EDUCATION FOR SUSTAINABLE DEVELOPMENT

BALTIC 21

An Agenda 21 for the Baltic Sea Region

Logo created by:
Liis Laugas, Tallinn, Estonia

»Solar energy, the basis of life on Earth. Wave energy reaches the nine Baltic beaches, which are protected by the white tailed eagle – one of the indicator species of our home sea: Everything in life is interrelated!«

The Baltic Sea Project

LEARNERS' GUIDE NO. 5

THIS BOOK HAS BEEN PRODUCED WITHIN THE FRAMEWORK OF THE BALTIC SEA PROJECT AS PART OF THE UNESCO ASSOCIATED SCHOOLS PROJECT

Key words: education for sustainable development, Baltic 21 – an AGENDA 21 for the Baltic Sea Region, sustainable agriculture, energy, fisheries, forestry, industry, tourism, transport.

Abstract: "Education for Sustainable Development – Baltic 21" presents examples of how BSP schools have worked with the sectors in the Baltic 21 agreement: sustainable agriculture, education, energy, fisheries, forestry, industry, tourism and transport. Based mainly on the conference "On the Threshold – Baltic 21" Learners' Guide 5 contains a broad set of suggestions for activities that integrate the environmental, economic and the socio-cultural dimensions.

in co-operation with UNESCO and Amtsgymnasiet i Sønderborg (Sønderborg County High School)
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Preface

By Elizabeth Khawajkie

At the United Nations World Summit on Sustainable Development in Johannesburg, South Africa (26 August – 4 September 2002), a new approach to sustainable development was born, built on three "interdependent and mutually reinforcing pillars" – economic development, social development and environmental protection. The commitment expressed in Chapter 36 of Agenda 21 of the United Nations Conference on Environment and Development, Rio de Janeiro, Brazil (1992) was reaffirmed, as was the central role of education as the foundation of all sustainable development.

One of the most positive outcomes of the Johannesburg Summit was its recommendation to the United Nations General Assembly that "it consider adopting a Decade of Education for Sustainable Development starting in 2005". Just three months later, on 9 December, 2002, the United Nations General Assembly decided to proclaim the ten-year period beginning on 1 January 2005 as the United Nations Decade of Education for Sustainable Development.

The experience, methodology and educational materials which have resulted from the Baltic Sea Project (BSP) will provide valuable examples of good practice in quality education which can inspire UNESCO's work and role when preparing the Decade of Education for Sustainable Development.

The Baltic Sea Project is visionary in that it anticipated by many years a concept which has since been endorsed at the highest political level. Launched in 1989 by Finland in seven countries, within the framework of UNESCO's Associated Schools Project Network (ASPnet), the project promoted both environmental awareness and international cooperation while encouraging schools to find creative solutions locally. Today this flagship project includes all nine countries around the Baltic Sea, where it creates networks of schools and stimulates the development of teaching methods in environmental education and education for sustainable development, with excellent results.

The initiatives of the Baltic Sea Project over the last 14 years are exemplary in their integration of local, national and regional levels, but also because they have inspired and served as a blueprint for such other ASPnet projects as the Blue Danube Project (launched in 1991); the Caribbean Sea Project (1994), the Western Mediterranean Project (1996) and the Zambesi River Project (1998). With such a multiplier effect, the Baltic Sea Project can truly be said to be global in scope.

I warmly welcome this fifth learners' guide of the Baltic Sea Project "Education for Sustainable Development-Baltic 21 – An Agenda 21 for the Baltic Sea Region", which emphasises a holistic, interdisciplinary approach to the complex subject of sustainable development. This publication complements the four other handbooks published by the Baltic Sea Project on Air Quality, Water Quality, Rivers, and on the topic "From Words to Action".

"From Words to Action" is an apt summary of the work of the Baltic Sea Project and I wish it continued success. My congratulations go to the editor of the learners' guide, Birthe Zimmermann, and the many contributors who have joined her in putting action back into words again.

Elizabeth Khawajkie
International Co-ordinator
Associated Schools
Project Network, UNESCO

The Baltic Sea Project

The general co-ordination of the Baltic Sea Project rotates anti-clockwise Finland – Sweden – Denmark – Germany – Poland …

Finland 1989 – 1992, Liisa Jäskelainen (left)
Sweden 1993-1997, Siv Sellin (middle)
Denmark 1997- 2000, Birthe Zimmermann (right)

On the Threshold-Baltic 21 in Soenderborg, Denmark 2000

Germany 2000-2003, Ute Grönwoldt (left)
Poland 2003 - , Jolanta Mol (middle)

Germany's ASPco-ordinator Eva Maria Hartmann (right)

World Summit on Sustainable Development, Johannesburg, South Africa, 2002

To the reader

By Birthe Zimmermann

Education for Sustainability was introduced into the Baltic Sea Project with the Rio Declaration in 1992. The Agenda 21 Action Plan moved the focus somewhat from environmental education onto individual lifestyle education, asking for philosophical reflections and approaches to changing personal attitudes. Some of the chapters of the Agenda 21 Action Plan created the basis and starting point for the Baltic Sea Project conference "From Words to Action" in Nyköping, Sweden in 1997. In 1998, Learners' Guide 3 was published, with the same title as a prologue.

The regionally agreed Agenda 21, entitled Baltic 21, formed the framework for the BSP schools to work within one or more of the sectors prior to the 2000 Baltic Sea Project conference "On the Threshold – Baltic 21", held in Sønderborg, Denmark in June 2000.

The Baltic 21 Secretariat supported the conference with a letter of understanding, and made the Baltic Sea Project Conference part of Baltic 21 Joint Action 7. As a result, the BSP school network maintained its pilot function in promoting education for sustainable development, and continued to serve as a source of inspiration for others.

This book is based on the outcome of the conference in 2000, adding perspectives and results achieved in the years after the conference.

Zane Zárdina, Latvia

The first part of the book introduces suggestions for schools preparing work on the different sectors included in Baltic 21 – sustainable agriculture, energy, education, forestry, fisheries, industry, tourism and transport. The second part deals with the Haga Declaration, the decision and reasons for making education an important sector in the Baltic 21 agreement in 2002, and presents suggestions for school curricula items concerning the education sector. The third part is based on lectures presenting reasons why education for sustainable development needs to combine local cultural and social actions as well as international dimensions in order to achieve a global perspective. The lecturers have different backgrounds and educational qualifications.

Other parts demonstrate how education for democracy can form part of the students' work and lead to empowerment and increased action competence.

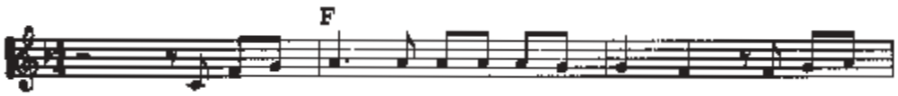
The best practices described show a kaleidoscopic bouquet of experiences and practices, thus underlining the differences in educational systems, culture and traditions in the Baltic Sea Region, and simultaneously emphasising the necessity to work locally in order to understand globally.

Students express their concern for the environment through their actions and through artwork, while concern for the Baltic Sea is also clearly expressed in the hymn composed for the conference (see next page).

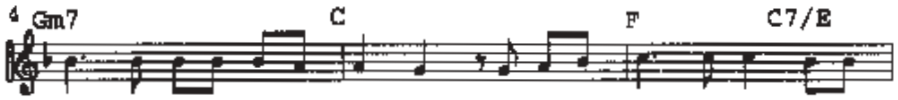
Learners' Guide 5 is a contribution to the efforts made within Baltic 21 Education. We hope it will serve as a source of inspiration for others. Thank you to all who contributed!

Hymn to the Baltic

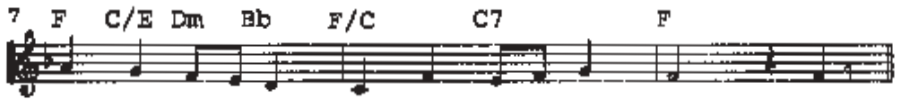
by Andris Mikulis, Riga Special Secondary School no 66, Latvia



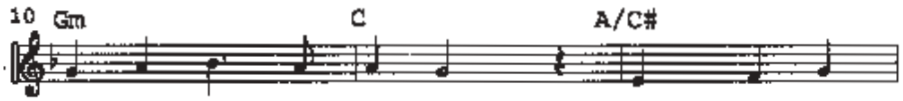
The Bal-tic Sea has gi-ven us the chance to en-joy its



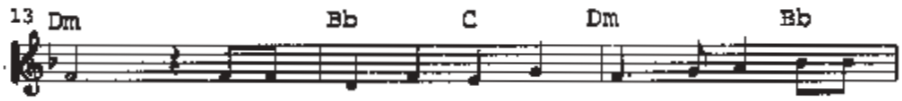
beau-ty, yet its waters needs you to be a-ware, take care, and to-



ge-ther we shall work on how to pro-tect it: //:We

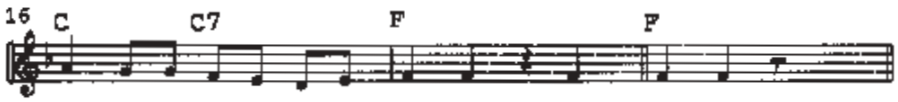


will re-spect its wa-ters, air, fo-rest,



land and com-bine our ef-forts that will grant heal-thy

|: the chorus in your mother tongue:|



lives for the fu-ture ge-ne-ra- tions://

DK:
For Østersøens bølger,
luft, skov og strand,
kræver fælles ånd og mærkesag:
Vi vil trivsel for dem,
der følger efter

EE:
Meil südames on kanda
metsa, merd ja maad.
Nüüd selle nimel tehkem tööd,
et me loodust puhtamana hoida

FIN:
Ja pyrkimyksenämme
on säilytää
kaikki rikkaudet suuret sen
sukupolville myöskin tuleville

G:
Ich will das Wasser schützen
auch Luft und Land.
Alle drei lassen mich gut leben,
und die Menschen,
die nach uns kommen

LV:
Mes Milam musu juru
un zemi so
un lai solam muzu muzos
dzivibu sajos krastos nosargat

LT:
Tausosim, gerbsim jura
Miska ir zeme,
Pasistengsime uztikrint sveika
Gyvenima ateitis kartoms

PL:
Uszanujemy wody,
tlen, lasy, lad
i zlaczymy wysilki, by po-
zwolic zdrowo zyc
przyszlym pokoleniom

R:
Мы будем чтить его воду, воздух и лес
И для будущих поколений
Все вместе чистой планету сохраним!

S:
Vi måste ta hand om vatten,
luft, skog och land
och förena våra insatser
främja livet för framtidens barnbarn

Chapter 1

Baltic 21 An AGENDA 21 for the Baltic Sea Region

Overall goals

Overall Goal for Sustainable Development in the Baltic Sea Region

»The essential objective of Baltic Sea Region co-operation is the constant improvement of the living and working conditions of their peoples within the framework of sustainable development, sustainable management of natural resources, and protection of the environment.« Sustainable development includes three mutually interdependent dimensions – economic, social and environmental.

This means for the region:

- That a safe and healthy life is secured for current and future generations.
- That a co-operative and prosperous economy and society is created for all.
- That local and regional co-operation is based on democracy, openness and participation.
- That biological and ecosystem diversity and productivity are restored or maintained.
- That pollution to the atmosphere, land and water does not exceed the carrying capacity of nature.
- That renewable resources are efficiently used and managed, within their regeneration capacity.
- That materials flow of non-renewable resources is made efficient and cyclic, and that renewable substitutes are created and promoted.
- That awareness of the elements and processes leading to sustainability is high among different actors and levels of society.
- The Baltic Sea Region recognises its interdependence with other parts of the world and makes its contribution to the fulfilment of sustainable development goals at the global and European level.

Overall Goal for Baltic 21 Education

- All individuals should have competence to support the development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
- Education for sustainable development should be based on an integrated approach to economic, societal and environmental development.

The aims of Baltic 21

- To protect the Baltic Sea Region by reducing the environmental impact of municipalities, industrial plants, agriculture and transport.
- To co-operate regionally on environmental, economic and social aspects. Regional co-operation is based on joint actions and sector actions in eight sectors: agriculture, education, energy, fisheries, forestry, industry, tourism and transport.
- To place emphasis on environmental aspects, including health and spatial planning and to focus on long-term aspects and holistic perspectives.

Sustainable development essentially aims at:

- Constantly improving the living and working conditions for the peoples of the Baltic Sea Region. This is to be achieved through sustainable management of natural resources and through protection of the environment. Three interdependent dimensions are included:
- - the environmental dimension
- - the economic dimension
- - the social dimension

Countries involved:
Baltic 21 comprises 11 countries and the European Commission. The countries are Denmark, Estonia, Finland, Germany, Iceland, Latvia, Lithuania, Norway, Poland, Northwest Russia and Sweden.

Baltic 21 is committed to democracy, openness and broad public participation.

Basic principles: Sustainable development in Baltic 21 is based on

- The Precautionary Principle
- The "The Polluter Pays" Principle

These principles are based on international agreements including the conventions on "Climate Change", "Biological Diversity", "Long-range Air Pollution", "Protection of the Marine Environment", "Responsible Fisheries" and "The Amsterdam Treaty".

Introduction to Schoolwork on BALTIC 21 Sectors

Ask yourself the following questions:

- What are my expectations for the future?
- How would I like my life, and that of my children and their children to be?
- What do I basically need?
- What do I just like to have or get without really needing it?
- What am I willing to do in my private life to realise my expectations?
- How can I take part and work for a sustainable future?

Basically, we all need food, drinking water, air, health, friends, love and care.
But is our food always healthy? Is our drinking water always clean? Do we breathe clean air?
Why do so many people fall ill, become injured or even die in today's traffic and industrialised society?

The governments in 11 countries, namely Denmark, Estonia, Finland, Germany, Iceland, Latvia, Lithuania, Norway, Poland, North-west Russia and Sweden, together with networks of cities and organisations have decided on a regional Agenda for the 21st century: an Agenda for the Baltic Region entitled "Baltic 21".
The governments have defined aims and goals for sustainable development in the following sectors: agriculture, education, energy, fisheries, forestry, industry, tourism and transport.

Baltic 21 is committed to democracy, openness and broad public participation.
Now ask yourself two more questions:
"Do I agree with the politicians?
Do I want to take part?"

What does sustainable development mean to you?

Purpose: To find out what each of us understands by sustainable development:

Write two sentences on sustainable development: one sentence that you really believe will lead to sustainable development, and one sentence that you consider will not (do not mark which one is which!).

In pairs: read each other's sentences and discuss which ones you believe in and which ones you do not. If possible, come to an agreement, and then share your ideas with other pairs.

Definition formulated by
the Brundtland Commission, 1987:

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs"

Methodology

Schools can use the following three-step-methodology, generally agreed among the Baltic Sea Project co-ordinators and educators:

- Step 1: Preparatory work
- Step 2: Practical work
- Step 3: Discussion

It is suggested that students take their starting point in one of the general BSP themes or programmes (www.b-s-p.org), or in any of the Baltic 21 sectors: sustainable agriculture, education, energy, fisheries, forestry, industry, tourism and transport (www.baltic21.org).

Preparatory work:

- In what subjects will you do your work?
- Can the work be interdisciplinary in approach, with several subjects and teachers involved?
- Can practical work be done? What kind of practical work will you do?
- What people, institutions, non-governmental organisations (NGOs), and local politicians can be of use in your work?

Practical work:

- Make a list and a time-table for your actual practical work
- Make your results known to others!

Discussion:

- How does your work lead to a more sustainable future?

Alex Tulina, Russia

Baltic 21 sector: Agriculture

Political sector goal – Agriculture:

Sustainable agriculture is the production of high-quality food and other agricultural products and services with long-term impact on economy and social structure. Sustainable agriculture means that the resource base of non-renewable and renewable resources is maintained. Sustainable agriculture will meet society's needs for food and recreation.

Sustainable agriculture will preserve the landscape, cultural values and the historical heritage of rural areas. Production methods should not threaten humans or animals or degrade the environment, including biodiversity. The ethical aspects of agricultural production will be considered. Renewable resources should gradually replace non-renewable resources.

Pierre Geisler, Germany

Suggestions for schoolwork with Baltic 21 sector: Agriculture

Preparatory work:
- What kind of food production takes place in your area?
- What is the general attitude to farming and to the job of a farmer in your area/country?
- What is the national policy concerning agriculture? Fertilisers? Pesticides? Technology?
- What is the net production? Is your country selfsufficient? What does your country import and export?

Practical Work:
Search local newspapers and make a selection of cuttings. What kind of problems or discussions are presented in connection with food production related to:
- human health?
- environmental impact?
- economic and social aspects of being a farmer?
- other aspects?

Make a study visit to a farm:
- What is produced? How is it produced? Where are products sold? What is the farmer's financial situation?
- What impact does the farm have on the landscape, the biodiversity of the land, its cultural values, historical heritage, etc?
- Is the farm land used for recreational purposes – birds, flowers, insects?

Make study trips to local food stores and select certain food items, e.g. fruits or vegetables.
- Are the goods produced locally? How far have they been transported?

Discussion:
- What changes can be implemented to achieve the sector goals?
- Why are some people vegetarians?

Benjamin Mühlichen, Germany

Baltic 21 sector: Education

Political sector goal – Education (Schools) :

The individual learner should have the knowledge, values and skills to be an active, democratic and responsible citizen and to participate in decisions at the personal level, as well as at different levels within society, locally and globally, in order to contribute to creating a sustainable society. Learners in vocational education should also have skills and competences relevant to their future professions.

Malene Priske Meier,
Denmark

Suggestions for schoolwork with Baltic 21 sector: Education

Preparatory work:

- Is education for sustainable development part of the overall goal, the plan of , and the set of values in your educational institution?
- Who is responsible for achieving the overall goals?
- Are all subjects in education equally responsible for sustainable development?
- How does your school administration support work for a sustainable future?
- Does your school have awards that show the school works for sustainable development?

Practical work:

- Perform an eco-audit on your school. Perhaps using a questionnaire, investigate the following topics:
- Biodiversity: Does your school have green surroundings and/or a green school-yard? How is the area maintained? What species of plants or trees grow near your school? Are there any old trees? How far from your school is the nearest green area, such as a park, a forest, a field, the beach? How often do classes go there?
- Buildings: What materials were used to construct your school building? Do you have access to open-air areas? What sort of heating and ventilation system is used?
- Consumption of water, energy, electricity, paper and other resources at your school: How much water, energy, etc. is consumed per year per person? What are the sources? What happens to the waste? How much money is spent per year on each item? If possible: compare with previous years and with other schools.
- Food: Does your school have a canteen? Does the canteen serve organic food? Where do the raw ingredients come from?
- Transport: How do students and teachers get to school each day: What percentage walk? What percentage cycle? What percentage come by bus? What percentage come by train? By car? What reasons do students or teachers have for their choice of transport?
- Waste: Are organic waste products composted? Are other materials recycled? Are disposable or non-disposable materials used, etc.? How much money is spent per year on waste disposal?

Discussion:

- How can your school be made more sustainable?
- How can your local progress be evaluated or indicated?
- How can sustainability be measured? What timescale is needed?

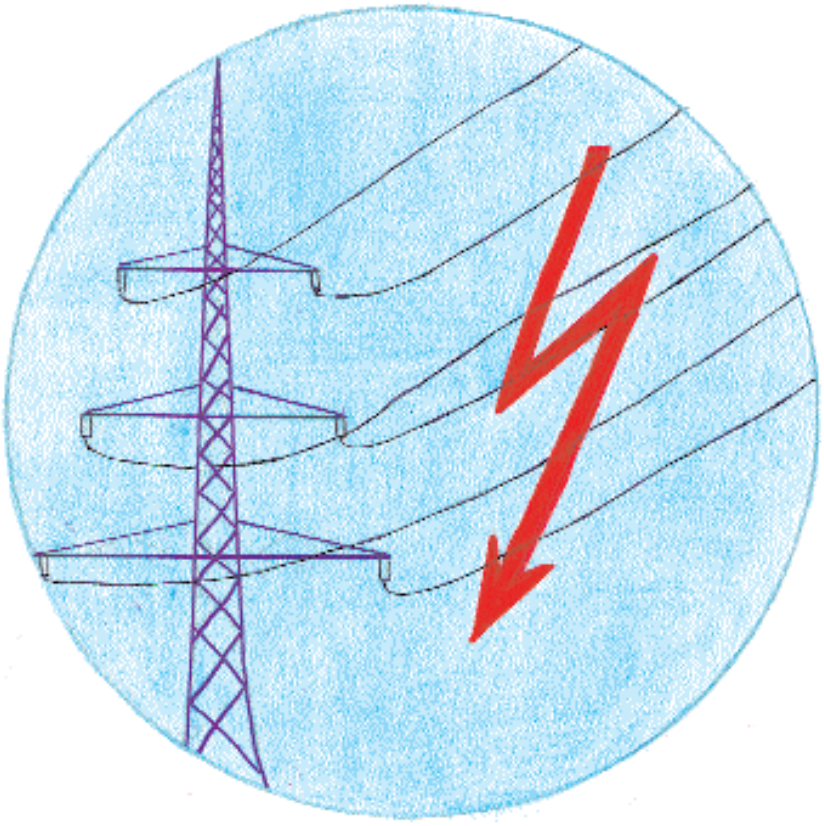
Ramona Rozmisa, Latvia

BALTICA 21

Baltic 21 sector: Energy

Political sector goal - Energy:

Sustainable energy concerns security of supply, the carrying capacity of the environment, resource management, economy and safety. Sustainable energy requires an increase in renewable energy production and an increase in energy efficiency and energy savings. Sustainable energy supply must not give rise to pollution that exceeds the critical loads or levels of acidification (substitution of high-carbon fossil fuels by low-carbon fossil fuels), eutrophication, tropospheric ozone and global climate change. Hazards of nuclear waste and nuclear energy production should be eliminated. Efficiency can be increased by combined heat and power production and by energy savings.



Angelika Rabiej,
Poland

Suggestions for schoolwork with Baltic 21 sector: Energy

Dumila Tymecko, Poland

Preparatory work:

- What kind of energy production takes place in your area?
- To what extent is your country dependent on imported energy? In what form, from where and from what sources?
- What indicators can be used to show the impact on the environment, the impact on biodiversity, or the impact on human health by energy production?
- What kind of sustainable energy has been introduced in your area?
- What is the general and the political attitude to sustainable energy forms such as wind turbines, solar cells, solar panels, biogas, etc?
- Has opinion changed over the last five to ten years?

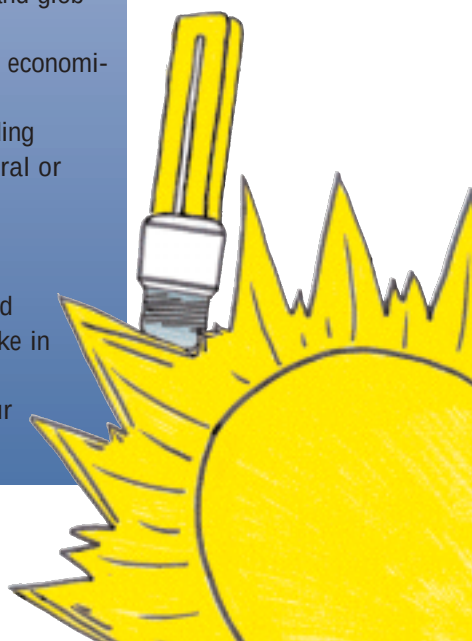
Practical work:

- How much energy is used for different purposes in your daily life at home or at school?
- How can the amount be reduced?
- Make a study visit to an institution such as a power plant, a wind-turbine, a combustion station (= a waste incinerator), a municipality with biogas, or a pilot project, and find out its resources, its efficiency and its possible impact on the environment, for example with regard to acidification, eutrophication, tropospheric ozone and global climate.
- Is work there considered safe and economically acceptable?
  Does the construction of the building change the landscape or the cultural or historical heritage?

Discussion

- What kind of energy savings would you be personally prepared to make in your life?
- Does the energy production in your area have an impact elsewhere?

Paulina Siedler, Poland



Baltic 21 sector: Fisheries

Political sector goal - Fisheries:

Long-term strategies should be developed for major fish stocks i.e. cod, salmon, herring and sprat. Important fish habitats should be restored. Sustainable aquacultures should be achieved.

Sustainable fisheries require sound ecosystems, so that fish stocks can replenish themselves, and the establishment of selective fishing techniques.

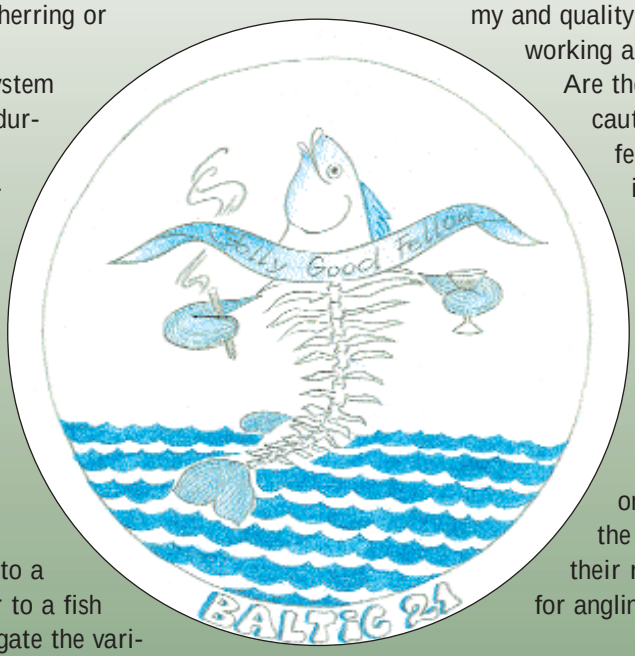
Above:
Paulina Ciesielska, Latvia

Niklaus Paegle, Latvia

Suggestions for schoolwork with Baltic 21 sector: Fisheries

Preparatory work:

- What species of marine or freshwater fish do fishermen catch in your area?
- Where do the these species breed?
- What percentage of marine catches is made up of cod, salmon, herring or sprat?
- What kind of ecosystem do these fish need during a lifetime?
- Which fishing techniques are used to catch fish? How far do fishermen travel to catch fish?
- What is meant by selective fishing techniques?



Practical work:

- Make a study visit to a fisherman's boat or to a fish auction and investigate the variety of species/biodiversity and the quantities. Are the fish for human consumption or for the fish industry?
- What is the fisherman's attitude to his job, including the »quality of life«, and the financial rewards offered?
- Visit a fish industry and investigate the products, the amount of natural resources, the economy, etc. Are the goods for the local market or for export?
- Visit an aquaculture ("fish farm") and investigate the net production size, the economy and quality of life of the people working at the aquaculture: Are there any special precautions necessary when feeding the fish, treating the fish, and treating the water? Is there any special legislation regulating the establishment of aquacultures in your area?
- Interview anglers on the coast or along the river bank about their reasons and motives for angling

Discussion:

- What indicators can be used to establish whether a is viable and replenishing itself?
- Are fish generally considered healthy food in your area?

Janis Presis, Latvia

Baltic 21 sector: Forestry

Political goal - Forestry:

Sustainable forestry maintains its biodiversity, its productivity, its regeneration capacity and its vitality. Sustainable forestry fulfils ecological, economic and social functions and does not cause damage to other ecosystems, be it at local, national or global levels. Consideration must be given to global carbon cycles, conservation of biological diversity, and the productive functions of wood and non-wood, in particular protective forest management concerning soil and water. The promotion of wood and wood-based products should emphasise wood as a natural renewable resource that is environmentally friendly.

Edgars Kujatkoskis,
Latvia

Suggestions for schoolwork with Baltic 21 sector: Forestry

Preparatory work:

- What percentage of your country is covered by forest? What percentage of this is natural forest?
- Does legislation differ between national and private forests?
- What do people generally combine with the forest in your area?
- What do ordinary people use the forest for?
- Which tree species are harvested?
- What products are produced from wood from forests in your area?
- Is waste wood used for any practical purpose other than fire wood?

Practical work:

- Investigate the biodiversity of the forest e.g. by conducting phenological studies.
- Interview people about their recreational use of the forest (picking mushrooms and berries, roving and camping, mentally relaxing etc).
- How can annual growth and net production be measured?
- What harvesting methods are used – clear-cuttings or individual trunks? At what age are trees felled for other purposes?
- How does a lumberjack consider his "quality of life" as a forest worker, and is his financial and social situation acceptable?

Joanna Kuligowska, Poland

- Any threats to forests in your area?

Discussion:

- What is your definition of a forest? What characterises a forest in your area?
- What emotional issues are connected to forests?

Baltic 21 sector: Industry

Political goal - Industry:

Sustainable development means economic, social, technical and environmental improvements. Sustainable strategies apply to resources, processes, products and services. Sustainable industry ensures the availability of goods and services that satisfy human needs and bring quality of life, whilst simultaneously reducing the ecological impact and resource intensity throughout a lifecycle. Ecological impact should not exceed the carrying capacity with respect to biodiversity, ecosystems and usage of natural resources. Sustainable industry means improving the working environment and safety of the workforce.

