired pursuant to Paragraphs 1 and 2 of this Article, to co-operate in developing inter-comparable observation methods, in performing baseline studies and in establishing complementary or joint programmes for monitoring.'*

### **7.2.2 Legal obligations of the 1992 Helsinki Convention**

The provisions concerning scientific-technical co-operation are very similar in the 1992 Convention. The main differences concerns the obligations regarding the pollution load compilations and reporting, which are much stronger in the 1992 Convention.

The inclusion of these new requirements into the body of the 1992 Convention reflects the experience gained and the problems encountered, *inter alia*, during the work with the first three HELCOM Pollution Load Compilations. It also reflects the political changes in the late 1980's. These changes had opened for a much more comprehensive co-operation, including co-operation on coastal and internal waters. It was also possible to cover pollution sources within the whole Baltic Sea drainage area, and there was a new willingness to openly exchange or submit information and data on environmental problems, discharges, etc. Such information had been classified during the Soviet period as information of importance to national security.

Thus, the 1992 Convention includes provisions for collection of data to allow for correct pollution load compilations to be made. In Article 3 it is specified that the Contracting Parties *'shall ensure that measurements and calculations of emissions from point sources to water and air and of inputs from diffuse sources to water and air are carried out in a scientifically appropriate manner in order to assess the state of the marine environment of the Baltic Sea Area and ascertain the implementation of this Convention.'*

Provisions concerning reporting and exchange of information are set out in Article 16 of the Convention. Accordingly, the Contracting Parties are to report to HELCOM at regular intervals on:

- *'the legal, regulatory, or other measures taken for the implementation of the provisions of this Convention, of its Annexes and of recommendations adopted there under;*
- *the effectiveness of the measures taken to implement the provisions referred to in subparagraph above; and*
- *problems encountered in the implementation of the provisions referred to in the first subparagraph.'*

The provisions on scientific and technical co-operation are further elaborated in Article 24 (but the responsibility to develop and carry out a detailed work programme to implement them is, however left to the Commission):

- *The Contracting Parties undertake directly to co-operate in the fields of science, technology and other research, and to exchange data and other scientific information for the purposes of the Convention.*
- *The Contracting Parties also undertake to promote studies and to undertake, support or contribute to programmes aimed at developing methods assessing the nature and extent of pollution, pathways, exposures, risks and remedies in the Baltic Sea Area. In particular, the Contracting Parties undertake to develop alternative methods of treatment, disposal and elimination of such matter and substances that are likely to cause pollution of the marine environment of the Baltic Sea Area.*
- *Further the Contracting Parties undertake to co-operate in developing inter-comparable observation methods, in performing baseline studies and in establishing complementary or joint programmes for monitoring.*

### **7.2.3 Continuous high-level political for scientific-technical co-operation**

On several occasions, the need for a solid scientific-technical basis for HELCOM to work from has been highlighted and given further high-level political impetus. The prominence given to scientific-technical co-operation is illustrated by the fact that these issues were addressed in the first operative paragraph of the Medium-Term Plan for the activities of the Helsinki Commission, adopted by the 1984 HELCOM Ministerial Meeting. The following was stated:

*‘Activities with a view to obtaining a rational base for appropriate measures aimed at the environmental protection of the Baltic Sea Area will include:*

- *regular monitoring and periodic assessment of the state of the environment of the Baltic Sea;*
- *evaluation of the pollution load;*
- *research work aiming at the improvement of the state description of the Baltic Sea, including study of the pathways and environmental effects of harmful substances, especially persistent contaminants;*
- *research and development with a view to improve technologies for reduction of pollutants, especially nitrogen compounds;*
- *exchange of relevant scientific and technical information.’*

In the 1988 Ministerial Declaration a firm determination was declared to *‘intensify research and development, as well as exchange of information, in order to improve knowledge relating to degree and character of the marine environment pollution, of methods for monitoring the state of the marine environment and the ecological system of the sea.’*

Further the Ministers expressed their determination to *‘take appropriate actions, including further research, related to the assessments of the environmental status of the Baltic Sea Area, and to develop methodologies and exchange data in order to further, as a matter of urgency, the reliable assessment of the pollution load of the Baltic Sea Area on a regular basis.’*

Particularly from a MARE research programme perspective it is interesting to note that the need to *‘develop models of the ecological system of the Baltic in order to facilitate the choice of appropriate action to protect the marine environment’* was highlighted already in the 1988 Declaration.

Furthermore, in that Declaration a reference to the need for monitoring and assessment of the coastal areas of the Baltic (not covered by the 1974 Convention) was included for the first time. Thus, the Ministers agreed to intensify co-ordinated research and monitoring in coastal waters, including the estimate of the total charge of pollutants entering the Baltic Sea Area from different sources.

In the 1990 Baltic Sea Declaration, adopted at the Heads of Government level, the high-level representatives declared their firm determination to intensify co-operation in the field of environmental sciences. This was to be done to strengthen the foundation for designing adequate measures to reduce the most harmful pollution, and to promote, through supportive measures, increased transfer of knowledge regarding the environment. In addition, the programme of monitoring should be extended and strengthened in order to improve the assessment of the state of the marine environment of the Baltic Sea area, and encourage the co-operation between statistical agencies to improve demographic and other statistics relevant to the protection of the Baltic Sea

In the 1992 Baltic Sea Declaration, the Ministers agreed to *'intensify relevant research and exchange of information within the framework of the Helsinki Commission and, among all interested parties, improve the monitoring of reductions of pollutants, increase the understanding of their impact on the environment and its living resources, and develop and disseminate cost-effective environmental management technologies.'*

Moreover, the need for further scientific studies was included in the 1994 Ministerial Declaration. In that declaration the Contracting Parties were urged to *'carry out further studies on toxic and/or persistent and bioaccumulating organic compounds (mainly halogenated) in the marine environment and their transfer through the food chains, especially in relation to coastal areas.'*

The most recent political expression of the need to further develop and strengthen the scientific-technical co-operation was given at the 1998 HELCOM Ministerial Meeting. In the Ministerial Communique, the Baltic Ministers and the EU Commissioner decided to *'streamline and make more effective the system for monitoring environmental performance and compliance within the Helsinki Convention, and to improve the production and dissemination of accurate pollution load data which is necessary for the detailed evaluation of the environmental health of the Baltic Sea.'*

They also committed themselves to *'intensify joint co-operative research projects including, i.a., the application of models for decision support, evaluation of critical loads and methods to follow up action taken. This will contribute to a more effective environmental management framework for the restoration of the Baltic Sea.'* Obviously, such a statement is of direct relevance to the objectives and work of the MARE research programme.

#### **7.2.4 The Baltic Sea Joint Comprehensive Action Programme**

Research issues were also included in the legally non-binding Baltic Sea Joint Comprehensive Action Programme (JCP), adopted by the Environment Ministers in 1992. A specific component on Applied Research was included in the programme, aimed at building the knowledge base needed to develop solutions, and to deepen the understanding of critical problems. Increased applied research and exchange of information concerning physical, chemical and biological systems in the Baltic Sea region are to be supported to improve the

monitoring and understanding of changes and impacts, in co-operation with HELCOM activities.

Among concrete scientific issues to be addressed (and of direct relevance to the MARE research programme) one can find the following in the JCP:

- *Environmental trends*. The JCP should include support for periodic analyses of the long-term responses of the ecosystems to natural and anthropogenic influences.
- *Systems ecology*. Support should be given to applied research in systems ecology in recognition of the contribution of such investigations to the understanding of the inter-relationship of key factors in the ecology of the Baltic Sea and its drainage area. Programme support should be focused on applied research to further define the critical relationships between inputs to the drainage area, the coastal zone and the marine environment.
- *Evaluation of critical loads*. The development and application of the ‘critical loads’ concept for different pollutants in the Baltic Sea Region should be supported under the JCP. The results are to be used, among others, for the local management of wastewater discharges.

Within the JCP, applied research is also highlighted in key sectors:

- *Agriculture*. Evaluation of various scenarios for the development and/or re-structuring of agriculture within the Baltic Sea drainage area will be an important issue for support.
- *Management of critical ecosystems (wetlands and coastal lagoons)*. According to the JCP, these ecosystems play a critical role in the ecological system of the Baltic Sea. They serve as important buffers for pollution to the sea by acting as natural traps and providing variable levels of treatment of biodegradable wastes. Thus, recognizing the importance of wetlands as ‘multi-purpose ecosystems’, applied research on the identification and evaluation of selected wetland areas, in a variety of locations within the Baltic Sea drainage area, should be supported within the JCP.

These issues were again emphasized in the 1998 report *Recommendations for Updating and Strengthening of the JCP*. It was noted that the need for action to strengthen monitoring and data collection to support better analysis of regional, national and local trends had been demonstrated in the preparations of the *Third Periodic Assessment of the State of the Marine Environment of the Baltic Sea Area, 1989-1993* and the *Third Pollution Load Compilation (PLC-3)*. Improved monitoring and data collection would permit greater comparability of data for assessment of transboundary environmental issues, for development of better environmental strategies, and better evaluation of the effectiveness of measures taken under the JCP.

The need to fully operationalize the Applied Research component of the JCP was also underlined in the report, and recommended actions included:

- *Least-cost approaches*. Research should include work to evaluate critical loads and development of practical methodologies to assess least-cost approaches for implementation of programmes. For this purpose it will be important to make efforts to develop systems for achieving good quality data, a common methodology for assessment of the pollution load from the Baltic Sea drainage basin, and the application of models to provide decision support;
- *Biological effects monitoring*. One important issue should be the development of environmental indicators, which may be used to indicate ecological stresses due to their responsiveness to environmental conditions;

- *Strengthening of monitoring systems.* The fact that monitoring data were incomparable among countries in the region was noted and considered a hampering factor for a compilation of an aggregate assessment of the environmental conditions. Thus, the standardisation of monitoring methodologies, equipment and data sets is of major importance in assessment of trends in the Baltic Sea and its drainage basin. Activities should specifically be concentrated on supporting and improving the systems for Pollution Load Compilations, via upgrading of the monitoring information becoming available from point as well as non-point sources.

### 7.3 HELCOM Scientific-Technical structures and products

The scientific and technical monitoring and assessment work within HELCOM has been focused on two things:

- The establishment and further development of a joint monitoring programme and the production of the Periodic Assessment of the State of the Baltic Marine Environment;
- The regular preparation and publication of a Baltic Sea Pollution Load Compilation.

#### 7.3.1 *The establishment and further development of a joint monitoring programme and the production the Periodic Assessment of the state of the Baltic Marine Environment*

With the objective to follow up the effects of the pollution of the marine environment of the Baltic Sea, a joint monitoring programme for the open Baltic Sea was established at an early stage. Joint guidelines for the Baltic Monitoring Programme (BMP) was prepared by experts, and the BMP started on a tentative basis in 1978 and was co-ordinated by HELCOM already from 1979, i.e., before the Convention had formally entered into force. The first monitoring programme was based on a pre-study prepared by ICES.

So far, five Assessments of the State of the Marine Environment of the Baltic Sea, and one Assessment on the State of the Coastal Environment, have been published (the fifth is to be published in March 2001)<sup>1</sup>. It should be noted that the Periodic Assessments are based not only on data collected within the framework of HELCOM's Monitoring Programme (the BMP and later the COMBINE Programme), but also on all available scientific information published on the issues concerned, including such information published in recognized scientific journals.

The 1980 Assessment, and the First and Second Periodic Assessments, were carried out under the auspices of the HELCOM Scientific-Technological Work Group, (STWG). During the period 1989–99, the HELCOM Environment Committee (EC) was the body responsible for

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- Assessment of the effects of pollution on the Natural Resources of the Baltic Sea 1980 (BSEP 5A and 5 B).
- First Periodic Assessment of the State of the Marine Environment of the Baltic Sea Area, 1980–85 (BSEP No. 17B, 1986);
- Second Periodic Assessment of the State of the Marine Environment of the Baltic Sea, 1984–88 (BSEP No. 35B, 1990);
- Third Periodic Assessment of the State of Marine Environment of the Baltic Sea, 1989–93 (BSEP No. 64B, 1996).
- Fourth Periodic Assessment of the State of Marine Environment of the Baltic Sea, 1994–98 (BSEP No. ??, 2001).
- First Assessment of the State of the Coastal Waters of the Baltic Sea (BSEP No.54, 1993).

the joint monitoring programme, as well as for organizing the compilation of the Periodic Assessments.

The decision in 1988 to launch a process to develop an assessment on the state of the coastal waters is particularly worth mentioning because of its both political and scientific importance. Politically, the acceptance by all Contracting Parties at the time (including the Soviet Union) to make a coastal assessment complemented the agreement on the overall 50 per cent pollution reduction target and the decision by HELCOM in 1988 to embark upon the task to elaborate a Second Pollution Load Compilation. From a scientific perspective, the joint coastal assessment, although it was to build on non-coordinated, non-harmonized national coastal monitoring programmes would, for the first time, create a common understanding of present conditions and trends in the coastal regions, and form a common platform for the future.

The coastal assessment could also be seen as an important first step to expand and widen the competence of HELCOM. It was to be followed by the formal inclusion of internal waters in the geographical coverage of the 1992 Convention – which was agreed in principle already in 1990 in the Terms of Reference for the Working Group on Revision of the Convention. In order to prevent or eliminate pollution from land-based sources relevant measures would have to be taken by each Contracting Party in the drainage area of the Baltic Sea (as set out in Article 6, paragraph 1 of the 1992 Convention).

In accordance with the geographical coverage of the 1974 Helsinki Convention, the BMP originally covered only the open parts of the Baltic Sea. Subsequently, and as a reflection of the inclusion in 1992 of internal waters, HELCOM in 1994 decided to elaborate an integrated monitoring programme for coastal areas of the Baltic Sea, and to harmonize it with the existing monitoring programme for the open Baltic Sea.

In 1999, the Commission, however, decided that it would be better to have a joint coastal–open sea monitoring programme, and to have the HELCOM monitoring work conducted under one organizational framework, the Co-operative Monitoring in the Baltic Marine Environment, COMBINE. The objectives of COMBINE are to: *‘identify and quantify the effects of anthropogenic discharges/activities in the Baltic Sea, in the context of the natural variations in the system, and to identify and quantify the changes in the environment as a result of regulatory actions.’*

The COMBINE programme includes both mandatory and voluntary components. Given that data obtained within COMBINE are needed for the preparation of the Periodic Assessment, the variables included in the programme have been classified into three categories. This is to ensure that basic information is obtained for all regions of the Baltic Sea, but that specific regional requirements are taken into account, as well as resource levels, different competencies available, and the desirability and necessity of sharing the work load among the Contracting Parties. The categories also take account of the need for different types of supporting studies on an occasional basis.

- Category 1: *Core variables* comprise measurements that have to be carried out on a routine basis to produce comparable and accurate results from all regions of the Baltic Sea as a basic information for the Periodic Assessment;
- Category 2: *Main variables* are of equal importance as the core variables for the Periodic Assessment and have to be measured on a regular basis. However, for reasons of regional requirements as well as of competence and/or resources not all Contracting Parties will be

required to carry out all measurements but all measurements will need to be covered on a work-sharing basis;

- Category 3: *Supporting studies* provide information that facilitates the interpretation of monitoring data collected in Category 1 and Category 2 or provide additional information as required. Individual Contracting Parties or groups of Contracting Parties carry out the investigations, often in a project-like or campaign-like manner. These investigations include, e.g., baseline studies, special monitoring studies, process studies and tests of new methods and techniques.

The success of COMBINE depends entirely on the willingness of Contracting Parties to commit themselves to carry out the various parts, particularly variables in Category 1 and Category 2, and to allocate the resources needed.

### ***7.3.2 The regular preparation and publication of a Baltic Sea Pollution Load Compilation***

In order to be able to implement the objectives of any convention on the protection of the marine environment, its Executive Body and Contracting Parties need reliable information on the input of various pollutants. Such information is needed on the input from land-based point sources and diffuse sources, from sea-based sources (shipping and offshore activities), and via atmospheric deposition.

The information obtained from the Pollution Load Compilations is essential for developing the environmental policies of HELCOM, as well as to assess the effectiveness of measures taken to reduce pollution from different sources, and for the evaluation of the state of the open sea and the coastal waters. The objectives of the PLCs are to:

- compile information on the waterborne inputs of important pollutants to the Baltic Sea from different sources in the Baltic Sea drainage area, on the basis of harmonized monitoring methods;
- follow up the long-term changes in the pollution load from various sources;
- determine the priority order of different sources and pollutants for the pollution of the Baltic Sea;
- assess the effectiveness of measures taken to reduce the pollution load in the Baltic Sea drainage area; and
- provide information for assessment of long-term changes and the state of the marine environment in the open sea and the coastal zones.

Three PLCs have been published, and the Fourth is being prepared for publication in 2003<sup>2</sup>. The first PLC (published in 1987) was carried out under the auspices of the HELCOM Scientific-Technological Work Group. During the period 1989-1999, the responsibility for organizing the compilations rested with the HELCOM Technological Committee (TC). The PLC-4 is produced by two sub-groups (PLC Water and PLC Air) to the new HELCOM Monitoring and Assessment Group (MONAS).

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- First Pollution Load Compilation, PLC-1, (BSEP No. 20, 1987)
- Second Pollution Load Compilation, PLC-2 (BSEP No. 45, 1993)
- Third Pollution Load Compilation, PLC-3 (BSEP No.70, 1998)
- Fourth Pollution Load Compilation, PLC-4 (BSEP No. ??, 2003)

The major experiences and conclusions from the PLCs can be summarized as follows:

- PLC-1 was an attempt to compile very heterogeneous data sets that had been collected by HELCOM on various occasions. Due to the fact that the information originated from different sources, there were differences in the reliability and age of the data. There were also gaps in the data sets. As a consequence, it was recommended that the results and conclusions drawn in the PLC-1 should be treated with caution.
- PLC-2 was carried out as a pilot project using the year 1990 as the basic measuring year. It aimed at basic coverage of the major aspects concerned. In order to improve the quality, specific guidelines were elaborated and adopted by the Commission. These guidelines provided a harmonised methodological base for the collection and evaluation of data at the national level. The results of PLC-2 comprised general data characterising major pollution sources and loads. The general understanding was that even though PLC-2 was not perfect it was a definite step forward, as it comprised more reliable data on total loads to the Baltic Sea. The ongoing political changes in the regions had a positive also on the PLC-2 by allowing improved reporting and collection of more detailed data than originally envisaged.
- Some of the major uncertainties and weaknesses of PLC-2 were avoided during the process of compiling the PLC-3 in 1995. Systems for quality assurance were introduced and a data entry system closely connected to a database was created. PLC-3 included nutrients, organic matter and heavy metals loads entering the Baltic Sea via rivers, coastal areas and direct via point sources. One major drawback was that point sources were only included when the source was discharging directly into the Baltic Sea, or when it was located down stream of the station in the river for which the load was given. This meant that an inventory of all point sources in the whole Baltic Sea drainage area was still missing. Even though the estimates and calculations could be regarded as more accurate than those found in PLC-2, many uncertainties still remained due to incomplete data sets. As an example, data on heavy metals were missing from almost all Contracting Parties.

The overall conclusion of an evaluation of the experience from the first three PLCs is that they clearly cannot be used for assessing whether or not the reduction targets – e.g., the 50 per cent reduction agreed in 1988 – have been reached.

In the design of the presently ongoing PLC-4, measures have been taken to overcome the problems previously identified. New detailed guidelines have been elaborated and adopted for the collection of data from point sources and non-point sources of pollution in the whole drainage area of the Baltic Sea. Inputs into surface waters within a river drainage area of monitored rivers, and unmonitored drainage areas from point sources, diffuse sources and natural background loads will be estimated. This will allow the retention of pollutants within the river drainage area and in the coastal zone to be calculated, thus, generating data on the total load at the lowest monitoring station in the river drainage area and from unmonitored drainage areas. Finally, data on point sources discharging directly into the Baltic Sea will be added, thereby hopefully giving a correct picture of the total water-borne load of different pollutants to the marine area.

Despite all the work put into the Periodic Assessments, the PLCs and the JCP, the key question remains unanswered: What will be the environmental benefits in the Baltic Sea marine environment of measures taken? The 50 per cent reduction goal set in 1988 was not

based on any major scientific effort to assess the possible positive effects, either in the open sea or in coastal waters. And only a very vague general description of the possible benefits to the marine environment was included in the JCP.

## **8. National systems for co-ordination between science and policy-making/decision-making**

National delegates representing Contracting Parties in the negotiations within international conventions usually have an overall knowledge of the issues to be discussed. Generally, however, they do not have any expert knowledge about the respective areas addressed. The need for detailed information can be satisfied in different ways, for example, by having experts included in the national delegations or by various types of preparatory or co-ordination mechanisms at home.

The systems used nationally for providing scientific-technical information vary from country to country. Some countries have more or less permanent structures, e.g., reference groups comprising scientists, technical experts and delegates which meets regularly in advance of the international meetings. In other countries, these contacts are handled on an *ad hoc* basis via contacts between delegates and individual scientists/experts, *inter alia*, those directly associated with the respective agency or ministry.

One consequence of the differing practices between participating countries is that delegates coming to negotiation meetings may have very different knowledge and understanding of the issues to be negotiated. This, in turn, may create significant difficulties and be a serious obstacle to constructive negotiations.

## **9. Analysis of HELCOM Recommendation and Declarations on nutrients and hazardous substances**

### **9.1. General principles and overall targets**

Despite the commitments made and actions taken to reduce the pollution load to the Baltic Sea in the 1970's and early 1980's, it soon became evident that this would not be nearly sufficient to reverse the prevailing negative trends. On the contrary, a continuous decrease in oxygen concentrations in the deep basins, a steady increase in nutrient concentrations and widespread eutrophication, reduced fish stocks, and the occurrence of a number of 'new' contaminants created a gloomy picture and gave rise to grave concern.

This was confirmed in the conclusions in *First Assessment of the State of the Marine Environment of the Baltic Sea Area 1980-85*. The trends towards increasing nutrient concentrations as the main negative change in the marine environment was described, and on action required it was emphasized that '*efforts should be further continued to reduce the nutrient load and thus the eutrophication of the Baltic Sea Area.*'

Concerning hazardous substances it was noted in the Assessment that positive trends had been registered for DDTs and PCBs, but that more restrictions were required on the discharges of persistent organic chemicals used by the Baltic Sea countries on a large scale.

### **9.1.1 The HELCOM 1988 Ministerial Meeting and Declaration**

The 1988 HELCOM Ministerial Meeting could be viewed as a response to the concerns expressed. This high-level political event created a new and concrete common platform to start the long-term process to reverse the negative trends. The meeting was held in a somewhat new atmosphere, following the political changes that had started in the Soviet Union in the mid-1980's. There was a more open acceptance of the environmental problems facing the centrally planned economies, and a willingness to co-operate internationally on these issues. These overall, highly political changes were crucial for paving the way for the first concrete commitment to reduce the pollution load to the Baltic Sea in terms of an agreed percentage.

*In the Ministerial Declaration, a firm determination was expressed: 'Current and new efforts on reduction of the load of pollutants should aim at a substantive reduction of the substances most harmful to the ecosystems of the Baltic Sea, especially of heavy metals and toxic or persistent organic substances; and nutrients, for example in the order of 50 per cent of the total discharges of each of them, as soon as possible but not later than 1995.'*

During the subsequent meeting of the Commission, three important and ground-breaking Recommendations aiming at the reduction of nutrients and hazardous substances were adopted.

- Recommendation 9/2: Concerning measures aimed at the reduction of discharges from urban areas by the use of effective methods in wastewater treatment;
- Recommendation 9/3: Concerning measures aimed at the reduction of nutrient discharges from agriculture and \*
- Recommendation 9/6: Concerning restriction of discharges from the pulp and paper industry.

These recommendations and major recommendations adopted by HELCOM since 1988 with the aim to reduce the inputs of nutrients from sewage and agriculture and the inputs of hazardous substances from the pulp and paper industry, particularly of organochlorine substances, are discussed below.

#### **9.1.1.1 Was there a scientific basis for the 50 per cent reduction goal?**

A review of the background documents and the reports available from the expert meetings (HELCOM STWG) preceding the Ministerial Meeting does not give any indication on the extent to which the 50 per cent goal was based on any scientific or technical discussions or agreement between scientists and other experts. As far as can be established, no scientific analysis or assessment was made of the possible improvement of the marine environment that would follow as a result of the 50 per cent reduction in the pollution load. Nor does there seem to have been any thorough analysis made on the actual technical and financial feasibility of implementing such an overall and substantial reduction during the stipulated period.

On the contrary, the information obtained in discussions with a number of persons directly involved in the negotiation process rather appears to confirm that the 50 per cent goal was ultimately agreed in the final high-level political negotiations between the Contracting Parties. At least one Contracting Party hesitated until the very last moment. However, facing the heavy political pressure from the other Ministers to join in a consensus decision, the hesitating Minister accepted the wording in the Declaration during the final round of

negotiations between the Ministers – but was later heavily criticized at home for having giving in to that pressure.

This does not mean that the 50 per cent goal did not have a sound scientific basis or that the scientific community did not support it. When the Declaration was negotiated, the Second Periodic Assessment covering the time period 1984–88 was in its final phase of completion. In the final summary report published in 1990, the Assessment Group discussed nutrients, as well as persistent organic compounds, and made recommendations concerning action to be taken. Concerning nutrients the following was noted:

- Studies indicated increasing winter concentrations of phosphorus and nitrogen in the surface layer of all sub-regions in the Baltic Sea until 1988;
- The phosphorus and nitrogen concentrations included in the biogeochemical cycle had recently been at such a high level in the Baltic Sea Area that sedimentation and microbial destruction of biogenic material produced in the euphotic layer caused further deterioration of the oxygen conditions and spreading of the anoxic areas in the deep water;
- Signs of eutrophication were evident in the pelagic ecosystem of the Baltic Sea.

Thus, the Assessment Group concluded that *'efforts to minimize the discharge of organic matter and nutrients in sewage and industrial wastewater should be continued. Efforts to restrict the use of fertilizers in agriculture to levels where excess nitrate is not transported to the sea should be continued.'*

The Group further stated that *'though the present knowledge of the nutrient budget of the Baltic Sea is still insufficient, especially regarding input from the North Sea, geochemical phosphorus fluxes, rates of denitrification, and nitrogen fixation, there is good reason to assume a significant effect of anthropogenic inputs on the increase of phosphate and nitrate in surface waters.'* Therefore, inputs of nitrogen compounds should be further reduced.

Thus, the Assessment Group welcomed the Ministerial Declaration about a 50 per cent reduction of input of pollution from land-based sources and atmospheric deposition by 1995 – even though the effect of such a reduction, in terms of primary production and harmful algal blooms, could not be calculated.

The scientific conclusions on persistent organic compounds were much briefer. The Assessment Group stated that *'in view of the special sensitivity of the Baltic Sea, because of its character as an almost enclosed water body, The Baltic Sea States should make strong efforts to reduce the input of persistent organic compounds and heavy metals to prevent their accumulation in the ecosystems.'*

Thus, it can be assumed that the 50 per cent reduction goal was agreed among the Contracting Parties as a politically attractive target, and the negotiators might have had the 1979 LRTAP Convention as a model.

