**FINAL REPORT**

# Environmental education in the educational systems of the European Union

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**Synthesis Report**

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## Preface

The study reported here was funded by the European Commission, Environment Directorate-General. We are indebted to the officials in the Ministries of Education (and others) who provided us with information. We would also like to thank the research assistants who helped with the study and John Wilkes for administrative support.

The study was carried out during 2000 and early 2001. Reforms of the secondary education system continue across the EU/EEA and some of the information reported here may now be out-of-date.

The views expressed are our own and do not reflect the views of the European Commission. Any errors or omissions are our responsibility.

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# 1 Introduction

At the end of 1999, the Centre for Educational Research at the London School of Economics and Political Science was commissioned by the Environment Directorate-General of the European Commission to carry out a study on environmental education in the educational systems of the European Union. The study had two main objectives: first, to provide information to support Community thinking in order to improve the direction of policy in this area; and second, to provide useful information to all of those who, at national, regional or local level, wish to become more familiar with the situation in their own country or in other countries. In order to do this, we examined the content of environmental education in primary and secondary schools in the European Union (EU).

This report provides a synthesis of key findings that emerged from the research and addresses a number of key issues:

- how environmental education is taught in different countries, including subject areas in which it is covered and curriculum content;
- similarities and differences across countries in terms of the approaches adopted to the teaching of environmental education;
- examples of initiatives and innovative practice in the teaching of environmental education;
- policy recommendations in relation to the future co-ordination and dissemination of information about environmental education.

This report is divided into six sections. Section 2 provides the policy background to environmental education within the European Union and this is followed in Section 3 by an outline of the methods used in the study. Section 4 examines the aims, curriculum content and approaches adopted to the teaching of environmental education during primary, lower secondary and upper secondary (general) education. Section 5 outlines some of the initiatives in the area of environmental education that have taken place in individual Member States and the final section examines the policy implications that arise from this study and the possible role that could be played by the European Commission in the future in relation to the co-ordination and dissemination of information about environmental education.

# 2 EU Policy Background

The European Union's environment policy has developed over the last two decades and environmental education can be considered to be part of its effective implementation. In tandem, the concept of 'the environment' has changed over time. Early views focused on changing ecosystems and the impact of various forms of pollution. However, the social, economic and cultural dimensions of the environment have been increasingly recognised and the inclusion of sustainable development makes the concept even more broad.

The role education has to play within environment policy was made explicit in the Resolution adopted by the Council of Ministers in 1988, which argued that the objective of environmental education is:

to increase the public awareness of the problems in this field, as well as possible solutions, and to lay the foundations for a fully informed and active participation of the individual in the protection of the environment and the prudent and rational use of natural resources.

In 1993, the European Parliament reinforced this approach in a Resolution which called on Member States and the Commission to: 'include the environmental dimension in all aspects of education at all levels' and to 'emphasise the fundamental role of schools and their teachers in the development and implementation of policy'. In addition, the Fifth European Community Environment Programme sought to integrate the environmental dimension in all major policy areas as a key factor in bringing about the behavioural changes required for sustainability. In this framework, information and education have become important components, complementing legislation and market-based instruments, in a drive to alter environmentally damaging behaviour and move towards sustainability.

## 3 Methods

The present study focuses on environmental education in the school systems of the European Union (EU). Information was obtained about the curriculum in the countries (and, where relevant, regions) concerned. We used existing material (e.g. Eurybase, 1999, 2000; West et al., 1999) together with the most recent curriculum documents available. Representatives of the Ministries of Education assisted by providing documents. In all countries, the focus was on the curriculum currently in place, or in the process of being implemented. The Annex provides details of the theoretical ages that were the focus of the study and the ages at which the different phases of education end and begin (i.e. primary, lower, compulsory and upper secondary education). It is important to note that we focused on general as opposed to vocational secondary education; at the upper secondary level the focus was on courses leading to university entrance (e.g. in the case of Germany, *gymnasium* education and in the Netherlands, *VWO* education (see Appendix: Reference Report)).

Across all countries of the EU the competent authorities (generally the Ministry of Education) produce documents that provide details of the curriculum content. Not all countries have a 'national curriculum'. In Germany, the individual *Länder* produce the guidelines[1]. In Spain, the national guidelines are modified by the Autonomous Communities (e.g. Catalonia) to cater for linguistic and cultural variation. In Belgium, the individual Communities have produced targets of attainment for schools for which they are responsible. In England and Wales, and in Northern Ireland there are national curriculum documents that apply until the end of compulsory schooling. In Scotland, there are curriculum guidelines that are applicable for pupils between 5 and 14 years of age. However, for England, Wales & Northern Ireland[2], and separately for Scotland, there are curriculum syllabuses for each subject that are explicitly related to the main public examinations that take place at the end of compulsory general education. Similar syllabuses are produced in Ireland.

Our study covered all 15 Member States of the EU. In some Member States, the education system is decentralised; thus in Belgium we focused on the Flemish and French Communities, in Germany on three Länder[3] (Bavaria, North Rhine-Westphalia and Thuringia) and in the UK on England[4] and

[1] For this study we focused on three geographically and politically distinct *Länder*, Bavaria, North Rhine-Westphalia and Thuringia.
[2] Our study focused on the syllabuses from two examining boards Edexcel and AQA. Schools are free to select syllabuses from the examining group or groups of their choice.
[3] For some phases of education, data on only two *Länder* were available.
[4] It is important to note that the education system in England is similar to that in Wales and Northern Ireland and so where appropriate we refer in the text to England, Wales & Northern Ireland.

Scotland. The total number of countries/regions involved was thus 19[5], although it should be noted that information relating to environmental education was not available in some countries/regions for certain phases (primary, lower and upper secondary) of education.

As noted elsewhere (West et al., 1999) the curriculum guidelines vary in terms of the extent to which they prescribe what is to be covered. Two models can be discerned. Over half of the countries provide detailed curriculum guidelines/syllabuses (e.g. Austria, Belgium (Flemish and French Communities), France, Germany (Bavaria, North Rhine-Westphalia and Thuringia), Greece, Ireland, Luxembourg, Portugal and the UK (England, Wales & Northern Ireland and Scotland). In some of these countries the curriculum is more prescribed than in others. Less detailed specifications of the curriculum content are generally given in Denmark, Finland, Italy, the Netherlands, Spain and Sweden. These may be considered to be countries providing a curriculum 'framework'.

It is important to note that unlike many other areas of the curriculum, environmental education is not necessarily taught as a separate subject – indeed it has been recommended that it should not be taught on this basis (European Commission, 1997). One of the implications of this, and of the fact that curriculum documents do not necessarily prescribe the content, is that in some countries, there is flexibility in terms of the extent to which environmental education is covered. As noted by one of the Ministry officials: 'The extent of teaching depends on the personality of the teacher'. A similar observation states: 'Even where local authority policies are in place, provision in schools remains patchy and heavily reliant on the interests and will of a small number of committed teachers' (Nixon et al., 1999).

It is also important to reiterate that the education systems across the European Union differ in terms of their structure. In particular, compulsory education begins and ends at different ages (see the Annex).

# 4 Environmental education in primary and secondary schools

This section examines environmental education in primary education (section 4.1), lower secondary education (section 4.2) and upper secondary general education (section 4.3).

## 4.1 Environmental education in primary schools

In the main, within the Member States of the EU, there are primary schools that cater for children until the end of the first stage of education which ends at around 11 or 12 years of age. However, Denmark, Finland and Sweden have a system whereby compulsory school takes place within one comprehensive school – thus there is no transfer from a primary to a secondary school.