Rolands Salmins,
Latvia

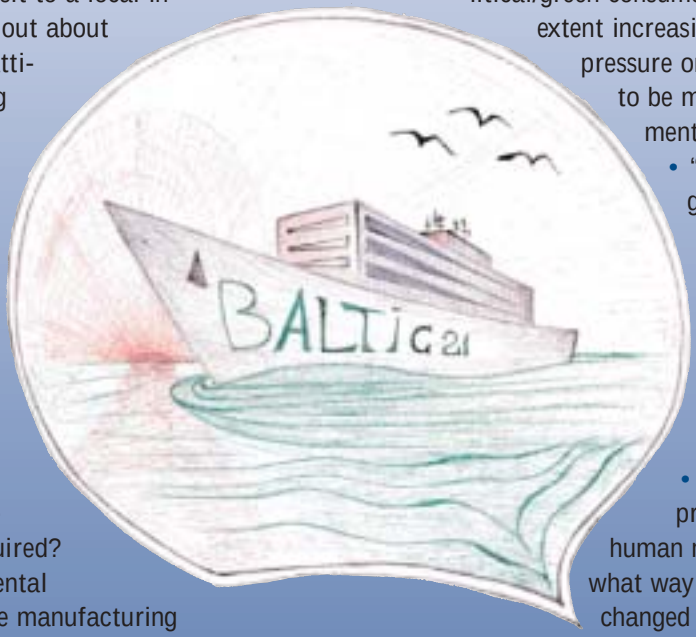
Suggestions for schoolwork with Baltic 21 sector: Industry

Preparatory work:

- Where are industries located in your area?
- Why are they located there?
- In what way have your local industries influenced the local environment, its biodiversity, the quality of the water and the air? What indicators can be used to investigate these factors?

Practical work:

- Make a study visit to a local industry, and find out about environmental attitudes concerning production processes and waste. Find out for different product categories what happens "from cradle to grave": How are products manufactured? What resources are required? What environmental hazards does the manufacturing process cause? How are the products used by people who buy them? For how long are they used? What happens after use of the product? Can the product be recycled or does it end as a waste product?



- Industries can be awarded "green certificates": What standards are required to obtain such a certificate, and in what way does this have an impact on the industry's image and economy?

Discussion:

- Market development and the view and awareness of the consumer are of great importance: Define what is meant by "the political/green consumer" and to what extent increasing awareness puts pressure on industrial goods to be more environmentally friendly.
- "From cradle to grave" projects have been carried out on industrial products: What applied aspects bring "quality of life" to the consumer?
- In what way do products "satisfy human needs" - and in what way have the needs changed over the last decade or two?
- Hazardous waste products are often transported long distances and deposited abroad: Do we need another planet?

Maigonis Preikss, Latvia

Baltic 21 sector: Tourism

Political goal - Tourism:

Sustainable tourism is any form of tourist development or activity which respects the environment, ensures long-term conservation of natural and cultural resources, and is socially and economically acceptable and equitable.

Sound environments should be sustained to conserve the recreational quality of natural and manmade landscapes. Satisfactory social conditions for tourists and the local population should be created.

Uldis Mangulsons,
Latvia

Suggestions for schoolwork with Baltic 21 sector: Tourism

Preparatory work:

- What do tourists do when visiting your area?
- What is the predominant means of transport?
- How can tourism be an environmental threat in your area?
- In what ways does tourism have positive and negative impacts on your local area?
- What kinds of physical activity are offered and promoted in your area?

Practical work:

- Bicycle maps have been produced for many local areas, clearly marking sites of cultural or natural interest. Investigate the map by making a bicycle trip and writing about your impressions to the media. If your area does not have a bicycle map, make one - perhaps with a demand to local politicians that special bicycle routes be created away from other traffic.
- Nature trails can be created around the countryside: Design a nature trail, making the signposts in co-operation with the authorities and designing a plan to maintain it. Ask groups of pupils and/or teachers to test the trail and report their experiences to the local paper.
- Take part in restoring ecologically-important biotopes through thematic activities, summer camps or excursions - be it by clearing woodlands for endangered species of butterflies, planting grass species or creating special paths to protect dunes from wind erosion. Co-operate with the authorities on such a plan.
- Organise fishing trips, horseback safaris, survival trips, etc in co-operation with the municipality and the local tourist company.
- Design a tourist guide for your area that includes what makes the area special to you as a local resident.

Discussion:

- What do you do in your leisure time?
- With regard to special biotopes, should endangered species of plants or animals be presented on posters to the public or should they be protected by means of not drawing attention to them?
- Define the term "ecotourism" in your local context.

baltic 21

Agata Ciemiorek, Poland

Baltic 21 sector: Transport

Political goal - Transport:

Sustainable transport minimises negative environmental effects, consumption of non-renewable resources, and the use of land for transportation purposes. Sustainable transport retains its ability to serve economic and social development in the Baltic Sea Region by establishing an infrastructure that improves efficient transport of goods, by rail and sea in particular.

Kristine Leja,
Latvia

Suggestions for schoolwork with Baltic 21 sector: Transport

Preparatory work:

- What kinds of jobs are connected to the transport sector in your area?
- What infrastructure is present in your area? What transport needs are there?
- What are the main negative impacts on the environment caused by different kinds of transport?
- What indicators can be used to monitor the impact on the environment, and on the cultural and historical heritage?
- In what way can transport be a threat to human and animal health?
- What are the statistics on annual injuries and deaths due to traffic in your country?
- Why do people prefer private cars to buses, trains or other forms of public transport?

Practical work:

- Find out what percentage of your country's land is used for roads.
- Calculate how many kilometres your group travelled in one week and find the difference in cost using different means of transport. Try to include environmental aspects in your calculation.
- Calculate the CO2 emission resulting from travelling 100 km using different means of transport.
- Examine the petrol prices and compare them with prices of public transport for a similar distance.
- Construct maps for bicycle paths away from motor traffic. Present the suggestions to your municipality and design a bicycle promotion campaign.
- Make a plan for your city centre that prevents private cars in the midst of urban dwellings but allows people to go shopping using other means of transport.
- Biofuels, ethanol and cars using solar energy have been produced for sustainable energy in the transport sector: Construct a bicycle that can make use of wind energy.
- Transport of goods should be by sea or rail: Construct a map in the Baltic Sea Region that would create suitable "new Hanseatic routes".

Discussion:

- How can public transport be made more attractive?
- How can cars be made to be environmentally friendly?
- How can the need for transport be reduced?

Euna Lazdina, Latvia

Chapter 2

Education for Sustainable Development in the Baltic Sea Region

The Haga Declaration

By Siv Sellin, Sweden

Following a Swedish initiative, the Ministers of Education of the Baltic 21 countries met in March 2000 at Haga Palace in Stockholm. The purpose of the meeting was to examine the feasibility of creating a network comprising ministries, appropriate authorities and educational institutions dedicated to the implementation of sustainable development through education and training. As a result of the meeting, the Haga Declaration was adopted, which included an agreement to develop an Agenda 21 education programme and the creation of the education sector network with Lithuania and Sweden as lead parties. Agenda 21 for Education should include: definition of goals, review and evaluation of educational activities to promote sustainable development undertaken so far, identification of obstacles and gaps, and an action programme. Three working groups were set up: formal education (schools), higher education and non-formal education.

As a first step in the work, the relationship between environmental education and education for sustainable development was discussed in the working groups. According to the Haga Declaration, education for sustainable development should be based on an integrated approach to economic, environmental and societal development, and encompass a broad range of related issues, such as democracy, gender equity and human rights. This broad approach should be recognised in both natural science and social science, and should complement and build on existing initiatives in environmental education. The difference between environmental education and education for sustainable development was further elaborated in the working group for schools and the result is formulated in table 1:

Environmental Education	Education for Sustainable Development
Deals with environmental problems	Deals in an integrated way with protection of the environment, effective use of natural resources, maintenance of the ecosystem, a well-functioning society and a good economy
Environmental problems depend on human activities and their impact on the environment	The problem depends on a conflict between different human goals - environmental, social, cultural and economic
Accounts biodiversity	Accounts cultural, social, economic and biological diversity
Desired outcome: A good environment	Quality of life for today and future generations
Actions to protect the environment	Motivation to change lifestyle based on important issues of personal life
Responsibility for the environment	Responsibility for the human condition and the condition of the ecosystem
Deals with individual behaviour (environmental ethics)	Increases action competence, including competence to develop moral criteria, and stimulates public participation in decision-making
Environmental education has a local and global context	Education for sustainable development should be applied and grounded in the local economic, social, cultural and ecological context and community, followed by regional, national and global contexts
Taught in some subjects	Integrated in all teaching and learning and in all school life

The Haga Declaration also emphasised that education for sustainable development should be pursued at all levels of education and also included in all curricula or equivalent instruments corresponding to the level of education. Such education should be based on broad scientific knowledge and be both integrated into existing disciplines and developed as a special competence. It demands an educational culture directed towards a more integrative process-oriented and dynamic mode emphasising the importance of critical thinking and social learning as well as a democratic process.

Each working group was responsible for conducting surveys of existing practices and provisions. The working group for schools, consisting of one representative from each country in the Baltic Sea Region, formulated a common framework for evaluation. It was seen as important to study the situation in countries with respect to both general and educational goals concerning environmental care and sustainable development. In addition, the way environmental education and education for sustainable development was actually provided in schools with respect to content, organisation and methods was to be studied. In order to identify all obstacles and gaps, questions were asked concerning competence of staff, support, partnerships and materials.

The survey found that a single-subject approach still seems to be most common in school. Scientific knowledge and scientific studies appear to be the most important part of environmental education, and transmitting these facts still seems to be a common method in schools. Among all educators there seems to be a lack of understanding of the concept of sustainable development and particularly knowledge about how to integrate economics and social aspects with the ecological aspects. In many countries, the curriculum design creates obstacles to covering the needs of environmental education/education for sustainable development in regular education.

There are, however, many indications of de-

Goals

The following goals were formulated for schools:

The individual learner should have the knowledge, values and skills to be an active, democratic and responsible citizen and to participate in decisions at individual, as well as at different levels within society, locally and globally, to contribute to creating a sustainable society. Learners in vocational education should also have skills and competencies relevant to their future professions.

This will require the following:

- Legal provisions that clearly include education for sustainable development
- Incorporation of education for sustainable development in regular teaching and learning activities in school and as the basis of all school life
- Educators with relevant competence to include sustainable development in their teaching
- Suitable learning methods and a learning environment conducive to sustainable development.

velopment towards education for sustainable development. Many methods are being used that could transform educational culture into a more integrative and dynamic mode in line with the Haga Declaration. Being in touch with the real world and building action competence are important components of education for sustainable development. Efforts in many schools to relate theory to practice in making the school environmentally friendly and in working with the local environment are promising examples of such work.

To fill the gaps identified in the survey, an action programme was formulated.

The aim here is to give strong political signals, to develop competence, to stimulate the production of materials, and to initiate and promote research and development.

The second meeting of Ministers of Education, January 2002

The Ministers of Education from the countries of the Baltic Sea Region, namely Denmark, Estonia, Finland, Germany, Iceland, Latvia, Lithuania, Norway, Poland, Russia and Sweden, met at Haga Palace in Stockholm on 24-25 January 2002 for their second meeting.

The purpose of the meeting was two-fold: to examine the results achieved by the Baltic 21 Education Sector Network and its three working groups in respect of the task given at the first ministerial meeting at Haga Palace in March 2000; and to adopt an Agenda 21 for Education for Sustainable Development in the Baltic Sea Region, Baltic 21E.

At the meeting, the ministers adopted the Agenda 21 for Education in the Baltic Sea Region (Baltic 21E), endorsed the major commitments, goals and action programme contained in Baltic 21E, and resolved to ensure an efficient implementation of Baltic 21E.

The Baltic Sea Project in the implementation of Baltic 21E

Under the joint action area "Research on and development of education for sustainable development", two actions are formulated in the following way.

- Encourage international co-operation regarding research and development of education for sustainable development, and support and initiate networks for experience sharing and joint activities at all levels

- Stimulate and support different approaches in education covering an interdisciplinary approach, ways of including aspects of sustainable development in different subjects, involving education in a local context, as well as collecting and disseminating examples of good practice

For more than ten years, the Baltic Sea Project has played an active role in stimulating and initiating networks of schools in the Baltic Sea Region. At the same time, development of teaching methods in environmental education and education for sustainable development in line with Baltic 21 has been stimulated and also produced good results. The Baltic Sea Project can therefore be seen as an important actor in spreading good examples and in taking part in the important development work in Baltic 21.

The Baltic Sea Project

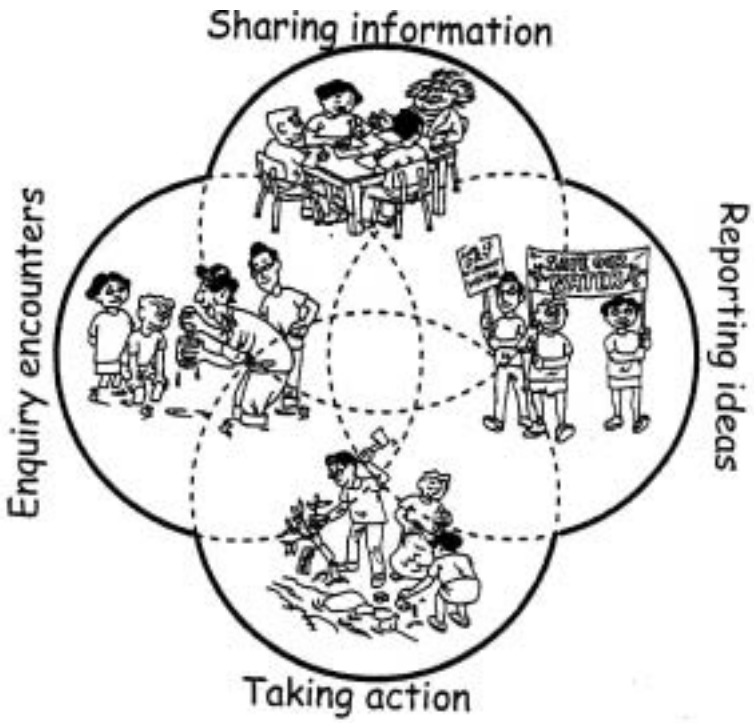
Measuring Progress – Key Elements

By Kaisa Lindström, Finland

To constitute a learning process and development towards active citizenship, the following key elements should be considered:

1) Information: Information on opportunities should be given to projects, local problems and other activities that students could work on to learn information techniques as well as enter into dialogue and network with others involved in education for sustainable development. The knowledge achieved should be made widely available and disseminated by different means, such as twinning and networking. Wide sharing of information is also a criterion of democracy.

2) Motivation is crucial for all kinds of learning. When a person starts a learning process, motivation largely depends on the expectations of the learner and on the nature of information previously obtained. Inner motivation



From "The Long Way to Sustainability" Johannesburg 2002

grows through experience, new interpretations and the usefulness of the knowledge and skills gained.

3) Training: The challenge of education for sustainable development is how to show the complex nature of the societies we live in today, how to make ecological, economic, political and technical processes transparent, and how to facilitate a holistic approach to environmental problems.
A reverse chronology of the time perspective is needed: the past ← the present → the future. The present situation, knowledge or problem is always in dialogue with the past and the future. Therefore, historical aspects as well as tools for future research have to be incorporated.

4) Learning is a constructive process: The learner constructs knowledge and interprets it according to his/her own former knowledge and according to his/her worldview. Knowledge can be fully understood only when it is used. Personal experiences have a strong effect on the whole learning process.

5) Cultural activities can be linked to aesthetic education for sustainable development; they enhance appreciation of one's cultural heritage and teach practical and traditional skills. At the same time, cultural activities build a platform for learning to understand other cultures.

6) Competence development is crucial for putting theories into practice. The challenge for learners is to commit themselves to competence development and to the learning process. A learner needs competence (theory, skills) in order to proceed with the learning process, gaining more competence in the process.

7) Projects are practical working environments in education for sustainable development. Projects include networking, an authentic situation and competence development. Projects can be large, involving many partners, or small-scale ventures geared to influencing concrete conditions or to addressing a local problem. Projects with partner schools in the Baltic Sea Region expand the learning environment on education for sustainable development, which leads towards international co-operation and cultural understanding.

8) Availability is an essential element. Local networks and local action groups provide a context for the personal learning process, a platform for working together and an opportunity to be part of a social network. Partnerships between companies, educational institutions and non-governmental organisations should be promoted. The Internet and virtual, open and distance learning environments offer a wide range of new opportunities for acting in a global network.

Baltic 21

Maria Mensonen, Finland

Suggested Methods for Self-evaluation (Indicators)

By Kaisa Lindström, Finland

Schools are recommended to make an annual evaluation and discuss in a transparent and democratic way:

- What has actually happened? What have we done, experienced and achieved?
- What can we learn from our experience?
- How can we better distinguish between our sphere of interest and our sphere of influence?
- How can we be more proactive?
- What actions should we take in the coming year?
- How should we adjust our vision?
- What are our goals for the coming year?

The following checklist may serve as a tool and can be further elaborated locally

1) Information

Does the school/organisation have a document, e.g. an action plan, a school policy, a set of values etc, which provides a framework for implementing education for sustainable development? Is it written in a language and style which everyone in the school can understand?
Quantity becomes quality: What kind of information is available and how many articles, brochures, course descriptions have been used? How are the goals formulated?

2) Motivation

Initially, motivation comes from the information and knowledge that the learner has, or through

* 2.1 Evaluation model of the process of change in attitudes:

This model can be used at three levels: the personal, the team or the organisation level. Discussion regarding the phases where individuals, teams or organisations are placed in this process will serve as a tool for evaluation. The commitment to education for sustainable development can only grow through the reflective and interactive process of individuals and communities.

Step 1 Think that the individual, the team or the organisation knows the main things about education for sustainable development
Step 2 Know that person, the team or organisation does not know enough about education for sustainable development
Step 3 Know about education for sustainable development
Step 4 Understand sustainable development
Step 5 Put knowledge into practice
Step 6 Develop new models and innovations to promote education for sustainable development

the perception of problems, needs or events. Later, the usefulness of newly-acquired knowledge and skills maintains the motivation.
The criteria here are quality of information and linkage between theory and practice.
Changes in attitudes – criteria become visible in action. Awareness of and responsibility for promoting sustainable development are closely linked to competence and opportunities to influence conditions.

3) Training

How do the key elements and the overall goals become visible through training?
Is access equal for all? What methods are used in training? Are people committed to promoting education for sustainable development?

4) Learning

Do we have open learning environments?
Do we have a holistic approach?
Is there interaction?
Do we manage creative learning?

5) Cultural activities

Do the school culture and ethics promote education for sustainable development?
Do the creative subjects, such as arts, crafts and design play a role in promoting sustainable development?
What aesthetic view is presented in education for sustainable development?
Does education for sustainable development deal with the multicultural aspect?
Is education for sustainable development a tool for strengthening identity?
Does education for sustainable development require co-operation and networking skills?

6) Competence development

How many authentic situations and opportunities are there for showing the competence gained?
Are communicative and social competences elements of the competence development?
How many innovations are there in day-to-day operations and in education, teaching methods, learning materials and co-operation?
Does education for sustainable development include and develop problem-solving skills?
Competence development is not valuable in itself, but becomes so in actions and interactions, and in authentic situations where a person is able to use the action competence acquired.

7) Projects

How can projects be designed to take the goals of education for sustainable development into consideration?
How can projects be evaluated in terms of achieving development goals?

8) Opportunities

How many opportunities are there for education for sustainable development? What is the quality of these opportunities?

Mára Alksne, Latvia

Environmental History and the Time Dimension

By Per Eliasson, Sweden

How do you heat your house? How is food produced on the farms in your neighbourhood? How have the landscapes – forests, fields and waters - changed during the last one hundred years?

The answer to these questions will probably be that your house has been heated by oil and/or coal, and that farms produce food using a high input of artificial fertiliser and machinery driven by diesel oil. The landscape was much more diversified a hundred years ago – i.e. there were different species of tree, smaller fields, and many small ponds and watercourses everywhere.

If you want to know in what direction you are going, you need knowledge of at least two points: a point in the past and a point in the present. Only then can you have a fair idea of where you will be in the future. We therefore need a knowledge of the past to have some reasonable idea of the future.

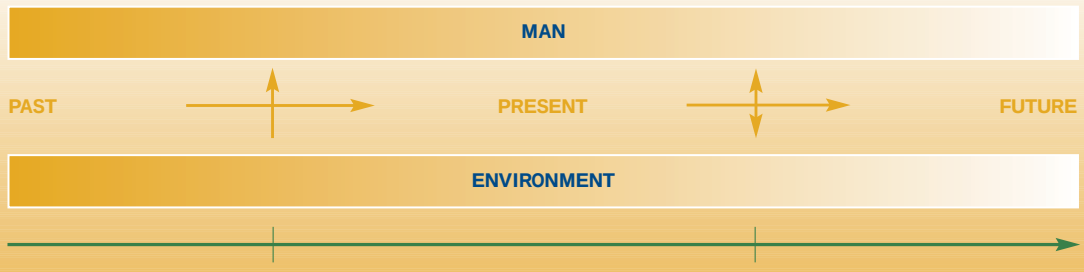
How can the historical perspective be used in environmental work?

Since the economic development of Europe and America has become the blueprint for developing countries such as India and China, the problems of global pollution and resource depletion will continue. The economic development of Europe and America has been based on an industrialisation where the use of cheap fossil fuels has increased exponentially.

The motivation for the poor countries to adopt a new strategy for economic development, while the rich countries at the same time cling on to their old strategy of ever-increasing resource use, is weak. When the USA, which is responsible for 25% of the world's oil consumption, refuses to discuss international limitations for the use of fossil fuels, it sets a bad example to other countries.

In order to understand the degree of the changes needed, we must look back and ask how this strategy of ever-increasing usage of resources was introduced. This is best done through local environmental history studies. When did our city start using coal and oil for heating, for production and for transport? Why did this happen? What were the consequences?

Learning from the past for the decisions of the future



Always use a timeline in environmental history

How was food produced on our farms before the arrival of industrialisation? How was nutrition used? When were fertilisers introduced, and what were the consequences?

How is the use of fertilisers and fossil fuels in our agriculture connected to industrialisation? What happened to the diversity of landscapes when these new methods were introduced? Why?

When we have the answers to these questions, it will be possible to discuss what we think of the future. Then we can also link our conclusions to the global situation. Is this a sustainable development for the whole world? If not, what changes are necessary here in our local community? What would the consequences be?

In this way, environmental history can contribute to an analysis of sustainable development on both a local and global scale.

Ideals of environmental history studies conducted by students

Students working with environmental history:

- start from environmental problems of today - they do not study the past independently of the present
- have a perspective of the future - they are not satisfied only with a better understanding of the present situation but want to create action competence for the future
- can accomplish practical results - they do not use their results only inside the school but present them to the community in order to change the situation
- use chronology as an important tool both in explanations and in narratives - they therefore avoid looking at questions as "eternal"
- start from conflicts about the environment - they thereby avoid both a biased natural science and a moralistic perspective
- look at people as active actors in history - they are therefore not satisfied with structural explanations but seek the causes behind people's actions
- start with studies of the local environment in order to draw conclusions about other areas from their results - they do not start with the great trends in world history in order to illustrate this on a local level

Chapter 3

Perspectives

Based on lectures held at the "On the Threshold – Baltic 21" conference in Sønderborg, Denmark in June 2000, summarised by journalist Bjarke Larsen, Denmark

Baltic 21: An Agenda 21 for the Baltic Sea Region - with special reference to the agricultural sector

Lecture by Christine Jakobsson, Sweden

"Baltic 21 is an overall framework for regional co-operative efforts in promoting sustainable development," Christine Jakobsson said, "and the Baltic Sea Region is the only region in the world which has adopted a common fisheries policy with quotas which works," she continued, giving an example of the work being carried out.

She told the audience that work within the sectors encompassed by Baltic 21 is being carried out with two countries at the forefront – one from Eastern Europe and one from Western Europe – or by a common organisation.

Within each sector as well as across all sectors, a string of joint actions are being implemented. Among the most important, Christine Jakobsson mentioned increased production and use of bioenergy and other renewable energy sources, plus the establishment of demonstration areas and pilot projects for proving sustainable development in practice.

"Here you can show people the effects of different experiments and form a basis to discuss the pros and cons of various ways of trying to reach the common goals," she said.

Another important joint action is to get cities to work together when buying different kinds of things:

"Did you know that 65% of all decisions on what to buy – and where – within the public sector are taken at community level?" she asked. "This means that it is very important to raise

the awareness of sustainable development on this level."

As an example of how this can be done successfully, she mentioned traffic lights. Some years ago, a public contest was held in this area resulting in a new kind of traffic lights, which shine brighter but use less electricity than the 'old fashioned' kind.

Where the circles meet

Sustainable development is where the three circles – economy – society - environment - overlap

Christine Jakobsson underlined the importance of not just working with the environment when talking about sustainable development. Economic sustainability and social sustainability are of equal importance. If you draw a circle for each component, genuine sustainable development occurs in the area where the three overlap.

"The reason we may not have succeeded enough in some areas so far might be that we have not worked in the areas where the three overlap," she said.

Overall goals and indicators

Christine Jakobsson emphasised the overall goals within Baltic 21 (page 8) and introduced examples of indicators.

Within each sector, several indicators will have to be used to see if development is moving in the right direction. One such indicator is life expectancy at birth or the gross domestic product (GDP) per capita.

"All these indicators show us that there are very big differences between the countries in the Baltic Region, and that we have a long way ahead of us," Christine Jakobsson said.

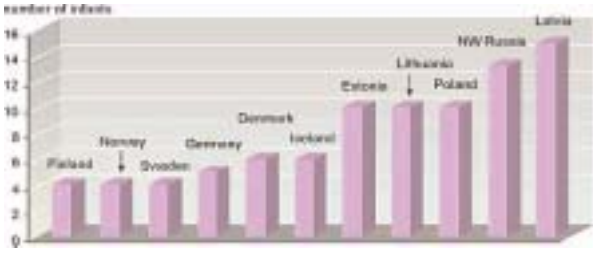


Fig 3.1
Infant mortality rate in Baltic 21 countries

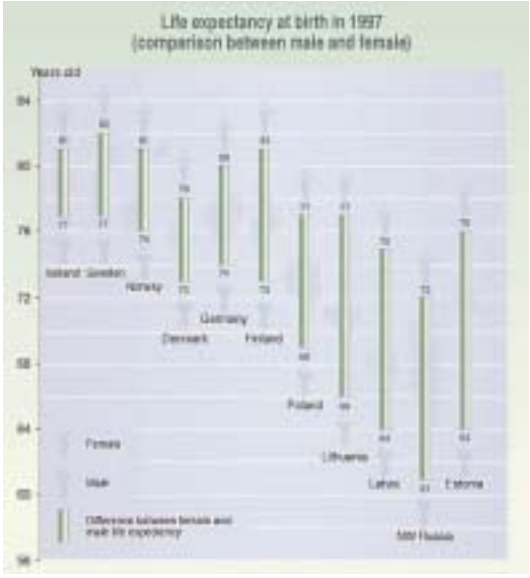


Fig 3.2
Life Expectancy in Baltic 21 countries. For each country, the rate for women is at the top, and at the bottom for men.

Agriculture as an example

Christine Jakobsson then turned her attention to the agricultural sector and spoke of the goals for the work in this area:

"Agriculture contributes significantly to the society of the future. Sustainable agriculture is the production of high-quality food and other agricultural products and services in the long run, taking into account economy and social structure in such a way that the resource base of non-renewable and renewable resources is maintained."

To achieve this important subgoal requires that:

- farmers' income be sufficient to provide a fair standard of living in the agricultural community.
- farmers practise production methods, including biodiversity, which do not threaten human or animal health or degrade the environment, and at the same time minimise the environmental problems that future generations will have to assume responsibility for.
- non-renewable resources gradually be replaced by renewable resources, and that re-circulation of non-renewable resources be maximised.
- sustainable agriculture meets the needs of food and recreation, preserves the landscape, cultural values and historical heritage of rural areas, and contributes to the creation of stable, well-developed and secure rural communities.
- the ethical aspects of agricultural production be safeguarded.

Each of these goals has been discussed – some at great length – in order to reach workable agreements and solutions. According to Christine Jakobsson, the ethical aspects, for instance, are important to include, and she drew attention to the many cases of Mad Cow Disease and other problems with food quality.

Success criteria

In all these areas, Baltic 21 examines the direction in which developments are moving. One such indicator is the number of livestock animal per hectare in BSP countries.

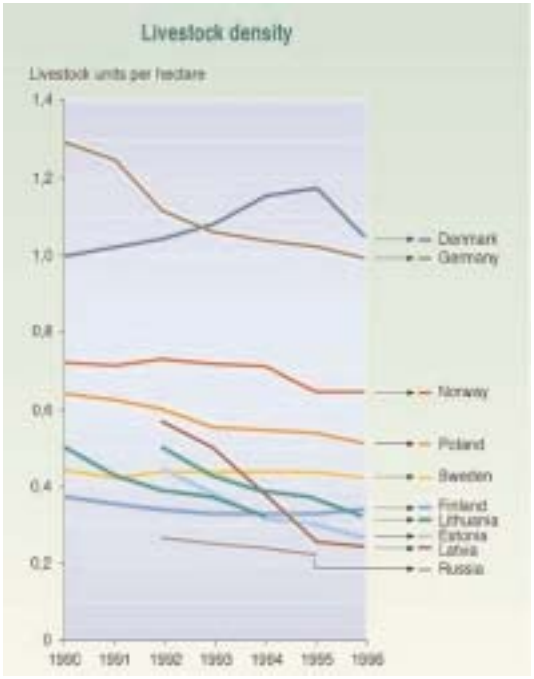


Fig 3.3
Livestock density in Baltic 21 countries. In some countries, a steep decline took place in the years immediately following the end of the communist era.

"When we compare progress with the goals achieved, it is important to notice that political goals are not always realistic goals," Christine Jakobsson stressed. She mentioned, for instance, that there is a goal to reduce nutrient outlet by 50%. This has not been achieved anywhere in the region, but a reduction of 25% has been reached in several places.

Overall goals and actions

According to Christine Jakobsson, the overall goals of the work in this area are:

- to build sustainable structures.
- to improve the viability of agriculture in the region.
- to strengthen farm management with respect to aspects relating to environment, biodiversity, landscape, cultural heritage, social and economic issues.
- to create demonstration watersheds with training/educational programmes.
- to improve agro-environmental legislation.

