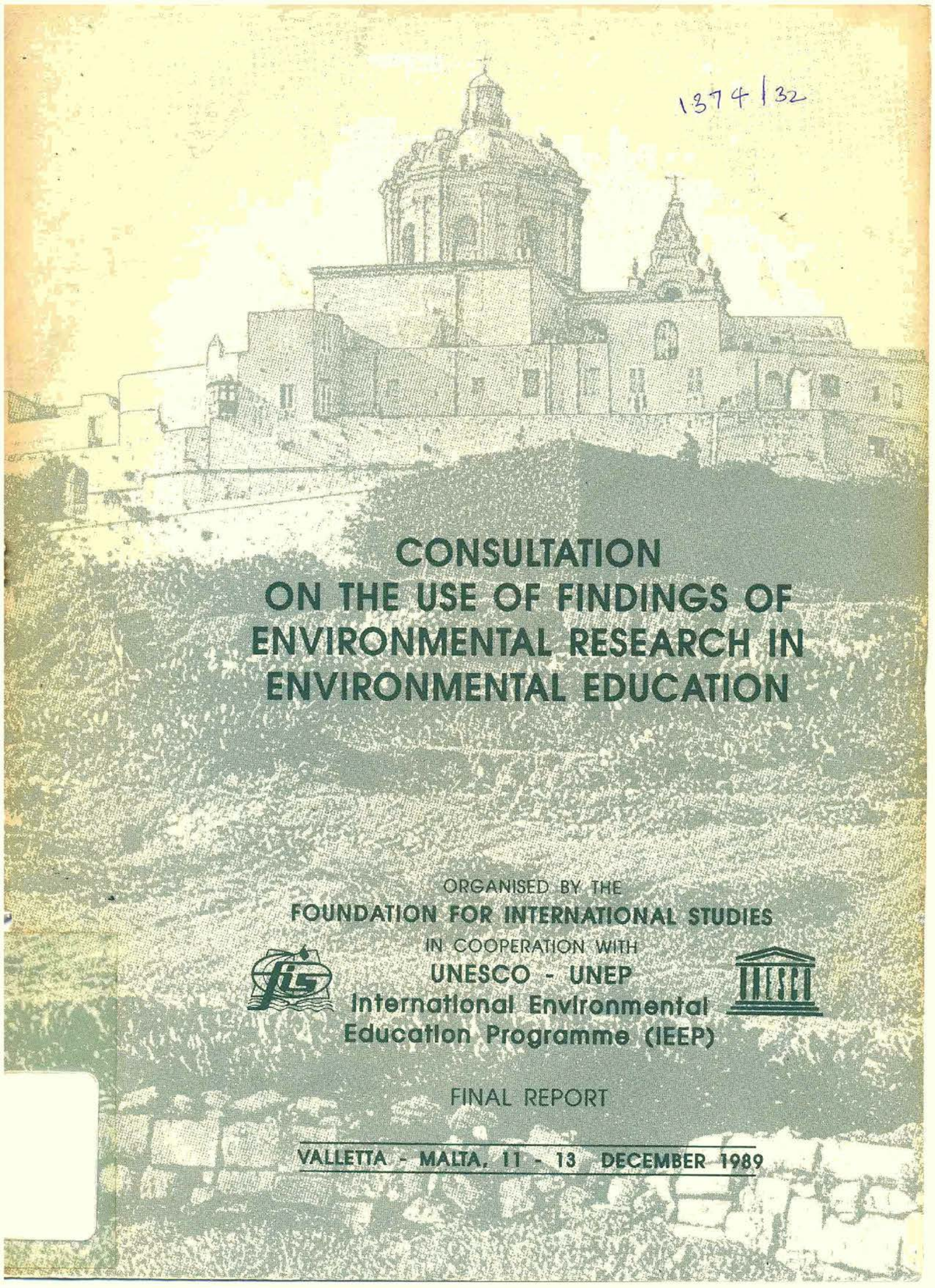


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CONSULTATION ON THE USE OF FINDINGS OF ENVIRONMENTAL RESEARCH IN ENVIRONMENTAL EDUCATION

ORGANISED BY THE
FOUNDATION FOR INTERNATIONAL STUDIES

IN COOPERATION WITH

UNESCO - UNEP



International Environmental
Education Programme (IEEP)



FINAL REPORT

VALLETTA - MALTA, 11 - 13 DECEMBER 1989

CONSULTATION
ON THE USE OF FINDINGS
OF ENVIRONMENTAL RESEARCH
FOR ENVIRONMENTAL EDUCATION

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FINAL REPORT
VALLETTA, MALTA
11 - 13 December 1989

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INTRODUCTION

BACKGROUND

The Intergovernmental Conference on Environmental Education held in Tbilisi, USSR in 1977 acknowledged that "the dissemination of specialized and general knowledge on the environment and the development of public awareness of the need for a correct approach to the complex problems of the environment are of tremendous and possibly crucial importance, both for further economic development and rational use of the Earth's resources for the good of individual nations and of humanity as a whole" (Final Report p. 37). The Conference made a number of recommendations regarding environmental information programmes and strategies, with a special emphasis on dissemination of information through the mass media.

Ten years later, in a review of the past decade, the UNESCO-UNEP Congress on Environmental Education and Training held in Moscow, USSR in 1987 commented that in a growing number of countries, new people and new groups are demanding information about the environment and environmental education, or are even producing information themselves. The Congress identified problems concerning the information materials themselves (how easily understood, how to deal with the ever increasing growth, etc.), and educational strategies. Recommendations were made for (1) the setting up of a computerized service, (2) the strengthening of regional networks of institutions of excellence and documentation centres, and (3) the publication of the newsletter 'Connect'.

UNESCO's Programme and Budget for 1988 - 1989 made provision for the preparation and organization of a Consultation Meeting on the Use of Findings of Environmental Research in Environmental Education. The Foundation for International Studies of the University of Malta organized the above mentioned Consultation Meeting in cooperation with UNESCO - UNEP International Environmental Education Programme (IEEP) from 11 - 13 December 1989 in Valletta, Malta.

OBJECTIVES

The objectives of the Consultation were:

- (1) to develop guidelines on the ways and means for the use of findings of environmental research programmes in the development

of environmental education programmes of various types and the different education levels.

(2) to enhance exchange of information and experience in this field.

It was intended that Environmental Education should be based on the Environment in its totality - natural and built, technological and social (economic, political, cultural-historical, moral esthetic) should be included in the general education by all people.

AGENDA

1. Opening Session

2. Election of the Bureau

3. Keynote address: The flow of environmental research findings into environmental education for the future

4. Case Study: Environmental research findings and their application to environmental education in Finland

5. Case Study: Human ecological education and research and their relationships to environmental education, in Sweden and internationally

6. Introduction to the draft guidelines for discussion on the use of environmental research findings in environmental education

7. Case Study: Perspective for environmental education programmes

8. Keynote address: Global environmental education: towards a way of thinking and acting

9. Case Study: Towards a common understanding of environmental education for children in schools in Britain

10. Case Study: Environmental education and the diffusion of environmental research findings in Malta
11. Case Study: The use of environmental research findings in education in Ethiopia
12. Case Study: The role of components of the environment in the definition of marginal areas in the Mediterranean region
13. Round table discussion on suggested guidelines for the use of environmental research findings in environmental education
14. Adoption of the draft report
15. Closing session

WORKING DOCUMENTS:

1. Discussion paper "Suggested guidelines on the use of environmental research findings in environmental education"

prepared by F. Ventura, Faculty of Education, University of Malta.

2. Two keynote addresses and five case studies as identified in Agenda.

3. Working paper on Networking prepared by N.H. Dajani, Global Harmony Foundation, November 1989.

4. Documents provided by Unesco
(List of documents in Annex)

PARTICIPANTS

Nine participants from Finland, Sweden, United Kingdom, Canada, Ethiopia, Switzerland, Italy and Malta attended the meeting.
(List of participants in Annex 1)

BUREAU

Chairman	-	Professor Patrick J. Schembri (Malta)
Vice-Chairman	-	Professor Nicholas Polunin (Switzerland)
Rapporteur	-	Mr Frank Ventura (Malta)
Vice-Rapporteur	-	Ms Beletu Mengistu (Ethiopia)

STEERING COMMITTEE

Professor Salvino Busuttil	-	Chairman
Dr A Ghafoor Ghaznawi	-	Advisor

Dr James Calleja - Member
Professor Patrick J. Schembri - Member
Mr Frank Ventura - Member
Ms Lucienne Bugeja - Secretary
Ms MaryRose Pirotta - Secretary
Ms MaryAnne Zammit - Secretary

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DATE AND VENUE

The meeting was held at the Aula Magna of the Foundation for International Studies, Valletta, Malta between 11 - 13 December 1989.

TIMETABLE OF WORK

The timetable of work is given in Annex 2

PROCEEDINGS

CONSULTATION ON THE USE OF FINDINGS ON ENVIRONMENTAL RESEARCH TO ENVIRONMENTAL EDUCATION

Item 1: Opening Session

1. In the absence of Professor S. Busuttil, Director-General of the Foundation for International Studies, Malta, Dr James Calleja, Executive Assistant to Professor S. Busuttil, opened the Consultation Meeting on the Use of Findings on Environmental Research to Environmental Education being held in Malta from 11th to the 13th December 1989.

Dr Calleja stated that the aim of this meeting is to develop and maintain a system of information exchange for educators in the environmental fields, at regional, national and international levels.

2. In his welcoming speech, Dr A. Ghafoor Ghaznawi of UNESCO began by outlining the different environmental aspects that have caught the attention of the international community over the past decades. He went on to discuss the complexity of an interdisciplinary approach to the study of environmental problems. He stressed that generating knowledge about the environment was not enough, but that knowledge must be disseminated. Environmental education, especially where it is directed to target groups, provides the principal means by which this dissemination of knowledge can be achieved. For this purpose UNESCO has given attention to environmental education in its programmed budget for 1990/91.

The objective of this consultation meeting is to provide UNESCO with guidelines and suggestions on the ways and means of doing this.

3. In his address, Professor P.J. Schembri of the University of Malta explained that one aim of this meeting is to investigate the channels and modalities used by international scientific research programmes for disseminating their results to the scientific community, to international and national educational institutions, and to the general public. A case study approach is being adopted to explore this.

4. Dr U. Mifsud Bonnici, Minister of Education of the Republic of Malta then addressed the Meeting. The Minister said that the question of environmental education was given due consideration in setting up of a national minimum curriculum for all schools in Malta. He explained the approach adopted in tackling this task and said that in today's world care of the environment cannot be left solely in the hands of government and the major economic sectors. The destiny of our planet, he stressed, is in our hands and what we do determines our future. Every person has a role to play. The Minister pointed out that it is the politicians and other decision-makers that need this kind of meeting. They need to know the condition of the environment to act properly. They need to take consideration of the environment in their work but it is a great battle to do this. The Minister then declared the meeting open.

Plenary Session 1

Item 2: Election of the Bureau

5. Dr James Calleja proposed that Professor P.J. Schembri will act as Chairman of the meeting, Professor N. Polunin as Vice-Chairman, Mr F. Ventura as Rapporteur and Ms B. Mengistu as Vice-Rapporteur.

Dr C. Gayford seconded this proposal which was unanimously accepted by the participants.

6. Professor Schembri then assumed the Chair and brought to the attention of participants that there were some amendments to the programme, as previously circulated, due to the non-arrival of some participants.

The Chairman then referred the participants to the discussion paper "Guidelines on the use of environmental research findings in environmental education" prepared by Mr F. Ventura. He stressed that this document should serve as a framework on which to base the discussion.

The Chairman requested participants to present a two to three page summary of their paper. This has to be handed to the rapporteur before the end of the meeting. This summary is to be incorporated in the final document to be presented to UNESCO.

Item 3

7. The Chairman then invited Professor E. Mann Borgese of the International Ocean Institute, Malta to present her keynote address entitled "The flow of environmental research findings into environmental education for the future".

8. Stemming from the discussion following this address, it was noted that: (i) a fair amount of research has been done on environmental education particularly in western Europe and the USA; (ii) environmental awareness tends to be a preoccupation of the middle class and the more affluent sections of the population; (iii) poor people have more immediate problems and this seems to be particularly worrying in terms of international environmental education and developmental education. It was also stressed that there is a link between research and training, and, training and research which is very important when carrying out environmental impact assessments. There is a need for trained personnel in order that this can be effectively done.