This section refers to education that takes place during this primary phase. Descriptions of the theoretical ages covered by this phase of education are given in the Annex.

### Global Aims and Values

At primary level, the majority of Member States include environmental education in their general statement of aims and/or values. These countries are: Austria, Belgium (Flemish and French

[5] Austria (AT), Belgium, Flemish Community (BE(FL)), Belgium, French Community (BE(FR)), Germany (Bavaria) (DE(BA)), Germany (North Rhine-Westphalia) (DE(NRW)), Germany (Thuringia) (DE(TH)), Denmark (DK), Spain, (ES), Finland (FI), France (FR), Greece (GR), Ireland (IE), Italy (IT), Luxembourg (LU), the Netherlands (NL), Portugal (PT), Sweden (SE), UK, England (E) or England, Wales & Northern Ireland (EWNI), UK, Scotland (S).

Communities) Denmark, Finland, Germany (Bavaria and Thuringia), Greece, Ireland, Luxembourg, Spain, Sweden, UK (England, Wales & Northern Ireland and Scotland). In the curriculum documents of Denmark, Finland, Germany, Spain, Sweden and the UK (England) there is a particular emphasis on the environmental element. We look at the overarching aims and value statements of these countries, where environmental education has been given relatively high consideration, and therefore achieved a relatively high profile in primary education.

***Denmark***

The *Folkeskole* Act of 1994 states that '*Folkeskole* shall familiarise pupils with Danish culture and contribute to their understanding of other cultures and [the] interaction [of humans] with nature'. Great emphasis is put on the fact that the division of teaching into separate subject areas such as history, mathematics and so on, is a cultural phenomenon. The aim of the institution is to develop a thoughtful and responsible individual capable of being a productive member of society and partaking in a democratic system. Hence as far as possible, an interdisciplinary approach is to be taken by teachers. This is reinforced by three themes which are intended to permeate all teaching throughout the *Folkeskole.* The themes include information technology, the practical/musical and the 'Green Element'. The Green Element is further described as concerning:

> the way in which we singly and in groups manage the interplay between our lives, nature and society. It is a dimension that ought to be treated in all subjects – therefore not simply a matter for Geography, Biology, Nature/Technology and Cultural studies. The experience of nature is taken as a basis for knowledge and reflection.

***Finland***

The National Board of Education determines the objectives and core contents by confirming the core curricula. Based on these, each education provider prepares a local curriculum. The preamble to the comprehensive (primary and lower secondary) school core curricula scrutinises the changes needed for sustainable development and calls for a clearer value base for the school. It suggests four starting points that all schools should include, the first of which is promoting sustainable development:

> The improvement of our environment and the maintaining of the viability of the earth require a change in the direction of development. We must strive towards an aim where the basic needs of all are met without endangering the chances of the coming generations to meet their basic needs…Education is an important factor in making our way of life go along with sustainable development. It is possible for the school with its support networks to create visions of the future, reinforce morals and know-how, which [humans] need as... member[s] of society and in international co-operation, in order to correct the direction of cultural evolution.

***Germany: Bavaria***

Environmental education is compulsory for all pupils in primary schools within the content of existing subjects. According to the curriculum documents, environmental education should start with the everyday experience of students in their local environment (e.g. school, family home). On walking tours, teaching walks or other opportunities students can experience the environment that has emotional importance for them. A number of possible teaching locations are suggested (e.g. parks and nature reserves, eco-centres) and 'action-orientated' learning experiences (such as the layout of the school building, grounds and everyday school life). Specifically within the primary school, pupils should build on knowledge gained before school, acquire basic knowledge, have

positive experiences of nature and be given opportunities to develop sensitivity for environmentally friendly behaviour. This should be embedded in social learning like trusting each other, being dependent on each other. Environmental education starts with local issues; gives a first impression of interconnectedness, prepares students to become active and to take responsibility.

***Germany: Thuringia***

According to the curriculum documents, the aim of environmental education is for students to gain knowledge, abilities and attitudes that are necessary for environmentally friendly, aware and responsible activities. Environmental education encompasses:

- part of an up-to-date general education;
- enlightenment of environmental problems in their ecological, historical, ethical, social, economic and political dimensions;
- value oriented education (relation between humanity and nature, sustainability of foundation of life, critical perspective on different life styles, action-oriented);
- exploration of the problems of cause and effects – activities need holistic perspective, isolated actions can do more harm than good;
- interdisciplinary learning and working;
- action-oriented education;
- school as environmentally friendly location (with issues that have been learned being reflected in daily experience);
- a European dimension (environmental problems cross borders).

Environmental education is one of six interdisciplinary topics (others are peace education, health education, media education, preparation for professional life and traffic education). In the primary school (*Grundschule*), pupils are seen as open to nature and natural phenomena. Pupils should learn from their local environment. A number of themes should form the focus of their experiences: people, animals, plants, water, air, earth and consumption.

***Spain***

Three of the general learning objectives for pupils in primary education which have a link with environmental education are:

- to collaborate in the planning and carrying out of group activities, to accept the norms and rules which are democratically established, to articulate [their] objectives and interests with those of other members of the group, respecting distinct viewpoints and taking on board the responsibilities attached to such attitudes;
- to comprehend and establish relations between the facts and phenomena of the natural and social environment and actively contribute to the possible protection, conservation and improvement of the environment;
- to know about the cultural heritage, participate in its conservation and improvement, to respect cultural and linguistic diversity – as a right of both groups and individuals – so as to foster an attitude of interest and respect in relationship to the exercise of this right.

Environmental education is one of a number of areas (others include health education and consumer education) which are regarded as transversal themes and which should be incorporated in the teaching at all levels.

***UK: England***

A statement of values produced by the National Forum for Values in Education and the Community, set up under the auspices of a government agency asserts:

> We value the environment, both natural and shaped by humanity, as the basis of life and a source of wonder and inspiration. On the basis of these values we should:
>
> - accept our responsibility to maintain a sustainable environment for future generations;
> - understand the place of human beings within nature;
> - understand our responsibilities for other species;
> - ensure that development can be justified;
> - preserve balance and diversity in nature wherever possible;
> - preserve areas of beauty and interest for future generations;
> - repair, wherever possible, habitats damaged by human development and other means.

It is further stated that education for sustainability enables pupils:

- to develop the knowledge, skills, understanding and values to participate in decisions about the way we do things individually and collectively, both locally and globally, that will improve the quality of life now without damaging the planet for the future;

and affords opportunities for pupils:

- to develop their understanding of sustainable development within the school curriculum, in particular in their work in geography, science, [personal, social and health education] and citizenship.

***Other countries***

Other countries which make reference to environmental education in their overall aims are Austria, Belgium, Greece, Ireland, Luxembourg, Sweden and UK (Scotland). For example:

- Sound environmental behaviours and understanding (Austria).

- The primary school should be open to the life of the group/class and the environment, provide opportunity for the widest means of expression and devote a certain amount of time to spontaneous activities [focusing on the exploration/appreciation of the pupils' immediate environment] (Belgium, French Community).

- The [revised] curriculum emphasises a number of elements including the environment. All aspects of the environment are used, thereby associating theory with practice and giving relevance to what is learned (Ireland).

- Basic education should…develop suitable attitudes and behaviour towards society, the natural and cultural environment, technology and the individual, him or herself (Luxembourg).

- There are three central perspectives provided on all subjects: the historical, the international and the environmental perspective (Sweden).

- The national guidelines for the curriculum make provision for 25 per cent of the allocated time to be spent on environmental studies (Scotland).