To reach these goals, the following actions have been prioritised:

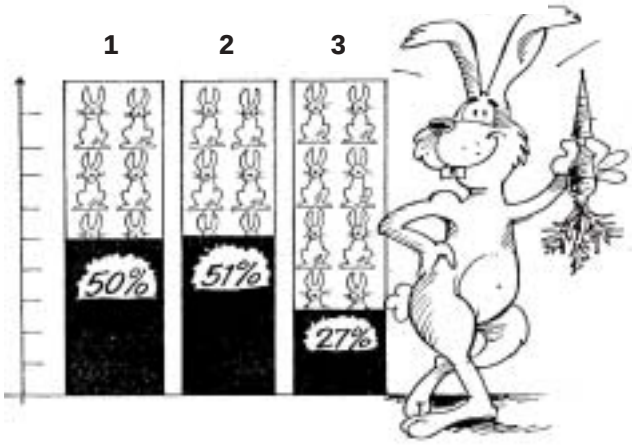
- Provision of education and training.
- Creation of demonstration watersheds with demonstration farms in a network in the countries.
- Development of a "Virtual Research Institute" for sustainable agriculture
- Elaboration and implementation of agro-environmental legislation and policies.

"Education and training is the number one goal. And this goes not only for farmers. It is equally important to raise consumer awareness and to educate and inform politicians, advisors and everybody else," Christine Jakobsson said.

Aleksandra
Pisarska, Poland

Sustainable Agriculture, Food Quality and Human Health

Lecture by Jens-Otto Andersen, Denmark



Young rabbits dying at birth
1: Conventional fresh food + vitamins
2: Conventional fresh food
3: Organic fresh food

Public focus on food quality

"Normally when we walk, we do not pay attention to our legs. But when we break a leg, we suddenly realise how important the leg is and how complicated it really is to do a 'simple' thing like walking. Today, this is the situation concerning food quality. There is tremendous public focus on food quality and many people feel that we have – so to speak - broken a leg in this area."

Those were the opening words of Jens-Otto Andersen when he gave a very pedagogical lecture to the BSP participants on the subject "Sustainable Agriculture, Food Quality and Human Health".

His conclusion, with which he also started, is that there is a very close connection between the quality of soil, plants and human beings: "Mother Nature is extremely complex, and today we do not know enough about how she works," he said, also warning the students not to take his words for granted:

"Other researchers will paint a different picture. Think for yourself, ask questions, investigate."

Young rabbits dying at birth

Jens-Otto Andersen told of a famous research finding in 1975 when pregnant female rabbits were fed different kinds of food. This resulted in very different death rates for the newborn young rabbits:

Of the mothers fed conventional fresh food + vitamins, 50% of the newborn rabbits died. Of those only fed conventional fresh food, 51% died. But of those fed organic fresh food, only 27% died.

"These results raise a big question: Why do we see this difference? In my view, the conclusion is that there is a close connection in the way we farm, in food quality and in human health; a very close connection," Jens-Otto Andersen said.

Not insulting conventional agriculture

"I do not want to insult conventional agriculture as such. Conventional agriculture is many different things, just as you can find good as well as very poor examples of organic agriculture. There is a great variety in both cases," Jens-Otto Andersen stressed.

Healthy plants?

He then went on to talk about healthy plants. Using wheat as an example, he showed the audience how plants become less capable of defending themselves against fungus attacks if the soil is fed too much nitrogen (fertiliser). Farmers therefore start using pesticides in order to protect the plants, thus initiating a vicious circle:

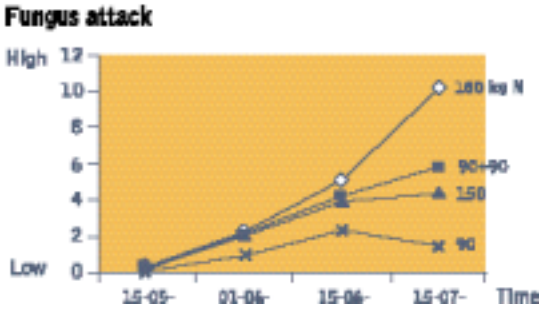


Fig 3.4
Relationship between fungus attacks on wheat and the amount of fertiliser (kg N)

"It is quite normal in modern agriculture to use 180kg of nitrogen per hectare. Research has shown that wheat is several times more vulnerable to fungus attacks when you use this amount compared to only using 90kg. This means that the farmer always has to apply pesticides. We artificially create sickness in the plant."

Intelligent plants

Jens-Otto Andersen went on to talk about the many components in nutrients and in plants – both primary nutrients, like minerals, carbohydrates, proteins, amino acids, fats and vitamins, and secondary nutrients, like aroma, taste, phenols, alkaloids and flavonoids – some of the latter providing human beings with protection against cancer.

"The plant can resist fungus attacks by producing a high concentration of caffeic acid. When the plant senses that a spore from a fungus has landed on a leaf, it produces so much caffeic acid in that specific area that it actually kills a small area around the spore," Jens-Otto Andersen explained.

Healing ulcers in rats

He then told of another scientific experiment showing the importance of caffeic acid:

Two groups of rats were starved for 24 hours in order to empty their stomachs. Then the rats had acid injected into their stomachs in order to create an ulcer. Afterwards, one group was fed a ginger extract with a high concentration of caffeic acid, while the other group was not given this food. After some time, the rats were killed and dissected, and it was clear to see that the group fed caffeic acid was capable of healing the ulcer much better than the other group.

Caffeic acid

Healing of ulcer better with ginger phenols

A positive circle

Jens-Otto Andersen used this experiment to conclude that there is an important circle of inter-dependence in nature:

- Sustainable agriculture yields healthy soils.
- Healthy soils yield healthy plants.
- Healthy plants yield healthy animals and human beings.

The Greenhouse Effect and the Risk of Global Climate Change - Status 2000

Lecture by Peter Laut, Denmark

"Climate is the sum of many things: the temperature and the way it shifts during the year; rain and its distribution annually and globally; the number of hours with sunshine; the degree of cloud cover and so on. All this is climate, and each separate factor can change – and does change."

"Many people cannot imagine any change in the climate. They are used to 'their own' climate and think that climatic changes are something that happened 100,000 years ago. This is not true."

Those were the opening remarks of Professor Peter Laut of the Technical University of Denmark when he gave a very lively lecture on the greenhouse effect and the risk of global climate change, where he succeeded in explaining these sometimes very complicated and complex issues in a very pedagogical manner.

Constant changes

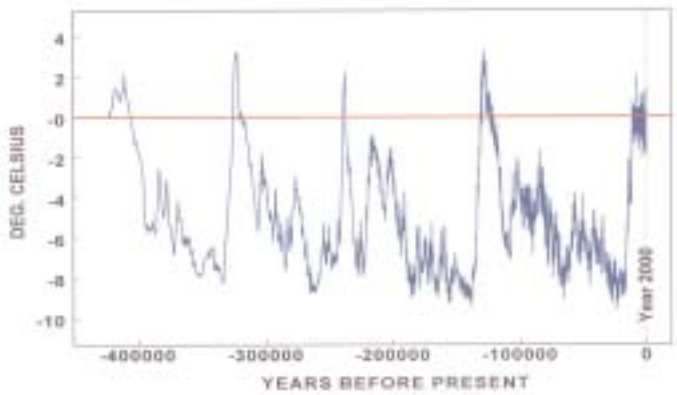


Fig 3.5
Climate changes in the past
Temperatures over Antarctica during the last 420000 years
Scale: °C relative to the present

Peter Laut started by showing a graph illustrating past changes in climate and temperature over Antarctica during the last 400,000 years. One could clearly see four distinct epochs with relatively high temperatures each lasting approximately 20,000 years – and each followed by an ice age, a glacier period.

"We are now living in the 5th warm period, but this one is different from the previous because the temperature remains constant at a relatively high level," Peter Laut explained and continued:

"All civilisations that we know of have developed within this period and therefore we all think that temperatures will be constant. NO! Stockholm will once again be covered in thousands of metres of ice," the professor told the audience.

Many public misunderstandings

Throughout the lecture, Peter Laut took up public misconceptions about the greenhouse effect, which one hears again and again in the media or in one-on-one discussions. One of them is that 'global warming will prevent another ice age'.

"NO! This is not true: the effects of global warming will last maybe 500 years – then the ice age will come," Peter Laut said.

Another 'public misconception' is that nature will regulate itself and always try to return to a stable 'middle position'. But again Peter Laut said "NO! : Nature is accustomed to great changes."

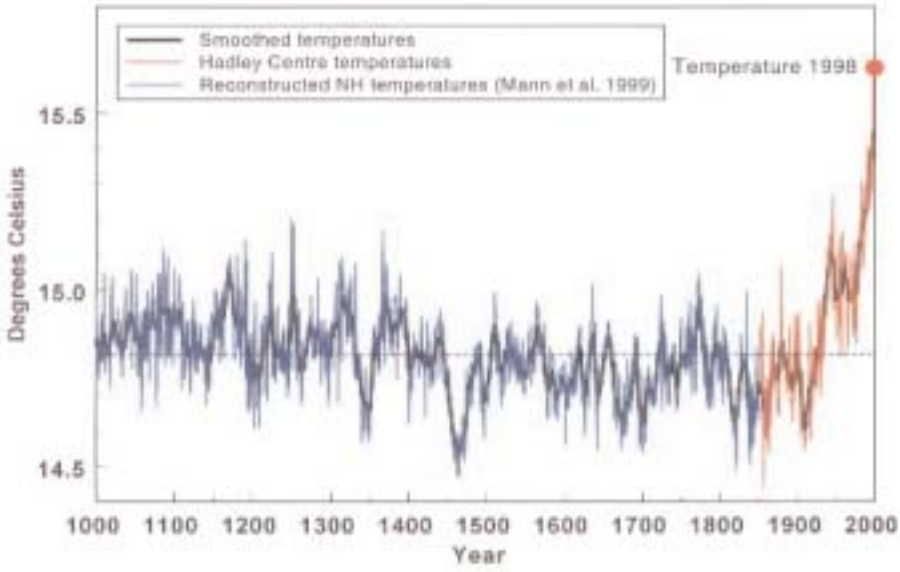


Fig 3.6
Northern Hemisphere temperatures over the last 1,000 years.

Temperature IS rising

Peter Laut showed a graph with the mean temperatures in the Northern Hemisphere over the last 1,000 years. The graph clearly indicates that temperatures have been rising steeply since the middle of the last century.

"Global warming during the last 100 years is between 0.4 and 0.8 degrees Centigrade. The global temperature is definitely rising," Peter Laut concluded.

The "natural" greenhouse effect

Peter Laut then went on to tell about the natural greenhouse effect and the man-made increase in temperature. Greenhouse gases account for 0.4% of the volume of the atmosphere – but they play a crucial role in determining the temperature on Earth.

The greenhouse gases can absorb and re-emit heat radiation from the surroundings. This means that these gases absorb the heat radiation which goes up in the atmosphere, hold the gases for a little while and then re-emit them in another direction. This process goes on continuously and the result is that most heat radiation eventually returns to Earth.

The effect of this process is that the global average temperature is +15 instead of -18 – a difference of 33 degrees.

The chemical composition of the atmosphere Greenhouse gases are in bold, red letters		
Moist air's components in percent of volume [1]		
		Increase
Nitrogen (= N_2)	77.77	
Oxygen (= O_2)	20.87	
Argon (= Ar)	0.93	
Water vapour (= H_2O)	0.4	
Carbon dioxide (CO_2) year 2000	0.0365	+ 30%
Neon (= Ne)	0.00181	
Helium (= He)	0.00052	
Methane (= CH_4)	0.000175	+ 150%
Krypton (= Kr)	0.00011	
Nitrous oxide (= N_2O)	0.0003	+ 15%
Ozone (= O_3)	0.000002	
CFC's in total	0.0000001	
+ other trace gases		
Non-greenhouse gases, total:	99.6 %	
Greenhouse gases, total:	0.4 %	

[1] Assuming a water vapour content of 0.4 %

Fig 3.7
The "natural" greenhouse effect and the man-made increase

"The amounts of greenhouse gases have been constant for 10,000 years and there is no scientific debate about the greenhouse effect in itself. It is NOT a theory. But in the last 50 years, the amounts of greenhouse gases have increased in the atmosphere. This means that more heat is being sent back to the earth, which means the temperature will rise," Peter Laut said.

"The crucial question of course is 'how much' it will rise. That of course is very difficult to calculate. The best scientific estimate is 2-4 degrees over the next 100 years".

The energy budget of the Earth

Peter Laut then used another method to explain other aspects of the greenhouse effect, showing what happens to 100 units of sunshine entering the Earth's atmosphere.

Out of 100 units, 22 units are reflected by clouds, 8 units are reflected by the Earth's surface, 20 units are absorbed by the atmosphere, and the remaining 50 units reach the ground, where they are converted to heat.

For the temperature to remain stable, the Earth has to rid itself of these 50 units and this is done in the following way: 7 units are taken into the atmosphere by thermal winds, 23 units are absorbed by the atmosphere through evapotranspiration, and the last 20 units leave the Earth as radiation.

The problem is that the last 20 units are made up of a balance between surface radiation eminating from the Earth and back radiation re-entering the surface thanks to the mechanism of the greenhouse gases described previously. The balance maintained by the Earth's climate system during the previous 10,000 years of stable climate has been 115 units leaving the surface and 95 re-entering, thus creating a surplus of 20 units.

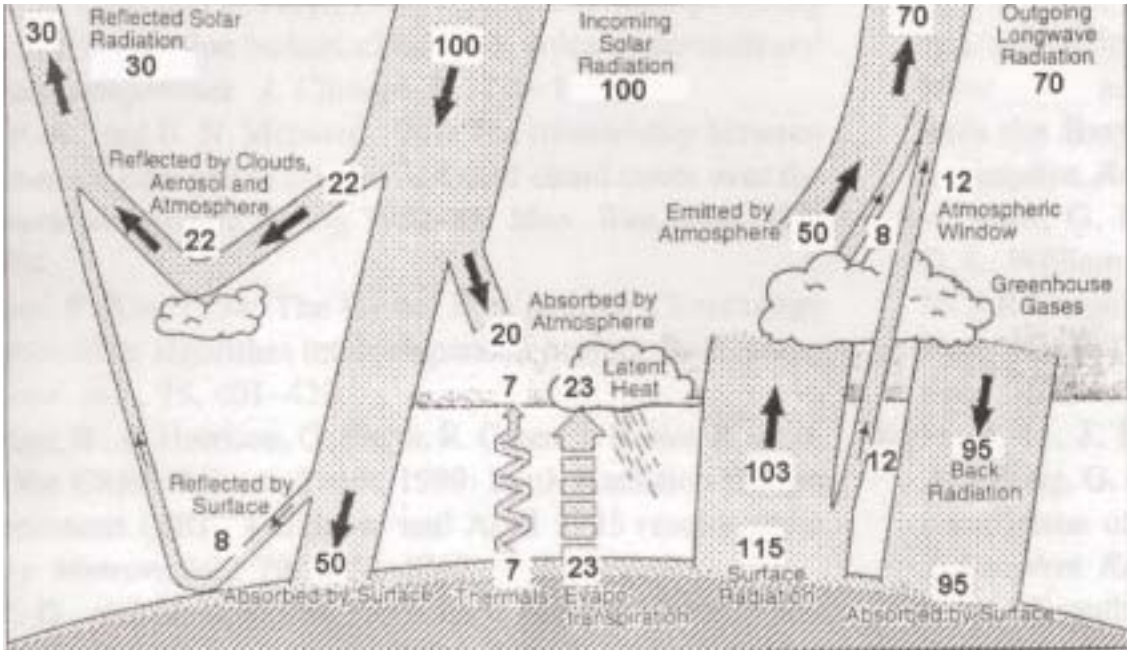


Fig 3.8
The energy budget of the Earth. Global annual mean (Unit: 3.42 W/m2)

The man-made increase in the amounts of greenhouse gases means that the amount re-entering the surface has also increased from the old equilibrium value of 95 units, causing temperatures to rise.

What will happen?

Based on current scientific knowledge, Peter Laut estimates that there will be a global warming of approximately 2-4 degrees, that the sea level will rise 0.5 metres (causing, for instance, 50% of all agricultural land in Bangladesh to disappear), and that there will be changes in rain and snow patterns.

"These last changes may be the most important," Peter Laut said.

Rising CO_2 concentration

Another public misconception is that there is no reason to worry about the rise in CO_2 in the atmosphere. 'CO_2 is good for the plants,' people say.

"That is true – but what if the plants cannot grow because the rain pattern has changed?" Peter Laut asked, adding that the CO_2 level in the atmosphere was rising steeply. During the last 400,000 years, the level has constantly been between 300 ppm in the warm periods and 200 ppm during the ice ages. Today, however, the level has reached 364 ppm, and all indicators point towards a further rise to a level of 700-1000 ppm within the next generation.

What should be done?

Peter Laut went on to tell about some of the important gases making up the atmosphere, where they come from and what can be done to minimise the man-made changes. His two conclusions were that it is important to reduce the emissions of greenhouse gases as much as possible, and that it is equally important to prepare ourselves for a warmer climate.

To do both things, it is important to have more international conferences like the ones in Rio and Kyoto in 1992 and 1997, respectively, and to continue to do scientific research.

"What will all this lead to in the real world?" Peter Laut asked, and pointed towards the audience:

"It is YOU – the young generation – who will have to decide many of the important questions as voters, politicians and taxpayers. YOU will also have to do most of the work as scientists, engineers, administrators and economists.

"And YOU will experience the climate change yourselves and be able to judge if we have done enough to diminish it," Peter Laut said, concluding his lecture.

Pawel Piatek, Poland

The Global Perspective in Environmental Work

Lecture by Jakob Kjøller, Denmark

Jakob Kjøller visited Vietnam in 1998 when he worked as an intern (doing voluntary work) on a development and environmental project in Vietnam. He told about his trip, the country and first and foremost the project, showing and commenting a series of slides. This gave the BSP participants an inspiring, global angle to their work. Some of the aspects touched upon, problems discussed and facts mentioned by Jakob Kjøller are listed below.

The Hoa Binh Dam in Vietnam

Even though the environmental problems that Vietnam is facing are very different from those of European countries, and certainly of Denmark, the solutions and the ways of dealing with the problems are sometimes the same.

In Hoa Binh on the Black River, the Vietnamese government has built the largest dam and hydropower plant in Southeast Asia. The lake stretches 230 km along the Black River and the water level has risen 60-70 m at most, leading to flooding of huge land areas. More than 58,000 people have lost their agricultural land and have had to move up into the mountains. It took five years to build the dam, which was finished in 1984. It took seven years to fill the dam, and this was completed in 1991. When the dam was finished and the water started rising, people from the local authorities came to all the villages and put red sticks in the mountainside 50 m up. They then told people that in seven years the water would reach that level. However, people refused to believe this and moved their houses 5-10 m at a time. Many of these houses have been moved several times. Vietnamese people are relaxed and easy-going: 'Don't worry about future problems'. They often say: 'When the water rises, wait until the water reaches your feet and then run.'

Most of the people who have had to move are ethnic minorities.

In 1993, this hydropower plant produced 45% of all the electricity produced in Vietnam. This is environmentally 'good' energy, which does not worsen the greenhouse effect. Therefore, it is not easy to say if these dams are good or bad: They are really bad for the people who had to move, but good for the environment in other terms.

Some people moved further away from the lake and many villages are only accessible on foot, as there are no roads, no electricity, etc.

Ecological problems in Vietnam

The building of the dam also meant that more people had to live on a smaller area of land, which has increased the consumption of resources. One of the biggest problems in this part of Vietnam is that the people cut down forest in order to make a living and to cultivate the land. Today, many people have to cultivate hillsides where there is less water for irrigation. At the same time, there is less land per person and people are not familiar with appropriate methods for cultivating sloping land nor do they have the right types of crops suitable for this land.

The CARE project area of the Hoa Binh Dam in Vietnam

Many people in the mountains have for generations used what is known as slash–and-burn techniques. This is actually a very sustainable method:

People burn the forest and cultivate the land for a short period of time. They then leave it for a long period while the forest regenerates. Unfortunately, when the population increases, more people have to live off the same area, and the forest is unable to regenerate.

When the soil is left bare, it leads to soil erosion. The top layers of the soil are where all the nutrients needed by the trees and vegetables are found, and when it rains, these top layers are washed away, leaving sandy and bad soil. Such areas are very difficult to cultivate again.

Soil erosion is a serious problem. It also leads to silitation of rivers and lakes, which means more flooding when it rains. Furthermore, the Hoa Binh power plant is now only expected to last for 50 years, compared to the prediction of 100 years when it was built.

Deforestation has meant that today less than 20% of Vietnam is covered by forest. In 1960, the figure was 40%. Every year an area of 2000 km^2, i.e. 40 km by 50 km, is cut down.

One reason for this is the population growth, which is more than 2% a year, with 40-45% of the population in Vietnam under 15 years old. During the Vietnam War, bombs and chemicals dropped by the Americans, such as Agent Orange, also killed many trees.

Another reason is poverty. Vietnam has experienced high economic growth during the last 10 years, but this has mainly benefited people living in cities, not the 80% of the population who live in the countryside.

The CARE project

These are the problems that the CARE Denmark project in which I was involved in had to address. The importance of this is that, even though the environmental problems are very different from the ones we have in Europe, the solutions are not necessarily very different.

The purpose of the project is to improve the environment and stop environmental degradation by giving families, households and villages a better standard of living and alternative incomes.

The local authorities in Vietnam tend to use a top-down approach. This means, for instance, that they forbid people to use or cut down the forest. The problem is that that is not a sustainable approach; at least, not in the way I define sustainable: sustainable for both people and nature. People have to be able to make a living.

To solve the problems, it is necessary to change the practices and agricultural techniques, especially of the people who used to live in the valley and cultivate rice paddy fields. The circumstances have now changed because of the dam, which means that the project also has to change.

One project activity is hedgerow planting: bushes or small trees planted in horizontal rows. They keep the soil together, which allows farmers to cultivate the soil in between on a permanent basis. This way the farmers do not have to clear new land.

In addition, the project has created some nursery gardens, and in the first six months of 1999 more than 400,000 seedlings were produced, ready to be planted.

Another good alternative is homestead gardens. The project introduces new varieties and new kinds of vegetables that are suitable for the local area and for the new circumstances. This provides an alternative to cutting down more forest.

Another good source of income is animal husbandry of different kinds: pigs, cows, bees, fishponds and chickens. The project provides new species and teaches people how to keep animals. For example, people usually have pigs roaming around free in the village. By helping people to build pigsties and breed pigs properly, it is possible to use pig manure as a natural fertiliser in, for example, the homestead gardens. Better husbandry also promotes better hygiene and fewer diseases.

The planting of fruit trees is another highly successful activity. Fruit trees are good because they prevent soil erosion and provide a good income.

In each village, a Village Development Board (VDB) is elected. The VDB decides how to do things and what kind of activities need to be done in each village: planting trees, building drinking-water systems, or carrying out pig vaccination campaigns. It is important to ask the people on the board what kind of activities they would they like in their village, what kind of training they feel they need, etc. This is the key to making the project participatory, and to ensuring that the project activities address the needs of the people.

Sustainable development and local competence

One of the most important aspects of development project activities is that they are sustain-

able. A project like this lasts for only 3-4 years in each village, after which time the activities must be able to continue by themselves.

To ensure the sustainability of the project, the people in each village set up a Village Development Fund (VDF). If a person decides, for instance, to breed pigs, he/she can borrow the money from the project to buy piglets and build fences, etc. Then after some years, when the person is able to sell the pigs, he/she has to repay this money to the VDF. This way, there is a revolving fund in the village, which can lend money out again.

In each village, model farmers are chosen by the project. They carry out the activities in a proper way; they are models for other people. The idea is that if you can get some people to do something new, and other people see that it works, it is easier to get other people to do the same.

Very often the local knowledge is available; people do not need foreigners or experts to improve everything. One model farmer, for example, took some of the tall, thick and hollow bamboo canes, cut them and made a small hole in the bottom. He then put them in the soil next to the fruit trees – and voila! He no longer needed to water them as often because the water dripped out of this bamboo cane very slowly.

For me it has been a fantastic experience and personally very rewarding to visit all these villages. And it is very personally rewarding. It is a privilege. Mostly because you feel welcome, and you actually work together with these people. I do not think that we could be more different – a student from Denmark and a farmer from Vietnam – but we worked for the same cause. Together. Especially when I said that I was an intern and not paid: That gave respect.

Beyond poverty

When you stay for four months in the same area, you start to see beyond the poverty. In the beginning, I mostly noticed the poverty, the small houses. After a while, I became used to it and started to see that people lived ordinary lives like you and me in many ways. I have experienced that behind the poverty and misery is a very strong and friendly people with an enormous vitality and energy. Vietnam is one of these countries where you just walk around in the streets and smile because people just look happy.

I think that a project like this in Vietnam shows that it is actually possible to influence things in a good and positive way. A country like Denmark spends $14 billion on development assistance every year. This is a good example because it shows that it is actually possible for us in the richer part of the world to help change things for the better in other parts.

Non-Governmental Organisations, Democracy and Action Competence

Lecture by Nanna Jordt Jørgensen, Denmark

Nanna Jordt Jørgensen, who is from Sønderborg and presently studying anthropology at the University of Copenhagen, started by presenting herself and the organisation she heads.

'Nature and Youth'. This is an environmental organisation connected to the Danish Society for the Conservation of Nature. It is open to young people between the ages of 8 and 25, and it has approximately 600 members, of whom 300-400 are active.

"In 'Nature and Youth' we believe that if young people come out to see and experience nature, they will also want to preserve and protect it. Therefore, we try to get the youngsters involved in a lot of different activities like hiking, camping and bird watching," Nanna Jordt Jørgensen said.

One up-coming is called 'Let's make a bet'. 'Nature and Youth' dares the Danish government to make a bet on whether the young generation in Denmark – by making a dedicated effort – in eight months can manage to save more CO_2 than the Danish government has committed itself to doing over the next eight years.

Both idealistic and pragmatic

"Why get involved in an organisation like Nature and Youth?" Nanna Jordt Jørgensen asked.

"My own motives have changed over the years. In the beginning, I was attracted by the outdoor life and the social life. Then I got involved in environmental work, was an activist organising demonstrations, etc and tried to influence decisions. Today, I am active in international organisational work, because I found out that in order to gain influence you have to engage in other kinds of political work than just demonstrating."

"I have learned that it requires a lot of patience to do this kind of work because you have to attend so many meetings (and hence, ironically, do not have time to go out into nature that much!). I have also learned that democracy works in many different ways, and is often not straightforward."

"You must have goals in order to achieve anything, but you must also be pragmatic," Nanna Jordt Jørgensen told the audience.

You CAN make a difference

"Working in an organisation like Nature and Youth gives you a great opportunity to participate in the democratic process. For me, democracy is not just voting every four or five years; democracy also means taking active part in civil society."

"People in Denmark are often not interested in doing this. Most organisations lack members – especially active ones. Why?" Nanna Jordt Jørgensen asked and tried herself to give part of the answer:

"People do not think that their engagement makes a difference. They say that environmental problems have to be solved on an international scale and then they leave the work to the politicians. But this is not true. You CAN

make a difference locally. Many campaigns start locally and end up as national and international issues," Nanna Jordt Jørgensen said, giving an example of such a success started by her own organisation:

"Some years ago, we started to put focus on the use of pesticides in private gardens. We handed out leaflets in front of shops selling the pesticides, and we wrote letters to the newspapers and to politicians, etc. We started very locally here in Sønderborg, but today it is a national issue which is being debated in Parliament and other places."

Lots of fun

"The Bet', which I told about earlier, is a political campaign that will be carried out in several countries. By working internationally, your work carries more weight. Today, working internationally is necessary. It is hard work, it is time-consuming – but it is also a lot of fun. And in the end it works!" Nanna Jordt Jørgensen concluded.

In 'Nature and Youth' we believe that if young people come out to see and experience nature, they will also want to preserve and protect it. Møns Klint will be one of the first National Parks in Denmark.

From BSP to Municipal Youth Council

Lecture by Marie Søndergaard Larsen

Marie Sønderborg Larsen graduated just before giving her lecture as a student from Sønderborg County High School (Amtsgymnasiet), and appeared in her white graduation cap. She attended 'the green class/ the UNESCO Baltic Sea Project class' and became a member of Sønderborg Youth Council. She began her lecture by telling how and why she got involved in the Municipal Youth Council:

"Our 'Green Class' visited a school in Estonia as part of BSP networking. We were different from each other in many ways, but I especially noticed the way young people in Estonia felt about democracy, particularly their belief that they could not have any influence. This made me realise how privileged we are in Denmark. So when I came back to Sønderborg, I went to a meeting about the Youth Council, which young people had been trying to establish in the municipality for some time."

The Youth Council consists of 15 members, five of whom are elected by all the young people in the town. Schools and organisations appoint the last 10 members.

"We prefer not to have members of the Youth Council who are also members of political parties. We want to have individual opinions and personalities that speak for themselves and other young people," she said.

A hard start

Marie Sønderborg Larsen said that the Youth Council had a difficult beginning because the members felt that the old, 'professional' politicians were always on their backs whenever they strayed slightly from the path of mainstream thinking.

"Today, the Youth Council works fine. We express our opinion whenever there is an issue that involves or affects the young generation in the municipality. The politicians do not always follow our suggestions, however, but we are part of the dialogue," Marie Søndergaard Larsen said.

"The politicians do not know enough about

the life of a young person today or what we experience in the streets at night when we go out to party. They have many prejudices, which influence the decisions they take."