Item 4

9. The Chairman then informed the meeting that Professor M.L. Bouguerra (Tunisia) had not arrived for the meeting.

10. Professor L. Aho (Finland) was therefore invited to present her study on "The Finnish case study on environmental research findings and their application to environmental education".

11. During the discussion that followed, it was identified that there is an urgent need to train teachers in environmental education and that environmental education should be included in school curricula as an integral part. It was stressed that more information on the environment and on environmental education should be given to teachers.

There is a need to address closely how educators approach value education. It should not be assumed that giving teachers and pupils more information will necessarily contribute towards values that would sustain environmental development. A new

methodology of an interactive kind is required.

It was also noted that a change in education is a slow and complex process. To move forward rapidly would antagonise teachers, sap the energies of pupils and provoke the opposition of parents. What is required is an integrative approach through existing subjects such as social studies or under the subject 'man and environment'.

Item 5

12. At this stage Dr Eva Ekehorn (Sweden) made her presentation on "Human ecological education and research and their relationships to environmental education, in Sweden and internationally".

Item 6

13. Mr F. Ventura (Malta) then presented a brief summary of the draft guidelines for discussion.

14. Stemming from the above, it was pointed out that the education process is a negotiation between those who are at the giving end and those who are at receiving end, rather than something which is imposed. What is required is to improve the flow of information among all those involved. As regards the use of environmental research findings in environmental education, the gap between the production of research findings and the recipients must be narrowed. Researchers should not remain in an 'ivory tower'.

Planners and advisers need training as well, and workshops for this category of people should be organised. Valuable feedback can be gained from such an exercise.

Databanks would be useful creation. UNESCO already holds a databank on environmental education, and environmental information can be deposited there. This databank could be accessed through computer systems. However, for the sake of those who are unable to retrieve information in this way, a directory of institutions or a bibliography on environmental education will

be more useful in published form.

Item 7

15. Professor R.E. Scossiroli (Italy) then read out his paper (with Professor F. Urzi and G. Ronsisvalle on "Perspective for environmental education programmes: a proposal".

16. It was proposed that a network for information exchange on regional, national and international levels could be set up. As part of this it is necessary to identify the personnel to activate such a network and to propose further solutions.

17. Professor N. Polunin (Switzerland) then read a working paper on networking prepared by Naseeb H. Dajoni of the Global Harmony Foundation.

The meeting was adjourned to Tuesday, 12th December 1989 at 9.00am

Plenary Session 2

The second session of the Consultation on the user of Findings on Environmental Research to Environmental Education was convened on Tuesday, 12th December 1989 at the Aula Magna of the Foundation for International Studies in Valletta.

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Item 8: Opening of Plenary Session 2

18. The Chairman, Prof P.J. Schembri, opened this second session of the meeting.

As Prof Moharam of Egypt and Ms D.K. Etoori of Uganda did not arrive, the chairman informed the meeting that some changes to the previously circulated timetable were necessary. The changes were agreed to by the meeting.

Item 9

19. The Chairman then invited Prof N. Polunin (Switzerland) to deliver his keynote address (with Dr W.B. Stapp, USA as co-author) entitled "Global environmental education: towards a way of thinking and acting".

20. During the discussion that followed, it was identified that:

- (i) there is a need to spread knowledge of a rudimentary kind, such as where different countries are on the map and what their characteristics are, etc. before one can embark or even envisage educational programmes on the international environment.
- (ii) the link between environmental education, environmental awareness and international understanding should be stressed.
- (iii) the issue of a redistribution of resources, one that is linked to the above point, although fraught with enormous difficulties, cannot nonetheless be ignored.

Item 10

21. At this stage Dr C. Gayford (UK) delivered the case study "Towards a common understanding of environmental education for children in schools in Britain: a report of the findings of surveys made in schools from 1986 to 1989".

The readiness and preparedness of environmental educators and researchers to respond to the demands of various groups, especially the media, were discussed. This would greatly enhance the potential for disseminating information on the environment.

Links with regional, national and international organizations and a computerized system on environmental education were also discussed.

It was stressed that there is a need for a more efficient use of information by potential users by making methods of retrieval more user-friendly.

It was proposed that the papers and proceedings of this meeting be passed on to the editor of "Connect" for publication and circulation.

22. On the request of participants Dr Gayford briefly outlined the role of and the work undertaken by the Council for Environmental Education based in the UK.

Dr Gayford said that this Council was founded in 1970 under the auspices of the Department of Education. In 1972 it moved to the University of Reading and was set up with funds from various sources viz, Department of Education, local authorities etc. This Centre is involved in the development of environmental education at regional and national level. Dr Gayford explained that although the Council has strong international ties, its work at present lacks an international dimension.

Item 11

23. The Chairman then invited Mr F. Ventura (Malta) to present the case study: "Environmental education and the diffusion of environmental research findings in Malta".

24. In the subsequent discussion Mr Ventura expounded further on the various activities connected with environmental education at present carried out within and outside the University of Malta.

It was stressed that there is a need to depart from a traditional approach in the teaching of academic subjects if environmental education is to be integrated successfully in the curriculum. Problems created by early channeling of students at secondary level were also discussed.

It was observed that attention and recognition was to be given to the concern of other professionals, including school teachers, with respect to the disciplines they teach and the problems they face.

Item 12

25. Ms B. Mengistu (Ethiopia) then presented her paper: "The use of environmental research findings in education in Ethiopia".

She mentioned that an attempt has been made to base research findings from the Ethiopian Reclamation Study which is jointly organised by the Ethiopian Government and the Food and Agriculture Organization of the United Nations (FAO). She also mentioned that environmental protection or conservation activities must be development based.

Finally, Ethiopia's experience regarding the approach to environmental education is felt to be rather different from that of other countries as it started from practical action on the environment.

Item 13

26. In conclusion, Prof R.E. Scossioli (Italy) presented his study on the "The role of components of the environment in the definition of marginal areas in the Mediterranean region".

Following a brief discussion on the methodology involved, the meeting was adjourned to Wednesday 13th December 1989 at 9.00hrs.

Plenary Session 3

Item 14: Round table discussion

27. The round table discussion on suggested guidelines for the use of environmental research findings in environmental education was chaired by Dr A. Ghafoor Ghaznawi.

During the lengthy discussion participants made suggestions and commented on various questions to which their attention had been directed beforehand. These included: how one would locate environmental research projects and their findings at national, regional and international levels; how to identify and/or select environmental research findings that are relevant to formal and non-formal environmental education; how to make the flow of relevant environmental research findings to environmental education a continuous process; how should one process and who should process the relevant research findings for the various levels and types of education; how to harmonize the speed of production of relevant research findings and the slow change in educational renewal for all types and levels of education.

Suggestions and opinions were noted and were to be incorporated in the final document on suggested guidelines.

The meeting was then adjourned to 16.00hrs

Item 15: Adoption of the draft report

28. The chairman opened the session, which was held at the Hotel Les Lapins, by distributing copies of the draft report on the Consultation Meeting. Participants were asked to read the report and to suggest any necessary corrections so as to ensure a faithful representation of the various contributions to the meeting. Twenty minutes were then allowed for reading the report.

29. A small number of minor corrections and suggestions for

further clarifications of some points in the report were then noted. These will be incorporated in the final draft report which will again be circulated among participants before final submission to UNESCO.

30. The draft report was then approved.

Item 16: Closing Session

31. The chairman then thanked the participants, the Foundation for International Studies and its staff, and UNESCO for all the good work that was carried out, which was described as substantial and which should enhance environmental education everywhere.

32. On behalf of Professor S. Busuttil and the Foundation for International Studies, Dr J. Calleja then thanked all the participants for their useful work and UNESCO for making it possible for the F.I.S. to organize this meeting.

33. Finally Dr A. Ghafoor Ghaznawi stated that he was delighted that the work had been fruitful and that a useful draft report had been produced but this had to be further refined so that it could be circulated among interested professionals world-wide. He then thanked Professor S. Busuttil of the F.I.S. and Dr J. Calleja his representative, the chairman, the rapporteur and the vice-rapporteur for sharing in the responsibility of the formulation of the report. Addressing all participants, Dr Ghafoor Ghaznawi then stated, "We needed your help as experts to give us guidelines as to how the problem of the use of environmental research information in environmental education can be tackled. I am glad to say that the objectives of the meeting have been achieved". After auguring a good journey home to the participants, he then declared the meeting closed.

SUGGESTED GUIDELINES ON THE USE OF ENVIRONMENTAL RESEARCH FINDINGS IN ENVIRONMENTAL EDUCATION

I THE NEED

1. In the Report entitled "Our Common Future" (Brundtland Report), the World Commission on Environment and Development points out that most people base their understanding of environmental processes and development on traditional beliefs or on information provided by conventional education. Because of this, many remain unaware about ways by which they could improve traditional production practices and better protect the natural resource base. This leads to the conclusion that environmental education should be included in the general education by all people and that it should be integrated with the other disciplines of the formal education curriculum at all levels (Brundtland Report, 1987, pp. 111-114). This meeting emphasises that such a policy should be implemented by all governments.

2. A meaningful environmental education should develop the knowledge, skills and attitudes which are appropriate for understanding and helping in the solution of environmental problems that arise in a rapidly developing world. This presumes that there is a smooth and rapid flow of the latest knowledge from the research community to environmental educators. Unfortunately, the flow is not as smooth as desirable, and in fact the Moscow Congress on Environmental Education and Training identified the current problems as concerning the information materials themselves (how easily understood, how to deal with their ever-increasing number etc.), and educational strategies (how to 'master' the information flow, how to communicate the message, etc.).

3. Participants of this Consultation Meeting also expressed the urgency of the need for the flow of environmental research findings into environmental education to be smoother. Special emphasis was put on the need of the flow of environmental knowledge and information into curriculum development for various types and levels of school, into teacher education, and into mass media programmes for enriching the knowledge and understanding of the general public.

II THE PROBLEM

4. There are several barriers that discourage or prevent the easy flow of environmental research findings into formal and nonformal environmental education. They are: (i) the volume of information, which may be too much in one place and too scarce in another; (ii) the lack of trained technical personnel to select the relevant data from research findings with the aim of making them available to educators; (iii) the lack of an infra-structure for facilitating the flow of knowledge and information as well as lack of financial resources.

5. The first problem in this area is the large and increasing amount of research findings in the various aspects of the environment. This abundance of knowledge and information are recorded in journals and publications in various languages which makes the selection of the appropriate findings a rather difficult task to educators. For example, a cursory look through a list of information sources such as that published by UNEP in its Environmental Data Report (2nd edition 1989/90) reveals a large number of environmental data compendia ranging from national statistical yearbooks or reports published by many countries, to regional and global data compendia. Besides, a network of 27 World Data Centres are currently active providing facilities for archiving, exchange and dissemination of data sets which encompass all disciplines related to the earth, its environment and the sun. Additionally, the International Environmental Information System (known as INFOTERRA) set up by UNEP in 1974 exists as a decentralized network of national and international institutions and experts co-ordinated by a 'Programme Activity Centre' in Nairobi, to process thousands of queries each year. All this indicates that a wealth of environmental research data is published regularly and is theoretically available to all citizens interested in the environment. However, this abundance creates the problem of selection on the part of educators concerned with environmental education.

6. The second problem is the technicality of research findings which, in general, cannot be used directly in the teaching/learning processes. This may not be a major problem at tertiary level. However, the use of such research findings in school curricula, teacher education and mass media requires their translation into appropriate educational messages for the various target groups. No action at national or international levels was reported to this effect.

7. Another problem is the lack of necessary funds especially in developing countries for the purchase of research journals and publications on environmental matters. As research findings are on the increase this need of funds is likely to persist for as long as the renewal and up-dating of teaching/learning curriculum

materials with respect to the environment and its problem are desired.

III SUGGESTED SOLUTIONS

8. The above, and similar problems which act as barriers to the free flow of knowledge and information into environmental education, require solutions that may be applied individually or in association with each other depending on the nature of the problem. In this context, the following model is presented to focus attention on the way to facilitate the flow of environmental research findings into environmental education.