**Models of environmental education in primary education**

In all countries of the European Union environmental education is provided variously as a compulsory subject, as part of a compulsory subject area (normally science) or as an interdisciplinary theme in primary education. The actual approaches adopted for the teaching of environmental education differ; but we have identified three main models:

- environmental education as a subject area in its own right;
- environmental education embedded in specific subjects of the curriculum;
- environmental education addressed through topics or themes in the curriculum that are addressed in an inter-disciplinary manner.

Table 1 shows the countries in which environmental education is a subject area in its own right during primary education, those in which it is embedded in specific subjects of the curriculum and those where it is addressed through an interdisciplinary topic or thematically oriented approach.

**Table 1 Models of teaching environmental education in primary education**

| Environmental education taught … | Number countries /regions (N=18) (1) | Countries/Regions (N=18) |
|---|---|---|
| As a discrete subject area | 5 | BE(FL), FI, FR, GR, ES |
| Embedded in other subjects | 14 | BE(FL), BE(FR), DK, ES, FR, GR, IE, IT, LU, NL, PT, SE, UK(E), UK(S) |
| Via thematic interdisciplinary approach | 5 | AT, DE(BA), DE(TH), DK, FI |

(1) Total number of countries/regions is 18 (15 EU with two regions in Belgium, Germany and the UK). N is more than 18 as in some countries/regions, environmental education is taught using more than one approach.

As can be seen from Table 1, the most common approach is for environmental education to be taught embedded in other subjects, but there are also examples of it being taught as a separate subject area or via a thematic interdisciplinary approach. In all cases where it is taught as a separate subject it is also taught in some other way, primarily embedded in other subjects.

There is variation in terms of the subjects in which environmental education is embedded. In seven countries/regions, it is covered in science subjects and in seven in geography (or geography/history). Depending on the country it may also be covered in technology, domestic science, citizenship or civic education.

When environmental education is taught as a *separate area* its content is variable as shown in the following examples:

- In environmental studies the content is organised into six domains, which are designed as a frame of reference rather than specific topics. These are: nature, technology, humans, society, time and space (Belgium, Flemish Community).

- Discovering the world: activities are undertaken that help pupils to understand the importance of recycling refuse and to identify pollution…environmental issues with a geographical focus on those faced by France…a basic understanding of the relationships between human beings, animals and their environment…the study of ecology, initially based locally (France).

The following exemplify the teaching of environmental education using an interdisciplinary approach:

- Proposed themes for study include diversity, individuality and the beauty of nature; the importance, meaning and history of the cultural landscape; personal lifestyle and environment (Germany, Bavaria).

- Environmental education is investigated through a number of topic areas such as 'international education', 'consumer education' and 'traffic education' (Finland - see also section 4.2).

**Environmental education in the primary curriculum: areas of knowledge**

There is enormous variation in terms of the information available on the environmental education curriculum. In many countries, there is information on aims and objectives, but this is not universal. Whilst it might be considered desirable to examine similarities and differences in terms of for example, knowledge, skills and attitudes (European Commission, 1997), such information is rarely available. Indeed in our analysis the most commonly found information related to curriculum aims and content.

We have examined the curriculum material in terms of broad areas of knowledge as they relate to environmental education. The main areas in which environmental education is addressed are geography and the sciences but it is also addressed in other areas - for example, technology and social studies. Figure 1 gives examples in each of these broad areas of knowledge to demonstrate the issues covered.

We also examined the curriculum material for transversal themes that cut across the broad areas of knowledge exemplified above. One important theme at this phase relates to ethics, values, attitudes and behaviour, for example :

- One of the goals: learn how various societal trends (for example the rise in consumption) affect the environment (more shops, more traffic) and understand that people evaluate these effects differently (Netherlands).

- Overall aims: to help the pupil develop a view on environmental and health issues; to provide an insight into ethical perspectives on the environment; to develop concern for the environment (Sweden).

**Figure 1 Broad areas of knowledge that address environmental education (primary)**

**Geography**

One of the main objectives of the geography programme is the realisation of the importance of the rational use of space and the protection of the environment (Greece).

Human environments: learning about people and their interrelationships with environments; natural environments: developing the child's knowledge of natural environmental features in the locality and wider environment; environmental awareness and care: appreciation of environments and the pupil's sense of responsibility for their conservation and enhancement (Ireland).

**Science**

Final objectives include: influences of humans on the presence of plants and animals in the locality through traffic, construction, agriculture, water collection, nature and landscape management; knowledge of threatened and protected plant and animal varieties; raw material and fuels used or reused by humans; recycling materials (Belgium, Flemish Community).

Content: Plants/animals/human beings; humans and the environment; the impact of intervention on the environment, in particular through practical observation of phenomena in the region. The development of respect for the environment and awareness of the potentially negative impact of intervention on the environment without rejecting, because of it, technological progress (Italy).

**Technology**

Aims: To create understanding of how production, society, the physical environment and our living conditions are subject to the influence of technology; to analyse and assess the interaction between people, society, technology and nature; to develop the ability to reflect over, assess and evaluate the consequences of different technological choices for human beings, society and nature (Sweden).

**Social studies/subjects**

Selected aims: Reflect on international relations and global conditions, not only from the economic, social and political but also cultural aspects; acquire insights into the interaction between society and nature from the perspectives of social and historical development as well as become conscious of economic and political aspects concerning environmental issues. Goals to be attained: the driving forces, economical and political, which produce environmental problems of various kinds and how these driving forces can be used to remedy problems (Sweden).

People and place: Settlement, including transport, ways of life; land use, resources and change, environmental issues and sustainability. Attainment Targets: describe how land is used in and around the school/home; discuss ways of caring for resources and the environment at home and in school; land use or industrial processes, possible effects, both good and bad on landscape/environment; tropical forest clearance; improvement of derelict land; conservation of major resources such as fish, energy, forests (Scotland).

## 4.2 Environmental education – lower secondary education

This section refers to education that takes place during the lower secondary period (see the Annex for theoretical ages).

### Models of teaching environmental education in lower secondary education

In all countries of the European Union environmental education is either a compulsory subject or part of a compulsory subject area (normally science) or interdisciplinary theme in lower secondary general/academic or compulsory education. Thus in all countries, issues associated with environmental education are addressed in the curriculum.

Although the actual approaches adopted are variable, three main models can be discerned; these are the same as those identified for primary education, namely:

- environmental education as a subject area in its own right;

- environmental education embedded in specific subjects of the curriculum;

- environmental education addressed through topics or themes in the curriculum that are addressed in an inter-disciplinary manner.

Table 2 shows the countries in which environmental education is a subject area in its own right during lower secondary education, those in which it is embedded in specific subjects of the curriculum and those where it is addressed through an interdisciplinary topic or thematically oriented approach.

**Table 2 Models of teaching environmental education in lower secondary education**

| Environmental education taught… | Number countries /regions (N=18) (1) | Countries/Regions (N=18) |
|---|---|---|
| As a discrete subject area | 3 | DK, IE, UK(S) |
| Embedded in other subjects | 17 | AT, BE(FL), BE(FR), DE(NRW), DK, ES, FI, FR, GR, IE, IT, LU, NL, PT, SE, UK(E), UK(S) |
| Through topic/thematic interdisciplinary approach | 8 | AT, BE(FL), DE(NRW), DE(TH) DK, ES, FI, BE(FR) |

(1) Total number of countries/regions is 18 (15 EU Member States with two regions in Belgium, Germany and the UK). N is more than 18 as in some countries/regions, environmental education is taught using more than one approach.

As can be seen from Table 2, the most common model is for environmental education to be taught embedded in other subjects, but there are also examples of it being taught as a separate subject area. In those countries where it is taught as a separate subject it may not be available for all students at all schools (e.g. in the case of Ireland). However, in all cases where it is taught as a separate subject it is also taught in some other way too, primarily embedded in other subjects, although in Denmark all models can be discerned.

There is variation in terms of the subjects in which environmental education is embedded. In all 18 countries/regions, it is covered in geography. It is all covered in all countries/regions in science subjects – either biology (15) or sciences other than biology (17). A range of other subjects include environmental education – social sciences, technology, domestic science. It may also be covered as part of citizenship or civic education.

When environmental education is taught as a separate area its content is variable as shown in the two examples below:

- Aims: to develop a respect for the local, national and global environment; to develop a generalised knowledge and understanding of issues relating to the world's natural resources and to conservation and of contemporary social, cultural, environmental and economic issues. Content: at least one practical assignment during the course of study in the area of environmental issues in a region, or a study of a heritage or tourism topic (optional subject, environmental and social studies, Ireland).

- Important elements within this subject area are: environmental awareness and sustainable development; moral and environmental issues, including those relating to sustainability,

technological developments, wealth creation and the sharing of resources. Content: social and physical conditions which influence, or have influenced, the lives of individuals and communities; understanding of scientific and technological principles and ideas and ability to integrate and apply this [understanding]; study of society at different times and in different places; values and attitudes towards the environment, health and wellbeing (environmental studies, UK, Scotland).

Below we provide three examples of how environmental education is addressed in an interdisciplinary manner:

- Cognitive fundamental objectives: to understand that various environmental components must be examined in an investigation of the local community; to realise that environmental problems should preferably be tackled at source. Skills: to categorise, classify, analyse and interpret environmental data; to be able to set up constructive co-operation through environmental communication and environmental conservation in schools. Attitudes: to be critical concerning information related to the environment; to be willing to use personal talents to improve the living environment. Final Objectives include: Living beings and environment: deal respectfully and carefully with plants and animals; Society and use of space: critically examine environmental problems and landscape changes in relation to local use of space; be willing to work hard for nature conservation and the preservation of valuable landscapes; Waste: explain what happens to non-recycled waste from the local community (Belgium, Flemish Community).

- General objectives include: analyse the basic mechanisms that govern the workings of the physical environment; evaluate the repercussions that human activities have upon it, and actively contribute to the defence, conservation and improvement of the environment – it being a determinant element of quality of life; know and value scientific and technical development, and its applications in the social and natural environment. Proposed themes to be taught across the curriculum: contamination; water quality; the energy we use; deforestation and its consequences; the allocation of resources. Optional topics for study are: 'Nature Workshop', in which the pupil deals with concrete ecosystems or contamination problems; 'Applied Botany', which covers environmental equilibrium and how best to make use of natural resources; 'The Mediterranean forest', the purpose of this is not only to inform but also to promote the awakening of an ecological consciousness to prevent its destruction; 'Meteorology Workshop' includes the influence of pollution on climatic changes (Spain).

- Suggested topics include: 'international education', 'consumer education' and 'traffic education'. Example of what students are expected to learn: discern the drawbacks and conflicting interests in production, consumption, and the ways human beings do things, and start discussion on how these could be changed in order to cut down on the strain on nature and to improve the quality of life. International education includes study of 'a just distribution of the world's resources and furthering sustainable development'. The aim of consumer education is for students to 'take a critical look at the factors guiding their consumer decisions as well as how their choices affect their own lives and environment.' Traffic education can help the student 'estimate the effects of traffic on nature'. The broad aim of health education is for each student to 'acquire the basic knowledge, skills and capacities to maintain and to promote his or her own health and that of his environment' (Finland - applies also to primary education).

**Environmental education in the lower secondary curriculum - areas of knowledge**

As in the case of primary education, the information available on the environmental education curriculum varies greatly. In many countries, there is information on aims and objectives, but this does not apply to all. An examination of similarities and differences in terms of for example,

knowledge, skills and attitudes (European Commission, 1997) might seem to be ideal, but such information is rarely available and according to our analysis, the most commonly found information is related to curriculum aims and content.

We have examined the curriculum material in terms of broad areas of knowledge as they relate to environmental education. As noted earlier, the main areas in which environmental education is addressed are geography and the sciences, but it is also covered in other subject areas in particular, technology and civic education. Figure 2 below shows examples of how environmental education is addressed in these various areas of knowledge.

**Figure 2 Broad areas of knowledge that address environmental education (lower secondary)**

**Geography**

Aims include: the exploration of relationships between societies, climate, landscapes and environment. Selected content: the course includes case studies to illustrate: the actions of human beings on the environment; the role society plays in the utilisation and organisation of space; some of the environmental problems associated with the actions of human beings (geography/history, France).

One of the main objectives is: to realise the importance of the rational use of space and the protection of the environment. Study should make provision for the direct contact with the natural environment, the collection of relevant material and the processing of the information provided by direct observation (Greece).

**Natural sciences**

Aims and objectives include: to support the deeper understanding of ecological and social consequences of technological development; to learn to be critical and to take on responsibility for environment and society; to learn that natural sciences and technological developments have effects on society and natural environment; to learn that humankind is dependent on nature and to be responsible with the use of renewable and non-renewable resources. Content includes: Energy and the Environment – how energy supply systems change the environment and the ecological consequences; use of energy in a responsible way; Radioactivity and atomic power/nuclear power stations: the dangers of nuclear power, especially disposal; learn how to view the use and danger of nuclear power critically (physics, Germany, North Rhine-Westphalia).

Overall aims: to help the pupil develop a view on environmental and health issues; to provide an insight into ethical perspectives on the environment; to develop concern for the environment. Selected content: biology - the ecosystem: pupils should have knowledge of some of the world's ecosystems; physics – learn about different forms of energy and energy transfers, know that in these transfers energy is always conserved and understand the associated environmental and safety problems (biology, physics and chemistry, Sweden).

**Technology**

General aims include: to develop an insight into the relationship between technology and sustainable development and in the importance of technological development for society. Students should learn to satisfy demands of environment, hygiene, health and ergonomics. Attainment targets include: give examples of the effects of technological developments and production processes on the environment; explain the effects of technical practices and emission (materials and energy) on environmental pollution (soil, air and water); explain the effects of technical practices on the exhaustion of natural resources and energy supplies (Netherlands).

Pupils should combine practical skills with an understanding of aesthetics, social and environmental issues, function and industrial practice. Content includes: identify and use criteria to judge the quality of other people's products, including the extent to which they meet a clear need, their fitness for purpose, whether resources have been used appropriately, and their impact beyond the purpose for which they were designed for example, the global, environmental impact of products and assessment for sustainability... (design & technology, UK, England).

**Civic education**

Two of the key concepts in civic, social and political education which have a bearing on environmental awareness are: interdependence - the actions of individuals can have effects, sometimes in places and situations they have never seen...the effects on economies, businesses and the environment of the purchases we make as consumers…; stewardship - pupils should be aware that as individuals born on the planet every person becomes a temporary owner or steward entrusted or empowered with its care and maintenance…and with constructive management of its finite resources (Ireland).

In addition to the broad areas of knowledge outlined above, there are also transversal themes that run through environmental education at this level. One of these relates to ethics, values, attitudes and behaviour and another more broadly to environmental problems. Figure 3 gives examples of these from the curricula of different countries/regions.

**Figure 3 Transversal themes in environmental education (lower secondary)**

**Values, ethics, attitudes and behaviour**

The subject framework stresses the need for pupils to develop a responsibility towards the environment. General and particular biological and ecological insights should be gained and work done on finding solutions towards environmental protection issues (biology and environmental education, Austria,).

One of the broad aims for history/geography in all years, which is linked with civic responsibility, is that pupils should: understand the modern world and behave as independent, responsible and active people within the state, aware of the world in all its diversity and evolution (geography/history, France).

Aims include: to promote a sensitive awareness of the environment and to develop the following positive attitudes: an appreciation of social, cultural and environmental diversity; a sensitive awareness of the aesthetic quality of the natural and cultural environment, leading to a desire to maintain this quality; a responsible attitude towards exploitation and conservation of resources; sensitivity towards the interplay of conflicting needs involved in environmental planning e.g. social, aesthetic, ecological, economic etc. (geography, Ireland).

Objectives include: to stimulate a critical and non-dogmatic spirit, developing the tolerance and disposition to the reasonable exercise of citizenship, in particular when making decisions pertaining to the organisation of the environment; to develop the necessity to understand the causes and consequences of events with impact in the environment (geography, Portugal).

Knowledge and understanding about becoming informed citizens: the world as a global community, and the political, economic, environmental and social implications of this, and the role of the European Union, the Commonwealth and the United Nations; the wider issues and challenges of global interdependence and responsibility, including sustainable development and Local Agenda 21 (citizenship, UK, England).

**Environmental problems**

Topics include: dangers of environmental hazards; species preservation/endangered species; preservation of the biotope; environmental protection; the environment and human society (biology and environmental education, Austria,).

Content includes: water: environmental issues such as pollution of water; oils, soaps, detergents: at least one environmental issue such as recovering resources, water pollution, consumer behaviour; fuels: at least one environmental issue such as pollution, greenhouse effect, resources, alternative energies; carbohydrates: at least one environmental issue such as problems with recovering resources, methanol and ethanol as energy resources (chemistry, Germany, North Rhine-Westphalia).

Content: Responsibility in relation to the community and the environment, covers the school and its surroundings: degradations in both types of environment, human interventions to improve conditions and problems of ecological imbalance; the role of the local community in planning and protecting/conserving/using the environment including local regulations and conventions. 'Security' addresses the presence of major risks including environmental risks both natural and technological; the responsibility of the individual, community and the state to deal with this (civic education, France).

Final objectives include: the study of actual and specific problems relating to humans: the protection of the environment; specific ecology - the study of a particular ecosystem with its different aspects, such as interactions between humans and the environment, air and water pollution (biology, Luxembourg).

Develop an understanding of the major problems and hazards human actions have had on the environment and on the natural resources of the planet and develop a favourable approach to conservation and protection (geography/history, Spain).

## 4.3 Environmental education - upper secondary general education

### Introduction

At the upper secondary level, there is increasing curricular specialisation. Although some subjects may remain compulsory for part, or all, of the upper secondary phase, the curriculum divides into branches, orientations, directions or specialisation programmes in all countries (see Eurybase, 2000; West et al., 1999). Factors governing choice of subjects vary. Students may be required to choose a balanced range of subjects from prescribed subject groups (Germany) or their choice may be relatively unrestricted (UK, Ireland) or they may focus on a particular programme (Sweden). Students may also study different subjects at different levels and in different years. In this section, consideration is given to the compulsory/optional nature of environmental education, environmental education as an advanced or specialist course and the non-specialist coverage of environmental education.

### Is environmental education compulsory for all students?

As noted by West et al. (1999) at this level, certain subjects are compulsory in most countries of the European Union. The countries can be differentiated in terms of the subjects that pupils study in upper/post-compulsory secondary general education. There is wide variation in the number of subjects[6]. Whilst in the UK (England, Wales & Northern Ireland) pupils generally study a small number of subjects – around four or five in their first year of upper secondary education, in all other countries the number is commonly between five and ten (e.g. Germany, Denmark, France, Greece, Ireland, Luxembourg, Spain, the UK (Scotland)). In some countries it exceeds ten (e.g. Austria).

There is also variation in terms of the subjects that are compulsory. There are no compulsory subjects that pupils must study in the UK and only one in Ireland (Irish). In all except for Ireland, Portugal, Spain and the UK some science is compulsory. This is important because, as discussed below, environmental education is frequently addressed through science subjects.

### Specialist options in environmental education (upper secondary)

In a number of countries, advanced or specialist options in environmental education are available. The content varies according to type of course. We look here at the most advanced courses offered, i.e. the separate specialist courses offered:

- Environmental Studies (Belgium, Flemish Community)
- Principles of Environmental Sciences (Greece)
- Environmental and Consumer Education (Portugal)
- Earth and Environmental Sciences (Spain)
- Environmental Science and Environmental Politics (Sweden)
- Environmental Sciences (UK, England, Wales & Northern Ireland)
- Managing Environmental Resources (UK, Scotland)

[6] It is important to note that in different countries different conventions are used, so that in some each science subject may be listed and in others the term 'science' may be used. The same is true for social sciences and languages.

**Content**

Our analysis of the curriculum documents revealed that the following issues relating to environmental education were addressed in specialist environmental education courses in upper secondary education:

- policy, environmental law, regulation;
- scientific principles and analysis of environmental phenomena;
- social and economic factors, determinants or indicators of environmental issues;
- planning, land and resource management;
- ecology and ecosystems.

***Policy, environmental law, regulation***

Examples of content relating to environmental legislation and policy included the following:

- environmental policy and standards, regulations for the protection of the environment, government directives and initiatives, transport policies (Belgium, Flemish Community);
- aspects of environmental law in Spain (Spain);
- international conventions and treaties on environmental issues, the political decision making process with regard to environmental issues, locally and nationally (Sweden);
- the Environment Protection Act 1990 and water quality standards (UK, England, Wales & Northern Ireland);
- managing environmental resources - policy and practice (UK, Scotland).

***Scientific principles and analysis of environmental phenomena***

The following examples were included in the area of scientific principles and the analysis of environmental phenomena:

- environmental science as a field of interdisciplinary study and research, the basic principles of environmental science (Greece);
- causes of natural risk and measures to prevent or correct them, investigation of environmental problems, using scientific, sociology and historic methods, collecting/analysing data from different sources, scientific method, the systems theory of the environment; environmental changes, terrestrial systems, the geosphere, energy balances, atmospheric and hydrospheric balance and regulation, risks and environmental impact (Spain);
- laws of thermodynamics as conditions for the use of world resources by human beings, significance of maintaining natural diversity, absorption, transformation, transportation and effects of damaging materials on organisms, bio-indicators, chemical and physical parameters and interpretation of results, limitation of measuring methods (Sweden);
- the scientific approach to the study of the environment, environmental systems and their properties, observation and measurement, energy, the atmosphere and hydrosphere, the lithosphere, the biosphere, biotic resource management, water quality testing (UK, England, Wales & Northern Ireland).

***Social and economic factors, determinants or indicators of environmental issues***

In the area of social and economic factors, examples of curriculum content included:

- change in standards and cross-border character of environmental pollution with production and consumption; economic growth, development of welfare, demographic evolution and biotechnological development in a world-wide perspective (Belgium, Flemish Community);
- environment and quality of life, technological development, models of production and consumption and sustainable development (Greece);
- the concept of development in conjunction with social and economic transformations, economic development and the consequences to the environment, the lack of resources as a limit to economic development - consumer patterns of developed countries, use and replacement of non-renewable resources, sustainable development (Portugal);
- environmental problems and their political, economic and social repercussions, environmental health and quality of life, the conservationist and the sustainable development model, environmental issues of the future (Spain);
- consequences for households, businesses and society of ecological, social and economically sustainable development, administrative and economic resources that can be used to develop sustainable management of natural resources, political schemes or plans concerning the environment, environmental political conflicts (Sweden).

***Planning, land and resource management***

Examples of content related to planning, land and resource management included the following:

- take particular views…with respect to a problem of environmental organisation or management of the landscape and become informed about government policy with respect to that problem; be prepared to influence, through constructive contribution, decisions, measures or proposals that may have repercussions on mobility, traffic and use of space (Belgium, Flemish Community);
- the action of human beings on the environment; pollution of water and soil, world environmental problems (Greece);
- relationship between humanity and nature - resources, types, uses and alternatives; land-use planning (Spain);
- the limits to society's use of natural resources; diverse methods of valuing the environment (Sweden);
- pollution and physical resource management (UK, England, Wales & Northern Ireland);
- planning, developing, monitoring and managing an environment area; environmental issues, natural resource use, land use in Scotland, managing the natural heritage and environmental investigation (UK, Scotland).

***Ecology and ecosystems***

Examples of content relating to ecology and ecosystems included the following:

- basic ecological notions; the organisation and operation of the ecosystem; characteristics of ecosystems; downgrading/restoration of ecosystems, Mediterranean ecosystems, Greek ecosystems, ecology and humankind (Greece);
- ecological efficiency and self-regulation of the ecosystem; potential uses and the fragility of the environment (Spain);

- the effects of human beings on natural cycles and ecosystems; the various impacts of environmental factors on ecosystems and what these systems can take before collapsing (Sweden);
- ecosystems and land use; ecological principles (UK, Scotland).

**Non-specialist coverage of environmental education (upper secondary)**

Apart from the separate, specialist courses, environmental education is taught within other subject areas, as a topic or as a separate unit/module or both. The subjects in which it is most frequently found are the sciences, geography and social and economic subjects.

In all countries/regions for which information was available[7], environmental education is taught as part of geography. Likewise, in all countries/regions for which information was available[8] environmental education is taught as part of the sciences. In a few countries it is also found in other subjects such as technology, ethics, civics, languages and home economics. There are also some references to environmental education in art and mathematics.

We examined the curriculum material in terms of broad areas of knowledge as they relate to environmental education. As noted earlier, the main areas in which environmental education are addressed are geography and the sciences, but it is also covered in other subject areas. Figure 4 shows examples of how environmental education is addressed in these various areas of knowledge.

[7] N=16 - no information was available for AT, BE(FL) or GR.
[8] N=15 - no information was available for BE(FL), BE(FR), DE(BA) or DE(TH).

**Figure 4 Areas of knowledge in which environmental education is addressed (upper secondary)**

**Geography**

The final competences include: development and management of land: development concepts – under/over development, bad development, local development, permanent/lasting development, the politics of development and land management; environment: climate and bio-geography - human actions and their consequences, deforestation, drainage and irrigation, pollution; the fundamental principles for a rational environmental programme; economic, geo-political and social structures (Belgium, French Community).

Topics include: interaction between human beings and nature; changes in the globe caused by this interaction and people's responsibilities to direct regional development; measures to solve local, regional, and global environmental and developmental problems that have been caused by the interaction between human beings and nature; the study of topical events that have been caused by human beings or nature and the assessment of ways of predicting and solving the associated problems (Finland).

**Natural sciences**

Geology - the extraction of mineral resources and the problems caused to the environment; ecology - the basics of ecology, ecosystems and their transformations; the city as an ecosystem; the inter-linked problems of ecology, economy and technology (biology & environmental studies, Austria).

Content includes: ecology and environment: functioning of ecosystems and human use and impact on nature, including the concept of sustainability; biological production, resource use, pollution and management of nature; eco-toxicology; ecosystems, development and sustainability (biology, Denmark).

**Social and economic sciences**

The theme 'aspects of manufacturing' addresses: the exploitation of natural resources; the question of non-renewable natural resources; the natural environment opposed to the negative effects of manufacturing/production (Luxembourg).

**Economics**

Examination topics include: effects of technological development (product and process innovation) on the quality of the environment: sustainable development; tension between production growth and ecological sustainability; concept of sustainable development: reconcile production growth with the needs of future generations; causes of structural imbalances: rigid market relations, demographic evolutions, technological developments, exhaustion of resources, impairment of the environment (Netherlands).

In addition to the broad areas of knowledge outlined above, there are also transversal themes that run through environmental education at this level. As in the case of lower secondary education, one of these relates to ethics, values, attitudes and behaviour and the other to environmental problems; some examples are given in Figure 5.

**Figure 5 Transversal themes in environmental education (upper secondary)**

**Values, ethics, attitudes and behaviour**

General objectives include: Realise the significance of scientific knowledge in the changing world and work for an ecologically sustainable environment (biology); learn to bear responsibility both as consumers and as citizens who take a stance on their own lives and on the surrounding world and work for the ecologically sustainable environment (geography, Finland).

The objectives are to: arouse and reinforce students' interest in and sense of responsibility towards economic resource use and other environmental issues, on both the local and the global level; teach students to judge for themselves different ways of and approaches to taking care of the environment; provide knowledge about and insight into the active attitude required of citizens in participating in the decisions which have an effect on the use and protection of the physical environment; aim for students to become familiar with thinking in terms of life-cycles, with the idea of re-use and self-maintaining systems, with the idea of environmentally sustainable development (geography, Sweden).

**Environmental problems**

Topics include: ecosystems and populations: examples of the living and the built environment; problems arising through human interventions: overpopulation, use of resources, political decisions regarding land-use; aspects of ecology, ecological niches; sustainable use and support of ecosystems by humans; sustainable cultivation, local protection of environment and nature; conflicts and solutions for the protection of nature and environment (biology, Germany, North Rhine-Westphalia).

Topics include: recent transport problems in the Netherlands at a national and regional level; the effects of increasing mobility on area planning in urban and rural residential areas in the Netherlands including the spatial quality; environmental policy dilemmas and government choices relating to commuter traffic, e.g. the competition for scarce open space, rival uses of space (geography, Netherlands).

# 5 Initiatives in environmental education

In this section, we examine the various type of support, strategies and initiatives that relate to environmental education. We then highlight the ways in which project work is used as part of the teaching in environmental education in a sample of countries.

## 5.1 Support, strategies and initiatives

In this section we examine examples of the support, strategies and initiatives that relate to environmental education in specific countries.

### Austria

Information provided by the Ministry of Science, Education and Culture describes how governmental finance for the development of environmentally-oriented projects in schools was made available in 1996. This took the form of grants to schools submitting projects complying with certain educational, ecological, and/or health promotional and sustainability criteria. A Forum consisting of ministerial representatives from the Ministries of Education and Environment evaluates such environmental education projects. The other main tasks of the Forum include the publication of a magazine on environmental education, a web-site[9] and database, the co-ordination of environmental campaigns, competitions, seminars, workshops, exhibitions and contributions to the development of new environmental education programmes. The Forum also has a role in the production of resources for use in schools.

[9] See www.umweltbildung.at.

Austria took over the international secretariat of the Organisation of Economic Co-operation and Development/Centre for Educational Research and Innovation (OECD/CERI) network 'Environment and School Initiatives' (ENSI) between 1998 and 2001. Its focus for 1999 and 2000 had four main strands – 'eco-schools', 'learnscapes', environmental education in teacher education and a discussion on strategies to bring environmental education from the pilot stage into the mainstream. Running alongside this since 1996/97 has been a programme from the Ministry of Education and Cultural Affairs, for raising the ecological awareness of schools, the goals of which are the 'ecologisation of schools' in teaching and learning, the sustainable ecological development of schools and the encouragement of schools to become pro-active in environmental initiatives. Activities in which schools are encouraged to take part include saving resources, reducing waste, making best use of space, promoting a learning culture and bringing about change through influence on the local community. Through these types of activities, it is envisaged that environmental partnerships might be forged with local authorities, business and others.

**Belgium: Flemish Community**

The Green School Project, an initiative of the Ministry of the Environment, developed by the Human Ecology Department at the Free University of Brussels (Volsen & Vens, 1996) aims to 'stimulate positive feelings towards the environment in secondary level pupils by applying an Environmental Management System (EMS) in their own school'. By the end of 1996, more than 230 out of approximately 1,000 schools were registered participants. Pupils and staff are required to carry out an environmental audit of their school, identify measures to be taken to improve certain aspects, implement the measures as far as possible, and finally record and review their activities. Successful introduction and maintenance of an EMS in the school results in an award - the 'Green School Label'.

**Finland**

The Ministry of Education Development Plan (1999) states that as part of the information strategy 2000/04, 'Education, training and research in the information society', Finland is developing a virtual school in which students can study themes relating to sustainable development using new materials and teachers can exchange experience and good practice in education for sustainable development. The virtual school is being jointly developed by environmental and educational authorities. The aim of this is to help schools draw up their own action programmes for sustainable development and to find support for their implementation from partners outside the school world, to evaluate their curricula and teaching and make relevant modifications, as well as find new ideas and materials for learning (Finnish Ministry of Education, 1999).

**France**

The first national meeting for environmental education took place in February 2000. This was set up in response to the 1997 *Planet'ere* forum, held in Canada, which made an assessment of environmental education in 49 French-speaking countries. It had been preceded by regional meetings, which gathered together non-governmental associations involved in environmental education. Their contribution is to design teaching material, supplying information on educational resources for environment, training environmental workers, and finally networking with European countries and French-speaking countries with respect to environmental education. This national meeting for environmental education, which was organised by the *Collectif français d'éducation à l'environnement*[10], was an important step forward as for the first time policy makers, representatives

[10] See www.educ-envir.org/~cfee.

of the non-governmental sector, private companies and media met with the aim of making proposals for a national plan of action for environmental education and sustainable development.

**Germany: Thuringia**

Environmental education is one of six interdisciplinary topics taught throughout the school system. All interdisciplinary subjects are integrated into the curricula. According to materials published by the Ministry of Culture (Thuringian Culture Ministry, 1999) for teachers facing the problem of reconciling rapid social changes with a slowly changing curricula, interdisciplinary teaching is supported by the following institutions or tools:

- help and advice within the curriculum for particular topics;
- information desks introduced by the Ministry where teachers can get relevant material;
- contact schools where teachers and directors can exchange experiences;
- Thuringian education server and the German education server provide information about projects that have introduced new media into lessons;
- the Thuringian Institute of Further Education for Teachers offers further education for interdisciplinary topics.

**Greece**

A Presidential Decree in 1988 clarified the role of the Ministry of the Environment in environmental education and demonstrated that the Ministry had a responsibility to provide financial support for actions that promote environmental education**.** In 1989 a brochure on 'School and Environment' with information on environmental education was distributed by the Ministry of Education (Greek Ministry of Education, 1989).

Since 1991 environmental education has been recognised as part of the primary and secondary school curriculum at a national level. A national centre was established to promote environmental education and to implement programmes sponsored by the Ministry of Education in collaboration with other agencies. At the regional level environmental education centres were opened throughout Greece with an 'accountable employee' in each region responsible for environmental education programmes (Gravanis, 1992).

**Italy**

Documentation supplied by the Ministry of the Environment (2000) describes ANDREA, the National Archive of Environmental Research and Education which is the database of INFEA, the National System for Information, Training and Education on Environmental Issues. The latter is a service of the Ministry of Environment which is networking all the partners of the Ministry involved in environmental education projects; they range from local authorities to non-profit organisations, universities and research centres. Each Italian Region has a number of both public and private agencies for environmental education. They are usually linked to the regional administration and, via the region, to the national Ministry of Environment. Centres for environmental education include 'Territorial Laboratories for Environmental Education' which provide a service offering information and consultancy for stakeholders. 'Centres for Experience' are 'informal' schools for environmental education; they offer programmes involving direct experience with the environment, often using innovative teaching methods. 'Centres for Regional Co-ordination' are a more recent initiative and stem from the desire expressed by regional administrations to provide more coherent information training and education on environmental

issues. There is also a new web-site for environmental education[11] which is the result of collaboration between IRRSAE (Regional Institutes of Research, Experimentation and Reforming Education) and the Ministry for Public Education. It is a consultancy centre dedicated to teachers involved in environmental education (Italian Ministry of the Environment, 2000).

**Portugal**

The Institute for Educational Innovation supports pedagogic innovation for the implementation of environmental education; as such, it has promoted and encouraged projects on environmental education – focusing on the training of teaching staff, and the production of materials such as the 'Itinerary Environmental Project'.

In general terms, innovation has been implemented through specialised human resources and incentive schemes. The environment motif has been integrated in the 'Incentive System for Quality of Education', with the following objectives:

- the development of projects of educational innovation in schools;
- the development of research or 'action research' projects in the domain of education;
- the organisation of exchange activities – between schools, of innovation or research projects (including conferences, meetings, etc.);
- the publication of material relating to innovative projects and research.

**Sweden**

A Swedish Government ordinance (1998) launched the Green School Award as part of an increasing emphasis on pupils involvement in project work within the compulsory school system. The ordinance confers powers on the National Agency for Education to validate the Award for schools. The Award is described as requiring teaching on the environment to integrate theory with practice including both the school environment and the local community (Skolverket, 1999). Outdoor activities must be integrated with other activities and there should be co-operation with environmental organisations. Although participation in the scheme is voluntary, the aim is that all schools should be involved (Skolverket, 1999).

## 5.2 Environmental project work

In this section we examine ways in which environmental education is enhanced by means of activities such as field work or special projects. Such projects are often associated with government-funded centres which provide environmental education and resources. Examples from selected countries are given below.

**Austria**

Information provided by the Austrian Federal Ministry of Education, Science and Culture[12] describes one of the main ventures, the 'eco-schools project'. This was originally established by the now-decentralised network of the OECD/CERI 'Environment and School Initiatives' (ENSI), in which pupils in primary and lower secondary education take part in school and community based projects such as energy saving, recycling and plant cultivation. For older students in upper secondary education, there are opportunities to take part in 'eco-holiday jobs', financed by the Environment Academy of Upper Austria, in co-operation with sponsoring firms.

[11] See http://www.bdp.it/ambiente.
[12] See www.bmbwk.gv.at.

**Finland**

Schools participate in many international, national and regional projects looking at environmental questions. Many schools also have projects of their own, in which they collaborate with local experts and interest groups. The international projects include the OECD/CERI/ENSI project, the Globe programme, the EU sustainable development project SUSDEED, the Baltic Sea project, the World Heritage programme, and the joint Finnish-Russian project 'Northern forest ecosystems and education', all of which are co-ordinated by the National Board of Education. In addition there is the Naturewatch project co-ordinated by the World Wildlife Fund and the Green Flag (FEEE eco-schools programme) co-ordinated by the Society for Environmental Education. National and regional projects aim at improving the living environment. In many municipalities schools also develop their own action programmes as part of the local agenda for sustainable development.

**Germany: Bavaria**

As described in Programmes and Directives for Environmental Education (*Kultus und Wissenschaft und Kunst*, 1990) students in upper secondary education take part in local initiatives, developing links with local agencies involved in environmental management e.g. forestry, landscape gardening, farming etc and environmental protection e.g. conservation groups. Projects include action-based work - assessing/improving the school environment, the building and layout, the grounds etc. or taking action for species preservation such as adopting a natural habitat, for example, 'adopt a forest'.

**Germany: North Rhine-Westphalia**

Since 1996, a number of environmental projects in schools have received state funding, examples of which include: care of a school garden, adoption of streams or lakes close to the school and landscape regeneration (Haenisch, 2000). Within the curriculum at lower secondary level, as part of the natural sciences programme, provision has been made for a programme of 'Youth Research/Investigations', in which students can win an award through active environmental research.

**Italy**

The *Laboratorio Regionale di Educazione Ambientale del Friuli Venezia Giulia* (LaREA) organises a campaign on environmental education called eco-schools. This was started in the academic year 1998/1999 and initially involved nine schools in the Friuli-Venezia-Giulia region. By 1999/2000, 34 schools in different Italian regions were involved. The aim of the campaign is to promote environmental education in schools by producing materials for the teaching of the subject (Italian Ministry of the Environment, 2000).

**Portugal**

Information on projects from the Ministry of Education (2000) include participation in activities such as those addressing environmental issues in a local setting. One example is the discovery project, Gardens of the Fronteira Palace, Lisbon. This project is the collaborative venture of two Ministry of Environment institutions. Pupils from primary and lower secondary schools take part in visits, workshops and environmental activities designed to promote awareness and appreciation of the natural and built environment and its conservation.

Other examples of environmental projects include the 'schools network', 'friends of the dinosaurs' (for pupils age 3 to 17) which is an information exchange about conservation, preservation and the

palaeontological heritage and another is 'eco-schools day' – pupils take part in projects such as saving water, reducing litter and recycling waste.

**Spain**

Examples are given of project work undertaken by younger pupils in four of the Autonomous Regions:

- In Andalucia, as part of the Environmental Education Programme 'VILLAGE' (supported by the Science and Education Council and the Environment Council) a number of opportunities and campaigns have been set up for schools to take part in, such as the annual competition 'make your classroom green', the 'grow your tree campaign' for which trees and seedlings are supplied to participating schools, the 'take care of our coast campaign' which involves the observation and collection of data from particular coastal areas and the 'eco-audit campaign' (participating schools can win an eco-award.).

- In the Canary Islands, a number of activities related to environmental education took place, including 'preserve our ravines', which was a study and observation project based around workshops and hands-on activities such as collecting and sorting rubbish and litter.

- In Rioja, the Sustainable Education Centres Project, a joint venture of the Tourism and Environmental Council and the Education, Culture, Youth and Sports Council give their support to school activities, such as the 'shadow puppet theatre', a yearly event which involves pupils in infant and primary schools putting on a puppet show about waste and recycling (Spanish Ministry of Education and Culture, 1999).

## 6 Discussion and policy recommendations

This study has revealed a diversity of ways in which Member States of the European Union address environmental education in the primary and secondary school systems. Environmental education is a compulsory area of the curriculum in primary and lower secondary education. It is taught using a range of different approaches, the most common being that it is embedded in other subject areas, in particular geography and the sciences (notably biology). In some countries an interdisciplinary thematic approach is used and in a number of cases this is combined with other approaches, notably the embedding of the subject material in other subject areas.

It is interesting to note that in addition to broad areas of knowledge in relation to environmental education, the importance of values, ethics, attitudes and behaviours in the curriculum emerges, thus giving the teaching of environmental education a perspective not always found in other areas of the curriculum. This approach suggests that general concerns about the environment and sustainability are being taken seriously by policy makers striving to inculcate attitudes and values that will result in environmentally responsible behaviour by young citizens of Europe.

At the upper secondary level, a different approach emerges. Here, the curriculum becomes increasingly differentiated. In a number of countries there are specialist courses for environmental studies. In addition, the subject material is embedded in various other broad areas of knowledge – in particular, geography and the sciences.

In terms of policy recommendations, it is clear that there are points of convergence and divergence in relation to the teaching of environmental education across the European Union – particularly in the way in which it is embedded across the curriculum and in terms of the tendency for it to address values, ethics, attitudes and behaviour. There are some interesting points of divergence, particularly

in relation to whole school initiatives. These are clearly intended to encourage responsible behaviour by young people.

We would recommend the following actions by the European Commission and/or other bodies/organisations within the EU:

- Encourage and facilitate the dissemination of curriculum-related information across Member States of the European Union. This may be carried out by traditional means such as publications, but also via the world-wide web and the setting up of a European wide observatory of environmental education.

- Encourage the sharing and dissemination of whole school initiatives across the schools of the European Union. The notion of a Green Award for Schools across Europe would provide incentives for schools and their pupils to become more environment-friendly. In doing so, this should encourage more environmentally aware behaviour by young people.

- Acknowledge the need to evaluate initiatives across Europe including the extent to which goals have been met and amend those goals to ensure that they are in fact attainable (cf Rauch, 1996).

- Encourage adequate teacher training – both initial and in-service - to ensure that teachers are well-equipped to provide teaching in environmental education across the different areas of the curriculum.

- Encourage the evaluation of the teaching of environmental education across the European Union and as part of this develop indicators (using the Eurobarometer opinion poll) of attitudes, knowledge and behaviour.

## Annex

### Table A1 Theoretical ages for primary, lower and end of compulsory education

| Country | Primary begins | Lower secondary begins | Lower secondary ends | Compulsory ends |
|---|---|---|---|---|
| AT | 6 | 10 | 14 | 15 |
| BE | 6 | 12 | 16 | 18 (1) |
| DE | 6 | 10 | 16 | 19 (1) |
| DK | 7 | n.a. | n.a. | 16 |
| ES | 6 | 12 | 16 | 16 |
| FI | 7 | n.a. | n.a. | 16 |
| FR | 6 | 11 | 15 | 16 |
| GR | 5.5 | 12 | 16 | 15 |
| IE | 6 | 12 | 15 | 15 |
| IT | 6 | 11 | 14 | 15 |
| LU | 6 | 12 | 15 | 15 |
| NL | 5 | 12 | 15 | 17/18 (1) |
| PT | 6 | 10 | 15 | 15 |
| SE | 7 | n.a. | n.a. | 16 |
| UK (EWNI) (2) | 5 | 11 | 16 | 16 |
| UK(S) | 5 | 12 | 16 | 16 |

n.a: not applicable – in Denmark, Finland and Sweden there is no separate system of lower secondary education. We have used differing cut-off ages for each country. For Denmark and Finland the cut-off is age of 13 as there is increasing specialisation beyond this stage (year 6). For Sweden it is taken as being age 12 as the curriculum 'goals' relate to the end of year 5 (theoretical age 12).

(1) Part-time education (until compulsory school leaving age) for 15/16 year olds (BE) and 16 year olds (DE, NL) who are not in full-time general education.
(2) We have taken the end of lower secondary education to be the age of 16 (end of key stage 4).

**Table A2 Age range and duration of upper secondary general education**

| Country | Age range of upper secondary general education | Duration of upper secondary general education (in years) |
|---|---|---|
| AT | 14 – 18 | 4 |
| BE | 16 – 18/19 | 2 |
| DE | 16 – 19 | 3 |
| DK | 16 – 19 | 3 |
| ES | 16 – 18 | 2 |
| FI | 16 – 19 | 3 |
| FR | 15 – 18/19 | 3 |
| GR | 15 – 18 | 3 |
| IE | 16 – 18 | 2 |
| IT | 17 – 19 | 3 |
| LU | 15 – 19 | 4 |
| NL | 15 – 17/18 | 3 |
| PT | 15 – 18 | 3 |
| SE | 16 – 19 | 3 |
| UK(EWNI) | 16 – 18 | 2 |
| UK(S) | 16 – 18 | 2 |

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