For that convention, the agreements on emission reductions started with a Protocol adopted in 1983 on an overall 30 per cent reduction of the emissions of sulphur. The LRTAP Convention has then gradually been revised, strengthened and expanded to include protocols on emissions of nitrogen oxides and volatile organic compounds (VOCs). The message from the scientists to the LRTAP negotiators in the early 1980's was that a 30 per cent reduction would be a good start. The time period required by the countries to implement that target would allow the scientists sufficient time to get a solid scientific background for further measures. In practice,

‘scientific background’ in this context meant a scientific analysis to establish critical loads for different ecosystems, a concept that would give a more precise scientific basis about the absolute emission reduction required to avoid further negative effects to the ecosystems. The emission reductions needed would of course be much larger than the initial 30 per cent (in fact, rather in the range of 70–90 per cent), but in the meantime any reduction resulting in decreased load of acidifying pollution would be beneficial to sensitive limnic and terrestrial ecosystems.

Possibly, a parallel process going on in the North Sea region also influenced the Baltic negotiators. At the Second (1997) International Conference on the Protection of the North Sea, the Ministers had agreed to:

- *‘Accept the principle of safeguarding the marine ecosystem of the North Sea by reducing polluting emissions of substances that are persistent, toxic and liable to bioaccumulate at source by the use of best available technology and other appropriate measures.*
- *Take measures to reduce urgently and drastically the total quantity of such substances reaching the aquatic environment of the North Sea, with the aim of achieving a substantial reduction (of the order to 50 per cent) in total inputs from these sources between 1985 and 1995.’*

On inputs of nutrients, it was specified in the Ministerial (London) Declaration that the North Sea countries should:

- *‘Take effective national measures in order to reduce nutrient inputs into areas where these inputs are likely, directly or indirectly, to cause pollution;*
- *Aim to achieve a substantial reduction (of the order of 50 per cent) in inputs of phosphorus and nitrogen to these areas between 1985 and 1995.’*

The parallel between the North Sea and Baltic Sea processes is obvious, although the wording concerning nutrients would seem to be weaker in the 1997 London Declaration as inputs need only be reduced to areas where such inputs are likely to cause pollution. This approach was further confirmed in the 1992 OSPAR Ministerial Declaration but without the specific 50 per cent goal. In the 1998 Sintra Statement, an OSPAR target date for implementing the strategy to combat eutrophication (for achieving the ultimate goal, a marine environment where eutrophication does not occur) was set at the year 2010.

#### ***9.1.1.2 Was the 50 per cent commitment an absolute goal or a strategic target?***

At the time of adoption of the 50 per cent reduction goal for the Baltic Sea, the commitment was regarded by many (including the NGOs and the media) as an absolute goal to be reached no later 1995. However, the Contracting Parties have gradually realized the very large scope of work and costs involved, and the relatively short-time from adoption to implementation. As a result, the closer the time limit 1995 was approaching, and also thereafter, the countries have tended more and more to regard the 50 per cent goal as a strategic target and the whole Declaration as giving strategic guidance for the further work to protect the Baltic marine environment.

#### ***9.1.1.3 Implementation by Contracting Parties as reported to HELCOM***

It soon became obvious that the Contracting Parties were facing serious problems in actually reaching the 50 per cent goal by 1995. Looking back one might characterize the goal as unrealistic or over-ambitious. Not even the financially more wealthy Western countries in the

region have yet (early 2001) managed to fully reach the goal set 13 years ago. This holds especially true when it comes to the input of nutrients, where the agricultural and transport sectors have been particularly difficult to come to grips with.

Already at the second meeting of the HELCOM Technical Committee in 1991, it was noted concerning the pollution load from agriculture that:

- Sweden and Denmark might reach the 50 per cent reduction of the nitrogen load by the year 2000;
- for Finland no reduction of the nitrogen load had been reached, and that for phosphorus a 25–50 per cent reduction might be achieved before 1995;
- no information from either Poland or the Soviet Union indicated a reduction in the nutrient load; and
- for Germany a 50 per cent reduction in the nutrient load from Schleswig-Holstein was unlikely before 1995.

Since then there has been several reporting rounds in 1993–94 and in 1996. The problems facing the countries in complying with the commitment were further emphasized in the *Interim Report on the Implementation of the 1988 Declaration*, presented to the 1994 HELCOM Ministerial Meeting. The conclusions drawn were, *inter alia*, that the reporting round of 1993 had revealed gaps in implementation status between the Baltic Sea States; and that stronger efforts were needed from the Contracting Parties in order to accelerate the implementation of national measures aimed at the 50 per cent reduction.

These conclusions had good scientific backing. The seriousness and wide distribution of the eutrophication problems, particularly in the coastal regions of the Baltic Sea, had just been described in detail in the *First Assessment of the State of the Coastal Waters of the Baltic Sea*. The experts emphasized that '*serious physico/chemical and biological effects had been demonstrated and reported by all the countries. Effects included changes in light conditions in the water, oxygen deficiency, extinction of organisms or a changed balance between species at all trophic levels of the ecosystem with, not least economic consequences.*' The report also included a map with 25 identified eutrophication problem areas located in the coastal regions of all countries around the Baltic Sea.

As a result, the Ministers decided to urge the Contracting Parties:

- '*To accelerate the implementation of national measures aimed at a 50 per cent reduction of emissions of toxic and/or persistent and bioaccumulating substances introduced to the marine environment of the Baltic Sea;*
- '*To make further efforts to minimize the use and emissions of toxic and/or persistent and bioaccumulating substances and to ensure a reduction of pollution levels that are not harmful to man or nature with the aim of their elimination by substitution by less harmful substances and/or technical installations;*
- '*To accelerate the implementation of measures to reduce substantially the emissions of nutrients and to this end prepare an assessment of national programmes for consideration by HELCOM 17 (1996), with a step-wise approach in limiting further the inputs of nutrients from different sources and taking into account the provisions of relevant international regulations.*'

At its meeting in 1995, the HELCOM Technological Committee confirmed the conclusions from the assessment of the national nutrient programmes. No Baltic Sea country had managed to meet the 50 per cent reduction goal. It was noted that the nutrient load to the Baltic Sea

from municipalities had not substantially decreased. All countries should, therefore, be encouraged to elaborate or improve their national programmes and enforcement tools in order to reach the overall reduction target by the year 2000, i.e., five years later than had been agreed in 1988.

At its meeting in 1996, the Commission approved these conclusions. The fact that the overall reduction goal has not been achieved by any of the Contracting Parties, despite comprehensive work going on in the countries, was taken note of. In the proposed work to improve and enforce efforts, priority should be given to reduction of :

- pollution from agriculture and rural settlements in the entire Baltic Sea drainage area;
- NO<sub>x</sub> emissions from the transport sector; and
- nutrients (especially of nitrogen compounds) from municipal sewage treatment plants and industry with urgent consideration of those plants that discharge into areas that had been identified as problem areas for eutrophication.

In the final report on the implementation of the 50 per cent goal, presented to the HELCOM Ministerial Meeting in 1998, the great problems in assessing/ quantifying in percentage the changes in pollution load were noted. Consequently, it had been difficult to answer the key question: Had the 50 per cent target been met? It was further concluded that despite all efforts by the Contracting Parties, the overall or nation-wide reduction target had not been reached for all polluting substances included in the 1988 Declaration. Notwithstanding that progress had been achieved – including a significant reduction of discharges of organochlorine substances from some industries – the state of the Baltic Sea environment still remained alarming, especially regarding the severe eutrophication.

Concerning nutrients, and particularly nitrogen, the report did not provide much guidance. Because of the problems encountered with the Pollution Load Compilations, data on waterborne input of nitrogen could not be used for assessment purposes. The conclusion was that, based on other scientific findings and knowledge of technical measures already taken, there were no reasons to assume that waterborne inputs of nitrogen had either increased or decreased between 1990 and 1995.

In considering the report, the Commission noted at its meeting in 1998 that the overall 50 per cent reduction target had not been achieved for all polluting inputs, despite the efforts of the Contracting Parties to reduce them. It was concluded that major problems of continuing eutrophication arising from agriculture and sewage in-flows were still present.

Having realized these shortcomings, the Environment Ministers and the EU Commissioner decided to *'reaffirm their commitment to achieve the strategic goals set up in the 1988 Ministerial declaration and to define a series of more specific targets to be realized before the year 2005 and reviewed in 2003.'*

### **9.1.2 The 1990 Baltic Sea Declaration**

The 1990 Baltic Sea Declaration was negotiated outside but in parallel with the ongoing work within HELCOM to implement the ambitious goals set out in the 1988 Ministerial Declaration. One major reason for initiating this parallel process was the option to raise the environmental issues, including the protection of the Baltic Sea, at the highest political level (Head of Government). This option was within reach as a result of the ongoing dramatic geopolitical changes in the region during this time.

There was a substantial will to expand, widen and strengthen the international co-operation across the Baltic Region within practically all fields. It should also be recalled that the environmental issues were very high on the agenda of the groups demanding radical reforms of the centrally planned societies in the Eastern and Southern parts of the Baltic Sea region. On the part of Denmark, Finland, Sweden and Norway, the possibility to support the not yet independent Baltic Republics by having high level representatives from these still Soviet republics participate in the process as specially invited guests, was another important reason for pursuing this course of action.

The Baltic Sea Declaration (the Ronneby Declaration) was adopted by the Heads of Government and High Political Representatives of the Baltic Sea States, Norway, the Czech and Slovak Federal Republic, and the representative of the European Commission, in 1990. In the Declaration the representatives express their *'concern about the continuing threat to the environment of the Baltic Sea which threatens to irreversibly disrupt the ecological balance in the region and seriously curtail the possibilities for sound development in the area.'*

The operative section of the Declaration included some paragraphs that have proved to be of major importance for the Baltic environmental co-operation during the 1990's. The Governments expressed their firm determination, *inter alia*, to:

- *'Assure the ecological restoration of the Baltic Sea, ensuring the possibility of self-restoration of the marine environment and preservation of its ecological balance;*
- *Urgently prepare a joint comprehensive programme for decisive reduction of emissions in order to restore the Baltic Sea to a sound ecological balance. The programme was to be based on concrete national plans provided by the countries concerned;*
- *Undertake and support intensified efforts to reduce as soon as possible the emissions of harmful substances (toxic, persistent and bioaccumulating substances, heavy metals and nutrients) to levels that are in accordance with a restored ecological balance, implementing as a first step the existing commitments by the Contracting Parties to the Helsinki Convention to reduce such emissions in order of 50 per cent in the period 1987-1995.'*

Even though the Conference was, formally, held outside the HELCOM context, much in the Declaration supported the already ongoing efforts within HELCOM, referred issues back to HELCOM, or entrusted HELCOM with new tasks. The latter included the setting up of the *ad hoc* High Level Task Force with the mandate to draw up the JCP and arrange a Ministerial Meeting in 1992 to present the draft JCP and have it endorsed at the political level.

#### **9.1.2.1 The scientific basis for the Baltic Sea Declaration**

There is little evidence suggesting that results from the Baltic Monitoring Programme or other scientific studies played any major role in the final negotiations of the 1990 Ronneby Declaration. However, a scientific basis did exist in the form of the *Second Assessment of the State of the Baltic Marine Environment*, which had just been published. In the Assessment it was stated that inputs of nitrogen and phosphorous compounds *'should be further reduced and that in view of the special sensitivity of the Baltic Sea strong efforts should be made to further reduce the input of persistent organic compounds and heavy metals to prevent their accumulation in the ecosystems.'*

### **9.1.2.2 *Forward = Back to the 1950's***

Another substantive scientific input made at this time was the results from the multi-year Swedish national eutrophication research programme. In the final report from the programme, the scientists warned of the very extensive ecological effects that had occurred rapidly mainly due to the enclosure and stratification of the Baltic Sea. The results strongly suggested that the occurrence and negative effects of toxic algal blooms had increased during the last decades. The scientists further cautioned that eutrophication could be a self-generating process, i.e., that the effects could spread with the present input of nutrient to the Baltic.

In their final conclusions the scientists argued that the marine environment must be restored. A highly relevant question – ‘How can this be done, and what kind of balanced ecosystems should be the goal?’ – was asked. The goal subsequently suggested, based on the results from the programme, was that the reductions in pollution load should help recreate the conditions that had prevailed when the function and structure of the marine waters around Sweden seemed to have been in a satisfactory condition, i.e., in the 1950's.

This concept was further discussed by the Stockholm Environment Institute (AMBIO Special Report. No. 7, September 1990). It was suggested that a historical retrospect should be used when goals are set for counter measures. As a basis for policy development one should ask oneself when eutrophication started in the Baltic Sea and, consequently, when negative effects were first observed. It was concluded that eutrophication problems had developed over a long time period, but that it was only during the last four decades that the situation in the open sea had become critical. Around 1950 the Baltic was still regarded as relatively healthy from an environmental point of view. Aiming at returning to those conditions could then be regarded as an attempt by the Baltic Sea countries to achieve ecological sustainability. Consequently, the authors suggested that the goal to be achieved could be coined ‘Forward to 1950’.<sup>3</sup>

The authors further noted that the proposed ‘critical loads’ for nutrients for the Baltic Sea, which have been developed using arguments of systems ecology, to a great extent corresponded to the nutrient loads of the early 1950's. However, the authors also emphasized that it must be borne in mind that all ecological goals are, by nature, provisional, as they are depending on the still incomplete knowledge about the functioning of the ecosystems. New knowledge may require the goals to be revised on a regular basis.

Bringing the Baltic Sea back to its state in the 1950's would, according to the authors, require nutrient discharges to be reduced to the levels of the 1930's and 1940's, corresponding to an annual input of about 350,000 tonnes of nitrogen and 15,000 tonnes of phosphorus. It would mean a reduction of about 65 per cent for nitrogen and 80 per cent for phosphorus, based on the estimated loads of 1990, which were by no means exact. According to PLC-2 the input in 1990 was 662,855 tonnes of nitrogen and 45,826 tonnes of phosphorus.

### **9.1.2.3 *The environmental benefits of the JCP***

As far as this has been possible to verify, via reports and interviews, no detailed scientific assessment was made of the possible positive environmental effects on the Baltic Sea marine environment of the implementation of the JCP. However, considering the lack of data on the pollution load, and the gaps in the understanding of the interaction between the coastal

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<sup>3</sup> The concept ‘Back to the 1950's’ has later been elaborated further in a paper by Jansson & Dahlberg for the Baltic Sea 2008 project.

systems and the open sea, one could well question whether such an assessment would at all have been feasible to undertake at the time.

Thus, the potential environmental benefits from the implementation of the various components of the JCP were described in a rather general fashion. That, and the need for a very long-term perspective, was discussed in the introduction to Chapter 5.9 of the Programme. It was noted that the implementation of the JCP was planned to require decades. Given the long-term pattern of periods of natural stagnation in the Baltic Sea and their negative effects on the ecosystems, major permanent impact on the conditions of the Baltic marine environment could not be expected for less than a generation. Despite this fact, gradual and concrete (visible) improvements would be expected, and major environmental improvements could be expected to occur locally in a relatively near future. It was further noted that changes as a response to programme implementation (reduction of anthropogenic pollution) are much more difficult to predict in the Baltic Sea as a whole than in lakes, rivers and coastal waters.

The expected environmental benefits of the JCP were presented in four sections:

- ***Clean-up of rivers.*** The positive impacts of the actions taken under the JCP included health aspects, as well as environmental improvement, of both surface water and groundwater. The general improvement of the quality and reliability of potable water supply would significantly benefit the health and well-being of the people of the region.
- ***Clean-up of coastal waters.*** Coastal regions would be expected to improve most rapidly as a result of measures taken. Treatment of municipal sewage, industrial waste waters and other discharges containing pathogens and other harmful organisms would allow beaches to be reopened and contribute to improved conditions for investments in the once very important tourism sector. Regarding eutrophication, measures need to be taken not only in municipalities and industries located directly on the coast, but also at all pollution point sources and areas of diffuse sources (agriculture, forestry, transport) within the whole catchment area.
- ***Restoration of the ecological balance in the Baltic Sea.*** No definition was given of the exact meaning of the concept ‘ecological balance’, but it refers to the 1990 Baltic Sea Declaration and the determination expressed there to ‘*assure the ecological restoration of the Baltic Sea, ensuring the possibility of self-restoration of the marine environment and the preservation of its ecological balance*’. However, examples of potential positive effects were listed as steps that would indicate the move in the right direction towards restoring the ecological balance of the Baltic Sea. For example:
  - Decreased eutrophication leading to less algal production and blooms, decreased sedimentation and improved oxygen conditions;
  - Major positive impact on fishery resources in coastal waters as well as in the open sea; and
  - Reintroduction of salmonid species in previously degraded rivers and watercourses;
- ***Reduction in nutrient loads.*** No assessment was presented on actual estimated reduction in the nutrient loads (either in tonnes or percentage of the total load) to the Baltic Sea as a result of the JCP implementation. Only a non-quantitative summary of the expected positive effects was given. It was stated, *inter alia*, that nutrient loads causing extensive eutrophication and disturbance of the freshwater and marine ecosystems would be reduced

mainly by improved environmental management in the agriculture sectors, decreased atmospheric pollution, and expanded and more efficient treatment of municipal sewage and industrial waste waters. Protection and better management of coastal lagoons and wetlands would also have a noticeable effect on nutrient loads, in addition to improving the maintenance of biological diversity. The reductions in nutrient loads would also have wide-spread beneficial impacts on health and environmental values. Finally it was noted that phosphorus removal and costly but worthwhile investments in nitrogen removal from urban sewage would have significant sub-regional effects on coastal waters in many areas.

### **9.1.3 The 1996 Baltic Summit and the Action Programme of CBSS**

The Baltic Sea environment was also much in focus at the highest political level at the Baltic Summit (meeting of Heads of Governments from all Baltic Sea States) in 1996, and at the subsequent meeting of the Council of the Baltic Sea States (CBSS, Ministers of Foreign Affairs) that same year. However, most of the concrete measures suggested were once more handed over to HELCOM for implementation as part of regular HELCOM activities.

According to the Environment Action Programme adopted by the CBSS *'the uncontrolled use and handling of chemicals, including pesticides, require special attention. Discharges, emissions and losses of hazardous substances should be continuously reduced, towards the target of their cessation within one generation (25 years). The ultimate aim is concentrations in the environment near background values for naturally occurring substances and close to zero concentrations for man-made synthetic substances.'*

To this end, HELCOM was requested to *'develop an action programme for phasing out discharges, emissions and losses of hazardous substances, including persistent organic pollutants.* The proposed action programme was supposed to be submitted to the HELCOM Ministerial Meeting in 1998.

The increased emphasis on agriculture as the main source of nutrients was also reflected in the CBSS Action Programme. Accordingly, *'environmental protection should be an integral part of agricultural policies. The implementation of the HELCOM Ministerial decisions of 1994, as well as other relevant decisions and recommendations on measures to limit the environmentally adverse impact of agriculture on the Baltic Sea, should be given priority. Nutrient emissions and leakage's have to be reduced to a level consistent with the goal to restore the ecological balance of the Baltic Sea. Good agricultural practices, including the reduced use of pesticides, should be introduced. Measures necessary to achieve the environmental objectives will be identified and implemented. To this end the national action programmes should be evaluated and amended as necessary to meet, as a first step, the overall aim of 50 per cent reduction of nutrient inputs to the Baltic Sea.'*

Also proposals on these matters, and an agricultural Annex to the Helsinki Convention, were to be prepared for adoption by the forthcoming HELCOM Ministerial Meeting in 1998.

## **9.2 Eutrophication and nutrients**

As can be concluded from the above, the issues related to nutrients and eutrophication have been in the forefront of the work of HELCOM since the early to mid-1980's. The legal obligations set out in the 1974 Convention, and later in the 1992 Convention, have repeatedly

and on a number of occasions received political support in Ministerial Declarations and Communiqués.

Judging from the consensus texts in the first three Periodic Assessments there seems (at least since the mid-1980's) to have been a very broad scientific agreement on the problem of eutrophication, its root causes and the serious negative effects on the Baltic coastal and marine ecosystems. The only major scientific disagreement appears to have been the still partly ongoing debate about the sensitivity of different areas to nitrogen inputs.

Over the years, HELCOM has adopted Recommendations within a wide range of sectors and with the objective to reduce nutrient loads to the Baltic Sea and combat eutrophication.

Recommendations include measures in relation to

- urban areas (sewage treatment plants, storm water and sewerage systems – see below);
- industry (pulp and paper industries and fertilizer plants);
- agriculture (spreading of manure and chemical fertilizers, storage of manure);
- management of wetlands and fresh water ecosystems for retention of nutrients;
- marine and fresh water fish farming; and
- the transport sector.

Despite this scientific consensus and the strong political support – the latter very clearly and concretely manifested in the 50 per cent reduction goal – progress has been slow in the negotiation, adopting and above national implementation of the HELCOM Recommendations adopted to reduce nutrient discharges and combat eutrophication. This is illustrated, for instance, by the fact that not even the first substantive one (Recommendation 9/2, adopted in 1988) has yet, 13 years later, been fully implemented by all the Contracting Parties.

The lack of progress, particularly with regard to nitrogen reductions, has also been amply illustrated in the assessments of the national programmes on nutrient reduction made. For example, in the assessment made in 1995 it was noted that the 50 per cent phosphorus reduction (1988–95) has been achieved by most Contracting Parties, whereas the achieved level of nitrogen reduction varied generally between 10 and 50 per cent. Due to their economic problems, the countries in transition were still far from the goal, which meant that the nutrient load to the Baltic Sea from municipalities had not substantially decreased.

The Commission in 1998, stating that major problems of eutrophication arising from agriculture and sewage in-flow were still present and continuing, once more reiterated the seriousness of the situation.

### **9.2.1 Sewage**

#### **9.2.1.1 Legal obligations according to the 1974 and 1992 Conventions**

Obligations concerning the treatment of sewage from treatment plants were set out already in Annex III to the 1974 Helsinki Convention. Accordingly, municipal sewage should be treated in an appropriate manner so that organic matter does not cause harmful changes in the oxygen content of the Baltic Sea and nutrients do not cause harmful eutrophication of the sea.

These requirements were further strengthened in the 1992 Convention (Annex III, Regulation 2:1). Municipal sewage should be treated with, at least, biological or other methods equally

effective with regard to reduction of significant parameters. Furthermore, substantial reduction should, specifically, be introduced for nutrients.

### ***9.2.1.2 Specific recommendations and measures***

**RECOMMENDATION 6/7** concerning the treatment of municipal sewage and industrial wastewater with special emphasis on the reduction of discharges of nutrients (1985).

This first ‘sewage’ Recommendation sets out general principles to be followed and does not include any specific discharge standards. However, the Recommendation opens up for nitrogen removal, despite the fact that there were still technical uncertainties about the possibilities to have nitrogen removal processes in treatment plants operating effectively at the low temperatures prevailing for large parts of the year in the Baltic Sea Region.

In the Recommendations the following is specified:

- Appropriate criteria and measures should be applied to sewage discharge in order to control and minimize land-based pollution and eutrophication of the marine environment. In the treatment of the waste water mechanical, chemical and biological and other measures, according to the quality of the wastewater, and thus required to maintain or improve the quality of the recipient water, should be applied;
- Where nutrient removal is of primary concern appropriate treatment should be carried out, for example, by replacing or combining biological treatment with chemical precipitation or other measures of equal efficiency; and
- Where nitrogen removal is found more necessary than phosphorus, the treatment described above be replaced by or combined with nitrogen removal methods.

**RECOMMENDATION 9/2** concerning measures aimed at the reduction of discharges from urban areas by the use of effective methods in wastewater treatment (1988).

This substantive Recommendation includes major provisions of on sewage treatment:

- Urban wastewater deriving from households or industrial enterprises should be collected and treated before being discharged into water bodies;
- Sewage which is treated in wastewater treatment plants, loaded with more than 10,000 person equivalents, should be treated as soon as possible and not later than 1998 by biological methods or other methods, so that the treatment result in at least 90 per cent reduction of BOD, at most a concentration of BOD of 15 mg/l and a total phosphorus value below 1.5 mg P/l; and
- As a start, each Contracting Party should start research and evaluation projects as soon as possible Studies to give a basis for further recommendations for nitrogen removal within three years. Reduction targets to be evaluated were 50 respective 70 per cent reduction of total incoming nitrogen.

Already at this time some countries held the opinion that sufficient knowledge and experience of removing nitrogen from urban sewage in treatment plants was available. This was also reflected in the preamble of the Recommendation.

**Level of implementation of Recommendation 9/2 by Contracting Parties as reported to HELCOM in 2000<sup>4</sup>**

<i>DK</i>	<i>EST</i>	<i>FIN</i>	<i>DE</i>	<i>LV</i>	<i>LT</i>	<i>PL</i>	<i>RU</i>	<i>SE</i>
Fully: P+ N	Partly	Partly	Partly	Partly	Partly	No info	Partly	Fully: P

**9.2.1.3 The issue of nitrogen removal in sewage treatment plants**

In accordance with the provisions in Recommendation 9/2, the issues related to nitrogen removal were discussed at the first meeting of the newly established HELCOM Technological Committee in 1990.

The long process up till the final adoption included extensive discussions in the HELCOM Environment and Technological Committees; the holding of a number of seminars and workshops; and the development and joint assessment of national nutrient programmes. Debates on scientific and technical issues comprised, *inter alia*, possible self-purification, particularly in coastal waters; effectiveness of nitrogen removal at low temperatures; and the necessity/desirability to divide the Baltic Sea into areas that are sensitive or not sensitive to inputs of nitrogen.

It took seven years for the countries to finally agree on a Recommendation concerning nitrogen removal in sewage treatment plants around the Baltic Sea. In addition, it took another three years until the Commission in 1998 could endorse a list of the most urgent municipal treatment plants in the countries in transition to be equipped with nitrogen removal by the year 2010 (fifteen years after the adoption of the original Recommendation).

**RECOMMENDATION 16/9.** Nitrogen removal at municipal sewage water treatment plants (1995).

According to the provisions of this Recommendation, municipal sewage treatment plants, located in areas sensitive to nitrogen input should be equipped with nitrogen removal by 1998 or no later than 2010 (>100,000 person equivalents, p.e.) or by the year 2020 (countries in transition). The most urgent plants for 50,000–100,000 p.e. (to be specified by the Commission in 1997) should be equipped with nitrogen removal facilities by the year 2010.

**Level of implementation of Recommendation 16/9 by Contracting Parties as reported to HELCOM in 2000<sup>5</sup>**

<i>DK</i>	<i>EST</i>	<i>FIN</i>	<i>DE</i>	<i>LV</i>	<i>LT</i>	<i>PL</i>	<i>RU</i>	<i>SE</i>
Fully	Partly	Not impl*	Partly (most plants)	No info**	No info**	No info**	Partly (most plants)	Partly***

<sup>4</sup> Doc. HELCOM 21/2000 5b/2

<sup>5</sup> Doc. HELCOM 21/2000 5b/2

\* According to the Finnish Water Protection Programme, plants located in sensitive areas should have at least 50 per cent nitrogen reduction by the year 2005. The areas from the Gulf of Finland to the city of Vaasa are mainly sensitive to nitrogen (provisional definition).

\*\* No information on areas sensitive to nitrogen input had been reported from Estonia, Latvia, Lithuania, Poland, or the Russian Federation.

\*\*\* Sweden has identified the Swedish West coast and the Baltic Proper as areas sensitive to nitrogen. All Swedish plants serving between 50,000-100,000 p.e., and two thirds of all plants serving >100,000 p.e. are in compliance.

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In addition to the Recommendations focusing on sewage treatment plants, HELCOM has also adopted a number of supplementary Recommendations to control pollution from urban areas, e.g. the development of sewerage systems (Recommendation 7/3) and management of storm water (Recommendations 7/5, 11/2, 17/7).

## **9.2.2 Agriculture**

### **9.2.2.1 General principles, commitments and achievements**

The need to control the discharges of nutrients from agriculture was included in the first (1984) HELCOM Medium-term Plan adopted by the Commission in 1984 (see 7.3.3). Reduction of the pollution load from non-point sources (agriculture being one of these) was included in the 50 per cent goal commitment in 1988.

However, as could be expected, the implementation of the 50 per cent goal within the agricultural sector has been very difficult. This is exemplified, for instance, in the report in 1995 on the assessment of the national programmes on nutrient reduction<sup>6</sup>. It was concluded that agriculture is the largest anthropogenic source of nutrient input to the Baltic Sea. The 50 per cent target had been achieved in some countries in transition due to decreased agricultural production and, consequently, decreased use of fertilizers. Structural changes and financial difficulties, however, mainly caused this decrease, and in connection with economic recovery in these countries, the agricultural load might increase despite of existing protection programmes. In the EU member countries, the 50 per cent target had not been achieved and there was a need for additional measures. For nitrogen, these measures would to a great extent have to be taken within the framework of the implementation of the EU Nitrates Directive. Generally, plans indicated that in most of the countries the 50 per cent reduction would be reached in the period 2000–2005, thus, 5–10 years after the original timetable.

Agriculture was also included as one of the sectors to be analysed in the national plans that needed to be prepared as an input to the elaboration of the JCP programme. As a result, the JCP included a number of agricultural hot spots and a specific programme component to address these.

The increased emphasis on agricultural sector in the regular work of HELCOM, as well as within the implementation of the JCP, has been described above. The importance attached by the Baltic Sea States to issues related to agriculture is also illustrated by the specific projects on agriculture conducted within the regular HELCOM activities (HELCOM TC and the new HELCOM Land-based Pollution Group), as well as within the HELCOM PITF.

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<sup>6</sup> Doc. EC 6/15 (1995).

### 9.2.2.2 Specific recommendations and measures

**RECOMMENDATION 7/2** concerning measures aimed at the reduction of discharges from agriculture (1986).

According to the provisions of this Recommendation, farming practices should be managed under the following conditions:

- Storage facilities for manure and silage should be improved, including effluent control;
- Cultivation practices should be carried out with optimum use of nutrients, e.g., fertilization plan, soil mapping, timing, dosage, spreading technique, crop rotation;
- In animal husbandry, a certain area of farmland should be designated per animal to avoid harmful leaching to the environment as a consequence of manure spreading and/or animal pasturing;
- Water protection zones should be established along specified eutrophication sensitive water bodies, taking into account local conditions;
- Household wastewater, washing water from milking, cleaning of machines etc. should be controlled.

In addition, these measures should be supplemented with information and education for farmers. In addition, research on the environmental effects of farming, and monitoring of nutrient losses, should be carried out.

**Levels of implementation of Recommendation 7/2 by Contracting Parties as reported to HELCOM in 2000<sup>7</sup>**

<i>DK</i>	<i>EST</i>	<i>FIN</i>	<i>DE</i>	<i>LV</i>	<i>LT</i>	<i>PL</i>	<i>RU</i>	<i>SE</i>
Fully	Fully	Fully	Fully	Partly	Partly	Partly	Partly	Fully

**RECOMMENDATION 9/3** concerning measures aimed at the reduction of nutrient discharges from agriculture (1998).

It is recommended that:

- Farming practices should be managed so as to favour the efficient use of the nutrients that are available in the agricultural system;
- Farms with livestock production above a certain size should require approval with regard to environmental aspects;
- Farming practice with regard to manure should be in accordance with the following principles:
  - The capacity of the storage facilities should be sufficiently large to ensure that manure need only be brought out when the plants can use the nutrients (conversion factors for calculating animal unit set out in 13/7);
  - The ammonia evaporation from the storage and use of liquid manure should be reduced by incorporating the manure without delay into the soil when it is used on bare soil;
  - The application of manure on bare soil in the autumn should be restricted;
  - The application of manure on frozen soil should be restricted;
  - Where possible a large part of the cultivated area should be covered by crops – for example winter seed, grass or catch crop - during the autumn and winter.

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<sup>7</sup> Doc. HELCOM 21/2000 5b/2

Level of implementation of Recommendation 9/3 by Contracting Parties as reported to HELCOM in 2000<sup>8</sup>

<i>DK</i>	<i>EST</i>	<i>FIN</i>	<i>DE</i>	<i>LV</i>	<i>LT</i>	<i>PL</i>	<i>RU</i>	<i>SE</i>
Fully	Fully	Fully	Fully	Partly	Not impl.	Partly	Fully	Fully

**RECOMMENDATION 13/9.** Reduction of nitrogen, mainly nitrate, leaching from agricultural land (1992).

According to the provisions of the Recommendation:

- Artificial fertilizers and animal manure should be applied according to crop need. This principle should be promoted by the use of: economic incentives; fertilizer and crop rotation planning and calculation of nitrogen balance; prognosis tools for nitrogen application;
- Utilisation efficiency of animal manure should be enhanced by: application of animal manure shortly before or during the early growing season; establishing of six to twelve months storage capacity for animal manure; development of governmental programmes for financial support for farmer's investments in storage capacity; upper limit for application of animal manure corresponding to 170 kg N per hectare annually;
- Utilisation efficiency of artificial fertilizers should be promoted by integrated plant production;
- Green fields should cover 50 per cent of the agricultural land;

**Level of implementation of Recommendation 13/9 by Contracting Parties as reported to HELCOM in 2000<sup>9</sup>**

<i>DK</i>	<i>EST</i>	<i>FIN</i>	<i>DE</i>	<i>LV</i>	<i>LT</i>	<i>PL</i>	<i>RU</i>	<i>SE</i>
Fully	Partly	Fully	Fully	Partly	Partly	Partly	Partly	Fully

### 9.2.2.3 *The 1998 HELCOM Annex on Agriculture (Recommendation 19/6)*

The Annex on Agriculture was elaborated as a response to the 1994 Ministerial Declaration, according to which the Annexes to the Helsinki Convention should be amended by incorporating relevant provisions in the agricultural field.

In a HELCOM background report to the 1996 *Baltic Summit (Protection of the Baltic Sea – results and experiences)* it was suggested that such an Annex should provide a framework under the auspices of which national policies for agriculture would be harmonized and strengthened. It was further suggested that the Annex should be supplemented with a Baltic Strategy for Sustainable Agriculture to provide a concrete mechanism for the implementation of the principles and obligations of the new Annex.

<sup>8</sup> Doc. HELCOM 21/2000 5b/2

<sup>9</sup> Doc. HELCOM 21/2000 5b/2

The proposal for a HELCOM Annex on Agriculture was subsequently endorsed by the Summit, and included as a request to HELCOM in the CBSS Action Programme.

The Commission formally adopted the Annex in 1998 as Recommendation 19/6: Amendments to Annex III of the Helsinki Convention concerning regulations on prevention of pollution from agriculture. As a consequence of the entering into force of the 1992 Convention, the same provisions were included in the new Convention through the adoption of Recommendation 21/1, which was adopted by HELCOM in the year 2000.

The role of agriculture in the pollution of the Baltic Sea is recognized in the preamble to Recommendation 19/6: *'Conscious that agricultural activities within the Baltic Sea catchment area are responsible, inter alia, for pollution of water and air by nitrogen, phosphorus and plant protection products, causing negative effects on the Baltic Sea ecosystem, including eutrophication, oxygen depletion and reduced biological diversity.'*

The general provisions are set out in Regulation 1 of the Attachment to Recommendation 19/6, where the Contracting Parties commit themselves to *'apply the detailed measures described in Regulations 2 and 3 in the Attachment and take into account best Environmental Practice (BEP) and Best Available Technology (BAT) to reduce the pollution from agricultural activities.'* The Contracting Parties further undertake to elaborate Guidelines containing elements specified in Regulations 2 and 3 and report these to the Commission

Regulation 2 includes detailed regulations pertaining to plant nutrients. Accordingly, management measures to reduce the adverse environmental effects of agriculture should be taken within in regard to animal density; manure storage; agricultural wastewater and silage effluents; application of organic manure; application rates for nutrients; winter crop cover; and water protection measures and nutrient reduction areas

It is further required in Regulation 4 that farms with a livestock production above a certain size should have an approval with regard to environmental aspects and impacts of the farm. According to Regulation 5, projects should also be developed to assess the effects of measures and the impacts of the agricultural sector on the environment. Finally, the Contracting Parties are obliged to promote systems for education, information and extension (advisory service) on environmental issues in the agricultural sector.

#### ***9.2.2.4 Implementation by Contracting Parties as reported to HELCOM***

The Annex on Agriculture entered into force on 1 July 2000. It combines most of the provisions contained in the Recommendations adopted within the agricultural field since the mid-1980's (described above, and see also 9.2.2.4). By incorporating the already accepted principles, obligations and commitments into the legally binding body of the Convention, the pressure in the countries to implement them should increase, however. In practice, though, much will depend on the concrete content of the action programmes to be developed and implemented by the individual countries.

According to the provisions, Denmark, Finland, Germany and Sweden should develop national programmes for the implementation of the measures included in Part II of the Annex by 1 January 2000, and implement them by 1 January 2002. Similarly, Estonia, Latvia, Lithuania, Poland and the Russian Federation should develop programmes for the implementation of the measures and implement them as soon as possible, but not later than 1

January 2002 and 1 January 2011, respectively. No reporting on the implementation of the Annex by the Contracting Parties is yet available, though.

HELCOM has set up a special Working Group on Agriculture (a sub-group to the new HELCOM Land) jointly with HELCOM PITF with the task to:

- Monitor progress in the implementation of the Annex in the member countries;
- Report on monitoring of nutrient losses agriculture;
- Differentiation between agriculture and related business.

Concerning the relation to science and the input of scientific knowledge, one can note that the Working Group on Agriculture has a direct link to the agricultural component of the GEF Baltic Sea Regional Project. This connection is likely to ensure good interaction with the best agro-environmental science, as the GEF project is co-ordinated by experts from the Swedish University of Agricultural Sciences.

#### ***9.2.2.5 Other HELCOM Recommendations on agriculture***

RECOMMENDATION 13/7: Reduction of ammonia volatilization from storages;  
RECOMMENDATION 13/8: Reduction of ammonia vol. from field application of manure;  
RECOMMENDATION 13/10: Reduction of phosphorus leaching and erosion;  
RECOMMENDATION 13/11: Reduction of farm waste discharges;  
RECOMMENDATION 14/4: Reduction of ammonia volatilization from animal housing;

### **9.3 Persistent, toxic and bioaccumulative hazardous substances**

#### ***9.3.1 Evaluations and commitments in the Baltic Sea Region***

Persistent, toxic and bioaccumulating hazardous substances have also been in the forefront of HELCOM work since its inception more than 25 years ago. The scientific evidence presented in the late 1960's and early 1970's concerning the serious environmental effects caused by organochlorine substances, such as DDT and PCBs, and heavy metals, particularly mercury and cadmium compounds, was a strong driving force for the negotiations of the 1974 Helsinki Convention. This is clearly illustrated by the inclusion in the Convention of DDT and PCBs as top priority (black-listed) substances, and the later addition of PCTs. However, the scientific facts supporting the urgent need to eliminate these substances from the Baltic Sea environment seem never to have been disputed.

The emphasis on and approach to tackling existing hazardous substances in the marine environment, and preventing future problems from such substances, has changed over the years. The importance and seriousness of the problem has been continuously confirmed through a range of scientific data and information presented in the HELCOM Periodic Assessments. Facts have also been presented in a significant number of independent, national and international studies dealing with the effects of single or groups of hazardous pollutants, as well as from a whole industry sector (like effluents from the pulp and paper industry).

In the First Periodic Assessment of the State of the Baltic Marine Environment (1986) it was stated that more restrictions *'are required on the further release of persistent organic chemicals used by the Baltic countries on a large scale.'*

In the Second Periodic Assessment (1990) the following statements can be found:  
*'Halogenated organic man-made substances of various origin are today found widely distributed in the marine environment thus giving rise to special concern'; '---- among the new contaminants there is an increasing list of identified compounds that could pose a threat to the environment according to their analogies with known pollutants e.g. brominated biphenyls';*  
*'--- in view of the special sensitivity of the Baltic Sea, because of its character of an almost enclosed water body, the Baltic Sea States should make strong efforts to further reduce the input of persistent organic compounds and heavy metals to prevent their accumulation in the ecosystems.'*

In the Third Periodic Assessment (1996), the scientists expressed concern *'regarding the levels of dioxins as well as concerning some new contaminants which might create future environmental problems.'*

The First Assessment of the State of the Coastal Environment (1993) contains this statement:  
*'Many of the halogenated organic compounds used are regarded as toxic. Their artificial background gives them a specific position among the persistent and bioaccumulating pollutants. There are no background concentrations acceptable....'*

Thus, the Baltic Environment Ministers were well justified by scientific facts when they declared their firm determination that *'current and new efforts on reduction of the load of pollutants should aim at a substantive reduction of the substances most harmful to the ecosystems of the Baltic Sea, especially of: heavy metals and toxic or persistent organic substances; ---- for example in the order of 50 per cent of the total discharges of the total of each of them, as soon as possible but not later than 1995.'*

### **9.3.2 HELCOM Objective with Regard to Hazardous Substances**

As a response to the request by the CBSS in 1996, HELCOM in 1998 adopted an *Objective with Regard to Hazardous Substances*. In Recommendation 19/5 the Commission decided that: *'the Objective of the Commission with regard to hazardous substances should be to prevent pollution of the Convention Area by continuously reducing discharges, emissions and losses of hazardous substances, with the ultimate aim of concentrations in the environment near background values for naturally occurring substances and close to zero for man-made synthetic substances.'*

A Strategy for the implementation of the objective was attached to the Recommendation. Accordingly, the guiding principles for the implementation of the Strategy will be the precautionary principle; the polluters pays principle; and best available technology and best environmental practice. The Strategy also includes an Appendix with a long list of potential substances which are candidates for selection, assessment and prioritisation according to the provisions of the Strategy, as well as a list (Appendix 3) of selected substances for immediate priority action. These lists build on the 1991 and 1993 HELCOM decisions on lists of priority substances, other than nutrients, for immediate action in order to reach the 50 per cent reduction goal by 1995.

The need for scientific information as a basis for the implementation of the Strategy is mentioned in Section 3.4 Measures and Actions. There it is stated *'that with regard to hazardous substances identified by the Commission for action, such action generally includes*

*establishing with the help of an appropriate combination of monitoring and modelling, suitable methodologies for assessing risks whether these sources represent either a wide-spread problem or a problem restricted to regional or local environments within the maritime area.'*

However, already in 1997 HELCOM had decided to establish a project, with Sweden as lead country, for the preparation of an Action Programme for the phasing out of discharges, emissions and losses of hazardous substances.

### **9.3.2 Specific measures within the pulp and paper industry**

The pulp and paper industry, particularly its discharges of chlorinated organic substances, has been in focus for the environmental protection efforts within the Baltic Sea co-operation since the adoption of the first Medium-term Plan in 1984. The role of the pulp and paper industry for the pollution of the Baltic Sea can be illustrated by the fact that the total discharges from the Swedish mills alone in the mid-1980's were estimated to be about 13,000 tonnes of AOX (chlorinated organic substances) per year.

Despite the fact that the pulp and paper industries were identified as a high priority sector for HELCOM already in 1984, it took four years before the first Recommendation aiming at controlling the discharges was adopted. However, Recommendation 9/6 did not contain any set limit values for the discharges of chlorinated organic substances, only a general statement on the need to reduce considerably the load of TOCl (Total Organic Chlorinated substances).

Only in 1990 could the Commission agree on Recommendation 11/3 on restriction of discharges from the sulphite pulp industry, and Recommendation 11/4 on the kraft pulp industry. Both Recommendations included limit values for the discharges of AOX (2–3 kg AOX /tonne pulp and 1–2 kg/tonne, respectively).

Many experts regarded the limit values set as relatively high and just corresponding to decisions already made at the national level. For example, in a consultancy report to the HELCOM *ad hoc* High Level Task Force in 1991, the Finnish Company PI Process Consulting Ltd. argued that 1,4 kg AOX/tonne was possible for bleached pulp.

The delay in strengthening the control measures, including setting limit discharge values, may have been caused by a several factors. There can have been difficulties to agree on a common reliable analytical method for AOX, and there were apparently diverging views between Sweden and Finland on priorities and the most effective means of controlling the discharges.

Two expert workshops held during 1990 may have helped pave the way for the agreement leading to the two Recommendations. Another contributing factor may have been the scientific results from the Swedish project 'Environment/Cellulose', on the effects caused the discharges from pulp mill bleacheries. The results were published in 1988 by the Swedish EPA<sup>10</sup> and indicated that large-scale pollution of the Baltic Sea was occurring, caused by effluents from the bleacheries. The results from field studies and laboratory experiments demonstrated effects both on invertebrates and fish and on individual organisms and organs.

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<sup>10</sup> SNV Report 3498

Although the two Recommendations included a provision on re-evaluation before the Commission meeting in 1994, it took an additional two years until the Commission adopted Recommendation 17/8 and Recommendation 17/9, which Contracting Parties are presently expected to implement. The negotiations of stricter standards and revised Recommendations may, in addition, have been facilitated and pushed forward by new facts presented about the effects of the chlorinated organic substances from the pulp and paper industries<sup>11</sup>.

**RECOMMENDATION 17/8:** Reduction of discharges from the kraft pulp industry.

The major provisions of the Recommendation are that limit values for AOX and that molecular chlorine should not to be used after 1997 (the year 2000 for countries in transition). The limit values set for AOX implies a significant strengthening of the standards compared to Recommendation 11/4 (from 1 kg/tonne to 0,4 kg/tonne, or 0,2 kg/tonne for new mills).

**Level of implementation\* of Recommendation 17/8 by Contracting Parties as reported to HELCOM in 2000<sup>12</sup>**

<i>DK</i>	<i>EST</i>	<i>FIN</i>	<i>DE</i>	<i>LV</i>	<i>LT</i>	<i>PL</i>	<i>RU</i>	<i>SE</i>
–	Partly	Partly	–	–	–	Partly	Partly	Partly

\* In 1998 about one fourth of the plants in the Baltic Sea Region met the future recommended emission limit values set out in the Recommendation. The figure relates only to the plants where it was possible to allocate the emissions to the actual pulp production.

**RECOMMENDATION 17/9:** Reduction of discharges from the sulphite pulp industry.

The major provisions of the Recommendation are Limit values for AOX and that molecular chlorine should not to be used after 1997 (the year 2000 for countries in transition). Also in this Recommendation, the limit values set for AOX implies a significant strengthening of the standards compared to Recommendation 11/3 (from 2-3 kg/tonne to 0,5 kg/tonne, or and 0,1 kg/tonne for new mills).

**Level of implementation\* of Recommendation 17/9 by Contracting Parties as reported to HELCOM in 2000<sup>13</sup>**

<i>DK</i>	<i>EST</i>	<i>FIN</i>	<i>DE</i>	<i>LV</i>	<i>LT</i>	<i>PL</i>	<i>RU</i>	<i>SE</i>
–	–	–	–	–	–	–	Not impl.	Partly

\* There are 12 sulphite pulp plants in the Baltic Sea Region, 6 in Sweden and 6 in the Russian Federation. In 1998, none of the existing Russian mills met all the emission limit values recommended for the year 2005. In the year 1998, only one of the Swedish mills met all the emission limit values recommended for the year 2000.

<sup>11</sup> For instance in the report *Bleached pulp mill effluents fate and effects in the Baltic Sea*, published in 1993 by the Swedish EPA (SNV Report 4047), and the discussions at a seminar on the pulp and paper industry held in Sweden in 1994.

<sup>12</sup> Doc. HELCOM 21/2000 5b/2

<sup>13</sup> Doc. HELCOM 21/2000 5b/2

## **10. Implementation of HELCOM Recommendations at the national level**

To date, more than 170 HELCOM Recommendations have been adopted. They are not formally legally binding for the Contracting Parties. On the other hand, a unanimous decision by all Contracting Parties, including an obligation to report back on national implementation, implies a strong political commitment to fulfil the obligations and commitments set out in Recommendations and Ministerial declarations. Thus, Contracting Parties are expected to implement the substantive contents of the Recommendations through national measures like legislation, discharge standards, etc.

Reporting on national implementation of Decisions or Recommendations is an essential tool for the monitoring of any international agreement in terms of the fulfilment of its objectives. Reporting requirements concerning the implementation of the HELCOM Recommendations were introduced within the system already in the mid- to late 1980's. However, in order to streamline the system, the Commission in 1989 decided to harmonize the reporting by the Contracting Parties on the implementation of the Recommendations. Today, in principle all HELCOM Recommendations include provisions for mandatory and regular reporting, according to specified timetables, to the Commission.

The level and pace of implementation have been debated within HELCOM since the reporting requirements were introduced. A report reviewing HELCOM activities was submitted to the HELCOM Heads of Delegation in 1998. The Executive Secretary noted that the adoption of HELCOM Recommendations require unanimity, which inevitably involves a measure of compromise and delay. He further noted that out of the 150 Recommendations that had been adopted at that time, only about half had been fully implemented by all Contracting Parties. Summary reports on the national implementation of HELCOM Recommendations falling within the mandate of HELCOM TC and EC were most recently presented to the Commission in 2000.

One example related to monitoring and assessment is Recommendation 19/3, which contains a COMBINE manual, i.e., instructions on how to apply and implement the COMBINE programme. The Recommendation was adopted in 1998 and supposed to be implemented as of the same year. In 2000, Estonia, Lithuania, Poland and the Russian Federation reported that they had not implemented the Recommendation, but a closer review reveals that those countries reporting full implementation are still not in full compliance either. For instance, no information on biological data is reported from Finland. All countries also seem to have great difficulties to comply with the timetable set for reporting. According to the Recommendation, annual monitoring data, as committed by the Contracting Parties in the Manual, should be made available to the Commission on specific dates the following year. Hydrographic and hydrochemical data should be submitted by 1 May, and biological data and data on harmful substances by 1 September. National data reports and other relevant additional information concerning monitoring and quality assurance should be submitted annually together with the data submission. There have also been some problems with the reporting formats to be used for submitting data to ICES, being the Thematic Centre for HELCOM Combine.

## **11. A 'new' and more effective HELCOM**

On several occasions, HELCOM has reviewed its activities and working structures with the purpose of making its work more effective. This is part of the general development process that all international organizations are undergoing.

One such effort was initiated in 1994 when an *ad hoc* review group was set up. In this review and subsequent decision by the Commission in 1995, the co-operative monitoring in the Baltic marine environment (including open sea and coastal waters), as well as the production of periodic assessments and pollution load compilations, were ranked among the issues having the highest priority.

In 1998, the Baltic Environment Ministers and the EU Commissioner had to accept that the 50 per cent reduction goal had not been achieved. The conclusion that further efforts were needed to make HELCOM more effective, and that yet another review process was needed, could be seen as a reaction to this. A revised strategy and timetable was called for. Thus, the Commission reaffirmed the commitment of the Contracting Parties to the strategic goals set up in the 1988 Ministerial Declaration, and decided to further the progress by defining more specific targets, aimed at more cost effective solutions, to be implemented not later than 2005 and reviewed provisionally in 2003.

The Commission also obligated (which, incidentally, is a more or less new word in the HELCOM vocabulary) the Contracting Parties to intensify the national enforcement and national implementation of HELCOM Recommendations. These obligations would include point sources (with emphasis on municipalities and industries) and diffuse sources (with emphasis on agriculture and transport). It was also decided that priority attention in the activities within the Commission should be given to:

- Strengthening of actions within the framework of the Helsinki Convention with regard to additional pollution reduction measures in the areas of priority concern for the Baltic Sea, *inter alia*, by updating of the existing HELCOM recommendations;
- Intensification of co-operative measures to reduce and phase-out discharges, emissions and losses of hazardous substances liable to reach the marine environment, including persistent organic compounds and toxic anti-fouling agents and applying the substitution principle;
- Further facilitation of the effective execution of the Baltic Sea Joint Comprehensive Environmental Action programme, JCP, and the effective involvement of all HELCOM Committees in the implementation process; and
- Development of an effective follow-up system on environmental performance to comply with the Helsinki Convention, with imperative emphasis on the acquisition of correct quality assured data necessary for evaluation of the environmental status of the Baltic Sea and quantification of the anthropogenic load.

### **11.1 Further efforts by HELCOM to reorganize and strengthen its work**

The 1998 review process resulted in a fundamental restructuring of the HELCOM system, with new theme-covering Working Groups replacing the old Committees.

- The *Monitoring and Assessment Group, HELCOM MONAS*, identifies and quantifies the state and changes in the environment; the anthropogenic discharges/activities and their effects on the marine environment; the changes in the environment as a result of regulatory actions. The group is to define, co-ordinate and keep under review the monitoring programmes for coastal waters and the open sea, as well as monitoring of waterborne and airborne discharges, emissions and loads, and radioactive substances. It should also compile periodically discharges and emission inventories; prepare for publication assessments of pollution load and the quality status of the marine

environment. HELCOM MONAS is to give priority to eutrophication and hazardous substances. At present, the group co-ordinates the further development of the joint COMBINE monitoring programme; the work on the Fourth Periodic Assessment, and the Fourth Pollution Load Compilation.

- The *Strategy Group, HELCOM STRATEGY*, works to elaborate a coherent HELCOM policy and strategies for the protection of the Baltic Sea based on the concept of sustainable development. Further, it monitors and assesses the implementation by the Contracting Parties of the Helsinki Convention and HELCOM Recommendations (see 11.1.1).
- The *Land-based Pollution Group, HELCOM LAND*, identifies current and emerging issues related to point and diffuse sources of land-based pollution, proposes actions and promotes investment activities in order to reduce emissions and discharges;
- The *Sea-based Pollution Group, HELCOM SEA*, identifies current and emerging issues related to sea-based sources of pollution and proposes actions to limit emissions and discharges. Furthermore, the Group works to ensure a swift national and transnational response to marine pollution incidents.
- The *Nature Conservation and Coastal Zone Management Group, HELCOM HABITAT*, works on conservation of natural habitats and biological diversity and protection of ecological processes. The Group promotes ecosystem approaches for the sustainable use and management of coastal and marine natural resources. It fosters the development of Coastal Zone Management Plans as instruments of resource management for environmentally sustainable development in coastal and marine areas; and
- The *Programme Implementation Task Force, HELCOM PITF*, co-ordinates the implementation of the Baltic Sea Joint Comprehensive Environmental Action Programme (JCP) approved in 1992 and updated in 1998. It focuses on investment activities for point- and non-point pollution sources and on planning and investment activities related to management programmes for coastal lagoons and wetlands.

#### 11.1.1 HELCOM Strategy

At its first meeting in February 2000, HELCOM Strategy recognized the need to:

- *develop a strategy oriented to improve the elaboration and effectiveness of HELCOM Recommendations;*
- *elaborate proposals for strengthening the supervision of the implementation of HELCOM Recommendations;*
- *develop the mechanism to make relations between Recommendations and monitoring programmes as well as between the monitoring programmes themselves more direct applicable and effective.'*

In order to move things forward, the Group requested the Secretariat to elaborate background documents that should comprise and address the following issues:

- How do the Recommendations come into force by the Contracting Parties, what are the differences, and what measures are needed to overcome obstacles;
- How are the Recommendations implemented, what are the weaknesses, how could the situation be improved;

- How do the Contracting Parties report on implementation, what should be improved and by which measure;
- How do the Recommendations reflect the state of and trends in the environment, i.e., how are they linked to the results of monitoring programmes like PLCs, Periodic Assessments, Hot Spot emission inventories, etc.; and what are the interactions between the priorities of the Commission and the monitoring programmes.

In a report to the second meeting of HELCOM Strategy, in October 2000, the Secretariat presented its views on these matters:

***Monitoring, periodic assessments and pollution load compilations***

The Secretariat noted that the periodic assessments are basically scientific documents covering most topics related to the marine and coastal environment. This information is used as the basis for identifying where there is a need to elaborate HELCOM Recommendations. Concerning the usefulness of the pollution load compilations, the load data have been used to prioritise among different pollutants and pollution sources and have been taken into account in the elaboration of HELCOM Recommendations.

The Secretariat summarized that already today the results of the existing monitoring and assessments, and that the monitoring programmes, to a great extent cover the priority areas established within HELCOM in 1999, and are used to identify the needs for the elaboration of HELCOM Recommendations.

***Reporting on national implementation and compliance, particularly concerning monitoring and assessment***

The Secretariat concluded, based on the preliminary report on the implementation of Recommendations, that implementation is generally poor. For example, a preliminary report presented to EC in 1999 demonstrated that less than 40 per cent of all the Recommendations in the environmental field had been implemented by all Contracting Parties.

For better performance regarding environmental monitoring and assessment, the Secretariat proposed improved co-ordination and harmonization of work. Each Contracting Party cannot and does not necessarily have to perform all kinds of environmental monitoring. There are already several good examples of distribution of work within HELCOM, and this approach could be further developed particularly concerning data storage, handling and assessment.

The Secretariat also suggested that each country should designate one national data co-ordinating centre responsible for co-ordinating a network of data producers at the national level. These centres should also be responsible for the quality assurance and submission of data to the respective international agencies and data banks.

***National means of implementing HELCOM Recommendations***

A questionnaire on this issue has been sent out by the Secretariat, and an overview will be available following the third meeting of HELCOM Strategy, in February 2001. However, the Secretariat summarized the present situation by stating that assessments of implementation reports regarding land-based and sea-based sources of pollution, as well as within the environmental field, show that the Contracting Parties do not properly assure compliance with HELCOM Recommendations by those subject to their jurisdiction and control. The Secretariat suggests the introduction of a performance review system that could, for instance, alternate with the existing national reporting system.

National mechanisms (laws, regulations, economic incentives, etc.) for the implementation of HELCOM Recommendations at the national level. \*

	<i>Nutrients</i>		<i>Hazardous substances</i>
	<i>Sewage</i>	<i>Agriculture</i>	
Denmark			
Estonia			
Finland			
Germany	Federal Water Act/Waste Water Ordinance and Annexes/Waste Water Charges Act;  Federal State legislation in MV and SH	Federal Water Act/Waste Water Ordinance and Annexes/Waste Water Charges Act;  Federal State legislation in MV and SH	Federal Water Act/Waste Water Ordinance and Annexes/Waste Water Charges Act;  Federal State legislation in MV and SH
Latvia			
Lithuania			
Poland			
Russian Federation			
Sweden			

\* To be complemented with information from documents presented at the third meeting of the Strategy Group.

## 12. The European Union and its Role in Regional Marine Conventions

The relations between the regional marine conventions (HELCOM, OSPAR and the Barcelona Convention) and the European Union (the European Commission and the European Environment Agency, EEA) has changed fundamentally during the last 15 years, not least in the Baltic region.

Today, the European Commission is a Contracting Party to the Helsinki, OSPAR and Barcelona Conventions. The EU, via its TACIS and Phare Programmes, is also a major actor in supporting the implementation of the Black Sea Environment Programme, including the Bucharest Convention.

In the OSPAR Convention all countries except Norway and Iceland are EU members and in the Mediterranean all the countries along the Northern shores are EU-members while Malta, Cyprus and Turkey are candidate countries to become EU members.

In the Baltic Region (the HELCOM region) Denmark, Finland, Germany and Sweden are EU members, Estonia, Latvia, Lithuania and Poland candidate countries and likely to become full members within the next 3-5 years, while the future role of the Russian Federation in relation to the EU can be characterized as uncertain/unknown.

The changing role of the EU has been particularly noteworthy in the Baltic region since the mid- late 1980s, e.g., within the work of HELCOM. During the Soviet period the EU was not accepted to have any role to play within HELCOM, as the Soviet Union and its allies did not accept that a supranational organisation such as the EU could take over the legal responsibilities and competence of sovereign states. Thus, for many years the European Commission had to act through its member states (at that time Denmark and Germany) to make its voice heard in HELCOM. (A similar situation existed for a long time within the ECE LRTAP Convention).

However, the situation changed when the European Commission was first accepted as a signatory to the 1974 Helsinki Convention and in 1992 was able to sign, and subsequently became a Contracting Party to the new 1992 Convention.

During the 1990s the EU sphere in the Baltic region expanded significantly when Finland and Sweden became members in 1995 and the three Baltic States and Poland applied for EU membership. Thus, the whole of the Baltic region with the exception of the Russia (i.e. the St. Petersburg and Kaliningrad regions) will become almost an “internal” EU sea area in the not too distant future.

This development has gradually made the EU much more important and influential concerning policy/decision-making within HELCOM as well as regarding monitoring/assessment activities.

The strong political role nowadays played by the EU (represented by the European Commission) in the HELCOM co-operation can be illustrated, among others, by the fact that the EU representative chaired the working group that “constructed” the new organisation/working structure of HELCOM adopted in 1999. In addition, the working group built its conclusions and proposals on advice given by consultants from the European Institute of Public Administration, a Dutch consultancy company, that on previous occasions had worked for the European Commission..

The influence of the EU at the policy/decision-making level is also reflected by the fact that in principle no HELCOM Recommendation is adopted today without having been reviewed in a EU perspective to ensure that it is harmonized, as far as possible, with corresponding EU Directives. From a MARE perspective the EU Nitrate, Urban Wastewater and perhaps most importantly the recently adopted Water Framework Directive would seem to be of special relevance. As an example of the discussions about, and the importance attached to, the relationship between the work of HELCOM and that of the EU could be mentioned that at the recent meeting of the HELCOM Strategy Group in February 2001 it was suggested that the Baltic and its drainage area should be seen as one drainage area for the purpose of the Water Framework Directive and that a policy paper on the specific needs of the area should be developed.

Another important factor in this process is of course that the candidate countries today are putting much higher priority on fully integrating their environmental legislation with that of the EU and to the implementation of the EU Environmental legislation than on the implementation of non-binding HELCOM Recommendations.

The importance of the EU legislation in relation to the HELCOM Recommendations has also been recognized several times. In doc. HELCOM TC 8/97 Comparison of EU Directives and HELCOM Recommendation it is noted: “that the need to harmonize the HELCOM Recommendation with the EU Environmental legislation is one of the most important goals for the HELCOM Contracting Parties.” In 1998, a consultancy report: Comparison of selected HELCOM Recommendations issued by the Technological Committee with EU Directives and OSPAR Decisions and Recommendations, produced by the Environmental Consultancy Company – Milieu – was presented to the HELCOM Technological Committee. The EU has also recently financed a project on: The Follow-up of Implementation of the Strategic Goals of the 1988 Ministerial Declaration.

## **12.1 Environmental Assessments and Reporting at the European level – the European Environment Agency (EEA)**

While HELCOM's activities encompasses monitoring programmes as well as regular assessments of the state of the Baltic Sea environment, the activities of the EEA focuses mainly on assessments.

The major EEA products are:

- Indicator-based reports;
- Integrated assessment reports; and
- Thematic maps.

The next major pan-European assessment reports to be produced are: Europe's Environment, the 3<sup>rd</sup> Assessment, to be published in 2002 for the Kiev Environment Ministers Conference and the European State and Outlook Report, 2004 (an update of the report Environment in the European Union at the Turn of the Century).

The EEA reports cover all types of environments including the marine environment. Their geographical coverage is the whole of the EU, nowadays extended to a pan-European coverage within the enlargement process (one recent exception relevant to the marine environment being the report on State and Pressures of the Marine and Coastal Mediterranean Environment, produced jointly by EEA and the Mediterranean Action Programme, MAP.)

As a consequence, the EEA reports cannot be as detailed as those published by the regional marine conventions. The need to condense a large amount of information and data from several regions and to present them in a consistent way has also prompted the development of indicator-based reporting. The development of indicators are generally still in their early stage of development within the marine conventions.

It is also worth noting that the organizational structure for developing the HELCOM as well as OSPAR assessments (Periodic Assessments and QSRs respectively) comprise a very comprehensive process involving a large number of scientists from all Contracting Parties. In the case of the recently published Fourth Periodic Assessment of the State of the Baltic Marine Environment this consensus-building process included more than 150 scientists from all countries throughout the region. As a contrast the chapter on coastal and marine zones in the EU Assessment Reports, such as the report: Environment in the European Union at the turn of the century (1999) seems to have been elaborated by a team of two authors and less than ten other contributors (with only one from the Baltic region).

At the same time it should be recognized that EEA as well as the marine conventions in their assessment work to a very large extent are depending on access to high quality data from members countries and Contracting Parties. These data are collected either through national monitoring programmes or as national components of internationally agreed and co-ordinated monitoring programmes, such as the HELCOM COMBINE or the OSPAR JAMP programmes. Thus, the EEA and the marine conventions are more or less using the same data sets for their respective assessment and reporting. This clearly points at the need for harmonization of monitoring programmes, data collection and assessments procedures between the EU and the marine conventions.

It has been repeatedly emphasized that the current situation concerning the submission of data required for assessments from countries to international organizations inside and outside the EU, as well as the management of the data are at present very complex and unsatisfactory for all parties involved. A common strategy for data handling and management is missing. There seems to be a general agreement that, in principle, a data provider should not have to submit the requested data to more than one data centre.

EEA is trying to achieve this essential harmonisation through its Topical Centre on Marine and Coastal Environment (ETC–MC). As part of its work programme the ETC has established the Marine Inter-regional Forum (IRF) with the objective to facilitate the exchange and integration of existing data and information among regional and international conventions and organisations active in marine and coastal environmental monitoring within the EEA maritime area. According to plans, the IRF will develop the overall European framework for marine assessments, which would then be followed-up by the respective group in charge of the monitoring assessment activities of the respective regional marine convention. One working group under the auspices of IRF is presently developing the much needed strategy on data handling as discussed above.

Another common feature within the EEA as well as the regional marine conventions is a trend to move away from, or at least complementing, the heavy assessments reports produced every fifth years with more timely information/assessments products focusing on the needs and demands of the policy/decision-makers as well as the general public.

One of the major tasks of the EEA is to produce timely, targeted, relevant and reliable information. In the practical work this means that the data used should not be older than 2 years.

The process towards a new assessment procedure within HELCOM is further elaborated upon in section 13.1.1 The influence of the trends within the EU/EEA system and a strong wish by the HELCOM Contracting Parties to streamline/co-ordinate the reporting to different international fora are strong forces in this process. If HELCOM products are generated annually or biannually and as well on specific themes as is presently being discussed a harmonization with the work of EEA would seem to be feasible.

The EEA indicator-based reports give time trend information. They are updated annually. Of special interest to MARE is that eutrophication is one of the five priority themes to be covered by these reports. The reports also follow the now commonly established driving force-pressure-state-impact-response framework.

### **13. Discussion and conclusions**

In principle, decisions taken within any marine convention should be based on the best available scientific and technical advice. Thus, provisions for mandatory scientific-technical co-operation was included from the outset in the main text of these conventions. Scientific-technical co-operation with the objective to generate a common scientific and technical basis should also be regarded as an integral part of the decision-making process within the marine conventions.

The requirement to base priorities and decisions on scientific evaluations and assessments can be exemplified by the 1998 Strategy of the former HELCOM Technological Committee. In

the strategy it was stated that the ranking of priorities '*shall be based on the assessments of the state of the Baltic Sea Area and the pollution load evaluations as well as on the recent knowledge about harmful and hazardous substances of serious environmental concern, their sources and pathways to the marine...*'

In order to comply with the commitments made in the marine conventions, scientific-technical co-operation has been a significant and integral part of their work programmes since their inception in the early to mid-1970's. The major services and products from this co-operation has been:

- internationally agreed and co-ordinated monitoring programmes;
- periodic assessments of the state of the environment of the convention areas (e.g., the HELCOM Periodic Assessments, and the OSPAR Quality Status Reports), using the data collected within the monitoring programmes, as well as other internationally accepted data sets (e.g., from national projects, monitoring programmes, etc);
- compilations of the load of pollutants to the convention areas from land-based and sea-based sources, as well as from the atmosphere.

As has been pointed out, there are also other forms of scientific-technical co-operation of a more *ad hoc* character that have served as important stepping stones in a consensus-building process. Such activities can be seminars and workshops; bilateral or multilateral research projects; and exchange of experts between institutions. The issue of a need for nitrogen removal in sewage treatment plants, and the development of control measures within the pulp and paper industries, are examples where the decision-making process in the Baltic Sea region has been facilitated by 'external' activities of this kind.

However, these exercises require significant resources, most of which are not openly calculated or presented. For example, the production of the HELCOM Third Periodic Assessment involved hundreds of experts from a multitude of disciplines. It should also be recalled that particularly within the monitoring programmes substantial resources are spent on what could be called 'back-up activities', such as intercalibration of methods, quality assurance of data, etc.

Thus, a highly relevant question to be pondered upon at the political level is whether these resources are used in the most effective way to generate the information needed for the decision-making on control measures to improve the environmental conditions in the convention area. Scientists could also well ask whether the scientific information presented to the political level is finally used in the decision-making. What weight is attached to the scientific facts and arguments concerning the marine environment, compared to socio-economic and other considerations about costs for taking measures, effects on employment, etc.

When reviewing only the texts of the Ministerial Declarations and most of the HELCOM Recommendations adopted during the 1980's and 1990's, it seems inevitable to arrive at the conclusion that scientific information and arguments have played merely a minor role in the final stages in the negotiation of these documents. It has also been confirmed in several of the interviews conducted within the present project that this was indeed the case regarding the non-binding political Declarations, including the very important 1988 Declaration setting the 50 per cent reduction target. The almost total lack of scientific assessments (during the negotiating process or after the adoption) of the expected results of the Declarations and decisions tends to corroborate this.

On the other hand, it has repeatedly been stated in these interviews that it has been very important for the negotiators at the political level, and the Environment Ministers at their meetings, to be able to refer to HELCOM's consensus statements about the state of the environment and pollution load. These statements afford them a stronger position, particularly when they return home and have to negotiate the need for action within, e.g., agriculture or transport, with their sectorial colleagues.

In addition, it has been emphasized that the HELCOM Periodic Assessments have been important in the sense that they have provided a summary of the present state of knowledge, even though they have been published with considerable delay in relation to the time period covered by the assessment. The Periodic Assessments are also important because they present a picture of the situation for the whole marine region. Otherwise the overall picture would most likely have been made up of national State-of-the-Environment Reports that would most probably not have been harmonized with regard to e.g. parameters, methodologies, presentation and timing.

Bearing in mind the large number of scientists from each country involved in the monitoring and assessment activities within the HELCOM system there should, in principle, not be any major problem for them to communicate their views to the administrative – decision-making – political levels. This could be done either through formal co-ordinating and consultative bodies set up specifically for these purposes, or in more informal although regular contacts. One could also hope that individual scientists would feel a responsibility to inform ('sound the alarm bell') the decision-making level if new facts are emerging in the research projects; facts that may have a direct bearing on the overall picture and could lead to changes in priorities in the environmental work.

Ongoing communication may also have been facilitated by the fact that scientists have not been forced to 're-educate' the decision-makers. There does not seem to have been any major disagreement over the years in the general perception of what the major pollution problems facing the marine (especially Baltic Sea) environment are. Toxic, persistent and bioaccumulating substances, metals and nutrients/eutrophication have been in focus more or less since the start of the international co-operation; the only major change being that eutrophication has gradually been given a higher priority.

One should recall that individual scientists or small groups of scientists have actually conducted much of the work leading to the identification of different substances hazardous to the marine environment. That knowledge has not emerged as a result of the international monitoring and assessment programmes. Thus, it is highly understandable that concern has been expressed by the scientific community over the apparent decrease of resources devoted to research that could result in the early identification of potential 'new' contaminants that could pose new threats to the marine ecosystems.

Thus, one might tend to conclude that the slow progress in the development, adoption and implementation of certain HELCOM Recommendations is not due to lack of scientific information or backing from the scientific community. Instead, lack of agreement on technical matters and, perhaps most importantly, economic considerations, are the most likely major bottlenecks in the process towards the adoption of sufficiently stringent standards and other environmental management measures to reverse the negative environmental trends prevailing in the Baltic Sea marine environment.

Another contributing factor to the slow progress has been the requirement that all Recommendations must be adopted by consensus. This inevitably demands negotiations to seek a compromise that, in turn, may cause delays, particularly when Recommendations have had to be sent back from the Commission (the decision-making level) to the technical level for revision.

Yet another factor playing a role in this context is the problems repeatedly encountered in the attempts made to make reliable compilations of the load of various types of pollutants to the Baltic Sea and to differentiate between the various sources. On several occasions, the Commission and its subsidiary groups have been forced to conclude that available information is incomplete or too scarce. As a consequence, it had been impossible to draw any meaningful conclusions as to whether the policies/goals/targets and measures agreed have been effective.

### **13.1 Changes in the scientific-technical co-operation during the 1990s**

#### ***13.1.1 Efforts to improve the monitoring and assessment system during the 1990's***

A serious drawback of the three first Periodic Assessments was their lack of information on the state of the coastal waters. In addition, countries did not, as requested, submit information about their national coastal monitoring programmes.

The first step to improve this situation was the successful First Assessment of the State of the Coastal waters of the Baltic Sea. It took longer than first expected to complete the assessment, but already in 1994 it was followed by the next step in the form of the Decision to elaborate an integrated monitoring programme for coastal areas harmonized with the existing programme for the open sea. The next logical step was taken when it was accepted that an integrated monitoring systems had to be created to include both open sea and coastal areas (otherwise there would not be a well-functioning overall monitoring system).

Yet another important leap towards streamlining the monitoring and assessment system of HELCOM was taken when placing the monitoring programme COMBINE and the pollution load compilations under the same umbrella (HELCOM MONAS). If successful, this new structure will help avoid further problems of lacking co-ordination between those responsible for Periodic Assessments and those in charge of the production of the PLCs, and thereby enhance a truly integrated assessment process.

This process was initiated at the expert level by the EC MON and TC Input groups in 1999 to start harmonizing and co-ordinating the reporting procedures and requirements concerning monitoring and assessment activities. It is still going on, although two separate sub-groups covering the COMBINE and PLCs, respectively, have been established but still kept under the overall MONAS umbrella.

Again, if successful these structural changes will eventually create a much needed, smooth system to generate reliable and up-to-date information on the pollution load. If it works out, it will allow for much more up-to-date assessments of the state of the Baltic Sea marine environment to be produced.

Presently a discussion is also ongoing on broadening the scope of the HELCOM monitoring and assessment activities to include monitoring of the implementation within key policy areas such as the JCP and of a wide range of HELCOM recommendations. This would necessitate better integration between the work of MONAs and the other subsidiary bodies such as HELCOM Land and PITF. This discussion is going on within the HELCOM Strategy Group and is further discussed below in section 13.1.3.

### **13.1.2 *Baltic imbalances ?***

Science, including marine sciences, and the option to keep a high profile in international scientific co-operation, was an issue of very high political prestige for the former Soviet Union. In order to maintain this image, the Soviet Union had a significant resource base, both regarding access to research vessels (including several ocean-going ones) and marine scientists. This allowed the Soviet Union to play an important role in many of the major international marine research projects, like BALTEX and SKAGEX, in the Baltic Sea–Kattegat–Skagerrak region during the 1970's and 1980's.

Obviously, the situation for science changed radically after the collapse of the Soviet system. The former republics, now independent states of Estonia, Latvia and Lithuania have had to rebuild their scientific structures. Moreover, the financial difficulties have in many cases forced them to drastically cut back on resources for research. This holds true for both research of direct relevance to the Baltic Sea marine environment and for environmental research in general.

In today's Russian Federation there seems to be a general lack of co-ordination and great deal of uncertainty concerning responsibility for monitoring and collection of data to be delivered to the HELCOM databases. This could be illustrated by the fact that the Russian Federation has not managed to deliver any data or information on contaminants, biology and any national data report, i.e., three of the four categories requested<sup>14</sup>.

In the interviews conducted for the present study it has repeatedly been pointed out that this situation threatens to cause a serious imbalance in scientific resources available between the countries in the Baltic Sea Region. Economic constraints may limit the possibilities for primarily Estonia, Latvia, Lithuania and the Russian Federation to participate in the joint monitoring and assessments work. It could also, through lack of research vessels, lack of advanced analytical equipment and lack of qualified laboratory personnel, prevent them from fully participating in the field work, i.e., data collection.

These emerging problems may, however, be partly mitigated within the framework of the GEF Baltic Sea Regional Project. One component of that project is aimed at strengthening the capacity of the environmental laboratories and research institutions in Estonia, Latvia, Lithuania and the Russian Federation.

The importance of building a joint, pan-Baltic scientific knowledge base as a ground-work for recommending action to decision-makers has already been highlighted. However, experience from a number of international fora, *inter alia*, the LRTAP Convention, shows that such a consensus-building mechanism requires participation from all parties, at best on an equal footing, if it is to be effective as part of the decision-making process.

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<sup>14</sup> According to the Report on implementation of HELCOM Recommendations connected with the Baltic Sea Environment (HELCOM 21/2000 5b/3).

The usefulness of final results may be jeopardized by serious imbalances (and gaps that may even be growing), or lack of participation by some parties due to lack of resources. Those not able to participate may feel marginalized, as their views and proposals will not be considered in the process. Thus, they might not feel any true ownership of the products or proposals emerging. As a consequence, they might be unwilling or unprepared to advocate the implementation of these solutions and measures. This may, in turn, result in a situation where decision-makers in some countries are deprived of the best up-to-date information from their own scientists because the scientists cannot participate in relevant research programmes or meetings.

These facts should be taken seriously into account. They must be considered not only in HELCOM-related activities but also in all projects and programmes which have an international perspective and where the proposed action to be effective need be implemented by several countries concerned. The decision-support system to be developed by the MARE research programme is a relevant example. The full support and participation of the scientists from all key countries will be essential for the final success of the programme and its main 'product', the system for support to decision-makers around the Baltic Sea.

### *13.1.3 Emerging issues*

The process towards a new assessment procedure within HELCOM was elaborated upon in section 13.1.1. The influence of the trends within the EU/EEA system and a strong wish by the HELCOM Contracting Parties to streamline/co-ordinate the reporting to different international fora are strong forces in this process. If HELCOM assessment products are generated annually or biannually as well as on specific themes as is presently being discussed it would seem possible to achieve a harmonization with the work of EEA.

The broadening of HELCOMs assessment activities to include, in addition to traditional monitoring and assessing the state of the marine environment, also monitoring of other issues such as the implementation and enforcement of commitments made in recommendations and declarations was further discussed at the third meeting of HELCOM Strategy in February 2001. The Group found that such monitoring and assessment requires complementary competence and expertise compared to the current HELCOM MONAS structure and organisation.

Thus, the Group emphasized the importance of the (vertical) link between the policy/decision-making levels within the HELCOM system (the Commission and the Heads of Delegation) and MONAS as well as the importance of the horizontal linkages between MONAS and the other subsidiary groups such as HELCOM LAND, SEA and PITF. The overall objective would be for MONAS to assist the other groups in monitoring and assessing the implementation of key policy decisions such as the JCP, the 50 per cent reduction goal as well as a range of HELCOM Recommendations.

The development and broadening of the HELCOM monitoring and assessment activities and products towards a more integrated and comprehensive system would of course be very important and welcome from a MARE perspective. Such a system is likely to facilitate access not only to the environmental data (discharges, emissions, concentrations, biological effects), but also to the socio-economic data that will be essential for the successful development and implementation of the MARE decision-support system.

Another important process will be the review of the implementation of 1988 Ministerial Declaration (the 50 per cent reduction target) scheduled for HELCOM 2003, to be held at ministerial level. However, it is already quite clear, not least from the conclusions in the Fourth Periodic Assessment, that the review will show that the 50 per cent reduction target for nutrients has not been reached and is not likely to be reached by 2005 (the final target year adopted at the Ministerial meeting in 1998.)

Thus, it is likely that HELCOM will have to embark upon a new process to once more develop a joint strategy on how to come to grips with the serious eutrophication problems still manifesting themselves over large coastal as well as open sea areas of the Baltic Sea Area. If properly tested and having been widely accepted by this time, the decision-support system being developed by MARE could possibly be used as a common tool in the development and testing of future cost-effective scenarios and strategies to be agreed to reduce the nutrient load from different sectors.

MARE would then also be able to contribute to the forward-looking aspects in the planned monitoring and assessment activities in the new HELCOM system. This forward-looking perspective seems still to be lacking in the ongoing revision of the HELCOM monitoring and assessment system.

**Summary of major decisions/actions on science, monitoring and assessment to be taken within HELCOM in the near future (1-2 years) of particular relevance to MARE**

- National and international follow-up of the conclusions in the 4<sup>th</sup> Periodic Assessment of the State of the Marine Environment of the Baltic Sea Area published in March 2001. In the assessment it is noted that total riverine inputs of nitrogen to the Baltic marine area have not decreased and that diffuse sources constitute the main sources of nitrogen. Municipal wastewater treatment, agriculture, transport including, shipping, are identified as sectors where additional measures should be taken in the next few years. HELCOM 2001 emphasized that the Commission as well as the individual member states need to analyze the conclusions of the assessment and the measures needed to solve the problems identified, among those nutrients. The HELCOM Working Groups were instructed to report on proposed action to be taken by June 2001 and further discussions about the follow-up will start at the meeting of Heads of Delegation in August 2001;
- Follow-up of the publication of the next Pollution Load Compilation;
- Integration of the monitoring and assessment activities between the various subsidiary bodies within the HELCOM system (MONAS; LAND, SEA, NATURE, and PITF) to provide a more comprehensive picture of the implementation of HELCOM policies, the performance of Contracting Parties etc.;
- Decision to start making more timely (annual or biannual) assessment reports, including thematic reports or reports covering specific sub-regions.
- Development of indicators on eutrophication as part of the process towards indicator-based assessment and reporting;
- Interim review of the status of implementation of the 1988 Ministerial Declaration on a 50 per cent reduction of the pollution load. Scheduled for the 2003 Ministerial meeting. Possibly development of a revised Baltic-wide strategy to further reduce nutrient inputs.
- Implementation of the EU Water Framework Directive. HELCOM 2001 stressed that EU candidate countries should be supported in implementing the Directive, particularly in coastal areas with regard to water quality and monitoring;
- Further integration and harmonization between the data collection, monitoring and assessment processes within the regional marine conventions (HELCOM, OSPAR, Barcelona Convention) and the marine components of the European wide assessments carried out within the framework of EEA.