You need a sharp tongue

As an example of the work in the Youth Council, Marie Søndergaard Larsen mentioned the many refugees and immigrants in Sønderborg:

"We have worked together with some of the groups they have formed in order to get 'old' and 'new' Danes to mix more instead of heading off in two separate directions."

"I have learned to be patient. It takes a long time to get things through."

"Politics is interesting. But the game of the old politicians is hard to play if you do not have a sharp tongue," Marie Søndergaard Larsen told us based on some of her experiences from spending more than two years in the Youth Council. Even though it has sometimes been hard, she is happy about what she did:

Don't lose faith

"I would not have missed any of it, and I can only encourage all of you to do the same and to try to start a municipal youth council in your own school or town."

When asked about what a first step in that direction should be, she answered:

"Be a group, stand together, don't lose faith and make sure you talk to some of the politicians ahead of the first meetings."

"Stay faithful to the idea and stick together. Then you'll succeed."

Sønderborg Town Hall

On Biodiversity

Lecture by Hans Henrik Bruun,Denmark

Hans Henrik Bruun lectured on biodiversity with special emphasis on what this term really means. He also used a major part of the lecture to explain various methods for determining biodiversity in the past, thus putting a historical perspective on the environmental debate.

Ecological disaster – but for whom?

One of his points was that it is important to remember that the vertebrates (human beings and animals) only make up one group in nature – and that it is a very small group compared to insects, fungi, etc.

"It is also important to remember that when we talk about, for instance, an ecological disaster area, it may be an ecological disaster for humans and other vertebrates, but heavy metals are not necessarily dangerous for fungi or plants. As a matter of fact, when I visited an ecological disaster area in the Ural mountains in Russia, we found many fungi which are threatened with extinction in Europe to be thriving in this area, because it was a virgin forest hardly touched by human hand," Hans Henrik Bruun said.

Big variations

He gave the audience examples of how trees like beech and spruce have spread in Europe over time and went on to show the big variation in nature in two Baltic countries of the same size: Estonia and Denmark.

What favours biodiversity?

"What circumstances favour biodiversity?" Hans Henrik Bruun asked, and highlighted the three most important:

- A mature ecosystem
- Long maturity since immigration
- Long continuity of patch of forest/grassland

"Especially the time factor is important. So if you have to make a choice, you should always choose to preserve the oldest patches of nature. This is where the greatest biodiversity is," Hans Henrik Bruun said, concluding his lecture, which included a series of slides.

	Denmark	Estonia
Area	43,000 km2	45,000 km2
Population	5.2 million	1.5 million
Forest as % of area	12%	42%
Wetlands as % of area	4%	20%

Andrius Smetona,
Lithuania

Cultural Activities

»Stones for Bread« at Cathrinesminde Teglværksmuseum

At Nybøl Nor, an area of glacial age deposits of clay, later to be exploited as an important resource material, lies Catrinesminde Teglværk (brickworks). The area today is part of Sønderborg Museum – the perfect setting for an outdoor performance presented as "Environmental History Theatre":

Stones for Bread

Playwright Jacob Clausen,
Director Ole Sørensen

First play - Evening

It is Walpurgis Night, Thursday 30th April 1198

They will get bread
– if they make stone

A peasant village. A young girl has had a peculiar dream, a premonition of something that will change their lives. It is a dream about earth, water, wind and fire. Strangers appear in the village: the mighty master of Broagerland and the Abbot of Ryd Abbey. They bring with them a secret; the secret of how to change clay into stone. A church is to be built on the spot, and clay must be dug. A clairvoyant woman warns of devilry and misfortune.

Out of curiosity, and because of the opportunity for regular work, the peasants embrace this new concept. They will get bread – if they make stone.

Second play - Early morning

It is May Day, Friday 1st May 1545

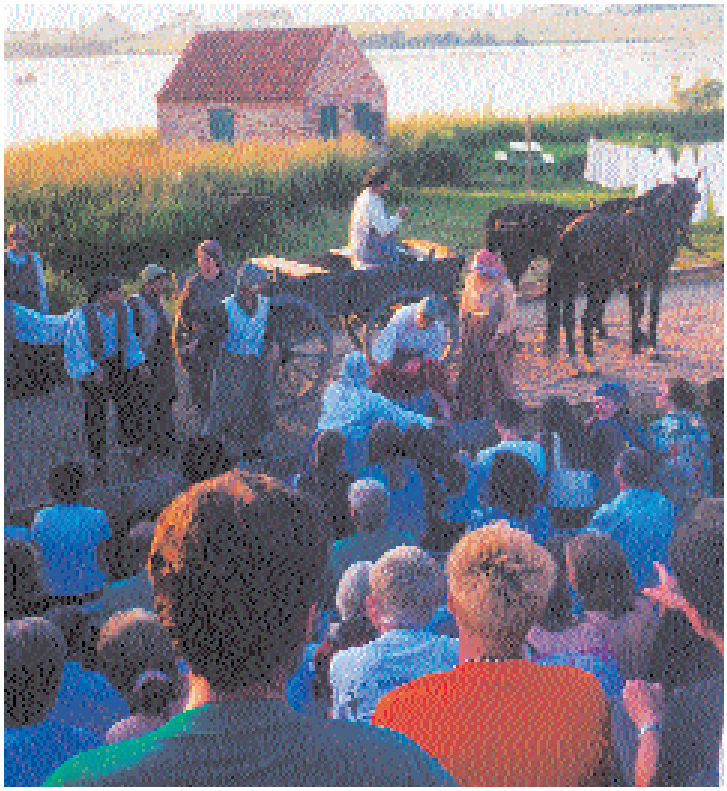
Men and women appear from the woods. They have been dancing on Walpurgis Night.

One of the girls has put a clay figure in the kiln to be fired. She is eagerly waiting to see the result. There is dancing and storytelling. The stories concern the king, who is being kept under house arrest at the castle in Sønderborg. The lords have usurped the king's power. Suddenly the king arrives on the scene. It is King Christian II. He is popular among the people. The lord lieutenant sends the king back to detention. Then it is back to work. The kiln must be attended to, and the girl receives her clay figure.

Third play - Morning

It is Friday 1st May 1744

The village people work and play. The overseer at the brickworks keeps watch to make sure everything is running smoothly. A couple of boys get too boisterous and race around, tipping a wheelbarrow. They get into trouble and are sent back to work. The children must attend to their duties, especially those who have already been confirmed. A cargo of Flensburg-style bricks is being loaded on board a ship. There is a shortage of bricks in Copenhagen following the great fire. Some of the bricks will be shipped out to the West Indies.



A horse-drawn cart arrives carrying bricks.

A horse-drawn cart arrives carrying bricks. On the back of the cart is a pregnant woman in labour. An argument arises between the workers and the overseer of the brickworks.

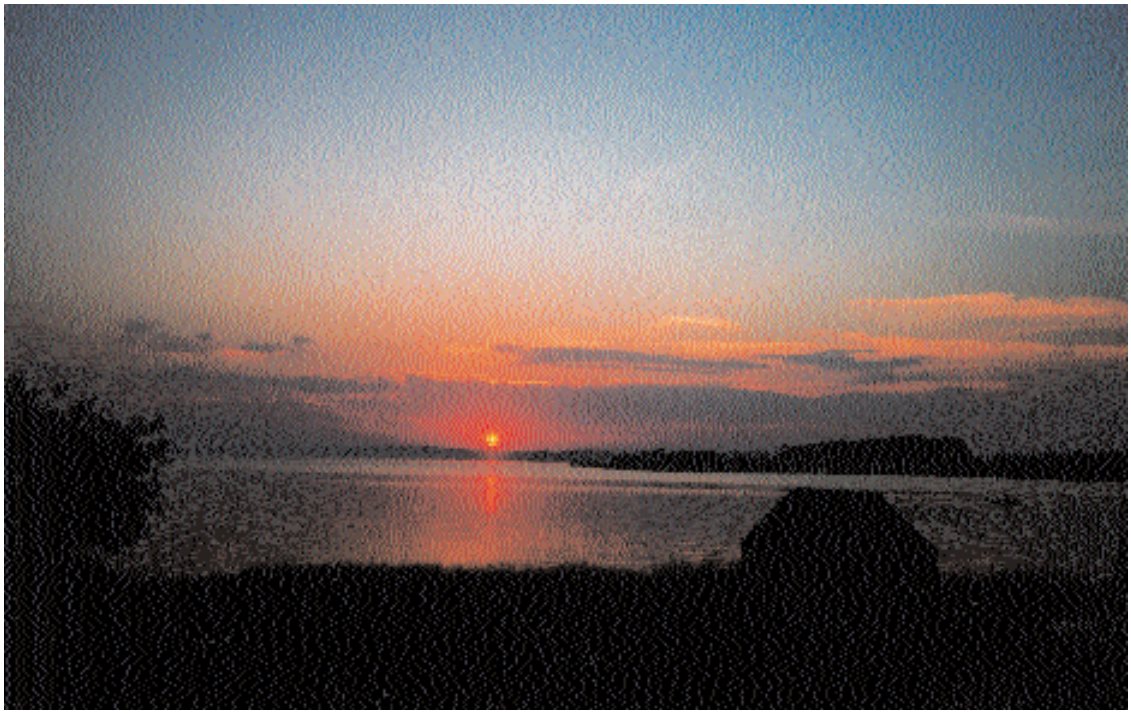
"We don't just want to trade bricks for bread – there's got to be a bit of happiness as well."

Fourth play – Midday
It is Friday 1st May 1896

The hubbub of everyday life goes on at the workers' houses. There are children playing and women working. The men lay sleepers for the carriages. There are new machines, new kilns. The brickworks is buzzing with life. Demands for higher wages are the order of the day. A family of newcomers arrives – to work at the brickworks. There is a certain amount of distrust. The children are the first to make friends. There is an accident involving the children. A socialist agitator arrives and talks about rights and demands. It is 1st May. There is a stirring among the assembled throng.

Fifth play – Afternoon
It is Saturday 2nd May 1936

The new machine means that everyone must work hard and fast. More and more hands become redundant. Right now the new machine is idle, as nobody can get it to work. There are sounds of shouting and complaining. Two vagabonds turn up and lift everyone's spirits. They say whatever suits them. The brickworks proprietor has arrived. The old foreman is fired. He will be replaced by a younger man who knows all about machines. A woman – the daughter of the old foreman – has been sitting throughout the play working with clay. There is talk of a dream, something that will change everything. The wheel has come full circle and everyone is united in song.



The sun sets behind the open-air theatre stage at Cathrinesminde Teglværk.

Midsummer's Night 2000
It is 21 June and time to get rid of the witches!
According to the legend Midsummer's Night is a night with special powers. Water in holy springs cure people of their illnesses, but also evil forces are out. Witches fly on their broomsticks to Blocksbjerg, and to keep them away people light bonfires. To actually put a witch onto the fire is a tradition that started in the 18th century.
It is part of the tradition that people gather to sing. Holger Drachmann's »Midsummer's Night« (1885) from the comedy »Once upon a Time« is part of the tradition and of Danish culture.

Chapter 4

Democracy as a Necessary Prerequisite

Inform Others of Your Work

By Birthe Zimmermann

For the enhancement of action competence, workshops on the Baltic 21 sectors or on integrated sector work serve this purpose. Part of a person's involves being able to inform others of the outcome and results of one's work.

All participants at the "On the Threshold – Baltic 21" conference had to be prepared before the activities took place. Each workshop was considered an integrated unit, and the workshop members therefore consisted of students, teachers, co-ordinators and politicians co-

Presenting your work to others leads to empowerment and action competence

operating and working together. The workshops thus had participants of mixed age groups, opinions and nationalities.

Included in the workshop tasks was a photo competition, where each workshop had a camera with 36 shots and was asked to nominate its best photo in the following three categories:

1. "On Baltic 21"
2. "Among friends"
3. "?" – Define the title within your workshop and state why you named it accordingly."

Preparing the dialogue with politicians was likewise an integrated task. Participants developed skills on:

- how to formulate questions
- how to address questions in a panel forum
- how to follow up on an unsatisfactory answer
- how to ask for concrete answers.

The outcome of the process was a resolution to be discussed in plenary and finally agreed upon and signed officially by representatives from all workshops.

List of Workshops

1. HEALTY FOOD/NOVEL FOOD

Preparatory work:

- How big is a typical farm in your country?
- How many people work on a typical farm?
- How many animals and what kinds do you have?
- What kinds of products are the animals used for?
- What kinds of crops are cultivated and what kinds of products are they used for?
- What kinds of fertilisers are mainly used, and what kinds of pesticides are necessary?
- What is the general attitude to farming and the job of a farmer in your country?

Contents:

- Plant growth and domestic animals in Danish agriculture were dealt with. The workshop gave examples of research and technical aids used in Danish agriculture.
- In the laboratory, experiments concerning plant production were performed: How do plants grow and what are their needs? How do you combat weeds? How are pesticides decomposed? These experiments were part of the workshop product.
- An excursion was made to Gråsten School for Agriculture to study methods used in modern Danish animal husbandry, e.g. insemination, automatic milking and feeding, and milk examination as a means of prevention. A field trip to study experiments in plant cultivation was made to Rønhave Experimental Farm.

2. BIODIVERSITY & GREEN AREAS

Preparatory work:

- Describe the surroundings of your school:
- What kind of green areas are there? How are they kept - and by whom?
- Does the staff use pesticides, fertilisers and/or machines?
- If so, what kinds of pesticides, fertilisers and/or machines?

Contents:

- This subject covered biodiversity and green areas and gave ideas how to create new experiences and green pleasures: parking grounds, ditches, flower beds, playgrounds and green areas around schools. Secondary schools and institutions are often poorly maintained. The staff often use fertilisers, pesticides and machines for manual treatment. Technical solutions affect the biodiversity.
- The workshop focused on questions like:
- How can we change the practical maintenance of green areas in order to recreate the biodiversity? How can we recreate a greater diversity of plants and animals, and how can we get more green experiences around the schools?
- How can we design a beautiful piece of nature without using fertilisers and pesticides?

Water as a necessity of life!

3. ENERGY FOR THE NEXT MILLENIUM

Preparatory work:

- How are houses heated in your area?
- Where do the resources for heating come from?
- Are there any renewable energy supplies (wind turbines, solar energy, biogas, etc) in your area?
- What means of transport are used in your area?

Contents:

- Investigations were made to see how the football field could deliver the heating system for the host school, Sønderborg County High School (Amtsgymnasiet), through 9km of pipes placed 1m below the soil surface.
- The solar car Denmark III, which has raced the Australian plains, was presented and driven at rather high speed around the school carpark. How the solar panels made the car move was dealt with in theory.
- The participants constructed a solar kitchen stove out of a satellite dish, and served a vegetable soup.
- Experiments were made with biofuels: "Gasoline" production took place by means of grinding rapeseed, and extracting and filtering the rapeseed oil. A car with an engine specially constructed for using rapeseed oil drove on the resulting product! Rapeseed is carbon dioxide neutral – and it worked!

A solar kitchen was made out of a satellite dish, which was used for cooking, for example, a vegetable soup. The photo was published in the daily newspaper Politiken – here igniting into flames within seconds due to radiation heat.

4. ENVIRONMENTAL DRAMA

Preparatory work:

- Imagine yourself among other youngsters, preparing a creative performance in which the drama team criticises, questions and provokes. We choose a subject by using one of the Baltic 21 sectors as our starting point. We then plan the scenes and produce the masks, costumes and scenery sets. Rehearsals - naturally - must be done before »the grand show«.
- It is part of the workshop's philosophy that all details, ideas and creations must be produced in close co-operation between the participants and the two drama instructors. The final result - and its success - depends on your ideas!
- Only the framework is set. The »ECO-DRAMA« will be performed on part of the pedestrian street in Sønderborg town centre. The full length of the pedestrian street is approximately 400m.
- Emotionally, what do you see as the most pressing problem in connection with pollution?
- Bring some kind of documentation: a story, a newspaper cutting, a personal experience, or an object that is typical or has symbolic meaning.

Environmental drama performance in Sønderborg's pedestrian street

Skills needed for participation:

- The work in the drama workshop was based on training specific control of mimics, gestures and body language as the platform on which a variety of simple but dynamically expressed spectacles were sculptured.
- The participants must therefore have a natural desire to use their own body as an instrument for dramatic expression. Besides, it is absolutely an advantage not to be timid in participating in public performances where many people watch you »perform".

5. IS TOURISM SUSTAINABLE

Preparatory work:

- What kind of tourism takes place in your area? Define what you understand by "sustainable tourism"!

Contents:

- The participants attempted to find answers to the following questions:
- What is meant by sustainable tourism?
- What kind of activities does Sønderborg offer visitors and tourists in the town and its surroundings?
- What kind of environmental problems or conflicts might emerge from the tourist activities?
- What is the Blue Flag and what does it take to keep it?
- What can be done to achieve or develop sustainable tourism?

– Is Tourism sustainable on Als?

Study visits were made to the beach to combine two aspects: the Blue Flag and the Sandwatch project, the latter being a programme implemented as part of the UNESCO sister project, the Caribbean Sea Project.

The Blue Flag station near the Sønderborg yacht harbour offered perfect opportunities for snorkelling and underwater observations, and, when demanded, for publicising the frequent measurements and results from water quality investigations, such as the number of the indicator bacteria Eschericia coli. Discussions took place on how to treat and handle sewage from boats and ships, as well as problems related to polishing and painting boats. The local camping grounds were visited for further discussions on tourist behaviour related to water consumption and waste.

Complementary activities relating to coastal tourism on the small tropical islands of the Caribbean Sea were incorporated into this workshop.

Students involved in the Caribbean Sea Project monitor different aspects of beaches on their islands, including accretion/erosion, waves and currents, pollution, types of uses (e.g. bathing, fishing, tourism), access to beaches and visitor facilities. After analysing their results, the students will design and implement projects, together with their schools and communities, to improve the environment around their beaches, both for island residents and tourists. With tourism being the main industry in many Caribbean countries, issues relating to tourism's sustainability and impact on local cultures are critical topics that can be related to tourism in Sønderborg and the Baltic Sea countries.

Representatives from the Caribbean Sea Project (St. Lucia) at Sønderborg Harbour

6. ART & DESIGN - A CONCEPTUAL WORKSHOP

Preparatory work:

- Imagine an apple tree, a small one, not taller than 2m high : Describe to the others HOW you would treat the apple tree. Your task is to express man's treatment of nature in the way you treat the apple tree. Think positively as well as negatively. You may wrap, cut, exhibit, bind, etc.
- Make a similar sketch if the object was - a fish, a flower, a human being, etc.

Contents:

- The workshop used the sea, the forests, the fields and the open landscapes around Sønderborg as a background for the set design.

Participants worked in a conceptual way with their own ideas on new and transbordering layouts for a positive poster tradition.

They used themselves as actors and models in the creation of set design highlights in nature.

They used photography, computers, colour copy, artworks, paint, glue, costumes, recycled materials, cars, trees, and the beach.

- Collages, drawings, photos were made and the result was a workshop factory producing high-quality layouts for posters and postcards for future use in the BSP.

The Art & Design workshop challenged the others, asking them, "Can our products carry the Nordic Swan for environmental-friendly production?"

7. RESTORATION OF HABITATS

Preparatory work:

- Is there an example of "restoration of nature" in your local neighbourhood?
- If so, bring a description, a folder, a photo to show to the others and explain the reason.

Contents:

- Denmark has been cultivated for thousands of years as most other countries in the Baltic region. The land has been deforested, and ponds and bogs have been dried out due to filling and drainage. Creeks and rivers have been regulated. The coastline has been changed by coastal protection and land reclamation. Pollution from traffic, tourism, industry, agriculture and forestry has altered the quality of the ground and the water. In Denmark, eutrophication is probably a greater problem than emissions of environmental poisons.
- Heather has turned into grassland, lakes and rivers have become overgrown and the fish have disappeared.
- Habitats for many plants and animals have been restricted or have disappeared. The diversity of living species has been reduced slowly but steadily, and the intricate natural food web has been disturbed. While people have become richer and richer, nature has become poorer and poorer. This process will continue unless we do something about it!

During the last decades, we have become increasingly aware of the fact that the protection and restoration of habitats are necessary if we want to stop the decrease in the diversity of living species. Protection of single species has no meaning if there is no suitable habitat left!

In this workshop, the participants studied an example of restoration of a natural habitat entitled Fjordmosen in the forest Nørreskoven, and suggested answers to the following questions:

- Why restore natural habitats?
- Where can it be done?
- How can it be done?
- Who is involved?
- How long does it take?
- How can changes be monitored?
- How should the area be closed or open to the public?
- What do local people think of the project?
- How can it be financed?

Waiting for biodiversity, Fjordmosen on Als

8. THE BALTIC SEA FOR FOOD!?

Preparatory work:

- Where do people get fish in your local area? From angling? From shops?
- What species of fish can you buy in the shops? Are the fish local, or have they been transported a long distance? Define what you understand by "sustainable fishery".

Contents:

- The participants visited the Blue Flag Station and went snorkelling to examine the conditions and to discuss species caught in Danish coastal areas.
- Excursions were made on local fishing boats, and the catch was used for dissections of pelagic and benthic species to determine their place in the food chain. The quantity of fish and the methods of fishing were dealt with in relation to discussions on quotas and net sizes.

Photo competition:
Among friends

9. SØNDERSKOVEN – FOREST MANAGEMENT & PRODUCTION

Preparatory work:

- What kind of forest do you have in your local neighbourhood? Make a list of trees and plants, and define what you understand by "sustainable forestry".

Contents:

- "Sønderskoven" is a forest situated in the immediate vicinity of Sønderborg. The workshop used the wonderful facilities of the Nature School "Egetofte", situated in the forest. The forest is right on the beach of Sønderborg Bay. Most of the trees are beech, but there are also areas with oak trees, spruces and other trees.
- Participants carried out investigations of the biodiversity of the forest floor in the beech wood, and also performed mathematical calculations on wood, measuring and gauging trees and productions.
- Severe damage to the Danish forests occurred due to an extreme hurricane on 3 December 1999. Observations of differences in damage done to deciduous trees and conifers were made and discussed.

Severe damage to the Danish forests occurred due to an extreme hurricane on 3 December 1999

10. FROM RESOURCE TO PRODUCT TO RUSTY HEAPS – OR?

Preparatory work:

- What industries are there in your local area? What kind of environmental problems do they cause?
- Define what you understand by "sustainable industry".

Contents:

- The political goals for a sustainable industry were used in discussions with employers in Danish industries and workers' representatives on strategies used to implement the ideas.
- Study visits were made to local factories, to JF producing agricultural machinery and to municipal waste treatment and recycling stations. The Danfoss museum was visited, Danfoss being a one-man enterprise that developed into Denmark's biggest industry ever, with branches worldwide.

Recycling waste
– Sønderborg ASA station

11. DOCUMENTATION - VIDEO DESIGN

Preparatory work:

- Film is an effective way to spread a message. It will not just tell the facts; a film will appeal directly to the feelings of people. Reflect upon how the political goals in Baltic 21 can influence the set design of the documentary video.

Contents:

- Participants worked with the following skills:
- how to write a script
- how to videotape
- how to conduct an interview,
- how to handle a camera
- how to handle a microphone
- how to edit

They presented parts of their video to the public in the town centre.

Video group at work at Amtsgymnasiet i Sønderborg (County High School) – competing with Danish national television

12. DOCUMENTATION - WEB DESIGN

Preparatory work:

- Reflect upon how you would like to document the conference through the construction of a webpage with the Baltic 21 goals as your starting point. A knowledge of English and basic computer skills are required.

Contents:

- The participants worked a great deal with computers and learnt the basics of website design:
- how to format pages with HTML tables
- how to edit and adjust pictures and photos for website presentation
- how to create websites
- how to publish a CD with conference documentation.

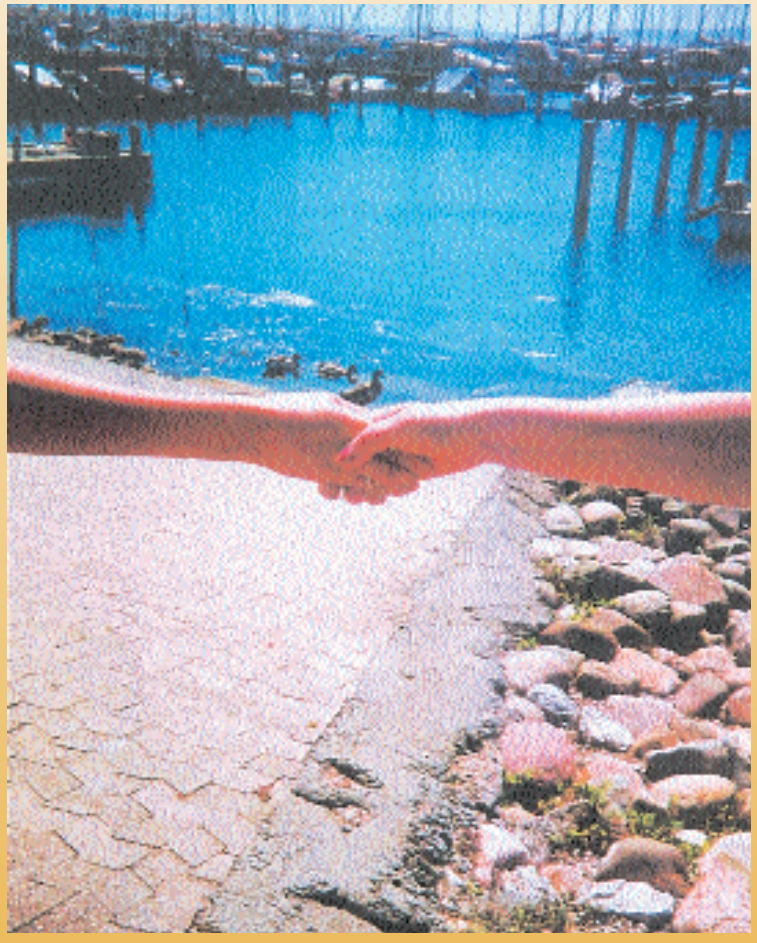


Photo competition: Among friends

13. ENVIRONMENT HAS A HISTORY - USE OF RESOURCES

Preparatory work:

- Why does the historical dimension play an important role in defining "sustainability"?

Contents:

During the last 300 years, people have completely changed the ecosystems around the Baltic Sea.

A global and industrial market economy with import of fossil fuels, fertilisers and materials has replaced the local and agricultural subsistence economy of the 18th century. With these imported goods, it is possible for the large majority of the people to live in cities and work in industry or service instead of farming in the countryside. The other side of this development is urban problems with pollution of air, pollution of water, problems in agriculture and problems in forestry with a decreasing biodiversity and eutrophication of the sea as two major consequences.

But in the 18th century fossil fuels such as coal, and industries such as ironworks and brick factories were the answers to a crisis. By using coal and iron, the people of those days tried to secure a sustainable development for the future. In the years that followed, they learned that this was not a good solution.

The participants investigated the changes in industry and urban planning over the last century in order to understand the situation of today.

The workshop contained a presentation of the following: an explanation of environmental history, A forest walk in Sönderskoven (1800-c. forestry), an excursion to Dybböl (agriculture) and Cathrinesminde (brickworks), and a citywalk in Sönderborg (town location, coastline, old town, industrialisation, German period, Danish period).

Each group dealt with one of the four themes:

1. Substitution of material (Cathrinesminde)
2. Urban planning (Sönderborg)
3. "Old sins" – deposit sites (Skratmosen)
4. Urban industry (The Solo factory, which produced margarine from 1889 to 1998)

Our aim was to make the participants aware of the importance of: Learning from the past for the decisions of the future.

Each group examined the theme and defined the conflict as it was at the time. They then studied the history (written materials were prepared in advance) and tried to find the answer to the question: Who made the decisions and the historical premises of the decisions? From there the group discussed how the decisions would be made today.

Learning from the past for the decisions of the future

Always use a timeline in environmental history

BSP Students and Dialogue with Politicians

By Journalist Bjarke Larsen, Denmark

All the politicians from the BSP countries participating in the conference, along with most of the politicians from Sønderborg Town Council, were present in the assembly hall on Wednesday 21 June 2000, ready to answer questions and enter into a dialogue with the students.

After working with their subjects for almost three days, the students had spent some time preparing questions and were eager to get into dialogue with the politicians.

Some of the questions asked and the answers given are listed below:

Do we know enough?

Question: Do politicians get enough information about environmental problems?

Answers:

- It differs very much. Some politicians are very active in many ways; they work in different groups and so on. Others are less active. It depends very much on the individual politician, but I think each person has a responsibility to get as much information as possible before making decisions.
- In Denmark, politicians receive a lot of infor-

Students were eager to get into dialogue with the politicians

Politician Simo Korpela, Meri-Pori lukio, Finland, gives an answer

mation from the Ministry of the Environment, the debate in newspapers, from various interest groups and from the county.

Question: What basic knowledge should politicians have for taking decisions on the environment?

Answers:

- We cannot all be professors, and all people should be represented in city councils and other democratic institutions. Many work as politicians for their own interest and do not earn much money.
- In my opinion, politicians should have a university degree and speak at least one foreign language.

Question: How do you use the knowledge of the past to make good decisions for the future?

Answers:

- I come from a town with a river which used to be heavily polluted with copper. But today, many things have changed, because we found out what had been put into the river in the past, and we were able to do something to clean the river.
- It is a natural part of our decision-making in the harbour where I work to look at our experiences from the past when we decide what to do for the future.

Question: Should people have special training in order to own a forest in the same way you need special training to become a farmer?

Answers:

- In Finland, we have 'city owners' – people who live in the cities and own a small forest as a small, part-time job. They sometimes know very little about how to take care of the forest, and this is a problem.
- I do not think it is necessary to introduce special training as long as the authorities are monitoring you and as long as there are laws and regulations telling you what is allowed.

How to promote organic food?

Question: What can be done to create a stronger demand for organic food?

Answers:

- Higher profits for farmers will make them interested in growing organic crops. But overly high prices will discourage consumers from buying.
- Politicians can do a lot: They can decide about prices for fuel and labour taxes and they can put taxes on pollution, etc. This all influences the prices of organic and non-organic products.
- In Finland, we have had examples of shops agreeing to take less profit for organic products in order to keep prices down.
- Consumers do not like to buy things which do not look good, are covered in brown spots, etc. And I think the organic producers have a problem here.

Pesticides

Question: Do you use pesticides at home yourselves?

Answers:

- Only once a year in some spots in my garden where the weeds are very bad.
- In Poland, this is not a serious problem because people do not have the money to buy pesticides.
- I am a farmer and I only use a little in my private garden.

Metal in household garbage

Question: In Sweden, each household has to sort the garbage into separate parts, putting

metal in a special place. In Sønderborg, you do not take the metal out of the garbage. Why is this, and will you do something to change this?

Answers:

- In Denmark, we have very little metal in the household garbage because we do not have cans for beer and soft drinks. We only have bottles and they are collected and recycled. Because of this, there is so little metal left in household garbage that it is too expensive to collect.

Global solutions needed

Question: Why do you move chemical industry to other countries instead of making it cleaner?

Answers:

- We cannot force them (chemical plants) to stay. If they want to move, they can do so. Therefore, it is an international problem, and we should try to get the same standards all over the world.
- We need global solutions. I know of one chemical plant that has moved several times between France and England – each time getting economic support from the government in the country they moved to, and also managing to lower the wages. It is a big problem.

More and better fish in the Baltic

Question: What will you do to improve the quality of the fish sold in the shops?

Answers:

- Fish raised on aquafarms cause a lot of problems and should be avoided.
- Consumers should demand only very fresh fish.

Question: What is the future of in the Baltic Sea?

Answers:

- It has been going down for 20 years, rapidly. But it is very difficult to solve all the problems. One thing is sure, though: Your generation has to do more than the previous one has done.
- I come from a town in the middle of Sweden. We have a river which used to be one of the most polluted rivers running into the Baltic Sea. Lots of heavy metal in the water. But now it is being cleaned up. This will help the Baltic to become cleaner and a better place for fish.

Money makes the world go round

Question: Which aspects are most important when making decisions about tourism: environmental, social or economic issues?

Answers:

- Money makes the world go round!
- Money decides everything, I have found out. And this is very bad.
- What politicians will you vote for: the ones giving you bread or the ones giving you clean air?
- Tourism often destroys nature. In my party in Sweden, we are trying to figure out a price to be paid by the tourist industry for using nature. But it is difficult to come up with a good solution.

The dialogue had to end at 4.45pm when the buses had to leave for the town centre in order for the students to see the drama workshop performance on the pedestrian street. Several students still had more questions ready, and it was evident that many had been very serious in their preparation for this session, and that many now had the courage to stand up in public and debate with politicians.

Resolution
- a next step towards sustainability

Resolution

Altogether, 400 students, teachers, politicians and co-ordinators from 21 countries on four continents who participated in the »On the Threshold – Baltic 21« BSP 2000 conference in Sønderborg on sustainable development in the Baltic region have adopted the following resolution. The text has been compiled by input delivered by the various workshops that each focused on one of the seven sectors within : Agriculture, Energy, Fishery, Forestry, Industry, Tourism and Transport. The text reflects what actions should be taken in the various sectors in order to ensure a sustainable development in the Baltic region in the years ahead.

Healthy Food/Novel Food

For a sustainable agriculture, we need:

- Education of farmers in handling manure and fertilisers.
- Decrease in the use of pesticides and development of sustainable methods to eradicate weeds, diseases and vermin.
- Laws for animal welfare and governmental support to the farmers to help them follow the laws.
- Education about healthy food/novel food for consumers, leading to stronger demands for organic products and making organic agriculture attractive to farmers.

Biodiversity & Green Areas

For students: Dialogue between politicians and students is very important. Invite politicians to come and see what you do and what you have on your mind. If you do not say anything, they will not know what you are thinking and feeling.

For politicians: If you have not heard anything about student efforts to preserve the environment, then go to the schools and see it for yourselves. Help them get in contact with you. Politicians must ensure that ordinary people learn about sustainable agriculture and the dangers of using fertilisers and pesticides by educating experts who can teach the people.

For all:

- Do not destroy all natural life when planning a new settlement.
- Save large amounts of different plants and animal life.
- Use compost instead of fertilisers.
- Decrease the use of pesticides and herbicides.
- Inform the people about sustainable agriculture through the media.

Workshop representative signing the resolution at Sønderborg Town Hall

Energy for the Next Millennium

We would like all the countries in the Baltic Sea Region to introduce one no-driving day and one no-shopping day every year in the cities.

Sustainable Tourism:

The most important thing for sustainable tourism is to achieve a balance between economics, society and environment. Tourists and tourist accommodation providers should select products and services which are least damaging to the environment: saving water and electricity, sorting waste for recycling, using eco-friendly cleaning agents, and motivating staff towards increased environmental awareness.

There should be a dialogue with the public before taking decisions about building new tourism facilities or changing old ones.

Restoration of Natural Habitats

In recent years, much has been done around the Baltic Sea to improve the environment. Nevertheless, pragmatic needs are still dominating and the role of biodiversity in our daily life is undervalued. Protection and restoration of natural habitats is part of a sustainable development. To maintain biodiversity in the world, we must accept our responsibility for the Baltic. Therefore, we want the politicians in the Baltic to allocate resources – money as well as inspiration and practical support to volunteers – to protect and restore threatened ecosystems in the region:

- All rivers and lakes
- Swamps and meadows
- Dunes, heather and hills
- Coastal strips and archipelago
- Old forest growths
- Heritage landscapes

To fulfil the requirements of Agenda 21 on biodiversity, high-quality environmental education and a rise in public awareness is necessary on all levels.

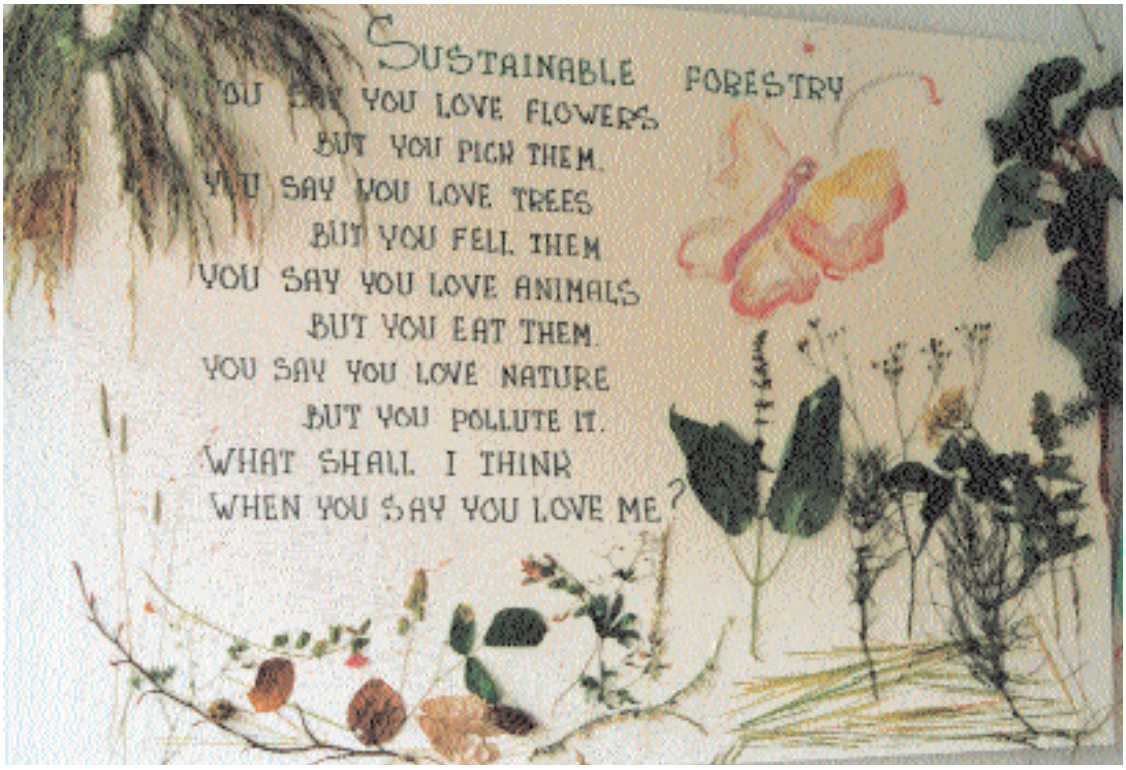
"Rings in the water"

The Baltic Sea for Food – Sustainable Fisheries

- I want my fish to be fresh and unpolluted!
- I want to be able to fish different fish species!
- I also want future generations to be able to enjoy the beauty of the Baltic Sea and its biodiversity!
- I want future generations to be able to fish and eat the delicious fish caught in the Baltic Sea!

Forest Management

Forests beautify a country and bring unity between people and animals. Therefore, we need to keep our forests safe, beautiful and clean. This also improves the financial value of the forests. Before making decisions concerning the



Poster for public display

forests, we need be educated on ecology. More large areas should be planted with different trees to encourage biodiversity.

Sustainable Industry

People should take a first step by co-operating with producers and offering them suggestions on how to produce in a more environmentally-friendly manner.

Environmental History

We keep making the same mistakes as our parents did, and we are losing the environmental wisdom of our grandparents. Therefore, it is important to study historical cases and spread the information to all in the region. This will result in a strong connection between the past and the future, so that we do not repeat mistakes or lose the environmental wisdom of previous generations.

Signed at Sønderborg Town Hall on Thursday 22 June 2000 by students, teachers, co-ordinators and politicians representing all workshops.

Chapter 5

Best Practices on Sustainability from schools in the Baltic Sea Region

Agriculture

By Niels Madsen, Denmark

Teaching sustainable agriculture to students

Esrum Møllegård's Centre for Nature & Environment is located in northern Zealand, 50 km north of Copenhagen. For the last 10 years we have acted as a nature and environmental school. Part of our work is environmental education of visiting school classes. Most of our activities are single-day activities, where we use the surrounding nature for investigations. Concerning our programme on agriculture, we consider it our main task to open students´ eyes to modern agricultural methods. We take into consideration the effect agriculture might have on the environment, and we discuss the alternatives to modern industrialised farming.

Farming in the 21st century

A few generations back most people were farmers, but in Denmark today less than 2.6% of the working force are farmers. Most people live in urban areas and have no contact with farming.

Visiting a farm is normally not the first wish that comes up in a Danish student's mind when the class is planning an excursion. Why is that? What thoughts come to students' minds when we talk about farming? Do they imagine mud and dirty boots, and a smelly, messy place with rusty machinery everywhere, or do they imagine birds singing in the sky, cute animals, fresh air, beautiful landscapes, harmony and no stress?

Of course, students differ in their opinion, but most of our visiting students only have a

Farmland dominates the Danish landscape

vague idea of what farming in the 21st century really is. This in itself makes it important to include farming in teaching. The general lack of first-hand knowledge about farming also goes for the daily work on a farm. Students do not know the names of ordinary agricultural machinery, nor do they know what the machinery is used for. Many students are not even familiar with the common crops and domestic animals.

Many students may think that agriculture is not important for them. For me, however, there are four basic facts in opposition to this attitude:

- Agricultural products are very important for Danish export.
- Altogether 65% of the total land area is used for farming. Consequently, farmland completely dominates the Danish landscape.
- Agriculture has a major impact on the environment.
- Agricultural practices influence the quality of the food we eat.

Visiting a farm with a school class

First of all, the farmer takes the students on a guided tour of his farm. The students often ask questions such as: "How can you work in this smell?", "How much milk can a cow produce per day?", "Do you give all the animals names?", and "Do you make a lot of money from farming?" Some questions seem more relevant than others, but they all express an interest in the farm visit, which makes them all relevant.

Agriculture and environment

When we discuss the influence of agriculture on the environment, students often know that fertilisers and pesticides may have a negative impact. In Denmark, the increased use of fertilisers has resulted in environmental problems for the

Drainage water from farmland contains nitrogen, phosphorous and pesticides

aquatic environments and for the groundwater. Also; the manure from livestock leads to environmental problems. The spreading of liquid manure has to take place during plant growth, and the spreading results in an extremely strong odour in the countryside, especially in the spring.

The pesticides used to prevent fungus and insect attacks on plants, or derivates after partial degradation of the herbicide or insecticide, have by now been found in many wells for drinking water. The result is increasingly less clean drinking water for the future.

What students normally do not think about is the influence that farming practice has on the landscape. During the last decades, the typical Danish farm has changed from a small family farm to an increasingly bigger industrial farm, almost like a factory. The traditional farm was characterised by having many small fields with a wide variety of crops. Over the last decades, the farms have grown enormously big with a few large fields with wheat, barley or rape as the only crops. The crops chosen often depend on what crops are subsidised by the EU.
The result has been that many small biotopes have disappeared; biotopes like ponds, living hedges, small groups of trees, stone dikes, etc. This is done to prepare the fields for bigger machinery.

The development removes important corridors, leaves very little space for wild plants and animals, and leads to loss of biodiversity in the agricultural landscapes.

Animal welfare

This is a topic that can rouse the emotions of young people. Of course, no one approves of cruelty to animals, but most of us buy meat derived from animals raised in stable systems that do not allow normal animal behaviour. Does this not make us guilty of cruelty to animals?

We think it is an important discussion to take up. Our experience is that young people often do not think of the connection between buying meat in shops and animal welfare.

The historical fact is that livestock has changed from many different kinds of animals to a very specialised production of only one type of animal, such as pigs for pork meat, cows for milk production, or poultry for meat or eggs.

Traditionally, the farm had a balance between the size of the livestock and the crops that the fields could produce. Farms were normally more or less self-sufficient.

Today, farms with large-scale animal production import large amounts of fodder, which has often been produced abroad, for example in Argentina or Brazil.

Modern stable systems are factory-like, and often they only provide animals a minimum of possibility for normal behaviour.

The question now is if this is done in order to be cruel to the animals? Of course, farmers are not cruel people, but like every one else, they want a decent income from their work, and to

do this, they have seen it as their only possibility to make production increasingly effective.

What lesson can students learn? Our suggestion is that it is up to the consumers to secure animal welfare by buying animal products produced under conditions that respect the natural behaviour of animals.

Sustainable farming

The results of an evaluation of modern farming may show that it is good business for the farmers, but that it may not be a sustainable way to farm in the long term. The environmental problems caused by modern farming may cost a higher price to repair than what is actually earned on the farming. Maybe this price will have to be paid by the next generations!

After the discussion of all these problems, it is natural to look for alternatives to modern conventional farming that have a less severe impact on the environment.

The most successful alternative to conventional (also called traditional or industrialised) farming until now has been organic farming. From the start 20 years ago, the number of organic holdings has risen to 3,500, cultivating a little less than 7% of the total agricultural area in Denmark.

In short, organic farms do not use pesticides or artificial fertilisers.

There are also rules that set the minimum standards for animal welfare.

The important discussion is not to make propaganda for one type of farming practice, but to discuss what difference the practice makes to the environment, to us, to domestic animals, to the landscape, etc.

Animal welfare can rouse the emotions of young people

The practical element – "safari at grass root level"

Our experience is that students best understand the differences between farming practices by making their own examinations. We make examinations on two different farms. Normally, we choose a conventionally-cultivated field, and for comparison, an organically-cultivated field. We discuss if any differences found can be explained by the farming practice.

The lesson learned from many different kinds of environmental education activities is that it is easier to attract attention to animals than to plants. We therefore concentrate on insects, worms and other bugs. Often, it is a big surprise to students how many different animals we can

find in the soil.

Earthworms as bioindicators: A high population of earthworms is actually the most important indicator for farmland in biological balance. Worms are important for the decomposition of dead plant materials and manure, and also for good soil structure.

The best way to catch earthworms is to dig up a quarter of a square metre in the field, put the soil on a plastic sheet, and then break the lumps of soil up by hand. The number of worms per m^2 may vary from 0–500.

Like all other biological systems, a high diversity is a sign of good and stable conditions as well as a good indicator of the total number of animals.

Weed plants are important for the animal diversity in the fields. A diverse population of wild plants in the crops will make it possible for more species of birds and insects to survive. Therefore, we normally compare the number of wild plants per m^2 with the plant diversity.

The number of birds is twice as high in organic fields as in conventional fields.

It is often difficult to evaluate what students learn from a visit to a farm. Some will remember the impressions of having seen a newborn calf, some the feeling of touching an earthworm for the first time.

Our general impression is that farm visits are excellent eye-openers, not only to some of the environmental problems in our country but also to the fact that we can influence the development by the choices we make when buying food.

Of course, some students will worry all the way home about whether it is possible to wash off the mud from their jeans, or whether the other passengers in the bus think they smell …

A soil sample from the topsoil is placed in the funnel. A lamp over it will gradually heat up the soil, causing the animals in the soil to try to escape the heat by crawling downwards. Finally, the animals will fall down into the glass under the funnel (within 24 hours). The animals can then be observed under magnification. Large springtails are an indicator of good biological conditions.

Education – Finnish Folk High Schools

By Kaisa Lindström, Finland

"A Silver Lady"- metaphor for education for sustainable development

One Estonian story deals with a silversmith who never succeeded in finding a wife. After living alone for years, he decides to make a wife from silver. So he makes a very beautiful silver wife, and he is very proud of himself. But when he has lived for a few days with this silver lady, he starts to become frustrated. There is no hope for companionship, and no possibility to share his ideas or everyday life matters with his new wife. He realises that without a mind, without a heart and without a spirit, his silver lady is just useless!

Words such as sustainable development and global citizenship seem to me similar to the silver lady - they are grand words but they have no spirit!

Folk high schools have special tools that can give this spirit to the »silver lady«.

I attended the World Summit on Sustainable Development in Johannesburg in August-September 2002, and in a panel discussion one participant analysed sustainable development as including three parts: ecology, society and spirit. I think the idea of giving spirit to the silver lady is very Grundtvigian. It is our responsibility to do so. Teachers and group leaders still do not know what sustainability really means: We need more teacher training. If teachers are not aware, how can they instil the necessary spirit?

We need better definitions of sustainable development, but it is useless to cry out for weak definitions. Nobody can come and tell us what the sustainable future looks like; we need to find the ideas together! When trying to find alternatives for the future, we can make choices and start to work for the best alternative.

Otava Folk High School's general education team working with the annual self-evaluation plan of education for sustainable development

Otava Folk High School is one of 91 folk high schools in Finland. They are rooted in the Danish folk high school movement, which started in the middle of the 19th century. Finnish folk high schools see themselves as free and independent institutions outside the official education system. Each folk high school is free to emphasise its own values, ideology and pedagogical objectives. Residential folk high schools offer long and short courses (from a couple of days to one year) and they can also provide consultancy and other services relating to their educational profile.

According to legislation, folk high schools are also authorised to offer certificate-oriented education and training, although the main emphasis is on non-formal education.

Grundtvigian folk high schools in Finland are considered to have the following dynamic criteria:

- they fulfil and complement the formal school system by bridging educational gaps
- they expand the variety of courses and educational programmes, e.g. they are responsible for educational biodiversity
- they offer alternative ways to learn
- they challenge the methods used in the formal school system by offering alternative ways to learn.

Otava Folk High School is a typical modern Grundtvigian folk high school, which is based on the following Grundtvigian values:

1. The perspective of relative truth: truth can only be found by discussing together with others and by looking at phenomena from different perspectives.
2. Open dialogue and interaction: dialogue is a way to learn together
3. Democracy and empowerment: the first two values are not possible if someone wields power over others.
4. The perspective of time: trialectic time views the past, present and future as tied together. We need "roots" to strengthen our identity and "wings" to face what is distant and strange.

Otava Folk High School students dealing with water samples taken from Lake Saimaa

The relative truth perspective highlights the need for knowing and reflecting on the different views of sustainability. The issues represent extremely complex social, political, economic, ecological, aesthetical and ethical aspects. Together, they clearly dictate a more sustainable approach to future development.

Open dialogue and critical thinking have always played a role in folk high school pedagogy. Dialogue means interacting, exchanging ideas, and learning together. Open dialogue is a basis for social and collaborative learning.

Critical thinking means challenging the present situation, defining the problems and reflecting upon our opinions. We learn about the issues involved and consider whether things can be done differently, and then we act together with others to change the present situation. Critical thinking also needs competence, and participants become competent by participating in the process.

Democracy and empowerment: In Grundtvigian thinking, democracy includes the democratic society as well as the question of how to be democratic. This requires an educational/-learning environment where power grows from below and moves inwards from the edges to the

centre. Equality is crucial in this process.

Open dialogue and open interaction play important roles in increasing democracy and equality. Empowerment is a result of a democratic learning environment, and leads to action. Involving politicians in the dialogue of sustainable development is important in order to show how democracy works and what global citizenship means.

Networks and action groups provide fruitful ground for education for sustainable development: They provide a context for a personal learning process, forums for working together, and an opportunity to become a member of a social network.

The trialectic time perspective builds a basis of sustainability. Present knowledge, a present situation or a present problem is always in a dialogue with a past and a future. Today's problems are yesterday's solutions. Environmental problems have increased as part of the development of human society. And the decisions we make now may cause problems for the future generation. But we can also learn from past mistakes. By showing that remote issues have local expressions which one can influence, it is possible to balance "distant" and "near" as well as promote empowerment.

As residential institutions, folk high schools offer an authentic environment for educating for sustainable development. They can behave as a microcosm of a sustainable community itself or find ways to go from plans to action.

Otava Folk High School offers many kinds of education programmes, from self-directed non-formal courses to vocational training and Open University courses. Its main area of expertise lies in modern media and open learning environments. According to the Otava core idea, the school is committed to promoting sustainable development and global citizenship, and to finding alternative ways for learning. The school aims at finding new target groups (groups with special needs) and at challenging methods of the formal school system, for instance developing participatory methods.

How does Otava Folk High School promote sustainable development?

- By running an accepted programme for education for sustainable development, where key elements and indicators have been written down.
- By having sustainable development mentioned in its core idea and in the curricula.
- By having taken the task of educational biodiversity and filling educational gaps seriously.
- By having a self-evaluation system for education for sustainable development according to the indicators mentioned earlier (see chapter 2)
- By being active in projects which offer authentic learning opportunities for education for sustainable development, i.e. the Globe Project, the UNESCO Baltic Sea Project, the Active Citizenship Project, and the Grassroot-Leonardo Project
- By having taken on a role to activate other folk high schools in Finland and to promote networking with them.

Education

By Franziska von Gadow, Germany

Indicators for a sustainable development in the city of Flensburg

This project was developed by 10 students at Auguste-Viktoria-Schule in Flensburg, a town in northern Germany about 5 km from the Danish border. The students were about 18 years old. With their results they wanted to show politicians and other people who are responsible for the administration of the town the current development of Flensburg towards sustainability.

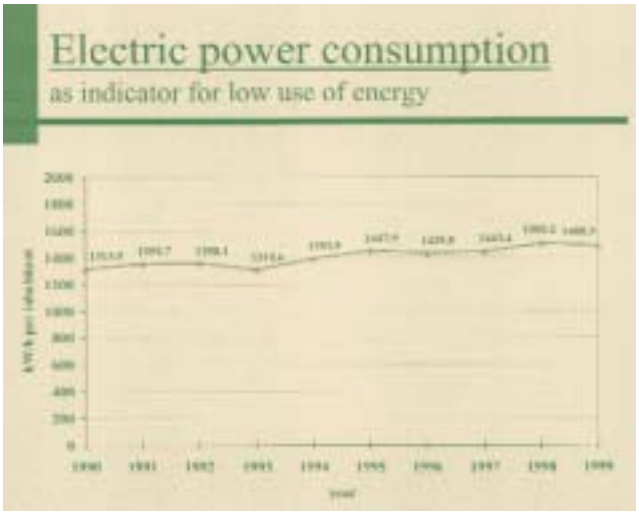
They used 24 indicators, which are listed below. In examining the indicators, the students gained very good experience as well as an overview of the ecological, social and economic situation of their own city. They began to feel responsible for their city and had a better feeling for the local Agenda 21 and its global aims.

The indicators are:

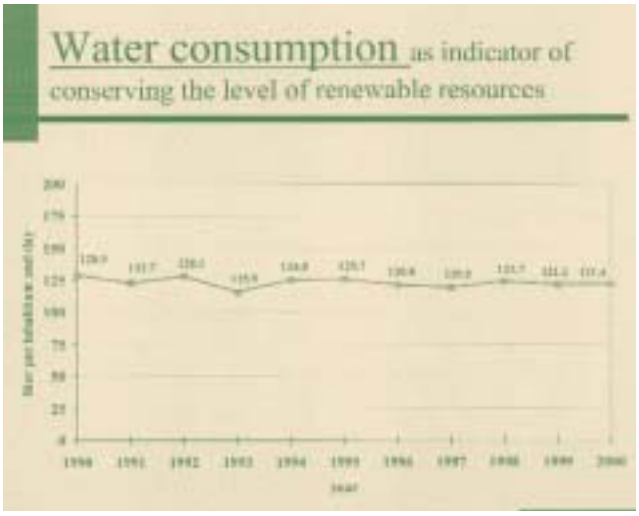
- Waste Minimisation: household waste measured as kg per person per year.
- Municipal waste measured as kg per inhabitant per year.
- Handling of non-renewable resources: land utilisation measured as % of entire acreage
- Conservation of the level of renewable resources: water consumption measured as litre per inhabitant per day.
- Use of energy: electric power consumption measured as kW/h per inhabitant.
- Mobility measured as number of vehicles per 1,000 inhabitants.
- Even distribution of work: unemployment rate in numbers of men and women and in %
- Degree of self-sufficiency: percentage of regional products at the farmers' market.
- Balanced economic structure: employees paying social security.
- Stability of the price level: price index of rentals measured as cost per square meter.
- Sound structure of official budget: municipal debt in DM per inhabitant.
- Operational pollution control: enterprises with an eco-audit in numbers.
- Fair division of income: number per 1,000 inhabitants receiving assistance.
- Level of training and education: number per 1,000 employees.
- Balanced population and settlement structure: number per 1,000 inhabitants relocated.
- Cultural offers: participants in further and continuing education per 1,000 inhabitants.
- Health: number of overweight children.
- Volunteer commitment: number of registered associations per 1,000 inhabitants.
- Democratic commitment: voter turnout in % at municipal assembly elections.
- Commitment to international justice: municipal expenditure for joint development in % of the municipal budget.
- Women's participation in public life: % women in the municipal assembly.
- Living conditions: municipal expenditure for improving the environment of children and youth.

After about four months of work, the students presented their results to the public in May 2002. They hope that other schools will follow and do the same research in their own town in order to obtain data for comparison:

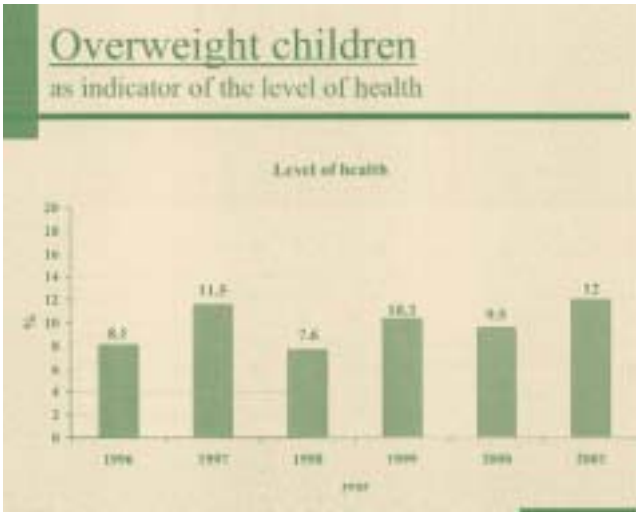
Household waste measured as kg per person per year



Electric power consumption measured as kW/h per inhabitant



Water consumption measured as litre per inhabitant per day



Health: number of overweight children

Energy

By Anna Figiel, Poland

Teacher's reflections

With colleagues teaching biology, chemistry and computer science, we have been working together with students in the Project since 1989. Each project has been prepared by approximately 20–30 participants, who have worked in groups of two to four members. The groups have worked on various topics within one single field.

We have worked with 'Environmental History' and dealt with two main topics: 'Energy' and 'Food'. The energy topic included co-operation with biology and chemistry teachers Gudrun Ejlertsson and Clas Edlund from Österportskolan in Ystad, Sweden, and Agnete Waagstein and Bodil Pedersen from Stenhus Gymnasium in Holbaek, Denmark, and also with chemistry and physics teachers from Carl Schurz Schule in Frankfurt am Main, Germany. The topic on food was dealt with in co-operation with Stenhus Gymnasium only. The historical aspect was approached through information taken from books, archives, surveys and interviews with elderly people who remembered the information needed.

Energy:

We started the work from the given topic. The

Polish and Danish students discussing energy, history and environment in Holbæk, Denmark 2002

students had to define their topics, such as 'The Sun and Solar Energy', 'Thermal Energy', 'Vitamin D', 'Calories and Fashion', etc. Students were very creative in the topics they wanted to prepare. I noticed an increasing eagerness during their work. They had to present information to the teachers about what they were going to do, and then we discussed how to do it. As the work progressed, new ideas appeared. In this way the work became very vivid and students became more and more involved. Sometimes they had to obtain special permission from the school authorities to gain access to some documents, offices or factories into which not everybody is allowed. This made them more curious and proud. They were able to become more familiar with research methods and felt a little like real scientists.

As some of the students took part in more than one project, I could observe that they were more skilful when working on the second one. They were more experienced and more self-confident. They knew what was good for the presentation, and what grabbed the attention of the audience. That is why they started working with computer CDs, which gave them the opportunity to make a more interesting presentation, which was also less stressful than talking and showing the data on an overhead projector.

In my opinion, this kind of group work, including co-operation with students from other countries and using foreign languages, is a great challenge. It gives people the opportunity to connect scientific investigations and to make study visits, for example to power plants, factories, and museums, both in our own country and in the country we are co-operating with. Students become aware of the ecological problems connected to the topic and the background for sustainability. They can find out what has been done during the last hundred years in the area they are investigating, they can discuss whether the changes have improved the situation or not, and they can suggest what could be done in the future.

What did not work in our projects?

In general, we did not have special class lessons for our work, and consequently the students came from different classes. It was almost impossible to gather all of them at the same time. They worked on their own and discussed the problems either after the lessons or during the breaks. It would have been much easier if there had been a special ecological class. The only time the whole group was gathered together was for the presentation of results in the school Aula (assembly hall) for our headmistress, some teachers and English-speaking students as preparation for travelling to another country. Then we spent the time together abroad. The next time we could meet each other was when our guests came to us, presented their work and we organised some events together. Anyway, this kind of work with young people gives a lot of pleasure to both students and teachers. They make friends, and very often they maintain good relationships for a long time, not only writing letters or e-mails, but visiting each other as well.

Students' reflections

Olga Madejska, Anna Karczewska, and Magdalena Leman tell about their project on vitamin D.

We gathered data on vitamins and healthy nutrition. Our sources were mainly the Internet, biology textbooks and encyclopaedias. We learned about the importance of vitamin D for bone growth and the necessity for the human

organism to obtain and absorb calcium. We learned where and how vitamin D is produced and its main sources. We also became familiar with the terms ' healthy', 'balanced diet' and 'osteoporosis' - which is the result of the lack of calcium in the bones.

Preparing this project gave us not only factual knowledge about vitamins, but also about co-operation between students and the possibility to support each other, and with mutual help reach a certain goal.

We think such projects give young people great opportunities: to learn about other countries and cultures, to learn how to work as a team and also, which is maybe the most important, to learn something about ourselves and the environment on which we depend so much.

How we started the work

We started working in the Ecological Club almost immediately after entering Nowodworski Secondary School. During our biology classes we learnt all about the club, and students who wanted to join could sign up for it.

What was the study about? What themes were included?

The title of the project was "Energy, Environment, Man and History". When talking about energy, all sorts of energy were taken into con-

Energy is also utilised in the human body. Krakow and Holbæk students in Copenhagen

sideration. The topics were not only about energy used in industry, such as solar or geothermal energy, but also about nutrition and energy in our bodies. The projects took up such themes as "How the organism uses energy", and "Anorexia and Obesity - Different Diets".

What were the results of the discussion?

First, we dealt with alternative sources of energy. Both Polish and Danish students raised this issue. The most interesting thing for me was the ideas of solar energy and wind energy produced by wind turbines. While visiting Holbaek in Denmark, we could see wind turbines, this source of energy being quite popular there due to the appropriate climate. It turns out to be an extremely good way of obtaining power, since it does not pollute the air at all. The same goes for solar energy. Solar energy is already used in countries where the climate allows for it. Unfortunately, in Poland, none of these ideas are possible for two reasons: climate and money, since building wind turbines or screens for catching solar energy is expensive. In Poland, another matter of concern is that not many people care about the environment compared to western countries. It will probably change in a few years, but now (2003) the situation is not very good.

The second part of the project was about the way the human organism utilises energy. I found this part more interesting since I think we are always more curious about the way our body functions. Moreover, the part concerning different diets enabled us to understand what healthy or unhealthy food we eat. It was a great opportunity to learn more about it and, if necessary, to change our habits so that we become healthier. What is more, we saw what the human organism does with the nutrients it receives and also what makes people become slim or fat, as probably not everyone knows the reasons for this.

Success or failure

Matylda Stryczniewicz tells about exchange visits:

Exchange visits are valuable, and twinning with partner schools abroad is a very good way to learn about different subjects connected to ecology. It is for sure more effective than sitting at school. We always remember things better when we prepare something out of our own interest.

During this project, all the topics related to the energy in our body were extremely interesting for me and that is why I am really glad I could take part in the exchange.

Beoita Joiwis, Poland

Energy Efficiency Measures in Raguva Secondary School

By Sigitas Zudys, Lithuania

Initiative

Activities towards sustainability in the secondary school of the settlement of Raguva began in 1999 within a national project entitled School Agenda 21. The main goal of the project is to encourage students to identify, investigate and take action to prevent and solve environmental and related problems in their own community. It includes

- integration of sustainable development/real-life problems into the school curriculum
- initiation of practical activities stimulating changes of lifestyle
- partnership with community organisations

The pupils' initiatives and their participation in planning the learning process and school life are essential components of the project.

During the 2002-2003 school year, children from Raguva Secondary School chose several topics for practical activities, i.e. changes in consumer habits, energy saving, improvement of the living environment, and waste management. The problems selected were discussed also by the team of teachers and incorporated into relevant curricula for the following subjects: geography, Lithuanian language, chemistry, physics, technology and biology. Links with national standards according to the age group were clarified. In this way practical activities were connected with the learning in the classroom. This also brought an extra value to the education process.

Investigation

Energy is essential to improve the quality of life. In our daily lives we use energy for many purposes: to light and heat the buildings we live and work in, to cook food, and to make various electrical appliances work. It makes life comfortable for us, but is it enough to be a conscious consumer?

Energy efficiency has been identified as a priority area for the Energy Sector of Baltic 21 (see page 16). What can be done to achieve this purpose at school and at home?

An investigation into electricity consumption was initiated by the eco-group, consisting of 9 students aged 13 to 17:

- How much electricity do we use at the school?
- How much does it cost?
- What electric appliances consume most energy?
- Are our habits in using electricity sustainable?
- What efficiency measures could be implemented?

These were the questions asked by pupils.

The background information on various ways to produce energy was discussed in the classroom. Production was related to economic, social and environmental issues. Problems and perspectives connected with the decommissioning of Ignalina Nuclear Power Plan (the main provider of electricity in Lithuania) were covered as well.

The eco-group performed an electricity audit of the school.

According to the assessment, electricity is

used primarily for lighting the school premises. At the school there are:

- 108 luminescence bulbs, installed power 2,600 W
- 630 heat bulbs, installed power 91,210 W
- 70,806 kWh in total was consumed for school lighting during 2002
- The total cost for the electricity consumed in 2002 was 20,476 LTL (5,930 EURO

In some classrooms the illumination does not meet the hygiene requirements because the power of the bulbs used is lower than required.

The pupils also evaluated their personal lifestyle according to the following questionnaire:

	My life style		Assessment A / S / N
1	I choose the optimum light	the power of light bulb	
2		the type of light bulb	
3		the location of light bulb	
4	I clean the bulbs and lampshades regularly		
5	I watch that light and electrical appliances are switched off when not used/needed		
6	I use the refrigerator efficiently	there is enough space for air circulation behind the fridge	
7		I clean the cooling pipes	
8		I observe that the temperature is an optimum one	
9		do not put warm and hot food into fridge/freezer	
10		I do not leave the fridge/freezer door open for long	
11	I use the electric stove efficiently	I choose the heating elements according to the size of the pot	
12		I use the convenient heating level	
13		While cooking I cover the pots with lids	

A - always, S - sometimes, N - never

In the beginning children were satisfied with their behaviour. It was expected that the most important (and simple) measure is just to switch off the light and other electric appliances when they are not needed. However, after the work was finished, children found space to improve

The electricity meter in the classroom was read regularly for one month

their habits as well.

The challenge was to find out how to save electricity and at the same time improve hygiene conditions. It should be done not only by behaving appropriately, but also by implementing new efficiency measures at the school.

The pupils collected and analysed information about the characteristics and efficient use of various appliances. The parameters of available light bulbs were particularly investigated. Different locations of the lamps were considered to provide appropriate illumination. The colours of walls and the position of windows were taken into account. It was decided to install additional switches in order to switch off the lamps close to the window or turn on the light at the blackboard. The municipal specialist in energy and a doctor were invited as consultants. Recommendations for changes in school lighting were developed.

Results

It was decided by the eco-group to carry out the following experiment:

Two identical classrooms, geography and physics, were selected. In the geography lab, all heat bulbs were replaced by energy-saving ones. Electricity consumption in each classroom was registered over a period of one month. The geography lab was used for approximately 36 hours, the physics lab for approximately 38 hours. The result was surprising, even for those who measured the results. The difference in electricity consumption was tremendous, i.e. 87 kWh and 17.3 kWh. It is estimated that investments in new light bulbs will be returned within 5-6 years.

A reconstruction plan for school lighting supported by the relevant calculations was submitted to the municipality.

Families of the eco-group members were informed about the activities at the school. Nine families decided to carry out an energy audit at home, based on which they started to implement various energy efficiency measures.

The eco-group presented their results at a conference at the community centre of the settlement of Raguva. Schoolchildren, community members and officials from the municipality of the Panevezys region participated.

Pupils discuss the best choice of light bulbs

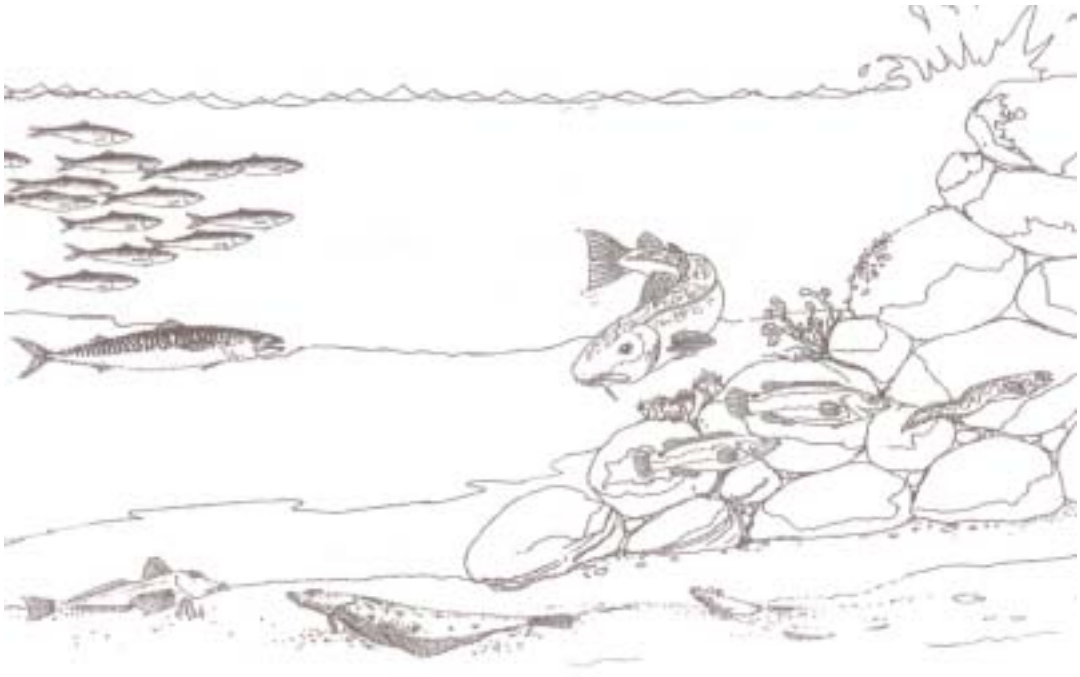
Various aspects were discussed:

- What energy efficiency measures are realistic?
- Why is it important for me to use less electricity?
- Will it affect my living conditions and health?
- What economic benefits will be achieved?
- What is the purpose of energy saving for my family and for the local community?
- How does it contribute to the saving of natural resources and to the protection of the environment?

The pupils found the practical activities interesting and stimulating, as it made them think more about the consequences and the broad impact of their personal lifestyle.

They also pointed out that they enjoyed working together in the eco-group, and co-operating with their parents as well.

Sustainable Use of the Sea - for food, for medicine, for energy ...



By Hans Jørgen Bruun Olesen, Denmark

- Is it OK to catch fish in order to produce medicine?
- It is OK to catch fish in order to produce fish-meal for animals?
- Is it OK to catch fish for food?
- Is it OK to catch fish?
- Is it OK to discharge waste water into the sea?
- Is it OK to place wind turbines in the sea?
- Is it OK…

Esbjerg Gymnasium is situated in Esbjerg, on the west coast of Jutland facing the North Sea. Fishery was one main reason for establishing the city, another was the need after World War II for a major harbour facing westwards towards England, traditionally one of the main markets for Danish dairy and other agricultural products. Fishery still plays a very important role for the entire society. South of Esbjerg, all the way to Holland, lies the Wadden Sea, a precious and special tidal zone with a unique biodiversity and with outstanding ecological importance, not least for migrating birds, such as waders and geese.

To understand fishery and sustainable use of the oceans, and to discuss some of the questions above, we introduced our 1st year students (aged 16) to the following studies:

Fisheries:

The students were divided into three groups, which all managed the following three elements during a full 8-hour day:

1. A visit to the Aquarium at the Fishery and Maritime Museum in Esbjerg to study fish species, fish adaptation, camouflage and behaviour.
2. A visit to the local fishmeal factory - one of the main industries in the local area.
   The students spent two hours on the working process. They followed the fish from the catch, determining the species, and finding out what is done with the fish in the factory and what the end-products are, e.g. fish oil for medicine, and fishmeal for domestic animals and fish farming.
3. A fishing boat trip to study fishing techniques. Fishing with trawl for fish and animals close to the sea bottom. The students identified the fishes and animals caught.

In consultation with fishery organisations, we are able to elaborate further on the following:

- The different species caught
- Problems related to the catch - such as dioxin in fishmeal, but also the cost of removing dioxin from fish, e.g. 100 million DKK to remove 1g of dioxin!
- The quantities caught
- The methods used - how they catch the fish: blue mussels (Mytilus edulis) and shrimp
- Regulations - net mashes and quotas
- Comparisons between Danish fishery and other North Sea countries.

Wadden Sea examinations

Through visits to the Wadden Sea, we perform

Low tide at the Wadden Sea. Some plants are well adapted as pioneers to create marshland by growing directly in high-salinity water

the following tasks:

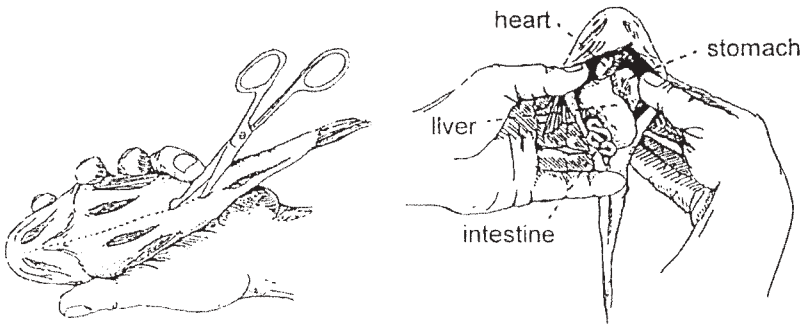
- We investigate the species of animals.
- We measure the water level at low tide and high tide, and the consequent tidal impact on the flats in the working period.
- We find out where the animals live and the plants grow, compared to the "normal" water level.
- We find out what the animals eat.
- We make food chains.
- We compare fishery.
- The students also make examinations of the marshlands.

Waste water treatment

In Esbjerg, we have two waste water treatment plants providing mechanical, biological and chemical treatment. The objective is to follow the water cycle from tap water (drinking water) to waste water, to the waste water treatment plant, and to the recipient, the Wadden Sea and the North Sea.

We study and discuss the effects of waste water in the sea.

The students think the visit is smelly, but they are very interested in the processes.



Offshore: energy and oil pollution

Objective: to study the effects of the offshore oil industry on marine organisms and on beaches used for recreation. Unfortunately, there is often oil pollution somewhere in the world that we can compare with.

Wind turbines in the sea is a new issue: There are 60-80 wind turbines constructed in the North Sea:

While we achieve energy without pollution, what is the impact on fishery, on tourism, etc? We also try to look at some of the issues from a historical perspective.

Here is what the students Dennis Jensen, Niels Ole Jessen, and Flemming Nguyen thought of the fishery studies:

At the 'Fisheries and Maritime Museum' in Esbjerg we did some research on the behaviour and adaptation of fish. The only important thing to a fish is finding nourishment without being eaten itself. That is why fish are endowed with different qualities such as camouflage, speed, the ability to make sudden attacks, etc. Other examples of adaptations are the agility and streamlined build which fish have developed. These qualities can be used for hunting as well as for defending itself.

Dissection:

At the laboratory section at the 'Fisheries and Maritime Museum' in Esbjerg, they gave us two different fish: a sculpin (Myoxocephalus scorpius) and a herring (Clupea harengus). Our assignment was to find similarities and differences between the two fish.

Our first observation was the form of the fish: the herring is more oval while the sculpin is almost triangular. Let us take a closer look at the herring. The shape of the herring shows that it is a fast fish that swims a great deal. The small

size of its head facilitates this activity. Further conclusions could be drawn after examining the inside of the fish. A striking difference between the two fish was that no swimming bladder was found inside the sculpin. A swimming bladder shows that the herring is often near the surface of the water, where such fish also feed.

We very quickly discovered that the sculpin lives on the bottom of the sea. Its stomach contained a funny little lump, which later turned out to be a crab. The fact that it has neither a swimming bladder nor contains various kinds of aquatic plants tells us that it lives on the bottom of the sea. We can also conclude the sculpin feeds by making sudden attacks, where great speed is required to catch its prey. However, the sculpin is a poor long-distance swimmer, which is indicated by the size of its gigantic head.

Fishing:

On "E1 Claus Soerensen", which took us on our fishing expedition: in the waters between Fanø and Skallingen, we caught the following fish and animals at a depth of 7-8 m: Flounder (Plaichthys flésus), whiting (Merlangius merlangus), sculpin (Myoxocephalus scorpius), pipefish (Siphonóstoma týphle), butterfish (Phólis gunéllus), viviparous blenny (Zoarces viviparus), sand goby (Pomatoschistus minutus), beach burbot (Cárcinus maenas), swimming crab (Portúnus depurátor), edible crab (Cáncer pagúrus), hermit crab (Eupagúrus bernhárdus), shrimp (Crángon vulgáris), and starfish (Astérias rúbens).

We think it has been an interesting assignment, and we can conclude and answer the opening questions:

- Yes, it is OK to catch fish in order to produce medicine. Medicine might even be more important than food and fodder. If fishery is not sustainable and the fish cannot regenerate, then fish for food should be reduced.
- It is OK to catch fish to produce fishmeal if the animals that are fed with fishmeal also eat fish in nature! But if animals are fed with fishmeal and fish is not part of their ordinary diet, then we oppose it for ethical reasons!
- It is OK to catch fish for food as man has eaten fish throughout history. We need food, but the fish stocks should be able to regenerate.
- It is OK to catch fish as it is healthy food. There is a problem with quotas because fishermen catch too many fish and have to throw them overboard. These fish will die, so the techniques have to be made less harmful.
- It is OK to discharge waste water into the sea after proper treatment. Waste water must not have a negative impact on the ecosystem, and we have to get rid of it somehow.
- It is definitely a splendid idea to place wind turbines in the sea. It is less harmful than Vestkraft power station!
- It is OK to have fish farms if the species is endangered. But there is a problem of nutrients, antibiotics and other pollutants being discharged from the farm, so the water quality of aquafarms has to be controlled.

Fisheries in Nexø, Bornholm

Poster exhibition in the gym

By Mette, Ditte, Bettina, Mie, Regitze, Sabrina, Maiken, Jannie and Carina, Denmark

We have worked with the subject of »fishery« in Nexø. There is a factory there that produces tins of cod roe, smoked cod liver and fish balls made of cod meat. The production of cod liver started during World War II, when fishermen were instructed in how to land the cod liver and make cod liver oil.

The development of Nexø harbour was examined. The harbour saw two major enlargement projects in 1964 and 1979, and was described as the »centre of fishery in the Baltic Sea«. The following years saw major activities in the harbour. At the end of the 1980´s, however, the adventure was over, brought to an end by the imposition of strict quotas. Today, there are only about 50 cutters fishing from Nexø.

The main species caught are cod, herring, flounder, sprat and salmon. How much the fishermen are allowed to catch depends on the quotas, which are determined every year in Warsaw. However, fishery has stabilised in recent years.

A marine biologist told us that the conditions for cod are rather good, but more oxygen would improve the conditions together with storms from the west, which would bring fresh salt water into the Baltic Sea. The worst pollution is caused by nitrogen, and this will only improve in 20-30 years if the pollution stops now.

We also tried to have a look at the future: How can we have a more sustainable fishery in the Baltic Sea? Some of the answers are: less pollution, less use of fertiliser in agriculture, more water treatment plants, larger meshes in trawls and nets, and sufficient quota.
The chairman of the Fishermen's Association of Bornholm and Christiansø thinks that the situation will not change much in the years to come.

When no herring is caught in the Baltic Sea, it has an influence on the traditional recipes of Bornholm, a cultural heritage of importance for tourism

Fisheries in Kolobrzeg

By Maria Adamiak and Andrzej Kropidowski, Poland

Our school is in Kolobrzeg, a beautiful town situated in the mid-western part of the Polish seaside at the mouth of the Parseta River. It is a small but busy fishing and merchant port with a number of tourist boats and a marina. There are about five hundred 12–15 year-old students at our school. We have worked on ecology and environmental projects for a couple of years. We take part in national and international educational programmes and work for sustainable development, and our school has been involved in the Baltic Sea Project since 1999. Fishery has been chosen because it is very important for the development of our town and region.

About the research:

Fifteen students were involved and five research groups formed. Each group was given a specific task. The groups visited some fishing boats, a fish processing plant and a fish farm, and interviewed some anglers and people involved in the fish industry.
Here are the results of their research:

Sea fishing

Polish fishermen work not only in the Polish economic zone but also in the Swedish, Danish and German zones in accordance with international agreements. The most important fish species are cod, herring, sprat, plaice, mackerel, salmon and eel. Salmon and eel are migrant – marine and freshwater fish. The salmon feeds in the sea and reproduces in rivers, especially the ones that lead into the Baltic Sea – the Parseta, the Slupia, and the Wieprza rivers. The eel feeds in rivers and reproduces in the Sargass Sea. The optimal environment for the reproduction of the cod is the deep waters north west of the island of Bornholm and north of the Gdansk Bay. The coasts of the Pomeranian and Gdansk Bays, the beaches and rocks of Germany, Denmark and Sweden are the main reproduction areas for the Baltic herring.

The most important fishing techniques and fishing gear are bottom trawls, bottom pair trawls (cod catches), pelagic trawls, pelagic pair trawls (herring, sprat), drifting nets (salmon) and hooks: bottom (plaice, eel, cod), under surface (salmon). The sprat accounts for the biggest percentage of marine catches (70-80%). It is mainly used for industrial needs to produce fodder. The other species are used as food sold fresh in shops, but most are processed in fish processing plants, where the fish is smoked,

Fishery is very important for Kolobrzeg

frozen or breaded. Preserves, salads, fish spread, canned food, marinades and pickled fish are also produced. Some products are sold locally, and some are exported.

Marine fishery is very important for our town and its people. Lots of people work as fishermen and their families depend on their incomes. There are several fish processing plants in the region, where a few hundred people are employed. Although they do not earn much money, they are happy; they can make a living, and they hope not to join the ranks of the unemployed, currently 30% of the population.

Aquafarms

There are several 'fish farms' in our area where carp and trout are bred. The trout needs clean, well-oxygenated, cool water. It is very vulnerable to infections and therefore it is much more difficult to breed than the carp. It is fed with wet food (sea fish) and dry food (granules made on the basis of fish meal imported from Denmark). Because of abrasions trouts become infected with mycosis, sometimes suffering gill inflammation. When the temperature of the water falls below 10°C they can get the VHS disease and that is the end of the farm, as there is no effective remedy for the disease. The fish from aquafarms are bred for food, and are especially popular here at Christmas.

Angling

Angling is very popular in Kolobrzeg due to the desire for hunting, for recreation, for sports and competitions. Anglers fish in the Parseta River and in the sea. They catch salmon, salmon trout, pike, bream, perch, roach, burbot and other fish. All the species (except for the eel) reproduce in the river or on the old riverbeds. Most of them feed in the river. The salmon and the trout feed in the sea, the perch and the roach in both the river and the sea. Only 10% of fish is caught for economic reasons.

Sustainable fishery – Protective measures taken

Delimitations on catches are set by the Ministry of Agriculture and the Development of Rural Areas. Poaching has to be effectively prevented and stopped. Fish stocks of salmon and trout salmon have to be continuously replenished.

Other protection acts

- Delimitations of type and amount of fishing gear depending on the size of fishing boat (the length of nets, number of hooks, diversity).
- Waste water from fishing boats is passed on to special locations and then recycled.
- Every owner of a fishing boat needs to work

Fish species	Minimum size in cm	No fishing allowed	Net mesh in mm
Plaice	25	15.02 – 15.05	105 - 130
Cod	35	01.06 – 31.08	105 - 125
Herring	16		Herring 32 / sprat 16
Salmon	60	01.06-15.09 / outside 4-mile zone 15-09-15.11 inside 4-mile zone	157
Trout salmon	50		
Eel	40		

out his own 'Oil spill protection plan'.

- Any attempts to interfere with river ecosystems should be stopped/banned (dams, river straightening, etc).

Fish stock viability indicators

Fish stock research is carried out mainly by the Sea Fishing Institute in Gdynia. The quality of eggs, fry and scales is examined. What is important is not how many eggs hatch into fry, but how many fry grow large enough to be caught. Environmental research – the salinity of waters, the amount of oxygen, the amount of food (plankton, other fishes), water pollution.

The fishing forecast

According to scientists, catches in the Baltic Sea should not exceed one million tonnes a year. The amount caught should not endanger the sea's biological balance. The Baltic fish stock consists of small pelagic fishes, i.e. herring, sprat – 80%, cod – 10%, and other species – 10%.

The catches presented in the forecast for 2003 (about 120,000 tonnes) in the Polish Economic Zone will not be increased after 2004. There will probably be more limitations on cod catches. The stock of cod is rapidly decreasing due to overfishing and fishing out small fishes. Fishery is a very important aspect of our lives. It gives us work, income, food and pleasure. We who live by the sea are well aware of this. Along with tourism, it is the core of the region`s economy. But we should be very careful when exploiting the resources of the sea as there are limits everywhere.

The biggest dangers are water pollution and overfishing. It is quite natural for people who are in the fish industry to get as much as possible from the sea.

At the same time, paradoxically, they realise that overfishing will lead to the end, but they are unable to stop it.

Therefore, others have to take action to stop it for them. More and more people should care about the sea and its limited resources, and then put pressure on their parliamentary representatives to take the necessary steps against the problems mentioned.

Forestry – Orchids and Biodiversity

Technogenic landscape: Ash mountain created by the chemical industry in Kohtla-Järve

By Kaidi Karu, Mari Sarv, Diana Revjako and teacher Mall Schmidt, Estonia

Kohtla-Järve Gymnasium is situated in Ida-Virumaa, where there are many different industrial landscapes because of the oil shale and chemical industry. We were told about orchids which grow on our ash mountains through previous research work conducted by students from our school. We decided to find out if orchids also grow on other industrial landscapes.

We divided the industrial landscapes into four groups according to origin

1. Ash mountains created by the chemical industry in Kohtla-Järve
2. Ash mountains created by the power station in Ahtme
3. Gangue mountains near Kohtla-Järve
4. Recultivated open pits in Kohtla-Nõmme

We arranged six expeditions to these industrial landscapes in June and July 2002, in an effort to identify what species of orchids grow there. As the orchids are under nature preservation, we cannot collect them. Nevertheless, we took pictures of the plants that we found, marked the places where they grow on the maps and charted the landscape.

The industrial landscapes are recultivated (wooded) and the oldest forests are about 40 years old.

On chemical industry ash mountains we found five different kinds of orchids: Orchis militaris, Dactylorhiza incarnata, Orchis maculata, Epi-

Orchis maculata thrives on the chemical ash mountain

pactis atrorubens and Epipactis helleborine.

On power station ash mountains we found three kinds of orchids: Dactylorhiza baltika, Epipactis palustris and Epipactis helleborine.

On Kukruse gangue mountains only one sort of orchid – Dactylorhiza baltica – was observed.

In the quarry areas in Kohtla we found more sorts of orchids than at the other places: Cypripedium calceolus, Dactylorhiza fuchii, Plathantera bifolia, Listera orata, Epipactis atrorubens and Epipactis helleborine.

We found altogether 11 different species of orchids. Two species belong to category II, and 9 species to category III of the nature preservation plant list.

The occurrence of orchids is most varied in the parts of industrial landscapes that are wooded. Sinivoore gangue mountains are covered with plants halfway up, but orchids do not grow there. Also, orchids do not grow in treeless parts of the power station ash mountains. Therefore, orchids like to grow on the industrial landscapes, where the soil is full of lime.

Orchids from industrial landscapes have no natural enemy – such as wild boar, which eat their tubers. That is why we found about 200 Orchis militaris plants in a 2,500 m² area of chemical industry ash mountain.

Recultivated industrial landscapes change the scenery, and they can be used for sports and hiking. Hikers and people who appreciate nature enjoy the blooming of the beautiful orchids in industrial landscapes.

In the future we plan to take soil samples, the goal being to examine the soil ecosystems in the technogenic landscapes in the hope of understanding why orchids like technogenic landscapes.

Students from Kohtla-Järve Gymnasium searching for orchids on wooded ash mountains

SUSDEED – SUSTAINABLE DEVELOPMENT IN EDUCATION

Finnish Esker forest

By Risto Hamari, Finland

Langinkoski upper secondary school in Kotka has participated in the Baltic Sea Project since 1989 when the project was still at the planning stage in Finland. Ever since, the school has participated in different activities of the project. The work culminated in 1992 when the school was responsible for arranging the first international conference of the Project entitled "Students Working for the Baltic Sea". This conference marked the end of Finland's host period (see page 4).

Within the framework of the Baltic Sea Project, two topics have attracted major interest in Langinkoski. One is the River Kymijoki, which runs into the Baltic Sea just near the school, and the other topic is forests. The importance of forests is self-evident in Finland, and in the county of Kymenlaakso even more so because many wood processing industries are situated here. The area is well known for its pulp and paper industry as well as its sawmills. Most families depend on forests for their living, directly and indirectly. Accordingly, educational aspects of forests and running waters have been our main contribution in national and international co-operation, the Baltic Sea Project included.

All the main types of boreal forests are present near our school: dry upland forests with Calluna vulgaris and Vaccinium vitis-idaea as the dominant species; moist upland forests dominated by Vaccinium myrtillus, and grass-herb forests dominated by Oxalis acetosella. The study of forest ecosystems includes analyses of trees, bushes, herbs, birds, mammals, insects and other invertebrates.

There was great interest in developing environmental education more in the direction of education for sustainable development. Encouraged by the National Board of Education in Finland, the school asked other interested schools to join in an EU project announced by DG XI (1997-2000). There were many interested schools/institutions throughout Europe and the project started with a network of six nations and about 30 schools/institutions. Several schools worked together in local units, which partly explains the high number of schools in the project.

The aims of the SUSDEED project were ambitious: to study and clarify the concept of sustainability in education, to create European modules for education for sustainable development, and to improve the environmental management of schools.

Schools and universities in interaction

In order to fulfil the first task, a decision was made to write a book about the development of the concept of "sustainable development". Dr. J. Raumolin from the University of Helsinki kindly accepted the task of writing the book. He also participated in all the meetings during the project and the participants obtained information about the process.

One of the most interesting parts of the project, at least for the participants, was the preparation of teaching modules. Every single unit (consisting of one to seven schools/institutions working together) chose an aspect which was both relevant and interesting from their point of view. Of course, thorough discussions took place on the proposals made by the participants. The attempt was to cover several aspects of sustainability and at the same time create a logical entity. In our Kotka unit, seven schools and institutions worked together, and the students visited each of these institutions during the course. The theme for the course was sustainable forestry. All the different aspects of the whole lifespan of the wood were dealt with - from the seed to waste products:

Forest ecology - Management in forestry - Multiple use of forests - Forest aesthetics - Industry based on forest products - Logistics of timber, pulp and paper - Woodwork - Lifecycle assessment of products.

Our results on forests were formulated in a small booklet, "The Forest Course". The results were included in the final booklet together with all other contributions, which dealt with various aspects of sustainability, such as sustainable tourism: the impact of tourism in wetlands (Rantalakeus unit in the Bothnian Bay), and the influence of tourism on local people (the unit in the Canary Islands, Spain).

Field work in the Finnish forest

Urban areas were studied in Greifswald, Germany. Interest here focused on the reconstruction of an old, historical city centre. In Leeds, Great Britain, the restoration of a park area after construction works was the topic of the follow-up study.

The Baltic Sea was in focus in several places. In Kokkola, Finland, the quality of the waters was studied in an aqua course. In Kempele, Finland, the swift change after the land uplift and the use of primary meadowlands for grazing was one of point of interest. In Kotka, the study of water purification systems in the pulp industry was part of the forestry course, and in Landskrona, Sweden, the topic was marine ecology. In Greifswald, the harbour area linked the unit's interest to the Baltic Sea as well.

Other important themes dealt with included energy saving (Alzey, Germany), recreation areas (Ludwigshafen, Germany), traditional and

ecological agriculture (Landau, Germany), biological diversity (Lyon, France) and environmental news in local radio networks (Canary Islands unit).

As a result of all these activities, the booklet "Environmental Courses and Sustainable Schools" plus a CD-rom was published and distributed to the participants.

Discussion

Sustainable development is a very complicated concept. Accordingly, education for sustainability is difficult and needs innovative perspectives that are interdisciplinary in nature. Conventional school work does not adequately support this kind of approach.

One of the criticisms made at the end of the project was that most of the activities had to be extracurricular and only a limited number of students wanted or could take part in them. One of the schools could not activate students for the practical work at all, even though their plan was quite interesting and should have been motivating. The conclusion is that more flexibility is needed if school work is really to form a significant part of the project activities.

In some cases the results gained from the study were obvious: The environment is in bad condition. The official parameters out of the school also express the same. It is hard for young people to understand why nothing has been done – as they say - to improve the situation. There is still a great deal of lip service paid in the field of environmental policy!
Many positive reactions could be mentioned. Students participating in the project expressed their interest for working in a different way from the school´s everyday routine. Teachers were inspired by the international co-operation and by the opportunity to find out what others are doing in education for sustainable development. Their sincere hope was to continue the project and strengthen the relationship between new partners. Unfortunately, and because of changed procedure in the EU, this was no longer possible under DG XI. One of the positive experiences was also the help of modern technology in facilitating communication between the participating units.

Multiplier effect

Our results serve as inspiration for new activities and the creation of a network of schools working for a better Gulf of Finland. In this network more than 10 Finnish, Estonian and Russian schools co-operate as a regional network for better conditions in the Baltic Sea. Their interest is directed to the rivers running into the Baltic Sea.

The SUSDEED project report

Soils in Poland

By Danuta Madroszkieiwcz, Poland

Glogow is one of the main towns situated in the Glogow - Legnica Copper Basin. Copper is found in soils in a one-metre layer covering altogether 600,000 km^2 and stretching from Great Britain, Holland and Germany to our position in Poland. Today, extraction and processing takes place only in Poland, where the soils contain approximately 3% copper. Copper is used industrially due to its enormous conductivity, especially in the electricity and electronic industries.

The smelting and flotation processes, however, are harmful to natural environments, especially aquatic ecosystems, and also to the air, the soils, and consequently to the whole food chain: plants → animals → man. Copper in man causes health problems, such as nausea and diarrhoea, and with increasing concentrations the liver tissues and other organs may be damaged.

Our school decided to examine the soils in our local area as part of a joint Comenius project with Polokowice, another UNESCO ASP-net school. Our ecological classes followed the special educational programme called "Protection of Environment" with the main objective being to prevent environmental pollution and identify solutions. Two copper smelters, Glogow I and Glogow II, are situated 7 km to the west of Glogow, in an area called Zukowice. Glogow is heavily polluted by dust and gas, which blows directly from the smelters and is carried by western winds. Glogow is thus constantly exposed to chemicals from the smelters, despite the fact that Glogow has many parks and trees that serve as natural filters.

We tested soil samples from the town of Glogow, from an area near Glogow I in Zukowice and in a protected area called Dalkow Hills.

We found many heavy metals - copper (Cu), lead (Pb), zinc (Zn) - in the air, in the water and in the soils. The situation is gradually improving because of considerable financial support for environmental protection.

The area near Glogow I was most contaminated. The samples were taken from a special strip of soil surrounding the industrial plant. To reduce the pollution problems, the area has been densely forested with poplar trees, especially Populus canadensis and Populus serotina as these species are tolerant to air pollution. No other vegetation can grow here except some mosses, algae and a few species of grass - Agropyron repens for one. Heavy metals cause soil degradation due to the harmful effects of heavy metals on all living organisms.

Dalkow Hills is called "Glogow's green lungs" because of its many forests and nature sanctuaries.

Within the programme we dealt with the structure and texture of soils, processes of importance for making soils, degradation factors and nature protection.

The waste problem is also connected to soils, and therefore we arranged a meeting with town council officials. The officials gave a presentation of the recycling plant: Every inhabitant in Glogow produces 340 kg of waste annually. We went to the municipal dump - a sad sight. We saw litter drifting, not segregated at all. There was a pile of industrial waste, too, called "Sniezka", which is the name of the highest peak in

Sustainable development? At least the white stork can still be observed in Polish fields

the Polish Sudety Mountains!

We also went to the after-flotation reservoirs "The Iron Bridge" with the remains from the copper-enriching process. The process severely damages the environment despite the fact that the reservoirs look interesting from a bird's-eye view (further information in Learners' Guide 4, Rivers, page 186).

We have therefore started collecting waste for recycling products, such as aluminium cans and paper!

To sum up our work, we presented our results at the International Earth Day, where the drama performance "Ecological tramps - how to re-cycle" showed that the participants had gained knowledge through the work.

We summed up our ideas on Polish soils in the following resolution:

To protect Polish soils we should:

- educate consumers on healthy food.
- eliminate the cultivation of plants for human consumption near contaminated areas and introduce industrial plants such as flax (Linum) and/or trees.
- prevent fruit and vegetables being grown in contaminated areas and bring in products from uncontaminated areas.
- propagate crop rotation and sustainable methods for removing weeds.
- minimise pesticides and fertilisers, and increase knowledge on organic farming.

Do we need another planet?

Poster made by students
from Zespol Szkol
Ogolnoksztalcacych
No. 6, Gdansk, Poland

Industry – Invitation: Travel St. Petersburg with us

By Anna Obukhovskaya, Irina Krichevskaya, Alexei Pryalukhin, Maria Melnikova, Polina Ignatyeva and Xenia Zakharova,
St. Petersburg, Russia

The hustle and bustle of daily routines surround us as we run through the streets of our native city, not noticing its beauty. There is history near us, yet we do not hear its pulse. Many people speak with love of this city, even without knowing it well: How is it possible to appreciate what you know so little?

Where should we begin?

St. Petersburg is so big, so different and so full of contrasts. It is the powerful current of the river Neva; it is majestic architecture, golden spires reaching the sky, temples and monuments. It is silence and beauty along its river banks and city channels, relaxation and time for reflection in the corners of its many gardens and parks.

St. Petersburg has majestic architecture

But it is also the hostile cosmopolitan industrial city of grey concrete blocks, huge factories and plants, hidden behind long characterless walls; it is chimneys and emissions, busy harbours with never-ending traffic.

Our school, no 179, is located in the northern part of the city. It is rather big with 1,300 pupils from the 1st to the 11th form. The buildings are well-equipped with laboratories and computer classes. Our main focus is on the combination of environment and medicine, humanities and economy.

Many students in the 8th form and onwards who are interested in medicine, ecology and scientific research join the "Senior Pupils' Club". Research work is done voluntarily and outside ordinary lessons, and is difficult and demanding. However, our students are guided by teachers and researchers in a personally-oriented way based on project work, investigations and technology, and their motivation is very high.

Before joining the Senior Pupils' Club, pupils have certain obligations at different class levels designed to gradually develop their attitude towards sustainable development.

When pupils enter the 5th - 7th forms they have a project on "Energy Saving", and each autumn and spring the 7th and 8th forms conduct a clean-up operation of the park areas along the banks of the Murinsky Stream, approximately 1-2 km away from our school.

They also clean up the area of the important memorial park of Piskaryovskoye, 12 km from our school. Piskaryovskoye Memorial Cemetery is the necropolis of Leningraders who died during the 1941-1943 siege. During the siege more

Flower festival: At primary level, at the age of 7-10 years, children learn about nature, grow green plants in their classrooms, clean the school premises and take care of trees.

than 740,000 people in St. Petersburg died of starvation and more than 16,000 people were killed in air raids and bombings. Today, delegations from all countries bring flowers to this place.

All our school projects share the same objective: to activate students and to make them responsible so that they understand the necessity of knowledge as a key to solving economic, environmental and social problems.

Let us begin our trip around St. Petersburg – and travel the microbes around us

For three years we have observed and analysed the sand of sandlots in children's playgrounds. We have conducted bacteriological and toxicological analyses and we found that sand is much polluted: Toxic substances are present, as well as nitrates, produced as a result of microbes degrading organic material.

After replacement of the sand with fresh sand, the level of nitrate pollution decreased 2-3 times. But already after three months, the pollution level was the same as before.

Our conclusion is that pollution of sand happens very quickly.

Travel the air of St. Petersburg

For evaluating the air quality we used bioindicators such as asymmetry in birch leaves - necroses - dryness in needles and lichen species.

Using these parameters we estimated that the air quality in St. Petersburg varies, but in general it is not very good. In reality, the pollution level is very high!

Waste water treatment plant in St. Petersburg

Travel the waterways of St. Petersburg

St. Petersburg was founded by Peter the Great in 1703. Our poet A. S. Pushkin called St. Petersburg "The Water Element" as there are more than 40 rivers and channels in the city. Often it is referred to as the Palmyra of the North or the Venice of the north, a poetic metaphor that is quite justified.

All the rivers feed into the main river, the Neva, which forms a delta in St. Petersburg and runs into the Gulf of Finland. The Neva, therefore, has significant anthropogenic influence - from the huge Lake Ladoga, and from all other rivers flowing into it, such as the Ochta, the Okkervil and the Zhernovka. Waste substances from industries and household drains that are released into streams and rivers will enter the Neva, and the navigation and number of ships on the river also has an impact.

Monitoring the quality of the water of the River Neva shows an increase of organic substances and hazardous substances, such as phenols, manganese, copper and lead.

Water flows into the Neva from many other rivers, one of them the Ochta. Numerous factories are situated along the banks of the Ochta, among them the three largest chemical manufacturers of the north-west region: the chemical fibre factory, the medical polymer factory, and the layered plastic factory. In addition, there are shipbuilding industries, metal working enterprises, and two huge productions, the Institute of Rubber and the Institute of Applied Chemistry, as well as many others.

Monitoring the river upstream from a green zone with beaches, boat stations and no industries, we find that the banks are clean, without dumps and dust, with trees and bushes, creating favourable conditions for people's relaxation.

Following the river downstream, numerous

drains cause the sandy bottom to become muddy, the water to have an unpleasant smell and be covered in petrol spots, and benthos plants to disappear. When we reach the entrance to the Neva, we find empty shells of molluscs, as well as molluscs with an abnormal shape! Chemical analyses show the presence of very little oxygen and an excess of iron, copper, manganese, phenols, nitrates and petroleum.

To check the results, we grew cress–salads, which showed a clear decrease in sprouting seeds, proving the presence of pollutants in the investigated samples.

In other rivers it seems that conditions have worsened when we use our bioindicators for estimating the water quality. The reproduction rate of algae has lowered, and the effect on Daphnia is lethal!

After travelling the microbes, the air and the waterways of St. Petersburg, it is now time to present our report:

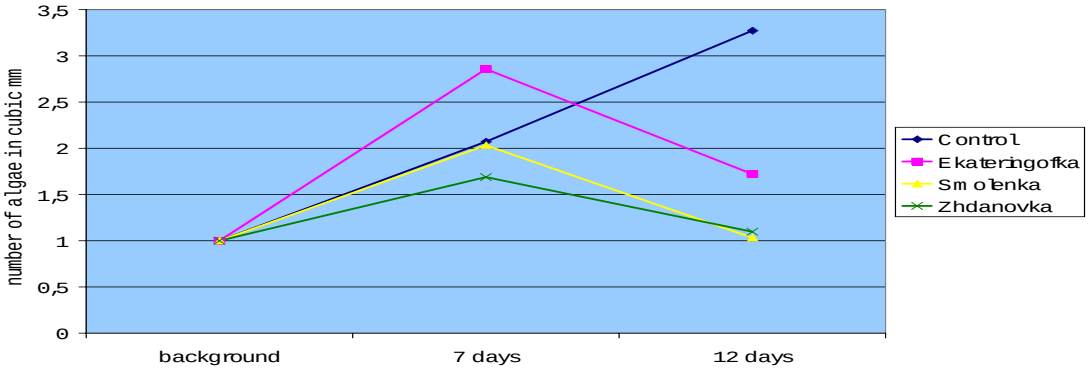
Some of the consequences may influence people's health. Using the bioindicators and chemical analyses, the students are able to observe the changes and to use the results to foresee the outcome of the changes. They are able to use their knowledge in different situations, they are able to develop collaboration skills in solving problems, and they are able to understand that the local activity influences others sometimes even far away.

The students inform others of their work – here in the school assembly hall

The students inform others of their work through participating in ecological olympiads and in seminars on ecological conditions.

Education for sustainable development is necessary to meet the challenges of the 21st century!

Dynamics of changing the number of algae (Scenedemus quadricauda) in tests from the rivers



Algae are influenced by industrial and household waste in St. Petersburg rivers

Tourism – Pelle and Lisa in the Stockholm Archipelago

By Malin Davelius, Sofie Renemar, Veronica Gustavsson and Sanna Elstad, Sweden

Pelle and Lisa have planned a boat trip in the Stockholm archipelago for the summer. Now the time has finally come to depart. They go to the Waxholm boat in Stockholm. It is crowded with happy and expectant tourists. Lisa and Pelle stand in the rear gazing at all the islands that the boat passes. All of a sudden they catch sight of the smoke that quells out of the funnel on the boat.

"That smoke can certainly not be doing nature any good," says Pelle.

An elderly woman comments that she has been working for 20 years as a technician in the Waxholm company. She informs Pelle and Lisa that the boats consume five million litres of diesel fuel every year.

"Oh, that is a lot," says Lisa, "How many boats are there?"

"We have 20 boats and they sail a total of 35,000 hours every year. Mind you, the exhaust is nothing compared to what cars emit into the surrounding atmosphere."

"I see. We learnt at school why cod are having difficulties surviving in the Baltic Sea. We learnt that the NOx that cars emit increases the eutrophication of the Baltic Sea as well as acid rain, and that problems thus occur in nature, even in the archipelago."

"Well, that is true, but there are other problems. You see, when the boats move off, a lot of bottom sediment is suspended into the water column; the sediment contains poisons and heavy metals that harm life in the archipelago more than the emissions. The stern waves also have a negative impact on nature and the noise from the boats disturbs bird life in the area. "Well, I did not know that," says Pelle.

As a result, we chose boat tourism in the Stockholm archipelago as our topic, and we investigated islands that represent the Stockholm archipelago, i.e. that differ in size and number of visitors, etc.

We had help from the Archipelago Establishment, the Environmental Protection Agency, and Värmdö Municipality in finding answers to the following questions:

- Do tourists know of the "Every Man's Right" in Sweden?
- Are the rules followed?
- How are tourist informed?
- Is waste sorted? At source?
- Is waste removed from beaches and camping sites? If so, how often?
- How does tourism affect animal life?

On the islands investigated we had help from hotels, restaurants, camping sites, youth hostels, etc. to answer the following questions:

- How many people visit the island every summer?
- What percentage of visitors are Swedish and of foreign nationality?
- Is waste sorted?
- How are the houses heated?
- What kind of sewage system is used - a loo or water closet?
- Is waste water treated?

The Waxholm boats link the islands, and are used not only for tourism but also for everyday necessities and delivery of goods, as well as for bringing waste ashore. We asked the company the following questions:

- In what way do the Waxholm boats affect animals and nature?
- What kind of fuel do the boats need for their energy supply?

Finally we asked various grocery stores the following questions:

- Do you compost your wet waste?
- What happens to the other waste products?
- Do you have a grill bar? If so, what do you do with the oil?
- How is waste taken away?

We can make the following conclusive comments:

Islands with a minor tourist impact know the most about environmental issues.

- Island residents protect nature by sorting waste and by composting.
- Grocery stores are small, and therefore sorting waste, etc is manageable.
- Restaurants: The bigger, the less sorting! Big restaurants have no sorting procedure, small restaurants sort waste into plastic, paper and compost.
- Youth hostels, camping cabins and summer cottages have signs with waste-sorting information.
- Youth hostels have loos that are composted.
- Electricity or wood are energy sources for heating houses, but as visitors mainly come in the summer, this is no great issue.
- According to the Archipelago Establishment, animal life is not very affected by visitors. The animals know where people move around, and there are protected islands with restricted admittance. There are special clean-up actions, especially after big holidays, as broken glass and even plastic rings pose a threat to animals.
- Tourists seem to have learnt how to acquire knowledge on how to behave, and most visitors know of the "Every Man's Right", so unique to Sweden. The Stockholm archipelago is unique, too.

Helen Litvinova, Russia

Tourism and Energy

The first Polish wind turbines were built in Cisowo in 1999

By Teresa Kaminska, Poland

Our school, Junior Secondary School No. 1, in Ustka has developed its own curriculum for the subject »ecology and tourism« for some years now. Our curriculum is based on activities conducted in the open area. We combine ecological education with our interest for walking tourism.

We have been interested in the topic of alternative energy since the first wind power station was built in our region. To find out more about it, we met with the architect of the first wind farm in Poland. We also participated in an ecological seminar in Duninowo devoted to the topic of renewable energy in our area. We also learned about some activities of solar and geothermal power stations by meeting their owners. We informed them, as well as the local newspaper, about our activities at school within the field of ecology and tourism.

Ustka is situated on the coast, in the region that has the best parameters concerning wind. It is an excellent location for wind power stations, and the winds blow as much as in Denmark and northern Germany. According to the wind zones into which our country has been divided, it is only our region and the northeast part of Suwalszczyzna that have such advantageous conditions.

Among the countries wanting to join the EU, Poland is the first one to formulate »A Strategy of Development of Renewable Energy«. Our country has also met all the obligations imposed by the EU. It is now the task of our Ministry of Environment to implement this strategy.

In accordance with the instructions of the EU, 8% of electric power produced in Poland by 2005 has to be »white energy«, i.e. coming from renewable sources such as wind or water power stations. By 2010, the figure should be 12%.

Yesterday

In the past, people in this region obtained energy only by burning pit-coal. With time, a few small water power stations have also been built.

The first information we have about wind turbines comes from the 18th century. They were single wind power stations used for driving wind turbines to grind grain in order to obtain flour.

In the 1980's near Darlowo, at Kopan Lake and in Zarnowiec, plans were made to build a nuclear power station. Construction began in Zarnowiec and work rapidly progressed. In Darlowo, this led to the creation of the first Citizen Committee in Poland, also known as "The Watch", which organised a huge protest against

the establishment of the nuclear power station. The protest was a success and construction work was halted. Since that time ecological seminars have been organised every two years in Darlowo. Where the nuclear power station was intended to have been built, wind turbines are now being constructed!

The decision about the location was preceded by two years of research on wind strength in the entire region. Positive results confirmed the profitability of wind power stations and enabled the National Environment Protection Fund to allocate favourable credits. This attracted investors, who purchased the land in the area for the purpose of building power stations there.

It took quite some time to convince the local authorities of the benefits of investment. Their decision was partly influenced by the possibility to employ local people in the construction of the plant as well as in the work connected with laying electricity cables in the ground. These would be additional workplaces.

Finally, in April 1999, in Cisowo, a small place about 35 km from Ustka, the first wind farm in Poland was built. It consisted of five wind power stations.

Today

At present, most Polish wind power stations are located in our region. It is still the biggest cluster of wind power stations in Poland. In Cisowo, four more mills have now been erected, while a few kilometres away, another farm consisting of seven power stations has been built.

Unfortunately, wind power stations in Poland still have very limited application. This is due partly to the extremely high cost of building them and partly to the defective regulations currently in force in Poland. These are the main reasons why the power stations are on the verge of bankruptcy, as electricity companies do not buy electricity from the mills. Therefore, foreign companies ready to invest in power stations in Poland are hesitant to carry through with their plans.

Tomorrow

If new regulations do not deter foreign companies, then over 100 wind power stations with 2,000 turbines will be built in our municipality along the entire Polish coast. They will be farms composed of a few wind turbines, situated 500-600 m away from residential areas.

These farms will take into account bird routes and will also be a safe distance from National Parks.

Tourist route

Over the years a change in the local people's attitude towards the power stations has been observed. Initially, they were hostile to them, claiming that they would disturb and alter the landscape, make considerable noise, and scare away holiday-makers.

Will there be more than 100 mills here in the future? Wind turbines in Cisowo 2002

With new technology, the noise created by the wings of the mills has become less troublesome. It has also turned out that the stations do not scare tourists away; on the contrary, they attract them. There is even a tourist route called the »Wind power stations' route« in the area.

However, as long as our regulations discourage the purchase of energy from alternative power stations, it is difficult to talk about profitability.

In connection with the date when our country will join the EU, there is hope that the issue will soon be resolved.

Ustka students present their research on wind turbines at the »On the Threshold - Baltic 21« conference in Sønderborg, June 2000

Transport: Exhaust Fumes – Research on Traffic Pollution

By Anda Deksne, Latvia

In our school every secondary-level student is required to choose and complete a research paper during the three years of their studies. Students are free to choose the theme of the paper, with many choosing environmental–related themes.

The research paper in question had been completed as an extracurricular project in the students' free time. The research was carried out during one academic year by two secondary school students, Liga Birsa and Valdis Celmins.

Before embarking on the research work, the students gathered basic information (in biology and chemistry lessons) on air contents and air pollutants, as well as the problems of air quality.

Of course, more information was needed, and thus the students did a detailed study of reference literature on air quality, as well as on the

Students measuring exhaust fumes

contents of exhaust fumes and their harmful influence on the environment and all living organisms.

The objective was to perform experiments aimed at measuring the contents of harmful substances in the exhaust fumes of cars of various ages and countries of manufacture.

In the experimental part of the paper, the students measured the concentration of carbon monoxide (CO) and non–reduced hydrocarbons in exhaust fumes. To complete this task, they went to the technical inspection centre of the Road and Traffic Safety Department.

The investigation showed that the contents of the exhaust fumes is not dependent on the car`s age, but on the petrol feeder`s adjustment. About 4-9% of cars fail the test, which applies to cars of various ages (years of manufacture 1980 – 1990).

The students also attempted to measure the amount of hard particles in exhaust fumes. For this purpose they constructed a special 'device' – consisting of a vacuum cleaner, a paper filter, a Bihner funnel and a pipe connected to the car`s exhaust pipe.

The chosen cars were run for five minutes at a low revolution rate (idle run). With the help of the vacuum cleaner, the fumes were pumped through the filter, where the hard particles were absorbed. After filtration, each filter was weighed. The result showed that every car in five minutes emits 50–700 mg of hard particles. The amount of hard particles depends on the car`s age and make, and whether the has a catalytic converter or not.

The research group students involved several junior pupils in their investigation work. They helped in counting cars, for the purpose of estimating the traffic load at the major junctions of the local town Rujiena. They counted the cars from 7 am to 7 pm. The calculation shows that the number of vehicles passing a junction reaches 1,500 – 2,300 in 12 hours.

One part of the project was a public poll on air pollution. 78% of the pollees were concerned about the air pollution and considered it as a serious problem in the rural areas. The major polluters in Rujiena were considered to be traffic and the local boiler houses.

The students took more delight in the practical part of the research than in the literature study and the result analysis. However, it was a rewarding job, because the project group could present their work to their school peers, as well as take part in a nationwide competition.

The problem was that not all owners were responsive and willing to take part in the exhaust fume test with their vehicle, because it was necessary to have free access to the electricity source in order to operate the vacuum cleaner.

From Words to Action
"So Was" helps us sort the waste

By Urmas Tokko, Estonia

Tartu Tamme Gümnasium is the biggest school in terms of pupils and staff in the city of Tartu – with about 1,300 pupils from grades 1-12 and 100 members of staff. Altogether, we have more than 50 rooms in the school building.

Naturally, different kinds of paper products make up the main waste in a school. Therefore, sorting waste into at least two groups is extremely real and natural in Estonia at the moment. "This may be a good and simple beginning, but it is not enough," we thought when we started the project. School is the most suitable place for this kind of beginning: pupils, as future citizens of the world, should be taught about the importance of the environment from an early stage. The environmental awareness of pupils will influence families and eventually other enterprises, such as the parents' workplaces.

The slogans "From Words to Action" and "Think Globally, Act Locally" should have a real meaning!

Students from Form 11B, a special natural sciences class, were the main participants in this project. Financial support was applied for from the SAS & Coca-Cola Environmental Foundation and also through a project competition on sustainable development called "Keep the city clean", organised by Tartu Municipality.

Our local decision-makers found our idea

Sort your waste, please: Mixed waste (green label), Papers only (red label) and Plastics only (blue label)

"Did you remember to turn off the tap?"

worthwhile implementing and they gave us a project budget of approximately 1700 Euros. Not much, but a start.
With this money we now have three different bins in every classroom and public room in the large school building. Each bin is labelled with a clear message in a coloured label that the students designed using a special computer program.

We also learnt about how to sort garbage, and we also made an attractive information stand for our fellow pupils.

The sticky labels were ordered via the Internet from Tallinn, and were sent to us through the post: Modern society! In addition to the labels for rubbish bins, we have now placed information labels around the school to raise people's awareness: "Did you leave the lights on?" and "Consume rationally!" to mention two.

Thus, investment into environmentally-friendly management of waste and rubbish was combined with education for sustainability of pupils and grown-ups connected to the school.

We had a rather funny problem getting the right boxes. As we needed more than 160 boxes in different colours, no store had these all in stock. So we ordered the boxes from the Netherlands through an Estonian firm, but at first we got boxes that were twice the size! We eventually got the right-sized boxes, but the colour was not what we had been expecting. The students pointed out that the colours should be in harmony with the colours painted on the walls, and that as red might attract more attention, it should be used for the most frequent type of waste.

As a preliminary result of the project, we can mention both positive and negative things. In terms of feedback from room cleaners, we are glad they that they have not complained about the additional work for them (More rubbish bins!). Our teachers and pupils are generally satisfied and pleased about the "new" situation, and teachers are happy to educate pupils on how to sort waste in their regular lessons.

We have as yet not noticed any intentional incorrect sorting of waste.

Nevertheless:

1. Quite a lot of mixing still takes place. We think this is due to both carelessness and the normal hustle and bustle of school life. Therefore, more effort should be made to educate pupils.
2. The big outdoor containers next to the school building are being used also by local people. They just throw their waste into the

school's containers no matter where they happen to be.
3. Our plastic boxes are perhaps not solid enough for the number of youngsters using them.

Still, we think we have made a good start in our efforts to promote a more sustainable development! We also think our efforts are the first of their kind in Estonian schools.

Why "So Was"?

The title can be understood in at least two different ways.

First, it can be "So it was" – with the sentence marking people's indifferent attitude to environmental problems in the past. The sentence also embraces the widely-held view of individuals that "I personally can't do anything in that field". This way the title of the project is an optimistic glance into the future, where we pay more attention to environmental problems and our attitude towards them.

Second, the words "So" and "Was" mark the beginning of the English words 'SOrting' and 'WASte'.

The title thus gives a direct indication of the content of the project.

In addition, "So Was" has a meaning in German, where "NA SO WAS!" would typically be said to express surprise. SO WAS is something extraordinary, adorable, amazing or unbelievable.

The title thus asks a question which addresses a number of dilemmas under discussion nowadays. For example, does sorting waste into different dustbins cause less damage than by NOT sorting waste? We believe so. Mixed garbage is taken to the local dump. But if sorted, paper is taken to a paper factory in Tallinn, and plastic to a firm in Tallinn, where foreign companies buy it as a resource material for producing another form of plastic!

Paper and plastic for recycling in their separate containers

Chapter 6

From Local to Global

Agenda 21 NOW! International Internet Conference

The "Agenda 21 NOW!" story

By Martin Jarrath, Germany

This is the story of the "Agenda 21 NOW!" International Internet Conference, a joint initiative of Anna-Schmidt School, Frankfurt am Main, and Kandel Comprehensive School, Germany

The story begins in 1996 when the Internet started to noticeably reach schools in Germany and elsewhere. Schools started to connect to the Internet and a wealth of new possibilities was offered for lessons in all subjects. But what about the content?

The idea

The idea for "Agenda 21 NOW!" comes out of a network. It emerged during the annual German UNESCO ASPnet schools meeting in September 1998, when school representatives discussed ideas for an action day on education for sustainability in 2000. We decided to introduce the Internet as a useful means of communication for educational purposes.

The main ideas were:

- To focus on the contents, not on the technical aspect
- To combine the new technical possibilities with traditional methods of intercultural learning: give students the opportunity to come into personal contact with students from other countries and communicate on certain topics for a certain period of time
- To do something with a long-lasting effect
- To make use of the existing networks we are a

part of, i.e. the UNESCO ASPnet and the Baltic Sea Project.

Step one: Title

The title should be a worldwide call for participation in the Agenda 21 process, to make the goals of the Agenda 21 come true. This led to the term "Agenda 21 NOW!".

Step two: Basics

We wanted every participant to be able to find out easily who he/she was having a discussion with. We wanted this information to be reliable and to avoid misuse of personal data.

We wanted high-quality discussions among well-prepared participants. Hence, we had to provide a website where the participants would find materials and linked sites for their preparatory work during school lessons and elsewhere.

We wanted easy-to-follow, yet serious discussions. This led to the idea that contributions should be content-related: At any time it should be possible to see logical connections between the contributions; for example, which answer belongs to which question.

We wanted the participants to feel safe and confident in the conference. Therefore, the conference is open for registered participants only and for a limited time only.

We wanted easy access: Students from all over the world should be able to participate, provided they have access to an Internet computer somewhere, be it at school, at home, at a friend's house or in an Internet café.

Last but not least, we wanted students from all countries to be able to fully participate in all parts of the conference regardless of computer equipment and age of modems. This excludes, for example, video conferences. A demand for modern equipment would exclude many schools, especially in poorer countries, and deepen the digital gap.

Step three: Preparing a conference

In preparation of the conference, we needed a nicely-designed website that invited teachers and students from all over the world to participate. The website should clearly announce the place, date, time and theme of the Internet conference, it should provide materials for the teachers and students to prepare for the conference, and it should contain links to websites with conference-related information.

During the conference itself we made available virtual Internet conference rooms with a content-related order of written contributions. One click on the author's name should show the most important data of the author - name, age, town, country, e-mail-address, etc. This allows contacts and further discussions among the

Teachers supervise and students work as moderators

participants, also after the conference.

Through the use of PHP communication software, we could offer participants real-time communication – with spontaneous questions and answers. We considered this to be highly attractive to the young people, and a very skilled upper secondary student, Thomas Detsch, created this PHP communication software according to our expressed needs.

Step four: Finalising the structure

We wanted the structure to be that of an ordinary conference:

It must have a specific date, and a specific but limited duration. As regards duration, 24 hours was chosen to allow students around the globe to discuss at a local time of the day, and e-mails in advance enabled registration and information to be given beforehand.

On registering for the conference each participant receives a password and can enter any of the conference rooms after passing the gate.

Each conference room has a moderator, who has been specially prepared for the task.

The discussions take place in real-time, with a new contribution visible to all participants in the same conference room only seconds after it has been posted.

The conference allows participants to take part in several discussions at a time.

Step five: How to find participants

E-mail announcements to schools within the ASP and BSP networks spread the information effectively, and from these two networks the information is distributed worldwide.

Step six: The operational team

The preparatory team designs the website, writes editorials, makes texts and pictures and establishes contacts to newspapers, radio and television.

Step seven: Waiting for registrations

The registration period starts approx. three months before the conference. The number of registrations per day is usually very low in the beginning– which concerned us enormously at first – and then increases to reach a maximum on the day of the conference itself. All registrations are manually checked to avoid misuse.

Step eight: Moderators

Moderators (upper secondary students) work during the conference by asking questions to start discussions, by possibly changing the direction of a discussion, and by politely asking participants to follow the rules when necessary. Teachers assist as supervisors when help is needed. E-mails are co-ordinated and distributed so that moderators do not have to check e-mails themselves during the conference.

A technically-skilled upper secondary student serves as webmaster in case technical problems occur. A catering team, a task force and a security team provide all the necessary services, such as food, tools from the nearest computer store, and protection of the hard-working moderators from the crowd during the conference.

Experiences

The first conference took place in June 2000: The conference team in Frankfurt am Main, at Anna-Schmidt School, was extremely excited when the time for the opening drew near. The conference started on time at 00:00 U.T.C. (2 am in Frankfurt). And it worked! A number of participants in different corners of the world had seemingly been waiting for this beginning, and we witnessed an hour of good discussions

with many people. It was really fascinating!

In the early morning a severe thunderstorm cut us off from e-mails for a couple of hours and damaged the computer system in our school. We were forced to continue the moderation of the conference with two laptop computers. Imagine four moderators sharing two small computers! This continued for three or four hours until the technical problem could fortunately be solved. For a while though, the situation looked technically very disappointing.

Fortunately, our webserver was situated in England, and the conference itself was therefore not affected. The only problem was that in Frankfurt we were more or less prevented from taking part. Once technically reinstalled, we found that the discussions had continued beautifully in the meantime, even without or with just a few moderators involved. Nevertheless, we then had a pleasant time with interesting discussions during the rest of the afternoon, cooling down in the evening. The team was extremely motivated, the co-operation during the 24 hours was excellent, and the conference was real fun for all of us.

Lessons learnt from the first conference in 2000

Apparently, it was attractive for students from all over the world to log into discussions with others about a topic of relevance to their future. We had many hours of interesting discussions.

The Internet conference gave students of countries such as Uganda the opportunity to – for the first time in their lives, as they wrote – come in contact with students from other countries!

A wonderful and highly motivated team of about 50 students and teachers had run the conference for 24 hours, sometimes faced with serious technical problems (thunderstorm damage), but able to ensure that at all times there had been a conference.

Moderators were important for the discussions, encouraging others to make a contribution, setting focus on important aspects, changing the direction of a discussion, and, on one occasion, politely asking somebody to follow the rules.

The quality of the discussions was mixed: Many were interesting, some even very intense. But there were also others that were not very serious and of poor quality. The best discussions emerged when talking about a concrete problem, or a special situation that encouraged different opinions. The improvement of the discussion quality was considered as one of the major challenges for the next conference(s).

Technically, the virtual Internet server we had was inadequate for the demands of such a conference. Moreover, such a conference server urgently needs a shield against Internet attacks. There are always people on the Internet who try to digitally attack such a conference, for example by so-called Denial-of-Service-Attacks, which might totally block the conference server.

Agenda 21 NOW! 2001 – 2003: Ways to improve the conference

Since 5 June 2000, Agenda 21 NOW! has taken place three more times, once every year.

Professional IT support

Information about our Internet conference has been spread worldwide. Hence, our conference is a target for hackers who try to digitally attack our Internet server. Since our second conference on 22 March 2001, CEMA AG, an IT company from Mannheim, Germany, has hosted our conference on a stand-alone physical server using

state-of-the-art security technology. Nearly 4,500 attacks, reaching a maximum of 86 per second during the conference on 3 April 2003, have proven the necessity of such professional support. It would really be feasible to set up such technology in a school; it requires specialists from an IT company!

The co-operation with CEMA AG has simply been excellent. You could very well say that the people from CEMA AG have become members of the Agenda 21 NOW! team!

Moderator training

The quality of a discussion is to some extent dependent on the quality of the moderation. Moderators need to be prepared, and since our second conference we have asked all moderators to attend a short theoretical and practical training course in moderation one or two weeks before the conference.

Who should the website be for?

For students? For teachers? The first conference gave a clear answer: for teachers. It is the teachers who have to be attracted by our e-mail-announcements and encouraged to take a look at our website. If they consider our website to be interesting (and attractive) – we know such decisions are often made within seconds – they may decide to work on Agenda 21 NOW! topics with their students in one of their courses. There is strong evidence to suggest that most registrations are made because a teacher has told his/her students to do so. To make a website for students would mean creating a totally different design and presenting the con-

The 2001 theme was Water

tents in a totally different way. It is a good question whether this could really work, whether topics dealing with sustainability and Agenda 21 could in general be so attractive that many students would deal with them in their leisure time totally voluntarily and without any special recommendation by a teacher.

This shows the important role of teachers in times of IT and modern media. Furthermore, teachers are multipliers, moderators of learning processes, and the ones who choose and introduce (new) topics into a learning process – or not, as the case may be.

Experts

It is nice to experience so many people from so many different countries having intense discussions together. We thought it might be even nicer – and more interesting! – to additionally have experts talking to the students in the Internet conference rooms. Experts – if well known locally or even internationally – might attract more people to take a look at our conference or to take part. And their contributions in the discussions have notably enriched the discussions. One of the experts of the 2002 conference was Prof. Bert Bolin, professor of meteorology at the University of Stockholm, former chairman of the International Panel on Climate Change (IPCC) and author of the introductory article in the BSP Learners' Guide "Air Quality". Since the third conference on 25 April 2002, participants have had the opportunity to discuss with several international experts during the conference.

The conference theme

"Agenda 21 NOW!" is the title of our project, and since Agenda 21 is such a huge plan of action, we have decided to focus on selected aspects in every conference. Therefore, each conference is devoted to a special theme.

A catering team of students provide the necessary food, and also wash the dishes

In 2001, the theme was "Water", as the conference took place on World Water Day, 22 March. In 2002, it was "Floods and Deserts", focusing on the probable or possible effects of global warming. Both these themes, looking at the number of participants, were well accepted: 1200+ participants in 2001, 1900+ in 2002. In 2003, the theme was an experiment: "Borders and Diversity – Can we live together sustainably in a globalising world?" Borders between countries and inside countries, maybe even in our heads, still exist world-wide, on all continents. How can we respect each other, respect the diversity of human culture and maintain peace in a globalising world?

The total number of participants (1500+) was lower than in 2002, but all moderators considered the quality of the discussion contributions notably better than the year before. The conference on 3 April 2003 took place during

the war in Iraq, and our conference room "Peace after War" about the consequences of this war was by far the most frequented conference room of the entire conference.

Expansion and co-operation

At the 2003 conference, the growing Agenda 21 NOW! team consisted of about 70 teachers and students from two schools situated in two rather different places (about 150 km apart). The co-operation has been enriching for both the people from Frankfurt and from Kandel. The two schools are not competing but genuinely co-operating as one team.

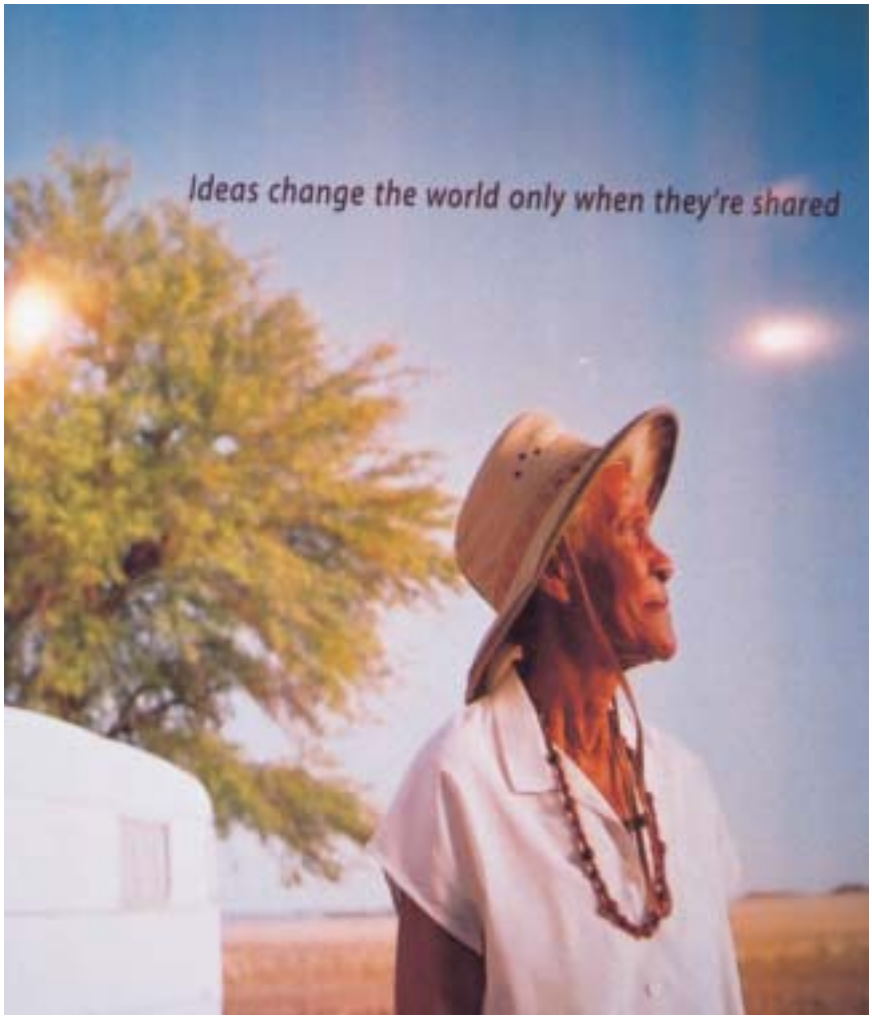
Does the Agenda 21 NOW! Internet conference reach its goals?

We have seen that a considerable number of participants have taken part repeatedly in our conference. There are schools which have been with us in all four conferences. We think – and hope! – that Agenda 21 NOW! is being considered as an interesting way to make use of the new possibilities of the Internet in lessons of non-technical subjects, such as English, social science, geography, biology, history and others. This way we hope to accomplish our goal that action moves from local to regional to global!

Agenda 21 NOW! started as an experiment; an example in extremely easy content-orientated international co-operation using modern media. Apart from anything else you might say about Agenda 21 NOW!, we hope that to most participants it has been what it has truly been to us, the Agenda 21 NOW! team:

- a lot of work
- a lot of fun
- a continuous opportunity to learn from and about others!

Therefore, the story will be continued.



Ideas change the world only when they're shared. Poster at World Summit, Johannesburg, 2002

Appendix I

Thematic Workshops on Baltic 21 Sectors - a list of instructors and participating schools

Sustainable Agriculture: Healthy Food/Novel Food

Instructors:
Mette Frølund, teacher of biology and chemistry
Køge Gymnasium, Gymnasievej 4,
DK-4600 Køge

Bjarne Nielsen, teacher of biology
and physical education
Contact e-mail: MetteBjarne@vip.cybercity.dk

Participants from the following schools and authorities:
- Estonia: Kohtla-Järve Grammar School, Tallinn Lilleküla Gümnasium, Tartu Nature House, Viljandi Secondary School
- France: UNESCO Paris
- Germany: Anna-Schmidt-Schule, Frankfurt am Main
- Latvia: Nauksenu Secondary School; Rujiena Secondary School; Vecpiebalga Regional Country Gymnasium
- Lithuania: Jonuciai Secondary School; Sitkunai Basic School
- Poland: II Liceum Katowice; Liceum No. 1, Krakow; III Liceum Glogow; Szkola Podstawowa No. 23, Wloclawek
- Sweden: Soltorgs Gymnasiet, Borlänge; Haraldsbo Gymnasiet, Falun; Gripenskolan, Nyköping
- St. Lucia: UNESCO Caribbean Sea Project
- Malawi: UNESCO Zambezi River Project

Spatial Planning: Biodiversity and Green Areas

Instructor Bo Jonø, project adviser
Græskobbel 5 DK-6440 Augustenborg, Denmark
Contact e-mail: Bo@Jonoe.dk
Website: www.jonoe.dk – Visit Baltic 21 for further conference information

Participants from the following schools and authorities:
- Denmark: Sønderskovskolen, Sønderborg; Gedser Naturskole
- Estonia: Tallinn Lilleküla Gümnasium; Uulu Basic School; Viljandi Municipality; Vinni Pajusta Secondary School, Virumaa
- Finland: Simon lukio
- Latvia: Riga School No. 49
- Russia: Junior Ecological Centre of Kirovsky, St. Petersburg
- Spain: UNESCO West Mediterranean Sea Project, Valencia
- Sweden: Norrevångsskolan, Eslöv; Saltsjöbaden, Stockholm

Sustainable Energy: Energy for the Next Millenium

Instructors:
Kim Maron, teacher of biology, chemistry and technology
Amtsgymnasiet i Sønderborg, Grundtvigs Alle 86,
DK-6400 Sønderborg, Denmark
Contact e-mail: KM@amtsgym-sdbg.dk

Mogens Winther, teacher of astronomy, physics and maths
Amtsgymnasiet i Sønderborg, Grundtvigs Alle 86,
DK-6400 Sønderborg, Denmark
Contact e-mail: MW@amtsgym-sdbg.dk

Participants from the following schools and authorities:
- Denmark: Bodilsker Skole, Nexø
- Finland: Meri-Porin lukio, Pori; Pedersöre Gymnasium; Otava Folk High School; Helsingin Luonnontiede lukio
- Latvia: Rujiena Secondary School; Ilgociema Secondary School, Riga
- Lithuania: Klaipeda Tailors School
- Poland: Zespol Szkol No. 1, Gdansk; I Liceum, Krakow; III Liceum, Glogow
- Russia: School No. 9, Gatchina; Kolpino School
- Sweden: Falun Municipality; Hjalmar Lundbohmsskolan, Kiruna; Soltorgs Gymnasiet, Borlänge

Baltic 21 Overall Goals: Environmental Theatre

Instructors:
Inge Brink, teacher of drama, French
and physical education
Amtsgymnasiet i Sønderborg, Grundtvigs Alle 86,

DK-6400 Sønderborg Denmark
Contact e-mail: IN@amtsgym-sdbg.dk

Tom Hansen, teacher of art and drama
Sønderskovskolen, Grundtvigs Alle 100, DK-6400 Sønderborg, Denmark
Contact e-mail: TH@soenderskov-skolen.dk

Participants from the following schools and authorities:
- Bulgaria: UNESCO Blue Danube River Project
- Denmark: Bodilsker Skole, Nexø; Sønderborg Municipality
- Estonia: Kohtla Järve Municipality; Kohtla Järve Grammar School; Lihula Gymnasium
- Germany: Anna-Schmidt-Schule, Frankfurt am Main
- Latvia: Salacgrieva Secondary School; Riga Secondary School No. 66; Limbazi Secondary School
- Lithuania: Klaipeda Tailors School; Klaipeda Construction School; Jonuciai Secondary School
- Poland: II Liceum Katowice; Szkola Podstawowa No. 3, Ustka; Zespol Szkol No. 6, Gdansk; III Liceum Glogow
- Russia: School No. 9, Gatchina; Kaliningrad Eco-centre; School No. 179, St. Petersburg

Sustainable Tourism: Is Tourism Sustainable on AIs?

Instructors:
Hannah Ørnsholt Ring, teacher of biology and chemistry
Køge Gymnasium, Gymnasievej 4,
DK-4600 Køge, Denmark
Contact e-mail: Hannahnas@yahoo.dk

Dr. Gillian Cambers
University of Puerto Rico, P.O. Box 9011,
Mayaguez, Puerto Rico 00681
Contact e-mail: g_cambers@rumac.uprm.edu

Participants from the following schools and authorities:
- Bulgaria: UNESCO Blue Danube River Project
- Denmark: Sønderborg Municipality; Struer Gymnasium
- Estonia: Lihula Gümnasium
- Finland: Meri-Porin lukio, Pori; Langinkosken lukio, Kotka
- France: UNESCO Paris
- Georgia: Tbilisi Classical Gymnasium
- Latvia: Vecpiebalga Regional Country Gymnasium; Liepaja Secondary School No. 10; Lielvarde Secondary School
- Lithuania: J. Luksa Gymnasium, Kaunas; Lapes Basic School
- Spain: Colegio Mare De Deu Del Carmen
- Poland: Glogow Municipality; Zespol Szkol No. 6, Gdansk
- Russia: School No. 9, Gatchina
- Slovenia: Osnovna sola Cirila Kosmaca, Piran; Gimnasio Gian Rinaldo Carli Koper, Koper
- Sweden: Gripenskolan, Nyköping; Chapmanskolan, Karlskrona; Nynäshamn Gymnasium, Nacka Gymnasium; Skolverket, Stockholm
- St. Lucia: UNESCO Caribbean Sea Project

Baltic 21 Overall Goals: Conceptual Art and Design

Instructor:
Søren Møller, teacher of art and design
Amtsgymnasiet i Sønderborg, Grundtvigs Alle 86, DK-6400 Sønderborg, Denmark
Contact e-mail: SM@amtsgym-sdbg.dk

Participants from the following schools and authorities:
- Denmark: Amtsgymnasiet i Sønderborg; Bodilsker Skole, Nexø; Ministry of Education, Copenhagen
- Estonia: Tartu Nature House
- Finland: Kotka Municipality; Helsingin Luonnontiede lukio, Helsinki
- Germany: Anna-Schmidt-Schule, Frankfurt am Main
- Latvia: Northern Vidzeme Biosphere Reserve, Salacgreiva; Liepaja Secondary School No. 10
- Lithuania: Klaipeda Tailors School
- Poland: I Liceum Krakow; II Liceum Katowice
- Sweden: Nynäshamn Gymnasium; Skolverket, Stockholm

Sustainable Agriculture, Forestry, Spatial Planning - Restoration of Natural Habitats

Instructors:
Knud Johnsen, teacher of biology and geography
Rungsted Gymnasium, Stadion Alle 14,
DK-2960 Rungsted Kyst, Denmark
Contact via website: www.rungsted-gym.dk

Peter Uhl, teacher of biology
Esrum Møllegård, Klostergade 12, Esrum,
DK-3230 Græsted
Contact e-mail: Peter@esrum.dk

Participants from the following schools and authorities:
- Denmark: Amtsgymnasiet i Sønderborg
- Estonia: Nature House, Tallinn; REC Estonia
- Finland: Helsingin Luonnontiede lukio, Helsinki; Simon lukio; Meri-Porin lukio, Pori; Langinkosken lukio, Kotka
- Germany: Anna-Schmidt-Schule, Frankfurt am Main
- Latvia: Limbazi Secondary School No. 1; Northern Vidzeme Biosphere Reserve, Salacgrieva
- Lithuania: Vytautas Didysis Gymnasium, Kaunas; J. Luksa Gymnasium, Kaunas
- Poland: Dep. of Environmental Protection; II Liceum Katowice
- Russia: Junior Ecological Centre, St. Petersburg
- Sweden: Haraldsbo Gymnasium, Falun; Gripenskolan, Nyköping

Sustainable Fisheries - The Baltic Sea for Food?

Instructors:
Hans Jørgen Bruun Olesen, teacher of biology
Esbjerg Gymnasium, Steengaardsvej 345, DK-6705
Esbjerg Ø, Denmark
Contact e-mail: Hans.Joergen.Bruun.Olesen@skolekom.dk

Kurt Berthelsen Kristensen, NGO representative from "Levende Hav (Oceans Alive)", Denmark
Contact e-mail: llh@levende-hav.dk
www.levendehav.dk

Mikael Himberg, former teacher of fisheries
Finlands fiskeri- och miljöinstitut, Fiskeriskolvägen 72 / Kalakouluntie 72
20 610 Kirjala, Finland
Contact e-mail: Kala@turkuamk.fi
Website: www.kala.turku.fi/english/index/htm

Participants from the following schools and authorities:
- Denmark: Bodilsker Skole, Nexø; Sønderskovsskolen, Sønderborg
- Estonia: Kohtla Järve Grammar School; Tartu Nature House
- Finland: Suomen Kalatalous-ja, Kirjala
- Germany: Anna-Schmidt-Schule, Frankfurt am Main
- Georgia: Tbilisi University, Dept. of Physics: Black Sea extension of SEMEP - South East Mediterranean Project
- Lithuania: J. Luksa Gymnasium, Kaunas
- Poland: Zespol Szkol No. 6, Gdansk
- Slovenia: Osnovna sola Cirila Kosmaca Piran; Gimnasio Gian Rinaldo Carli Koper

Sustainable Forestry - Forest Management and Production

Instructors:
Karin Jepsen, teacher of Danish and biology
Sønderskovskolen, Grundtvigs Alle 100, DK-6400
Sønderborg, Denmark
Contact e-mail: KJ@soenderskov-skolen.dk

Kerstin Lennerstedt, BSP resource person
Småskolevägen 1, S-22 467 Lund, Sweden

Risto Hamari, principal
Langinkosken lukio, Allintie 10, Kotka, Finland
Contact e-mail: risto.hamari@pp1.inet.fi

Participants from the following schools and authorities:
- Denmark: Bodilsker Skole, Nexø; Ministry of Education, Copenhagen
- Estonia: Tallinn Lilleküla Gümnasium
- Finland: Langinkosken lukio, Kotka; National Board of Education, Helsinki
- Germany: Schulzentrum am Heimgarten, Ahrensburg
- Latvia: Ilguciema Secondary School, Riga; Vecpiebalga Regional Country Gymnasium
- Lithuania: Zemyna Gymnasium, Vilnius; Klaipeda Construction School
- Poland: Szkola Podsatwowa No. 3, Ustka; Szkola Podstawowa No. 23, Wloclawek
- Russia: Kolpino School; School No. 476, St. Petersburg; School No. 9, Gatchina; Pskov Bilingual Gymnasium
- St. Lucia: UNESCO Caribbean Sea Project

Baltic 21 Overall Goals: Video Design

Instructor:
Bengt Littorin
Taraxacum Media, Sweden
Contact e-mail: Bengtl@taraxacum.com

Participants from the following schools and authorities:
- Denmark: Bodilsker Skole, Nexø
- Estonia: Lilleküla Gümnasium, Tallinn
- Finland: Helsingin Luonnontiede lukio, Helsinki; Meri-Porin lukio, Pori; Otava Municipality
- Germany: Anna-Schmidt-Schule, Frankfurt am Main

- Lithuania: Lapes Basic School
- Poland: Zespol Szkol No. 6, Gdansk
- Sweden: Nacka Gymnasium; Polhemskolan i Lund

Baltic 21 Overall Goals: Web Design

Instructors:
Niels Bjerre, webmaster of www.bsp-dk.dk (and previously of www.b-s-p.org)
Danmarksgade 16, DK-4874 Gedser, Denmark
Contact e-mail: swb@get2net.dk

Martin Jarrath, teacher of geography, chemistry and computer science
Anna-Schmidt-Schule (member of UNESCO ASPnet),
Gärtnerweg 29, D-60322 Frankfurt am Main, Germany
Contact e-mail: martin@jarrath.de

Participants from the following schools and authorities:
- Estonia: Kohtla Järve Grammar School; C.R. Jacobsens Gymnasium, Viljandi; Lilleküla Gymnaisum, Tallinn
- Latvia: Riga Secondary School No. 49
- Lithuania: Klaipeda Tailors School; Kaunas Anima Basic School
- Poland: Zespol Szkol No. 6, Gdansk
- Sweden: Polhemskolan i Lund; Gripenskolan, Nyköping; Nynäshamn Gymnasium

Sustainable Agriculture, Forestry, Industry - Environment Has a History!

Instructors:
Christian Bo Bojesen, teacher of history, latin and classical education
Amtsgymnasiet i Sønderborg, Grundtvigs Alle 86,
DK-6400 Sønderborg, Denmark
Contact e-mail: CB@amtsgym-sdbg.dk

Niels Kornum, teacher of biology and physical education
Amtsgymnasiet i Sønderborg, Grundtvigs Alle 86,
DK-6400 Sønderborg, Denmark
Contact e-mail: NK@amtsgym-sdbg.dk

Dr. Per Eliasson, environmental history co-ordinator
Lärarutbildningen Malmö högskola, Malmö, Sweden
Contact e-mail: per.eliasson@lut.mah.se

Participants from the following schools and authorities:
- Estonia: Tartu Nature House; Tallinn Lilleküla Gümnasium
- Finland: Pedersöre Gymnasium; Otava Folk High School; