



Dalhousie University

International Ocean
Institute



Water Management and Technology Cooperation, Development and Transfer

Working Paper Prepared by the International Ocean Institute

1. Recent emphasis on “integrated coastal management” as an important aspect of the implementation of Agenda 21 has changed our concept of water management. A hard and fast separation between fresh water and sea water management clearly is impossible in the coastal zone. The necessary changes have already been made in the programme structure of UNEP, the World Bank, UNDP and GEF which will facilitate the establishment of regional, national and local institutional frameworks capable of integrated water management.
2. The Law of the Sea Convention as well as each one of the post-UNCED Conventions, Agreements and Programmes recognize the fundamental importance of technology cooperation and technology sharing if poor countries are to fulfil their responsibilities and enjoy their rights under these new instruments. This recognition is progressive, gaining strength. The provisions in the new Conventions impose greater obligations on the industrialized States than the Law of the Sea Convention..
3. The weakness of the system lies in the fact that *each one* of the Conventions, Agreements and Programmes has *its own* provisions for technology cooperation and sharing as each one attempts to create its own regime, at national, regional and global levels. This obviously is a colossal waste, implying, more than a duplication, a *multiplication of efforts* -- especially considering that the technologies involved are largely the same.
4. An upgrading of regional cooperation and development is of crucial importance for the implementation of *all* the Conventions, Agreements, and Action Programmes emanating from the Rio Conference on Environment and Development (1992). Whether one looks at Agenda 21 or the Biodiversity or the Climate Convention, the Action Programme of the Barbados SIDS Conference, or the recommendations of the Nordwijk Conference on Integrated Coastal Management, the Agreement on the Conservation and Management of Straddling

Fish Stocks and Highly Migratory Fish Stocks in the High Seas or the Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities -- they all build on regional cooperation as an essential element in the implementation of their programmes. Water management, water quality control management, and the sharing of the required technologies are an essential part of all these conventions, agreements and action plans.

5. Thus, If now we see the emergence of *comprehensive regimes*, responsible for the implementation of *all* the new instruments at the regional level, it becomes logical to think in terms of setting up one single system of technology cooperation serving the needs of *all* the Conventions, Agreements and Programmes in the region. Obviously this would be more cost-effective, and far more could be done with far less.

6. To be cost-effective, such systems should create synergisms between public and private investments at the regional level. To be productive, they should be based on the organisational and managerial concepts of the most advanced enterprises of *high-tech* Research and Development enterprises.

7. Among the industrialized countries there are models for this kind of system. In Europe, EUREKA with its subsystem EUROMAR, is an excellent and very simple model, flexible, decentralised, and cost-effective. It generated billions of dollars of investments in R&D in high technologies.. These are systems of *joint research and development in high technologies, during the pre-competitive phase which is also the phase of the highest cost and the highest risk of failure*. The time has come to include the countries of the South in these systems.

8. For developing countries, co-development of technology has a number of special advantages: It has a built-in component of *training*. Technicians from developing countries, selected for participation in joint R&D, learn "on the job"; secondly, technologies developed jointly need not be "adapted" subsequently for use in the developing country, but is from the outset designed for such use; thirdly, there is no problem with regard to "intellectual property rights". Technologies developed jointly are owned jointly, and there is already a large literature on how such rights are managed. Technology co-development will contribute to the broadening and opening of the notion of "intellectual property"

which is inevitable in any case. Important in this context also is the role of publicly funded research and publicly owned technologies in the transfer and diffusion of environmentally sound technologies, presently being studied by UNCTAD, UNEP and the UN Department of Economic and Social Affairs.

9. The establishment of such systems of technology-co-development within the scope of revitalized Regional Seas Programmes would be in full accord with the Programme for the Further Implementation of Agenda 21 adopted by the Special Session of the UN General Assembly, 23-27 June 1997. Paragraph 92 of this Programme reads: *Governments should create a legal and policy framework that is conducive to technology-related private sector investments and long-term sustainable development objectives. Governments and international development institutions should continue to play a key role in establishing public-private partnerships, within and between developed and developing countries and countries with economies in transition. Such partnerships are essential for linking the advantages of the private sector -- access to finance and technology, managerial efficiency, entrepreneurial experience and engineering expertise -- with the capacity of Governments to create a policy environment that is conducive to technology-related private sector investments and long-term sustainable development objectives.* Paragraph 93 recommends the creation of centres for the transfer of technology at various levels, including the regional level. Paragraph 95 stresses the importance of taking appropriate measures to strengthen South-South cooperation for technology transfer and capacity-building.

10. In creating such a system, a second fundamental point should be kept in mind but is often forgotten: "Technology transfer" is not what it used to be. This, obviously derives from the changed nature of contemporary technology. Technology today is not what it used to be. Traditional technology was "hardware" that could be "transferred" from "producer" to "user" or "consumer" through a self-contained commercial transaction. The new technology is information, knowledge, development; it is process rather than product, a process that involves the consumer together with the producer and transforms the roles of both into what Alvin Toffler has called the "prosumer" -- with profound effects on international trade and the "transfer of technology." Technology today can no longer be "bought." It must be "learned." Each "transfer" becomes a kind of "joint venture," involving long-term agreements with regard to training, maintenance, repair, upgrading, etc. ...The notion

of transfer of products or technologies has therefore to give way increasingly to "prosumer" processes of joint collaboration and integration.

11. EUREKA is a very simple model, flexible, decentralised, and cost-effective. Over a period of barely three initial years, it generated 5 billion dollars of investments in R&D in high technologies. The formation of an R&D consortium of industrial giants such as Philips, Siemens and SGS-Thomson generated an investment of over twenty billion French Francs, divided among the three industries and the Governments of the Netherlands, West Germany, France and Italy, within the EUREKA framework.

12. The institutional framework consists, basically, of four elements:

- ◆ .A national co-coordinator, in each participating country, whose task is to solicit projects in determined priority fields of high-tech R&D, with participants in at least 2 countries;
- ◆ .the meeting of national coordinators, with the task of making a first selection among such projects;
- ◆ .the meeting of Ministers of Science and Technology of the participating countries, which makes the final project selection;
- ◆ a small co-ordinating centre to service the two levels of meetings.

13. Projects selected as EUREKA projects are financed partly by the industries (private sector) who made the proposal, partly by the Governments, and partly by the European Union where this latter is a partner to the project.

14. These new forms of public/private cooperation, at the national and at the international level -- not "privatisation" -- offers the possibility of a synthesis between the necessarily more narrow financial, short-range interests of the private sector, whose business is business, and the wider, social and environmental, long-term concerns and responsibilities of the State.

15. In 1987 the International Ocean Institute published a proposal for the establishment of a Mediterranean Centre for Research and Development in Marine

Industrial Technology (MEDITECH).¹ The proposal was endorsed by the Government of Malta and supported by UNEP and UNIDO. The International Ocean Institute was requested to conduct a Feasibility Study, which was completed in 1988.² Subsequently, an expert meeting was organised by UNIDO (Vienna, 1988). Several Mediterranean States offered to host the Centre, and as no agreement was reached on the eventual venue of the Centre's Headquarters or Secretariat, no further action ensued.

16. The proposal has been overtaken by a number of intergovernmental agreements on various forms of technology cooperation in the Mediterranean and in other regions. Most important, it has been overtaken by the United Nations Conference on Environment and Development (Rio, 1992), and the Conventions, Conferences and Action Plans that followed in its wake. All of these strongly reinforced the motives and principles underlying the proposal by stressing the absolute necessity of "technology transfer" to poor countries, if they are to do their part in the implementation of the new international instruments and attain "sustainable development." None of them exactly achieved what had been intended with the IOI proposal: i.e., on the one hand, to generate synergisms by mobilising investments jointly from the public and the private sector at the international level; and, on the other, to create synergisms by utilizing various Convention regimes in such a way that they reinforce each other.

17. Perhaps the time has come to re-examine this project and adapt it to the needs of the next century.

18. A regional system for technology co-development within the framework of a revitalised Regional Seas Programme should be conceived as an implementation of

- ◆ the Law of the Sea Convention (Part IX, Enclosed and Semi-enclosed Seas; Parts XIII, XIV, on regional cooperation; in marine science and technology,

¹Malta: Foundation for International Studies, 1987.

²Krishan Saigal, Chief Investigator, *Mediterranean Centre for Research and Development in Marine Industrial Technology: Feasibility Study*, Malta: IOI, 1988.

in particular, Articles 276, 277 Regional Centres for the promotion of marine sciences and technologies);

- ◆ Agenda 21, Chapters 17, Seas and Oceans, Chapter 34, Technology);
- ◆ Biodiversity Convention (Article 4);
- ◆ Climate Convention (Article 5);
- ◆ The Vienna Convention on the Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer.³

as well as the recommendations of the Nordwijk Integrated Coastal Zone Management conference (1994), the Global Plan of Action on land based sources of pollution (Washington, 1995) and the implementation agreement of straddling stocks – all with regard to technology cooperation within a broad, culturally, socially and environmentally sustainable context.⁴

.19. Considering the great diversity among regions with regard to their needs,

³The technology transfer programme of the Montreal Protocol, with its multilateral Fund has been hailed as a success story. Anil Agarwal, Director of the Ministry of Environment and Forests of the Government of India, has some serious reservations: “Again, there is a growing feeling that new technologies will replace existing ones. This would take place largely in the North, and the South will have to bear the cost of subsequent conversions. The full implications are yet to be known, but the thought of technological dependence leaves a very uncomfortable feeling...” (UNEP, *Our Planet*, Vol.9, Nr. 2 1997) Technology co-development, or joint Research and Development, as proposed in these pages would alleviate these concerns.

⁴When the Law of the Sea Convention was adopted in 1982, it covered all uses of the oceans, directly or indirectly through reference to “the competent international organisations” and their conventions and programmes. The Convention could not take into account the developments of the ‘Nineties, which, in their turn, are taking too little note of the Law of the Sea Convention. Thus, the ocean regime, again, is being splintered and sectoralized. Fundamentally, the problem cannot be solved until there is a forum where States and non-State actors can discuss the closely interrelated problems of ocean space as a whole, treating the Convention as a living and evolving organism incorporating and adjusting to new developments such as those of the Nineties. By a more liberal interpretation of the new legal instruments with regard to technology cooperation, however, one can, to some extent, anticipate and stimulate the new integration process.

resource bases and institutional infrastructure, It is suggested that two *pilot projects* be initiated, one in the Mediterranean within the framework of the Regional Seas Programme under the revised Barcelona Convention; the other, in the Indian Ocean. While both should be based on the principles of (a) creating synergisms between public and private investments at the regional level; and (b) serving the needs of all the Conventions, Agreements, and Programmes, the priorities of different regions will be necessarily very different. There will be greater emphasis on industrial technology in the Mediterranean; greater emphasis on village technologies in the Indian Ocean countries. This may also impact on the modes of financing, with greater private sector participation in the Mediterranean than in the Indian Ocean..

20 In the Mediterranean, the pilot project should be considered as a practical and cost-effective way of implementing the mandate of the Mediterranean Commission for Sustainable Development with regard to technology cooperation..

21 A *network* or *system* should be built consisting of

- (a) all contracting parties of the Barcelona Convention
- (b) all regional scientific and technological centres and institutions as well as international scientific and technological institutions operating in the region;

The network should be managed by four components:

- (a) national coordinators and representatives of regional and international scientific/technological institutions;
- (b) the meetings of the national coordinators and regional and international institutions;
- (c) the meeting of Ministers of Science and Technology;
- (d) the Co-ordinating Centre.

.22. Each contracting party should designate a national co-ordinator.

- (a) In the European member states, the EUROMAR coordinator might be designated for this purpose;⁵

⁵ Upon the publication of the IOI study, the Italian EUROMAR co-ordinator took the initiative of calling a meeting to discuss the possibility of opening EUROMAR to the participation of developing countries. The proposal, at that time was defeated. The French

- (b) In the other member states, a special coordinator would have to be designated and located in the most suitable national scientific/technological institution.

.23. The task of the national coordinators would be to solicit projects both from the public and private sector. To be eligible, projects must

- (a) *fall into one of the categories of technologies* agreed upon by the contracting parties themselves. They would include aquaculture and genetic engineering technologies, the production of more selective fishing gear; waste recycling; water treatment technologies including sewage treatment; renewable energy from the sea such as OTEC or methane production by deep-sea microbes (methanococcus, which perhaps eventually could be cultivated in laboratories/factories on land); research on hydrates, etc. Lists would have to be refined region by region, according to needs.
- (b) *have partners in at least two countries, including at least one developing country.*

24. National coordinators and representatives of regional and international institutions should meet twice a year to make a first selection among the proposed projects.

25. The Ministers of Science and Technology (or equivalent) of the contracting parties should meet once a year to make the final project selection. These meetings should be held within the context of the Mediterranean Commission for Sustainable Development. They should constitute one of the "High Level Segments" of the Commission, thus ensuring the proper linkage between joint technology development and the goals of sustainability and conservation aspired to by the various UNCED Conventions, programmes and action plans.

.26. The projects selected would be financed half by the industries that initiated

delegation, in particular, insisted that EUREKA and EUROMAR had to remain European, as its principal purpose was to make European industry globally competitive. Today the situation is somewhat different. The European Union's emphasis on technical assistance to the countries on the southern and eastern shores of the Mediterranean offers a far better chance of cooperation.

the proposal, half by governments and regional funding agencies. This would create the desired synergism between private and public investments at the regional level. The participation of developing countries should be (largely, but not necessarily wholly) financed through international funding institutions. By contributing to this financing, the industrialised contracting parties would fulfil their technology cooperation obligations under the Biodiversity and Climate Conventions while supporting their own industries.

27. The Coordinating Centre should consist of a core module and other modules which might be added or closed in accordance with needs and funding availabilities.

- (a) the core module should service the meetings of the national coordinators and representatives of regional and international institutions. In cooperation with the Athens Coordinating Centre for the Mediterranean Action Plan, it should service the special high-level segments of the Mediterranean Commission for Sustainable Development making the final project selection.
- (b) As soon as possible, there should be an additional model for the organisation of *training programmes*. Training programmes should cover the sciences and technologies involved in the network's projects, and trainees should be directly involved in the projects as much as possible. Training programmes should also be of an interdisciplinary nature, cover management and project planning and give an introduction to regional cooperation and development and the emerging forms of ocean governance as these provide the broader framework within which technology cooperation is to evolve. The *training module* should cooperate with existing training programmes and institutions.
- (c) There should be a *legal module* which should assist in the drawing up of joint venture agreements, the sharing of intellectual property, and other legal questions arising from the projects.
- (d) There should be a *module for data handling and information and cooperation with technology cooperation systems as they may be established in other regional seas programmes*.

28. Joint ventures in R&D between industrialized and developing countries do not happen by themselves. They need a institutional framework to encourage and

facilitate their establishment. Such a framework could be built on the model of a generalized EUREKA system as suggested in this paper.

29. The advantages of joint R&D or technology co-development for developing countries have been indicated under para. 8 above. One might add here that industrialized countries and international funding agencies would equally benefit. For industrialized countries it would mean a wider sharing of costs as well as of risks. It would also have the potential of enlarging markets. For funding agencies it would bring an important simplification in project selection and reinforce the trend towards regional rather than bilateral development and economies of scale.

30. Water scarcity and conflicting demands on water resources may pose threats to regional security in many regions -- certainly on the Mid-eastern shores of the Mediterranean. A scheme like the one proposed here might contribute to the maintenance of regional security.

Elisabeth Mann Borgese



Dalhousie University

International Ocean
Institute



***Water Management and Technology Cooperation,
Development and Transfer***

Working Paper Prepared by the International Ocean Institute

Executive Summary

Technologies for the implementation of integrated water management and water quality control will have to be transferred to developing countries in accordance with the provisions of all post-UNCED conventions, agreements and programmes.

Each one of these instruments now has its own provisions and mechanisms for the "transfer" of these technologies. This might lead to duplication of efforts and other inefficiencies.

The present paper recommends the establishment of a system of technology cooperation, development, and transfer that should serve the needs of *all* post-UNCED Conventions, agreements and programmes, on a regional basis, within the framework of a revitalized Regional Seas Programme.

A possible model is seen in a generalized, modified EUREKA system.

Water scarcity and conflicting claims on water resources are seen as a threat to regional security. The establishment of such regional systems might be an important contribution to the maintenance and enhancement of regional security.



Dalhousie University

International Ocean
Institute



***Water Management and Technology Cooperation,
Development and Transfer***

Working Paper Prepared by the International Ocean Institute

1. Recent emphasis on "integrated coastal management" as an important aspect of the implementation of Agenda 21 has changed our concept of water management. A hard and fast separation between fresh water and sea water management clearly is impossible in the coastal zone. The necessary changes have already been made in the programme structure of UNEP, the World Bank, UNDP and GEF which will facilitate the establishment of regional, national and local institutional frameworks capable of integrated water management.
2. The Law of the Sea Convention as well as each one of the post-UNCED Conventions, Agreements and Programmes recognize the fundamental importance of technology cooperation and technology sharing if poor countries are to fulfil their responsibilities and enjoy their rights under these new instruments. This recognition is progressive, gaining strength. The provisions in the new Conventions impose greater obligations on the industrialized States than the Law of the Sea Convention..
3. The weakness of the system lies in the fact that *each one* of the Conventions, Agreements and Programmes has *its own* provisions for technology cooperation and sharing as each one attempts to create its own regime, at national, regional and global levels. This obviously is a colossal waste, implying, more than a duplication, a *multiplication of efforts* -- especially considering that the technologies involved are largely the same.
4. An upgrading of regional cooperation and development is of crucial importance for the implementation of *all* the Conventions, Agreements, and Action Programmes emanating from the Rio Conference on Environment and Development (1992). Whether one looks at Agenda 21 or the Biodiversity or the Climate Convention, the Action Programme of the Barbados SIDS Conference, or

the recommendations of the Nordwijk Conference on Integrated Coastal Management, the Agreement on the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks in the High Seas or the Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities -- they all build on regional cooperation as an essential element in the implementation of their programmes. Water management, water quality control management, and the sharing of the required technologies are an essential part of all these conventions, agreements and action plans.

5. Thus, If now we see the emergence of *comprehensive regimes*, responsible for the implementation of *all* the new instruments at the regional level, it becomes logical to think in terms of setting up one single system of technology cooperation serving the needs of *all* the Conventions, Agreements and Programmes in the region. Obviously this would be more cost-effective, and far more could be done with far less.

6. To be cost-effective, such systems should create synergisms between public and private investments at the regional level. To be productive, they should be based on the organisational and managerial concepts of the most advanced enterprises of *high-tech* Research and Development enterprises.

7. Among the industrialized countries there are models for this kind of system. In Europe, EUREKA with its subsystem EUROMAR, is an excellent and very simple model, flexible, decentralised, and cost-effective. It generated billions of dollars of investments in R&D in high technologies.. These are systems of *joint research and development in high technologies, during the pre-competitive phase which is also the phase of the highest cost and the highest risk of failure*. The time has come to include the countries of the South in these systems.

8. For developing countries, co-development of technology has a number of special advantages: It has a built-in component of *training*. Technicians from developing countries, selected for participation in joint R&D, learn "on the job"; secondly, technologies developed jointly need not be "adapted" subsequently for use in the developing country, but is from the outset designed for such use; thirdly, there is no problem with regard to "intellectual property rights".

Technologies developed jointly are owned jointly, and there is already a large literature on how such rights are managed. Technology co-development will contribute to the broadening and opening of the notion of "intellectual property" which is inevitable in any case. Important in this context also is the role of publicly funded research and publicly owned technologies in the transfer and diffusion of environmentally sound technologies, presently being studied by UNCTAD, UNEP and the UN Department of Economic and Social Affairs.

9. The establishment of such systems of technology-co-development within the scope of revitalized Regional Seas Programmes would be in full accord with the Programme for the Further Implementation of Agenda 21 adopted by the Special Session of the UN General Assembly, 23-27 June 1997. Paragraph 92 of this Programme reads: *Governments should create a legal and policy framework that is conducive to technology-related private sector investments and long-term sustainable development objectives. Governments and international development institutions should continue to play a key role in establishing public-private partnerships, within and between developed and developing countries and countries with economies in transition. Such partnerships are essential for linking the advantages of the private sector -- access to finance and technology, managerial efficiency, entrepreneurial experience and engineering expertise -- with the capacity of Governments to create a policy environment that is conducive to technology-related private sector investments and long-term sustainable development objectives.* Paragraph 93 recommends the creation of centres for the transfer of technology at various levels, including the regional level. Paragraph 95 stresses the importance of taking appropriate measures to strengthen South-South cooperation for technology transfer and capacity-building.

10. In creating such a system, a second fundamental point should be kept in mind but is often forgotten: "Technology transfer" is not what it used to be. This, obviously derives from the changed nature of contemporary technology. Technology today is not what it used to be. Traditional technology was "hardware" that could be "transferred" from "producer" to "user" or "consumer" through a self-contained commercial transaction. The new technology is information, knowledge, development; it is process rather than product, a process that involves the consumer together with the producer and transforms the roles of both into what Alvin Toffler has called the "prosumer" -- with profound effects on international trade and the