Researchers produce	Facilitators use	Educators & Learners need Envir. Information
Research Findings	Channels of Communication	

9. Concerning researchers and research findings, international environmental research organisations on the whole have good means of disseminating information. Many of them have a public relations or publicity department and an extensive mailing list. Publications are usually free and readily sent to requestors. But this does not mean that they are effectively disseminated.

10. The second sector of the diagram refers to the facilitators who should be concerned with the smooth flow of environmental research information. A preliminary analysis shows that the facilitators either do not exist, or their role has not been really developed so that they could function properly. Facilitators should be persons who have access to environmental research findings and who can digest them and communicate them to educators and to different types of learners in a format and language that is meaningful to the users. It is clear that the facilitators should have a good scientific background to be able to understand the research findings, and an ability to communicate scientific information effectively to learners at

various educational levels. Without facilitators, much useful information produced by research organisations at great expenditure of effort and funds lies effectively beyond the reach of interested groups and individuals.

11. The third sector regarding the educators and the learners concerns persons at the various levels and types of education including primary, secondary, tertiary and non-formal education. Considering formal education, the problem of access to up-to-date information is particularly acute below the level of tertiary education. While lecturers at university or other tertiary education institutions may find ways of obtaining the required information, teachers and curriculum developers may find it very difficult to tap existing information and also to incorporate it in the school curricula without distorting it. Similarly for non-formal education where leaders of voluntary organisations, newspaper editors and radio and TV broadcasters have to rely on second hand information because the original sources are practically inaccessible for various reasons.

12. A possible solution to the problem of creating a smooth and continuous flow of environmental research information to educators is to establish an Environmental Education Unit within each country. This could be either attached to the Ministry of Education or to an inter-ministerial body. Only a small number of people would be sufficient to run the Unit, but they must be trained in Environmental Science, Social Sciences and in Science Education, especially in the presentation of scientific ideas through various media. By knowing the educational context of the country and by communicating the information in a way that can be easily understood by the target audience directly in the native language, the Environmental Education Unit (EEU) should play a crucial role in facilitating the rapid incorporation of environmental research findings in environmental education at all levels.

13. The main function of the Unit is to receive 'raw' research data from international and national research organisations, to select the relevant findings, transform them and to prepare them in a form which can be used by educators and curriculum developers, and by the media. The information provided by the EEU could take the form of summaries of relevant environmental research findings and annotated bibliographies.

For this reason the environmental education unit should strive to establish contacts with all major international and national environmental research organisations so as to obtain the required information.

14. In order to facilitate this, the EEU could work through a

Clearing House or a similar bureau which could be incorporated within the structure of UNESCO's IEEP. Besides facilitating contacts with international environmental research organisations, the Clearing House can also encourage exchange of the research findings generated by various national environmental research bodies and national environmental education establishments which could be of international interest. This information can be supplied by the national Environmental Education Units. Thus the Clearing House would be the focus of a network of channels of communication of environmental information.

15. Another function of the Environmental Education Unit is to act as an educational resource centre for up-to-date environmental information and advice. The actual presence of such a Unit with readily accessible data and materials should attract more requests for environmental research information from educators, interest groups, planners, and ordinary citizens wishing to participate in any public debate on environmental issues whether of national, regional or global importance. Indeed the presence of an EEU within each country may change the role of educators and learners from one of passive recipients of environmental information to one of active proposers of what information should be sought by the Unit which in turn can pass on the propositions to the researchers. Given sufficient support, the Unit could build a collection of visual, audio-visual and computer software materials obtained from international environmental research organisations, and which in some cases, can be locally produced.

16. The EEU should keep a general directory of international environmental research organisations such as UNESCO, UNEP, FAO, WHO, IMO, WMO, WWF and their various programmes. The general directory, which should be disseminated widely, could contain details of the function of individual research organisations, the type of research work carried out, lists of any regular and occasional publications and necessary details of how these can be accessed.

17. Knowledgeable persons within each country can also be considered as important sources of information. There may be willing to act as resource persons on questions concerning environmental research and environmental education. Regarding the educators, information can be given about which level of education interests them most, and their research interests in the field. The data about environmental researchers could similarly indicate their area of expertise and investigation, and their inputs both to national and to international environmental research programs. The directory should also contain information about the local 'focal points', that is, those government departments and other institutions which receive information directly from international bodies, and about what kind of information they can provide.

18. Any citizen within each country should have access to copies of the original documents and reports concerning the environment published by international agencies. These include research reports, conference proceedings, declarations and conventions. Similarly documents of national importance including laws, regulations, reports and statistics should also be available. It is understandable that such documentation cannot be made widely available, mostly for financial reasons. But this points to the need of a central official documentation unit which should be established within each country. This function could be coordinated by the EEU which must ensure that all documentation is professionally catalogued to facilitate retrieval and reference to it.

19. Special mention should be made of the media which appear to be the major channels of environmental research information for the general public. The media have the advantage of being fast channels which reach a relatively wide range of individuals and interest groups. However they suffer from (i) possible misinterpretation of the original information, and (ii) the exaggerated emphasis on what is sensational and topical at the expense of equally important but less dramatic findings. These factors may lead to distorted reports of research findings which give rise to confusion and perhaps inappropriate action by misinformed citizens.

More attention should therefore be given to the media as conveyors of environmental research information. Within each country, the problem of misinterpretation can be partly solved by the EEU, which can supply the media with specially prepared materials for publication or for broadcasting and, more generally the unit can advise on environmental topics. A different strategy on an international level should be adopted to supply international news agencies with clear, concise information about environmental research findings which avoids possible misinterpretation and distortion.

20. The Environmental Education Unit may also be asked to prepare special reports on specific environmental issues for policy makers. With up-to-date environmental information at hand and with the help of other experts, the EEU can play a very useful role in the development of environmental policies on issues of national, regional and global importance. This role will become increasingly important as governments are being asked to approve declarations in international fora and to ratify international conventions regarding the environment.

21. The Unit can co-ordinate activities to update teachers and teacher educators on progress in the various fields of

environmental research. For this purpose it can organise in-service courses on a regular basis. Researchers and other experts may be needed for giving the courses and for preparing course materials which can be distributed to participants. The Unit may also organise occasional seminars, discussions and debates by prominent experts with the intention of disseminating new knowledge in an informal way.

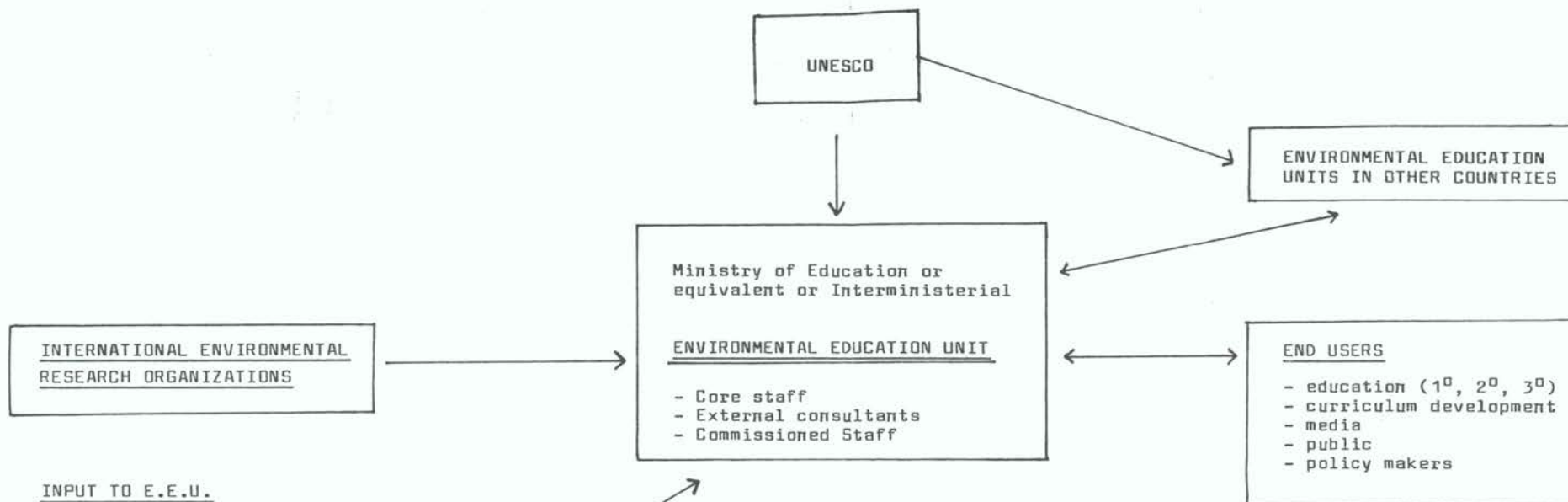
22. The work of the EEU cannot all be carried out by the staff of the Unit, but the Unit can call on the help of external consultants and some work may be commissioned out to researchers, teachers, curriculum developers and others as appropriate.

23. In order to perform its functions, the Environmental Education Unit needs to be properly established and recognised by researchers and educators. In many countries, the proper place for such a Unit would therefore seem to be either within a Ministry concerned with education or the environment, or under the responsibility of an inter-ministerial committee. Naturally, an adequate budget will need to be voted to enable the Unit to carry out its various functions, however other sources of funds such as major industries, media and other businesses could be tapped.

24. UNESCO may wish to support the setting up and evaluation of an Environmental Education Unit in one or more countries with different educational needs. A case study of such a project would provide an evaluation of the suggestions made in this document and it could also identify new ways of disseminating environmental research findings more widely.

25. UNESCO may wish to invite national educational authorities to organise and promote bilateral and multi-lateral consultations designed to promote environmental education in accordance with the principles of education for peace (peace education), respect for human rights (human rights education), the free flow of information (media education), and education for endogenous, integrated development centred on man and his future (development education).

26. A summary of the functions and connections of the Environmental Education Unit proposed in this document is found on the attached flow chart which gives an overview of the suggested strategy for a smoother flow of environmental research information in environmental education.



INPUT TO E.E.U.

- directly
- indirectly through central clearing house within IEEP

INDIVIDUAL RESEARCHER OR GROUP

FUNCTIONS

- to identify country's needs with respect to EE
- to receive information from international research agencies, individual researchers or groups
- to sift this information and classify it according to EE needs of country
- to prepare information in an appropriate form for different target groups
- to disseminate information to:
 - educators (all levels)
 - public
 - media
- to act as a resource centre for environmental information
- to prepare executive reports for decision makers
- to conduct training programmes on EE for key personnel:
 - teachers
 - media people
 - youth leaders
 - religious leaders
- to keep educators abreast of new developments through specially organised workshops or in-service courses
- to prepare material which can be used by educators (e.g. audio-visual aids, information packs)
- to prepare annotated bibliographies, abstracts and directories

CONCLUSIONS

1. The meeting feels that there is a large number of international organisations generating research.
2. These international organisations produce a large amount of publications of a technical and semi-popular nature which are widely distributed by them.
3. These publications do not always reach the target groups especially educators and curriculum developers in developing countries.
4. One strategy which might facilitate the smooth flow of information between international research organisations and the end users is to establish a national Environmental Education Unit (EEU) within each country.
5. The functions of the Environmental Education Unit are:
 - (a) to receive, digest and prepare in an appropriate form research information for dissemination to educators, curriculum developers, the media and the general public;
 - (b) to act as a resource centre which can be accessed by interested individuals;
 - (c) to produce curriculum materials, and other materials suitable for the media;
 - (d) to coordinate the preparation of executive reports about the environment for decision makers;
 - (e) to conduct training programmes on Environmental Education for key personnel;
 - (f) to prepare annotated bibliographies, summaries of research and directories.
6. Unesco might coordinate the activities of EEUs within countries in a particular region through the establishment of regional coordinating centres, possible within the framework of IEEP.
7. Unesco could consider funding an EEU pilot study in one or more countries.

Opening address by Dr James Calleja, Executive Assistant to the Director-General of the Foundation for International Studies Hon. Minister, Distinguished Guests, Colleagues, Ladies and Gentlemen.

It is with great pleasure that I welcome you to the Foundation for International Studies for this Consultation on the Use of Findings on Environmental Research to Environmental Education. Professor Salvino Busuttil, the Director-General of this Foundation, who is unavoidably absent, asked me to convey to you his best wishes for a successful meeting.

I am delighted to greet, the Hon. Minister of Education Dr Ugo Mifsud Bonnici who is also responsible for the Environment. Mr Ghafoor Ghaznawi Programme Specialist in Environmental Education of the Division of Science, Technical and Environmental Education of UNESCO and the coordinators of this meeting Professor Patrick Schembri of the Faculty of Science and Mr Frank Ventura Senior Lecturer at the Faculty of Education of the University of Malta.

I also wish to welcome a special participant in this Meeting Professor Elizabeth Mann Borgese, Chairperson of the International Ocean Institute which is based in Malta, a figure of international repute on the law of the sea and the rights of future generations towards their environment.

A special welcome to our guests from Ethiopia, Finland, Sweden, the United Kingdom, Switzerland and Italy. It is indeed our pleasure to have you all here with us this week and I hope you are enjoying your visit to our island. The more your country and ours get to know one another, the better it is not only for our two nations but for all the nations in the world.

Malta has lately been the venue for a world summit. Once again this Island has been called upon by the international community to give its share to peace and prosperity in the world.

This meeting, though on a much smaller scale, vests us with the responsibility of investigating environmental research and how this could be integrated through environmental education in educational systems. We are lucky to have a good number of different nationalities represented here so as to help us compare and contrast the various approaches which are being taken in environmental education now and what plans for the future lie in stock.

Education, as John Ruskin once said, does not mean teaching people to know what they do not know: it means teaching them to behave as they do not behave. As an educator by profession, I fully support this view on condition that we as educators or planners communicate an element of "savoir-faire" to all levels to society. For the ideology and development of the human environment largely depends on various forms of communication. The breath and complexity of such a process is the function of education. Communication, education and the environment are undoubtedly important means of promoting ethics and active participation in an orderly society.

In a study which I undertook in 1987 I tried to define and clarify a philosophy of education aimed at furthering knowledge and improving awareness, attitudes, motivation and skills about the total environment physical and social, through communication. My belief is that the environment itself is a form of communication and that people could learn how to communicate through the environment. However, a free flow and a well-balanced inter-relationship between man and his environment can only be ensured if action is taken, through formal and non-formal education to remove existing obstacles in our environment both in the physical and its social dimensions and consequently eliminate obstacles in communication: social, psychological, economical, or prejudice etc ...

Emphasis must also be laid on what I term "the cultural value of environmental communication". In other words to cristallize the uneasy dialogue between the environment as a whole and the world of communication. This relation has long been one of barely disguised antagonism or silence. I share with many contemporary philosophers the idea that a better world for us and for future generations depends on the levels of communication since messages convey an enormous quantity of information on which strategies of action can be built. Nicholas Suhmann once said that "social systems are built upon communication. All that is not communication is for them environment". The relationship between communication and environment, between man as a social being with potentialities to perceive and interrelate all of the complexities of a social system, and the environment, makes it commonplace to speak of communication, education and the environment as the web of society, the essential link among individuals, groups and institutions.

I therefore look forward to participate in this Meeting as an exercise in communicating facts and ideas that would lay stronger foundations for environmental education.

We are honoured to have with us this morning the Hon. Minister of Education who for the past two years as Minister responsible for the environment has worked to promote environmental education both locally and internationally.

Hon. Minister, thank you for being here with us this morning and for finding time on your busy schedule to address us.

Statement for the opening session of Consultation Meeting on the Use of Findings of Environmental Research in Environmental Education Malta, 11 - 13 December 1989 by Dr Abdul Ghafoor Ghaznawi. Unesco, Paris.

Hon. Minister of Education, Mr Chairman, Ladies and Gentlemen,

It is an honour and a pleasure for me to welcome you on my own behalf and on behalf of the Director-General of UNESCO, Professor Federico Mayor, to this Consultation Meeting on the Use of Findings of Environmental Research in Environmental Education. The Meeting is organised by the Foundation for International Studies at the University of Malta in cooperation with UNESCO-UNEP, International Environmental Education Programme (IEEP). This Consultation Meeting was planned in the context of Unesco's Programme and Budget for 1988-1989 (para 10906 24 C/5).

Ladies and Gentlemen,

Knowledge about the environment and its problem is on the increase. For a while it was pollution of the environment that attracted the attention. After this, it was other issues such as deforestation, floods, erosion, and extinction of species which became the topics of the meetings and publications. Not much was achieved in improving the situation than it was acid rain and its impact on agriculture, lakes and monuments which drew attention. The increase of carbon dioxide and other gases leading to the greenhouse effect with impact on sea-level rise and then the decrease of ozone in the atmosphere with its effects on living organisms, especially humanity, became the headlines. It was followed by anxiety about the depletion of non-renewable resources and their implications for development which has given birth to the concept of sustainable development. Now it is the global environmental change such as global climate change that draws the attention of the scientific community. Certainly, this is not the end. Perhaps, it is the tip of the iceberg. One can easily say that there is an explosion of knowledge about the environment and its problems. Much of this knowledge is the result of scientific environmental research and experimentation which are recorded in journals and publications and deposited in libraries.

The mosaic of knowledge about the environment and its problems becomes more complicated when environment is considered holistically and treated in an inter-disciplinary approach. It may be essential to point out that environment in its holistic nature is considered a "whole set of natural and social systems

in which humanity and other organisms live and from which they draw their sustenance. This concept includes the natural and man-made resources and products whereby human needs are satisfied. The natural environment consisting of the four interlocking systems of the atmosphere, the hydrosphere, the lithosphere, and the biosphere are in constant change but the nature and system of such changes are affected by human activities. The social environment includes human groups, the material infrastructures built by humanity, and the production relationships and institutional systems that humanity has devised. The social environment shows the way in which human societies have organised themselves and how they function in order to satisfy first of all, needs relating to food, shelter, health, education and work".

Generated environmental knowledge is essential but not enough. It ought to be shared with all concerned. In other words, the explosion of knowledge about the holistic nature of the environment and its problems mentioned above needs to be harnessed for the use of target groups in formal and non-formal environmental education. Environmental education is the educational process through which is imparted to its target groups the sensitivity, awareness, knowledge, skills, attitudes, commitment for actions and ethical responsibilities for the rational use of the environment and its resources and for the protection and improvement of the environment for the present and future generations.

The target groups of environmental education include the students of primary and secondary schools, industrial and agricultural schools, university education and the general public as well as the professional groups.

UNESCO in its Third Medium Term Plan (25 C/4: 1990-1995) gives high priority to the development of environmental education as part of basic education, including literacy and post-literacy education, for young people and adults alike, as well as primary education and secondary general, technical, vocational and higher education. Expressed needs of member states require that environmental education should be incorporated into school curricula, teaching materials, and preservice and inservice teacher training programmes.

UNESCO's Programme and Budget for 1990-1991 (25 C/5) focuses on the incorporation of environmental education into university and school curricula, teaching materials and pre-service and in-service teacher education programmes, mainly through 20 pilot projects for primary education and 10 for secondary education: 10 pilot projects for in-service training; 10 for specialists, and 24 research projects; training of about 100 educational planners and managers; five prototype curricula for primary education and

two for technical education: preparation and dissemination of four manuals, to documents, five audio-visual kits and adaptations of educational materials to local needs; and the publication of the quarterly newsletter "Connect" in six languages and the development of environmental education network at regional and international levels.

It should be added that UNESCO has four major intergovernmental scientific programmes functioning on the various dimensions of the environment and producing substantial technical data and knowledge. These programmes include the International Geological Correlation Programme (IGCP), Man and the Biosphere (MAB), the International Hydrological Programme (IHP), and UNESCO's Intergovernmental Oceanographic Commission (IOC). These programmes are the sources of environmental research findings at the international level. Similarly, much work is also done at national, regional and international levels with findings and outputs on the various dimensions of the environment.

The objective of this Consultation Meeting is to provide UNESCO with guidelines and suggestions on the ways and means of how to identify, select and transform into educational messages for various target groups of formal and non-formal environmental education, the essential environmental knowledge, especially that segment that affects humanity individually and collectively and which is on the increase at a rapid rate as a result of environmental research at national and international levels. UNESCO looks forward to your deliberations as the outcomes of the meeting. It is planned to disseminate widely your deliberations to institutions and professionals active in the field of environmental education especially concerning teacher education and curriculum development for various types and levels of education.

It is my duty to express my thanks to the Government of Malta and the Foundation for International Studies at the University of Malta for organizing this Consultation Meeting. I must add that Professor Busuttil has been a strong supporter of the development of environmental education. He has been instrumental in bringing to Malta this Consultation Meeting and the Symposium which was organised last week in the same place. This is not all. Professor Busuttil was one of the experts engaged in drafting the Declaration of the first International Conference on Environmental Education organised by UNESCO in cooperation with UNEP in Tbilisi, USSR in 1977. I want to thank Professor Busuttil and his staff members of the preparation and organization of this Meeting. Similarly, I thank Professor Schembri, the resource persons and the participants for making the needed substantive preparations and inputs to this meeting. I am grateful to the Hon. Minister of Education, Dr Ugo Mifsud Bonnici for honouring us with his presence here today and for being kind enough to open this Consultation Meeting on the Use of Environmental Research

Findings in Environmental Education.

Speech delivered during the opening session by Prof Patrick J. Schembri, University of Malta, on behalf of the organising committee.

Hon. Minister, Ladies and Gentlemen.

Allow me first to welcome our foreign guests to our Islands and to this meeting in my own name and on behalf of my colleagues of the organizing committee. We wish them a pleasant stay and a fruitful conference.

The Intergovernmental Conference on Environmental Education held in Tbilisi, USSR in 1977 acknowledged that the dissemination of specialized general knowledge on the environment, and the development of public awareness of the need for a correct approach to the complex problems of the environment, are of crucial importance for further economic development and the rational use of the planet's resources for the good of individual nations and of humanity as a whole. The international Congress on Environmental Education and Training held in Moscow in 1987 developed this idea further while the World Commission on Environment and Development in its final report "Our Common Future", came to a similar conclusion.

The aim of the present Consultation Meeting is to study the use of findings of international environmental research programmes in the development of environmental education programmes. During this meeting we hope to investigate the channels and modalities used by international scientific research programmes for disseminating their results to: the scientific community, to international and national educational institutions, and to the general public. To set the stage for this we are fortunate to have two keynote papers prepared by eminent experts: Professor Elizabeth Mann Borgese will speak about the flow of environmental research findings into environmental education, while Professor Nicholas Polunin will speak on environmental education programmes at international level.

We then hope to make a preliminary evaluation of the effectiveness of the transfer of research results to individual countries, and to international and national educational institutions, and to analyse the extent to which research information is incorporated in national education programmes, both formal and non-formal. This evaluation and analysis will be based on a number of case studies which have been prepared by our participants, who are all active in the field of environmental

education and/or research. Case studies have been prepared for Tunisia (Prof. M.L. Bouguerra), Finland (Prof. L. Aho), Sweden (Dr E. Ekehorn), the United Kingdom (Dr C. Gayford), Uganda (Ms D. Etoori), Egypt (Prof. Moharam), Ethiopia (Ms Beletu Mengistu), and Malta (Mr F. Ventura and coworkers).

On the basis of these studies and the discussions which will take place during the course of the meeting, we hope to draft a document which would include a summary of the proceedings of this meeting together with guidelines for the use of environmental research findings in environmental education. This document will be presented for discussion and adoption by the participants at a plenary session which will be held at the end of the third day following which it will be submitted to UNESCO.

I am confident that in spite of a large agenda, and the limited time we have at our disposal, with the cooperation of all concerned, we will nonetheless be able to come up with a valid contribution to this very topical and important subject.

Hon Ugo Mifsud Bonnici's Opening Speech of Consultation on the Use of Findings on Environmental Research to Environmental Education

First of all I would like to thank you for the honour of being asked to open this meeting.

However, I deem it not solely an honour, but rather I deem it a need, and so far as these meetings are functional I think that the politician is the person who needs them most. I would like to have more politicians listen to you and I would also like to tell you what in my particular position today I expect from you, namely the guide-lines so that the schools and the broadcasting media would be able to bring more environmental education to those who need it most. Sometimes too much is made of the hiatus between theory and practice, between academe and practical politics. This is the place where the link comes about; practical politicians in charge of Ministries like myself, need to take stock of what is the present position in this field, and I can give you my own evidence for this need.

Last year we enacted a new Education law in Malta, which law provides for a national minimum curriculum for primary and for secondary schools. When we came round to formulate this national minimum curriculum, something which is binding all schools in Malta, we had to face this problem of how to deal with environmental education.

We divided what should be the subjects of education and teaching, (and I make here a distinction to which I will refer later), into five classes. The first class was the normative, the ethical, the attitude forming part of the curriculum, the strictly educational and not the teaching part of the curriculum, amongst which we have religion, morality, civic education, methods of hygiene, and environmental attitudes. The third field was the field of science, solely cognitive subjects, and we had of course to relate what learning we gave especially in the scientific field to the earlier fields of habit formation, for example to that of attitudes to hygiene, and determine what cognitive part of the programme will prepare for that.

What cognitive part of the science syllabus should be linked to the environmental attitudes? This meant the changing of the whole science syllabus as it was imparted hitherto, because as soon as you relate what is to be taught and what attitudes to be stimulated in young pupils, you realise that certain parts of the formal scientific, cognitive syllabus are irrelevant and other relevant parts have been traditionally left out. That is why I am asking you how do we relate it, what are the new areas of scientific knowledge which should be relevant to teaching young boys and girls in the primary schools, the proper environmental attitudes and which we, as a society, are interested in having disseminated. I think that this kind of meeting is very, very important, in particular because of the schools and what happens

there.

What further strengthening of the environmental attitudes should we provide in secondary schools? I myself am of the opinion that to safeguard the environment, one has to have environmental consciousness and good attitude in all kinds of students, into the mass of the people, the people who will eventually come out of the schools. These people will never be in charge of a project: perhaps the general mass of people will never be in charge: to take the decision whether to erect an electrical power plant or not. But even at the level of the common citizen we now have come round to realise that every citizen has a role to play in safeguarding the environment. We cannot let the environment solely in the hands of Government and of the major economic operators. But those in Government and those who are in charge of the real transformation of the earth, need more environmental consciousness. They need to have a greater respect for the environment which should be embedded in a greater scientific knowledge of what may happen if the environment is not suitably taken care of. And here again I must give you my own testimony as a man in Government of how long the road still is to a true realisation, through scientific knowledge and through consciousness of the present position.

Some people in Government or in politics, to be less specific, and some even in the economic sphere still are weary of the word "environment" because they associate it with a band of weary-eyed environmentalists who, they think, are making too much fuss. So the first battle that is being waged today in the places where the decisions are being made is to have the environment considerations take their rightful place in every political and economic decision. The concept of sustainable development is being banded out. But how far are we, the people who are really in charge of making decisions, aware of what the environment needs? Even here we have to have further education through expert advice, through the broadcasting media, through the periodicals, through the papers themselves, of our responsibility to the earth.

Today being "green" is good and fashionable. It has become fashionable and much more environmental education has been disseminated than ten or twenty years ago when even the word "environment" and its connotations were still new. Yet we still have a long way to go. There is still a generation which is making economic considerations and calculations about the feasibility of projects does not properly consider the impact on the environment. Some people have not really realised that the destiny of our earth is in our hands and that whatever we do determines our future - our common future. Some people still think that it is costlier to think about, to give environmental considerations. It is not costlier. But people must be made to realise that both in the medium and the long run it is not costlier enough perhaps it may be costlier in the very short run - but this is taking a miopic view of things. People have to be made aware of this through more knowledge, through more

scientific knowledge, and through the establishment of more links, particularly within scientific community.

How do you get through to be taken seriously in the newspapers? How do you get through to be taken seriously by whoever makes the decisions?

When I was coming here I said "this is an occasion I should not go merely to open. I should come and listen, especially with an agenda such as you have". Unfortunately I cannot do it. I have other matters to attend to though perhaps I can look forward to see your deliberations and the results of your deliberations published. But at least this is a plea for people like me in Government.

I was going to start my speech by saying "fellow members of the educational community", because we all are in the same boat really. We have to make people aware, to educate in the sense that we have to make them change their attitudes. But, we have to do it through our own minds. As always, you have to educate through learning. People are not educated as Pavlov's dogs, they are educated through their minds. How the link is made is what I think is very very important.

Thank you for the help you will be giving us, I wish you success in your task.

Thank you.

Annex 1

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Annex 2

PROGRAMME

CONSULTATION ON THE USE OF FINDINGS ON ENVIRONMENTAL RESEARCH TO ENVIRONMENTAL EDUCATION

11th December 1989

- 09.00 Opening Ceremony
 Dr James Calleja, Executive Assistant to the Director-General of the Foundation for International Studies
 Dr A Ghafoor Ghaznawi, UNESCO
 Prof Patrick J. Schembri, University of Malta
 Hon Minister of Education, Dr U. Mifsud Bonnici
- 09.30 Coffee break
- 10.00 Keynote Paper:
 The flow of Environmental Research Findings into Environmental Education for the Future
 E. Mann Borgese, International Ocean Institute, Malta
- 10.45 Discussion
- 11.15 Case Study:
 Environmental Research Findings and Their Application to Environmental Education in Finland
 L. Aho, University of Joensuu, Finland
- 11.45 Discussion
- 12.30 Lunch break
- 14.30 Case Study:
 Human Ecological Education and Research, and its relationship to Environmental Education in Sweden and internationally
 E. Ekehorn, Sweden
- 15.00 Discussion
- 15.15 Coffee break
- 15.45 Case Study:
 Perspectives for environmental education programmes: a proposal
 G. Ronsisvalle, F. Urzi, R.E. Scossiroli, Italy
- 16.00 Discussion

- 16.30 Working Paper:
Networking
N. Dajoni, Switzerland
Read by N. Polunin, Switzerland
- 17.00 Closing of Session
- 19.30 Reception hosted by the Director-General of the
Foundation for International Studies

12th Decemeber 1989

- 09.00 Keynote Paper:
Environmental Education Programmes at International
Level
N. Polunin, Foundation for Environmental Conservation
Geneva, Switzerland
- 10.00 Coffee break
- 10.30 Case Study:
Towards a common understanding of Environmental
Education for Children in Schools in Britain: A report
of the findings of surveys made in schools from 1986 to
1989.
C. Gayford, Faculty of Education, University of Reading,
United Kingdom
- 11.30 Discussion
- 12.30 Lunch break
- 14.30 Case Study:
Environment Education and the Diffusion of Environment
Research Findings in Malta
F. Ventura, P.J. Schembri, A.E. Baldacchino, Malta
- 15.00 Discussion
- 15.30 Coffee break
- 15.45 Case study:
Using Environmental Research Finds in Environmental
Education in Ethiopia
B. Mengistu, Ministry of Education, Addis Ababa,
Ethiopia

- 16.30 The Role of Components of the Environment in the
definition of marginal areas in the Mediterranean Region
R.E. Scossiroli, Italy
- 16.45 Discussion
- 17.20 Closing of session

13th December 1989

- 09.00 Round Table Discussion
Strategies for Disseminating Findings of International
Environmental Research Programmes
Chairman: Dr A. Ghafoor Ghaznawi - Programme Specialist,
Environmental Education Section, Division of Scientific
Technical and Environmental Education, UNESCO
- 11.30 Cultural Excursion
- 13.00 Lunch break
- 14.00 Cultural Excursion (cont.)
- 16.00 Official Closing
(Grand Hotel Les Lapins)
Presentation of Draft Report
Prof P.J. Schembri, Mr F. Ventura, Dr J. Calleja

Chairman: Dr A Ghafoor Ghaznawi. UNESCO

THE FLOW OF ENVIRONMENTAL RESEARCH FINDINGS INTO ENVIRONMENTAL EDUCATION FOR THE FUTURE

Elizabeth Mann Borgese

SUMMARY

I can see three key elements, plus one in this question. These are; training (i.e. education), research and environment - 'plus one' is the future.

Education

Education has been in crisis for at least half a century. Education is not today what it was then I went to school, and this generation gap has been with our society since time immemorial. But today the break is a bit more significant than that. In the past, the main purpose of the educational system was to socialize the student; to fit him or her in the existing social, cultural and economic context - what the Club of Rome in its report "No Limits to learning" calls "maintenance learning". With the shocks this social, cultural and economic context has undergone in recent decades, such a system will not longer do, what is needed now is what the Club of Rome calls "innovative learning" - to teach how to learn; to adjust to change rather than to a stable system. Learning has become a life-long need and obligation.

The educational system now includes the work place. Industry now spends a considerable proportion of its budget on training and retraining its personnel as specializations become ever more rapidly obsolete. If overly specialized training comes to dominate the outlook of an individual, the Club of Rome says, it tends to impede participation, to block personnel fulfilment and to contribute to personal alienation from society. Specializations can be adjusted to rapidly changing needs only if there is a broad, interdisciplinary basis to which to return and from which to move in new directions. The big issues of contemporary life - food, energy, environment, disarmament, development, employment - are increasingly interdisciplinary and cannot be straightjacketed into the traditional, sectorial educational system.

An "innovative" educational system, the Club of Rome says, must be participational. Students must learn to participate actively in the whole process, from curriculum determination to teaching methodology. The right to participate must be extended to all

layers of the population and their needs and their culture must be reflected in the programmes. Since it is impossible to ask the abjectly poor to actively participate in this sense, it follows that an innovative, participational educational system must aim at the eradication of poverty. And this applies to the difficulties for the maldistribution of educational resources is even worse than the maldistribution of economic resources.

Traditional methods cannot cope with a problem of this magnitude. New, innovative teaching and learning methodologies, generating spin-off and multiplier effects, must be resorted to including distance learning, television, interactive computer programmes etc. These are available or can be made available. What is needed is the political will.

Research

The role of scientific research in contemporary society has been transformed as fundamentally as the role of education. In the past research could afford the lacklustre of the ivory tower; today, and even more so tomorrow, science "is explicitly assuming the role of a means of production" (Adam Schaff). Basic research is the foundation of applied research which is the basis of research and development which is the heart of technological innovation which, today, is the prime engine of economic growth. The role of scientific research has assumed unprecedented social importance, breaking the divisions between disciplines and departments and penetrating government and industry.

Training and research are intimately linked in the science-based industrial enterprise. One learns while doing research. Training is part of research and research is part of training. This applies also to the case of training and research in environmental sciences.

Environment

Environmental studies, as a discipline, lie athwart the natural and the social dimensions and their inclusions in an otherwise unchanged curriculum. The concept of environmental studies, rather than being added on the curriculum, should be infused into every department of a university, into every discipline of a secondary school.

Interdisciplinary courses should be introduced, drawing on the faculties of all the involved disciplines. This may sound simple, but it is difficult and frustrating because the different

practitioners live in different worlds, have different perception and speak different languages. Yet, the barriers between disciplines have to be brought down if environmental studies are what they are supposed to be and if they are to be effectively intergrated into the curricula of the future.

Links

Monitoring the health of the environment is the basis of environmental research. This activity need not be restricted to scientific research institutions but, on the contrary, the more people that are involved in it, the more successful it will be. Environmental monitoring should be participational, involving together scientists, NGOs, volunteers, fishermen, navigators, coastal residents and students. The Club of Rome suggests a general framework for integrating this kind of research into the learning process, especially in developing countries. One might envisage industries or Government departments contracting universities or even secondary schools to undertake several weeks of environmental monitoring and to report their results for academic credit.

Another way of linking the three terms of our theme is through regional centres such as we have proposed for research and development in marine industrial technology. The purpose of these centres should be the joint development, both South-South and North-South, of environmentally sound and socially relevant technology. This would include pollution monitoring and control, environmental impact assessment, and the intergration of environmental parameters into economic forecasts, cost-benefit analyses, and marketing projections related to such technologies. Any project carried out under the auspices of the Regional Centre would have the participation of at least two countries, at least one of which would have to be a developing country. The cost of the project would be borne half by the private sector (the industrial enterprise who would have proposed the project) and half by governments or intergovernmental organizations. The participation of the developing country would be paid for by a development corporation agency such as the World Bank or UNDP.

Scientists and engineers from developing countries would participate on an equal footing in the research and development activities, alongside their partners from the developed countries. Additionally, trainees could be taken on to assist in the research. The results of the R & D are to be shared by all participating countries. The technologies developed in common are owned in common. The traditional - and very unsuccessful - concept of "technology transfer" has been replaced by the more dynamic, more modern concept of "joint development of technology".

Obviously, joint development of technology has a strong, built-in component of training and learning and represents a direct flow of environmental research findings into education. Here research is part of training and training is part of research.

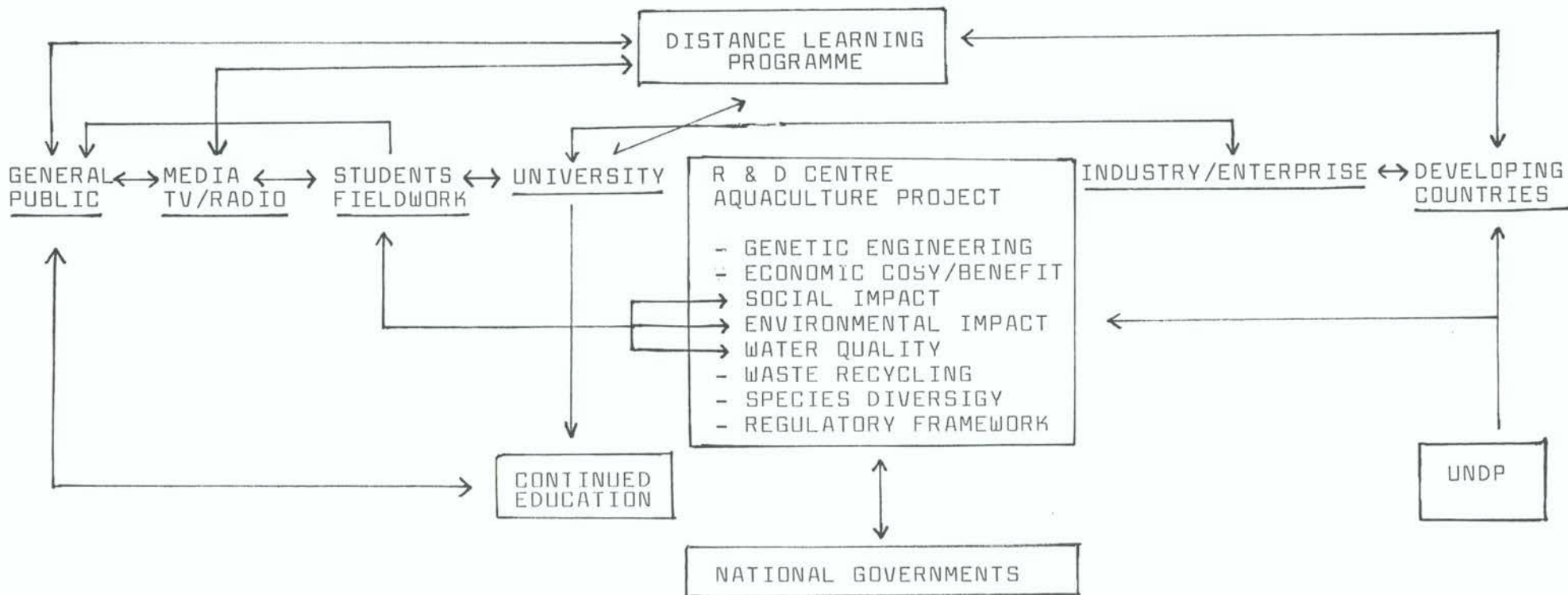
The regional centres should also conduct, or be linked to, regular training programmes directly benefiting from the findings of the scientists and engineers in the R & D.

The regional centres are conceived as focal points of very diffuse institutional networks. Although these networks will vary from region to region, we tried to design a general scheme, which was included in our feasibility study for the Mediterranean Centre for R & D in Marine Industrial Technology (Fig 1).

The Future

In the longer term we certainly will have to rely on the new technologies of education - distance learning technologies, television, radio, interactive computer programmes, etc. for the building of an educational system that is innovative, widely participational, both internationally and nationally, linking national, regional and global levels, adjusting to change rather than to a stable system, and having a genuinely interdisciplinary approach to the major issues of contemporary life. How can the flow of environmental research findings be enhanced in such a system? I have tried to design a simple flow chart to describe a very complex process, taking an aquaculture project as an example (Fig 2).

I think such a scheme probably maximises the flow of environmental research findings, integrated into a development project, into environmental educational for the future.



LINKAGES BETWEEN ENVIRONMENTAL RESEARCH AND EDUCATION
MULTIPLIER EFFECTS

Industries identify technologies with marketing potential (short-term)

National agencies identify and prioritise technologies:

- intensively using scarce factors of production
- stimulating indigenous technology
- bringing idle factors into production
- having minimal socio-cultural or distributive impacts
- fitting into national goals (medium-term)

High-tech institutes identify futuristic technologies (long-term)

RC collates all information

- disaggregates technology
- harmonises long, medium & short-term forces
- identifies critical components
- identifies areas of development
- draws up proposals

RC also organises

- training programmes
- information dissemination
- symposia, conferences, seminars
- advisory services

Council of Ministers decides on:

- Work plan to be taken up
- Arrangements for funding

Work allocated to:

National
R&D
Institutes

Universities

Industries
R&D

RC

Association
through-training
Institutes

THE FINNISH CASE STUDY ON ENVIRONMENTAL RESEARCH FINDINGS AND THEIR APPLICATION TO ENVIRONMENTAL EDUCATION

Leena Aho

Introduction

In Finnish environmental education the thinking that can be found in the publication Environmental Education in the Light of Tbilisi Conference (UNESCO 1980) have commonly been accepted. According to it one of the primary aims of environmental education is to enable human beings to understand the complex nature of the environment as this results from the interaction of its biological, physical, social, economic and cultural aspects. These are important in environmental decision-making too.

Research Findings

Environmental problem solving and decision making provided a crucial starting point in my research project "Man and Nature - an educational point of view". The object population consisted of students in comprehensive and upper secondary schools, students in teacher education and teachers.

The students and teachers had to decide if they took a stand for or against exploitation of nature. It was possible to prove that certainty of solutions depended on the environmental problems. Seven different problems were included. The strongest objection was found against turning a park into business quarters. Building a nuclear power station and building a hydroelectric power station were also objected to. Instead, establishing a conservation area was strongly supported. However, it was difficult to decide if the tourist and recreation centre, the industrial plant, or the hazardous waste disposal plant should be built or not.

The students and teachers were also asked, what factors in different cases were for the exploitation of nature and what factors were against it. The arguments could be classified according to their contents into five groups: socio-economic, ecological, social, ethical and aesthetic. Clearly, the economic, ecological and social aspects were presented more often than the others. The ethical and aesthetic arguments were not as common as those mentioned above. The significance of values in decision making process appeared when the students and teachers had to express their own opinions and to justify them.

Further, different orientations to assure exploitation have been found in the solutions made by the teacher to twelve year old school children. The pupils favoured most three orientations:

- (1) nature must be protected in every possible way;
- (2) technology can solve environmental problems, and
- (3) part of nature must be exploited, part must be protected.

In handling an environmental problem from different viewpoints the pupils had difficulties. This can partly be explained by the fact that teaching at school is divided into different subjects whereas environmental education is interdisciplinary.

Conclusions

The research on the relationship between man and the environment and the research on environmental sciences produces background information for implementing environmental education at the various levels of education. Practical experience alone will not provide adequate basis for the curriculum, it is also necessary to consider theoretical and didactic starting-points, and this is the task of educational research. In any case, research on environmental studies and environmental education (didactics) is needed in order to advance teaching.

HUMAN ECOLOGICAL EDUCATION AND RESEARCH AND THEIR RELATIONSHIPS TO ENVIRONMENTAL EDUCATION IN SWEDEN AND INTERNATIONALLY

Eva Ekehorn

Environmental research and studies provide us with a great amount of data and knowledge about the natural environment. We need this information if we want to understand more about the impacts of human actions on the environment and also what can be done about them.

However, as I see environmental studies and science, they all have their focus in the natural environment. But it is not the environment that has to change its pattern, it is human beings, people, that have to come to terms with their life styles and values. It is human beings who are the great transformers of the environment. What is driving us to behave in the way we do? Why do we use certain resources and not others? Why do we waste and pollute, and why is it difficult to change?

For many people, religion has provided the guidance as to how to behave, how to interact with one's neighbours and with nature. With our increasing dependence on science to explain everything for us, many of these guidelines have been discarded, and we are fumbling for new ones.

As science has become more specialised, and analyses have become more important than synthesis, science has increased our confusion. This confusion is compounded by the scattered information in mass media and contradictory statements from scientists and politicians in the debate as to what to do. Information is not the same as knowledge.

Human ecology, the study of the relationships between man and the total environment, is a new discipline which can help students in providing a world-view, based on integration of scientific knowledge and research. Thus it can provide a bridge between the confusing flow of media information and the more exact, but not always easily understood, knowledge produced by environmental researchers.

Human ecology should give an understanding of time and space, giving the essence of the natural environment of man, but it should also inquire into the characteristics of human beings, especially their cultural and social behaviour. In particular it should investigate and stress the relationships. A perspective like that should be both historical and global, with an outlook for the future.

In Gothenburg short under-graduate courses of ten weeks duration have been given since 1972. Later a full year course has been developed, and since 1978 a doctoral programme has also been offered. The short course is the basic one, and it is directed towards all kinds of students, from all backgrounds, even non-academic.

The course provides the students with an understanding of ecosystems, the concept of energy, matter and information, the transformation of resources, and about man's social and cultural adaptability to different environments and to change. This common understanding, together with the students' enormously varied backgrounds and age, contribute to a better problem formulation and analysis of the major problems of today. This is an extremely useful perspective and knowledge for the students when they return to their ordinary jobs, e.g. as teachers, and it can be a useful platform for a continuation, e.g. toward further studies in environmental sciences, and in regard to a person's own life it can be invaluable. At least many students of this course say so.

It is not only the students that have to restructure their knowledge regarding man's environmental relationships, we as teachers have to do that too. It is a valuable experience to see that your own specialisation is part of something greater, and you feel humble by the complexity of knowledge.

Internationally, human ecological education is to be found in all parts of the world. The perspective varies from university to university, partly due to different educational systems, but also due to specific traditional backgrounds. Similar programmes as that in Gothenburgh are in existence in other parts of Sweden, but could also be found in the USA, at the College of the Atlantic, and in India.

The area of study in human ecology is so large and complicated, and we can see a great diversity as to how to venture into this field. There are programmes that use the perspective of home economics, architecture, health and the study of tourism. More and more research programmes are being set up at many of these universities, but as research in human ecology is difficult, due to the lack of theories, concepts and methods, it will take time before we can see the results of this research in the field of education.

International organisations in human ecology do much to disseminate the concept of human ecology to universities.

schools, decision makers and the public, by means of conferences, books and articles. The two major organisations are the Society for Human Ecology (SHE) and Commonwealth Human Ecology Council (CHEC). SHE is the most academic one. Its purpose is, among others, to provide a forum through which scientists, scholars, educators and practitioners may exchange ideas and information. Much emphasis is put on the development of methods, concepts and theories in human ecology. CHEC is working at all levels in society, from governments to communities.

Human ecology is closely related to environmental studies. It seems that the longer the course in either subject, say two years or longer, the closer they come. If environmental studies ignore the social and cultural factors, and human values too much, solutions to environmental problems will serve only as a pill relieving the headache temporarily, but not curing the disease. The 'man in the street' has to be educated on the relations between man and his environment. In this context I think a short course in human ecology, like the one in Gothenburg, has proved to be an excellent way to start. It can provide the first skeleton of structure on which to base wider knowledge, be it environmental studies or anything else.

PERSPECTIVES FOR ENVIRONMENTAL EDUCATION PROGRAMMES. A PROPOSAL

G. Ronsisvalle, F. Urzi, R.E. Scossiroli

The increasing role of ecological problems in the Mediterranean Area point to the need of having available technical people with the scientific basis to describe the present situations of crisis of the environment and to provide suggestions for proper solutions.

With the goal to fill the need of such type of scientific, technical and practical knowledge to approach the problems induced by environment deterioration, an association of scientists and managers has been established in Catania under the name of Istituto di Formazione e Ricerca nel Mezzogiorno (ISFORM).

The activity of ISFORM is in line with a systemic vision of material resources and environmental problems from the point of view of an advanced team to improve public administration, provide specialized services, planning, realization and control of projects, in cooperation with universities, scientific and cultural institutions active in the South of Italy.

An important aspect to consider is the promotion of the formation of specialized technicians in the field of the environment.

Under consideration of ISFORM is a programme of education to be realized through a Course for the formation of technicians in the domain of environment.

The aim of the course is to teach the necessary bases of knowledge to prepare personnel for environmental management covering a large set of competences.

The proposed contents of the Course are listed. Theoretical preparation is expected to be parallel to practical examples to be found and worked out from the present situation in Sicily.

The course should be opened to people coming also from the Mediterranean countries.

NETWORKING

Naseb H. Dajani, Global Harmony Foundation

1. What is a network?

A network is a web of free-standing participants, be they persons, groups, institutions, etc . . . , adhering together through shared values, goals and/or interests.

A network is both a whole in and of itself, and a part of something larger than itself. Isn't all of life made up of whole things that are also a part of something else?

Networks are composed of self-reliant people and of independent groups or institutions.

One can find the following common patterns:

- A. Networks are whole systems composed of relatively autonomous participants;
- B. Networks are created and sustained by bonds of shared values among participants; and
- C. Networks are the connections that make us all one people on one small planet.

2. What is networking?

Networking is people connecting with people, linking ideas, resources, and operations.

It is this sense of cooperation among self-reliant, decision-making, peers that make the essence of networking. Networking renders each participant more responsible, self-respecting, and creative, than he or she should otherwise be.

The process of networking itself changes those who are networked, by enhancing each person's vision and expanding one's matrix of connections and operations.

3. What are the objectives of networking?

The main objectives of networking comprise the following:

- A. the reciprocal nurturing of resources and activities leading to a major goal;
- B. the complementarity in thought and action; and
- C. the unification of efforts and goals.

4. What are the characteristics of networking?

Networking is characterized as a process with the following:

- A. Dissonance and agreements: A dynamic equilibrium between a

few agreements on shared values and many disagreements on 'how to get from here to there'.

Dissonance is not only tolerated but encouraged, yet agreement is a common goal.

B. Decentralized: the parts of a network are essentially independent and generalized.

In networks, decision-making is distributed; networks are coordinated, not controlled.

C. Polycephalous: This literally means many headed; leadership comes from different sources, and is fluid.

D. Multilayered: Networking, while generating levels, preserves autonomy and prerogatives for decision-making in each participant at each level.

In networks, information and decisions flow in all directions, up and down and across the layers of organization.

E. Participatory: The means are participatory. Sharing and caring are the gyroscope.

5. What vitalizes a network?

What vitalizes a network is this sense of cooperation among self-reliant, decision-making peers.

Networking swallows up buck passing and renders each of us more responsible, self-respecting and creative.

The empowerment of networks and the reason they are cemented together is personal trust and respect.

An invisible, unweighable, intangible glue vitalizes a network and holds it together. This glue is shared values.

6. What is the scale of networking?

Since networking is a structure that knows no bounds, its scale may cover the following:

A. Local: Networking may take place amongst several groups or institutions in a community, town or city.

B. National: Networking may take place amongst several institutions operating in a country.

C. Global: Networking may take place amongst several institutions operating all over the globe.

7. What is the difference between networks and bureaucracies?

Although networks and bureaucracies both have level structure and are wholes with parts within wholes, networks and bureaucracies differ in how they structure the relationship between the whole and its parts.

Bureaucracies tend to bring parts together through centralized

control and to maximize the dependency of parts of the whole.

Networks tend to bring parts together under decentralized cooperation and to minimize their dependency on the whole. Network parts are dispersed and flexibly connected, as bureaucratic parts are concentrated and rigidly connected.

In addition, networks cohere through the shared commitment of their participants to a cluster of values. The value bond is perhaps the most paramount aspect of networking. The power of a unifying idea lies in a deep commitment to a very few basic tenets shared by all.

I believe that the key to the future may very well be conceptual rather than organizational.

GLOBAL ENVIRONMENTAL EDUCATION: TOWARDS A WAY OF THINKING AND ACTING

William B. Stapp, Nicholas Polunin

SUMMARY

Our world of humankind and nature is becoming more and more seriously threatened as human populations and profligacy increase. Yet short of near-future calamity, there should be hope in global environmental education as a basis for countering such threats as those of world hunger, acidic precipitation, increasing desertification, nuclear proliferation, 'greenhouse' warming, and stratospheric ozone depletion. We need to educate people throughout the world to see it in its global context and act always within this perspective - be they decision-makers, legislators, or mere private citizens. For their actions and effects compound to make up those of their predominant species, the likes of which our unique planet Earth has never experienced before, and consequently its all-important biosphere, constituting virtually the whole of our and nature's life-support, is totally unprepared to withstand.

The above means that decisions and concomitant actions at the personal level can and often do affect the globe, to however infinitesimal a degree, and of this all people on Earth should be forwarded, acting on it with clear understanding and due responsibility. Particularly North Americans should realise that their effect is disproportionately large, as they use some 36% of the world's resources although comprising only about 6% of its population. Towards remedying such anomalies and effecting an improved sharing of responsibility among all the world's human inhabitants, an urgent need is, clearly, effective global environmental education. We need a world of concerned people with the knowledge that personal decisions and local actions can affect others very widely, and that each individual human being thus has a role in furthering solutions to environmental, as well as political and social, problems.

Probably the worst overall barrier to our salvation and long-term future for Mankind and Nature is that of human vested interests and some concomitant religious teachings which advocate, respectively, development regardless of environmental repercussions and more and more child-bearing - such that, many long-winded UN and other documents play down or do not mention these most fundamental problems. This leaves to educators - particularly environmental and human demography ones - the key to a better future for Man and Nature, from the latter of which of course the former stems.

With the need for such thinking and action so clear, and the stakes so very high, why is it that global perspectives are not better integrated into today's educational system? The answer is that the barriers to such integration and concomitant action are many and strong, and due understanding of holism's fundamental importance is barely beginning to sweep our prejudice-bound world. These barriers include lack of student interest and pertinent enrolment, lack of international perspective among teachers and in the general press, and lack of television and other news-media coverage of world affairs. A general obstacle lies in the tendency of educational efforts to emphasise differences rather than similarities - scarcely conducive to fostering an interdependent, one-world ethic. Yet global issues should be our ultimate considerations and holistic practice our means of furthering them for lasting survival.

It is clear that we humans no longer have the option of foregoing a global perspective, and that there is dire need for widely-increased global environmental education to inculcate greatly-increased respect and concern for the world environment. This is brought starkly to mind on realization that practically all the horrors which now beset our world were known fairly widely already twenty years ago - including threats to the stratospheric ozone shield, the 'greenhouse effect' on world climate, the effects of deforestation and devegetation, ever-increasing human population pressures, and many more - and that new ones keep on emerging. These latter include build-up of nuclear-waste and other pollutants, AIDS, ever-increasing acidic deposition and salinization, flooding of lowlands and other effects of climatic change, and further foreseeable problems that are likewise of our own making in being due to human overpopulation, ignorance, and/or profligacy.

ENVIRONMENTAL EDUCATIONAL AND THE DIFFUSION OF ENVIRONMENTAL RESEARCH FINDINGS IN MALTA

Frank J. Ventura, Patrick J. Schembri, Alfred E. Baldacchino

SUMMARY

Environmental education in Malta

Compulsory education in Malta starts at the age of five although many children are now actually starting school at age three or four. At this level pupils follow an open and flexible curriculum whose main aim is socialization and familiarization with an environment which is different from that of the home. Any mention of the natural environment is incidental and depends mainly on the individual teachers' priorities, interest and knowledge.

At the age of 8-9 pupils in government primary schools are introduced for the first time to basic scientific concepts and principles. Although not specifically environment orientated, through this programme pupils come across concepts related to the environment and develop rudimentary investigational skills which they can utilize in exploring their environment. Unfortunately, many teachers find it difficult to implement this programme as intended, although through a system of ongoing evaluation and in-service teacher training, improvements are being made.

At age 11 pupils transfer to a secondary school where for the first two years, all pupils follow a common curriculum which includes a component of integrated science. This curriculum is wide-ranging and only some 20% of it is directly related to the environment. After the first two years pupils opt either for specialization in a group of subjects or for a trade, both of which are studied at least for the next three years until the end of compulsory schooling at age 16. Trade school pupils follow a vocational course whose scientific content is minimal or too narrowly related to their trade and for such pupils scientific and environmental education practically stops at this stage. In the other stream, for those pupils who do not opt for science subjects, the science curriculum reduces itself to physics which is a compulsory subject and through which they hardly obtain any environmental education. Only those pupils who opt for the sciences (biology, chemistry and physics) directly receive some environmental education.

Of the increasing number of students staying on at school after age 16, only a comparatively small number study sciences through

which they come across environmental issues. A recent innovation however, ensures that all students studying advanced level subjects follow a multidisciplinary course called 'Systems of Knowledge' which contains a component on 'Man and environment'. A pass in this subject is required for entry into university. Except perhaps for 'Systems of Knowledge', where specific guidelines are given to teachers to integrate different areas of the course, a general characteristic of secondary education is that each subject is treated on its own with very little or no attempt being made at integrating the subject with other areas of knowledge or with everyday life. Consequently, reference to the environment in any subject, including the sciences, depends purely on the teachers' whims unless specific mention is made in the textbooks or other curriculum materials.

There is only one institution concerned with tertiary education, the University of Malta. Within this institution, diffusion of information about the environment takes place under three forms: (1) as formal educational programmes concerned with the environment, (2) as part of educational programmes not specifically concerned with the environment, and (3) extracurricularly. Many courses at the University of Malta have an environmental component. The main ones are: the science degree courses, where environmental themes are treated in the biology, chemistry and, to a lesser extent, in the physics units; the education degree courses where students specializing in the sciences follow the same units as the science degree students, while those specializing in teaching early and middle years take units in environmental studies; and the architecture and civil engineering courses where students taking the recently introduced planning option follow units in man-environment relationships. Additionally, guest lectures on environmental topics form part of many other courses.

A number of government agencies produce educational material concerned with environmental issues, while the Ministry of Education includes the Museums Department and the Department of Culture and Environment. Amongst other functions, the latter is in charge of nature reserves and also produces and disseminates educational material on the environment.

Features on the environment appear regularly in local newspapers, magazines and on local radio and television. With the exception of radio programmes which are almost totally locally produced, much of this material however, is of foreign origin. Local contributors of articles to newspapers and magazines, and of scripts for radio programmes, are usually the same few people who are active in environmental organizations both governmental and non-governmental, and who do so mainly out of personal interest.

Between them, Maltese non-governmental institutions (NGOs) have

undertaken an impressive series of initiatives aimed at creating and stimulating public awareness of the Maltese natural environment and the necessity of preserving it. Many of these initiatives were aimed at school children and young adults. The school children of the 60s and 70s are the citizens and community leaders of today and this, more than anything else, has been the cause of the awakening environmental awareness of the Maltese public.

Diffusion of environmental research findings to and within Malta

Various international governmental and quasi-governmental organizations active in the environment field supply local governmental agencies and NGOs with information about new developments. The information received from these international bodies can be classified as follows: (i) proceedings of meetings, seminars and symposia; (ii) technical reports; (iii) newsletters, magazines and other publicity material; (iv) administrative exchanges; and (v) press releases.

In the case of international governmental organizations, research and development information from these bodies is passed to the Ministry of Foreign Affairs from where it is channeled to the Government department concerned with the matter. Besides this formal procedure, a copy of the same information is usually forwarded by the international body directly to the Government department recognised as the local focal point on the particular matter. All reports and other material received by individual departments are kept by the department and are not accessible to the general public, although by special arrangement private individuals occasionally make use of them. Some Government departments have a sort of 'documentation centre' for the purpose, however, in most cases, researchers are referred to the desk officer handling the particular matter and who often has the only copy of the publication in question. Some international agencies distribute publicity material and other information directly to interested individuals and groups within the community on request.

Evaluation of the effectiveness of environmental education in Malta

An attempt was made to, firstly, identify those facts, concepts and issues which Maltese people should know and understand about the environment, and then to check the effectivity of the sources of environmental knowledge, including school, media and voluntary organizations, in imparting and developing environmental

understanding among various sectors of the community.

The main conclusion of this study was that while the Maltese population is fairly knowledgeable about the environment, this knowledge is fragmentary. The study also identified several groups of people who have a significantly lower awareness of the environment than others. In particular, people over 20 years of age had a significantly better environmental awareness than people under 20 years of age. Since the under-20s identified the school as their major source of environmental information, it was concluded that the school was not as effective as other sources, which included radio, television, books and newspapers, and the place of work.

Conclusions

Environmental education at primary and secondary level is not producing the desired results. Students between the ages of 13 and 19 do not have an adequate knowledge and understanding of principles relating to the environment. This is not surprising since the school curricula do not cater for environmental education specifically, and the integrated approach to teaching, through which one would expect the environment to feature, is simply not being adopted.

At the higher secondary level, the new 'Systems of Knowledge' course ensures that all prospective matriculated students encounter some knowledge about the environment, however, it is too early to gauge how effective this is.

A number of university courses at undergraduate level offer units in environmental education. However, some courses, such as those in engineering, law and medicine, in which one would expect to find at least a component of environmental education, do not offer such units.

Non-formal environmental education through newspapers, magazines and the broadcasting media is more effective than formal education. Especially helpful in this regard is the work of voluntary organizations concerned with the environment who have significantly increased the general awareness of the environment through their various activities. This informal education is possibly the most effective medium for reaching the general public.

The link between the research community and interested groups is usually through mediators or communicators of information. The

task of the latter is to see that the information reaches the appropriate audience in a format that has an impact and that can be understood by the non-specialist. Research results reaching government departments are passed on to the desk officer concerned who makes good use of them but this does not mean that they reach other government officers who could also use the results, because the channels between government departments are rather poor in this respect.

NGOs who receive information directly from international agencies pass it on to their members and sometimes publicise it widely. The final outcome is not always positive however, because the original results may be misinterpreted.

Individuals engaged in environmental research are usually fully informed about research abroad through direct links. Since these persons usually lecture at the University, their knowledge is diffused more widely through their students.

The general public is not well-served by official channels since there is very little or no access to government reports, while government files are considered confidential. Furthermore, there are no channels to find out what research information is available.

The most effective sources of information for the general public are the newspapers and the broadcasting media, especially television. In the case of newspapers, a certain amount of editing both by international news agencies and by local editors may result in a distortion of the original findings and in their interpretation. Similarly in the case of television, where congested programme schedules and the criterion of topicality often dictate what is to be or not to be transmitted.

THE USE OF ENVIRONMENTAL RESEARCH FINDINGS IN ENVIRONMENTAL EDUCATION IN ETHIOPIA

Beletu Mengistu

SUMMARY

1. Various environmental researches have been conducted. However, since the underlying reason to start an environmental education pilot project is an Ethiopian Highland Reclamation Study which was organised jointly by the Ethiopian Government and the Food and Agriculture Organisation of the United Nations, efforts have been made to use some of its findings in the environmental education pilot project which was started in 1985.

2. Ethiopia's environmental degradation, as in most of the developing countries, has been the major cause of starvation and death of several thousands of people and animals. The problem of recurrent drought and famine since 1973/74 has inspired concern and serious attention within and outside Ethiopia to rehabilitate the famine afflicted areas and to find a long-term solution to the problem.

3. The Ministry of Agriculture which is directly responsible for the rehabilitation of the drought-prone regions has been carrying out natural resources conservation activities since the 1970s. However, what has been achieved so far, when compared to the intensity of the problem and the size of the area to be rehabilitated, indicate that there is much left to be done. The attitude the rural population towards environmental management and development remained unchanged. The problem of lack of awareness and general understanding about environmental problems and their possible solutions among the great majority of the rural population indicated the significance of the involvement of the education sector for its capacity of raising the general awareness and understanding of the underlying causes of environmental problems and their possible solutions through its formal and non-formal delivery systems.

4. Thus, in line with the national education priorities that emphasized education for production, research and a new way of life and the development of curricula that combine learning with doing and theoretical knowledge with practical activities, environmental education began as a pilot programme following the disastrous famine of 1984/85. The project is financed by the Swedish International Development Agency.

5. The project began with the following objectives:

* to ensure the relevance of education to resolving the problem faced by the rural population of the highlands by promoting greater understanding of the environmental condition through the education system in rural areas.

* to raise the capacity of the education system through training and the dissemination of technical information.

* to promote a widespread pattern of community-based action in the formal (school) and the non-formal (adult) education system.

6. Teacher Training Institutes are made focal points of the project together with associate Pilot centres (schools, community skills training centres).

7. The Project is run by a Co-ordinating Committee composed of various departments in the Ministry; and the same kind of committees are replicated at regional and district level. At school and teacher training level, technical committees are composed of teachers of Geography, Biology, Agriculture and Home Economics. The dissemination of the ideas of environmental education is made through practical activities such as tree planting, vegetable growing, soil conservation activities, environmental studies and environmental hygiene.

8. The environmental research which the Ministry of Education at the moment is trying to make use of its findings is the Ethiopian Highland Reclamation Study. The theme of this study is conservation-based development strategy. The rationale of the study is the serious land degradation in the highlands which threaten economic and social development throughout the country. The aim of this study is to analyse and explain the processes, causes, extent and types of degradation in the highlands, to identify the areas and people most critically affected and threatened, to estimate the rates and costs of degradation in different areas both now and in future, to assess the need to tackle degradation, and to evaluate what is already being done to combat or avoid degradation.

9. In the findings it is indicated that there is lack of awareness about the underlying causes of land degradation and therefore education was mentioned as the most important tool to raise general awareness about environmental problems. Along with this, problems of health, drinking water, family planning and nutrition are cited as environmental problems.

10. Although the Ethiopian Highland Reclamation Study's findings are extensive beyond the environmental education pilot project capacity to use all findings, some from the aspects of awareness creating activities are used i.e.

- * seminars, workshops have been organised on environmental problems and their possible solutions for education personnel, school directors, teacher training instructors, students, pre-service and in-service teachers and farmers in the project areas.
- * to promote positive attitudes and commitment towards environmental protection and development, activities like establishing nurseries, planting trees, fruit trees, multi-purpose trees, flowers and vegetables, are carried out by students and farmers in project areas.
- * from the natural resource conservation aspect checkdams and hillside terraces are constructed to control soil erosion.
- * steps have been taken to introduce environmental studies at district level for use in primary schools
- * activities promoting environmental hygiene are carried out.
- * to raise the capacity of education in resolving the rural population problem the practical activities carried outside the class are integrated with the teaching of Geography, Biology, Agriculture and Home-Economics for the purposes of skills development about environmental protection and management.

Towards a Common Understanding of Environmental Education for Children in Schools in Britain

A Report of the Findings of Surveys made in Schools and among Teachers from 1986 to 1989.

Summary of a paper given by Dr Chris Gayford - The University of Reading, Bulmershe Court, Reading, Berkshire.

The research in this report falls into two parts. The first involved a survey of teachers and school pupils to find their Environmental Education experiences, their evaluation of these experiences and their attitudes to some of the major issues and problems facing mankind. The second was concerned with finding the opinions and attitudes of school teachers and other educators to the content of Environmental Education in schools in England.

In the first part of the study pupils and teachers were studied. The survey addressed the following:

1. The range of environmental education encountered, to include the types of activity and approaches as well as broad areas of content.
2. An evaluation, by those sampled, of their environmental education experiences.
3. The attitudes of people to specific environmental issues and problems.

Among the teachers part of the purpose of the survey was to find whether they had attended courses in Environmental Education and the nature of such courses. The majority of teachers had not been

on either extended or short courses but the general findings on the content of such courses were that:

- (i) there was more emphasis on rural than the built environment
- (ii) there was major emphasis on identification and knowledge about flora, fauna and geology
- (iii) although there was some emphasis on developing lower order skills such as observation and identifying, there was even less on higher order skills such as data collection, analysis and problem-solving
- (iv) time actually spent outside in the environment was relatively small
- (v) a good deal of time was spent discussing issues
- (vi) participation in environmental improvement often involved specific competitions and local projects, but there was little emphasis on participation in decision making.

Teachers and pupils were also asked about the type of teaching they had experienced.

It was clear that courses were dominated by activities related to transmitting information but problem-solving, presenting their ideas to others and role-playing activities featured much less frequently.

There were also important differences between those types of activities which were evaluated by the pupils to be effective in transmitting information and those that were effective in affecting their attitudes.

With regard to the attitudes of pupils to environmental issues. Generally the results showed that consistently those who had received some environmental education expressed views which corresponded with those of a panel of 30 environmental experts.

The main points to emerge from the first part of the research are:

1. Teacher education in environmental education is varied and many have had no specific training.
2. Methods experienced by teachers in training tend to be repeated in their teaching.
3. Environmental Education programmes in schools seem to have an effect on the pupils' attitudes or what they present as their attitudes.
4. It is important that methods are used in Environmental Education which help pupils in schools to confront their attitudes. It must not be simply assumed that increase in knowledge naturally leads to a change of attitudes.
5. There is a range of methodologies available for teachers, these are varied in their effectiveness and some involve teachers in radically re-evaluating their role.

The second part of the research involved a quite separate survey of teacher attitudes towards the general entitlement of children of 5-16 years in Environmental Education.

This is represented with the following basic structure:

1. Knowledge and Understanding
 - a. about the environment, ranging from local to global
 - b. of environmental issues, ranging from local to global to include influences both natural and human
 - c. of the variety of attitudes to environmental issues and the values underlying these.
2. Skills and Abilities
 - a. finding out (i) through first-hand experience
(ii) through secondary sources
 - b. communicating (i) knowledge about the environment
(ii) both the pupil's own and other peoples' attitudes to environmental issues, to include a justification for the attitudes expressed
 - c. participation and practical improvement
(i) as part of group decision-making (ii) as part of making a personal response

The knowledge and understanding is grouped in 3 sections:

1. The earth and its natural resources and living things.
2. Human interactions with the environment.
3. The influences on human activity and attitudes in relation to the environment.

The skills as follows:

- (i) Intellectual, to include collecting information, analysing, defining questions, organising information.
- (ii) Participation, to include expressing their own views and those of others, discussing, empathising with others.
- (iii) Participation, to include making decisions and acting on them, participating in a group.

Specific environmental values and attitudes are not included but more general attitudes or qualities such as being willing to be critical of information, showing respect for the views of others, being willing to change ones in mind in the light of evidence, valuing fairness and care as criteria for making environmental decisions.

THE ROLE OF COMPONENTS OF ENVIRONMENT IN THE DEFINITION OF MARGINAL AREAS IN THE MEDITERRANEAN REGION

R.E. Scossiroli

The vegetational cover which is present in any environment derives from a complex system of interactions among the adaptive properties of plant species which thrive in any environmental situation according to their aptitude to find a competitive equilibrium for the use of resources: light, water and nutrients.

The presence of animals and men provide a strong negative influence on such natural equilibrium.

Such a situation is evident in the Mediterranean mountain range of Italy where economic marginality has become established. Indeed, a survival economy has kept people on the mountains in a poor quality life. In the last few decades man has abandoned most of the mountain range where only a marginal pastoral zootecnic economy is maintained exploiting seasonally degraded altitudinal grasslands still subjected to overgrazing.

For planning a correct use of the territory aimed at a possible improvement of the environment, a correct and detailed knowledge of the situation is badly needed.

The present paper suggests ways how to obtain the necessary information and can be considered as a didactic approach to be applied in similar situations.

The final purpose is to reach a description of a territory for planning the best use or identifying the possibility to remedial actions to overcome economic marginality or to stop degradation processes which might bring an irreversible loss of natural landscape.

From an operational point of view it is necessary to prepare a series of thematic maps of the territory under consideration, that are:

- (1) Geological map
- (2) Pedological and soil fertility map
- (3) Vegetational map

(4) Land use capability map.

The final map (n. 4) describes the potentiality of the use of the territory according to different classes in which all limiting factors are considered.

In the study areas many severe limitations have been indentified.

Therefore any political decisions on the best use of the whole area for improving economic use, with the goal of improving human quality of life, should be based on serious consideration of the situation described by the map of land use capability, which represents an example of multidisciplinary environmental research.

Such type of environmental research represent a strong operational approach for environmental education perspectives.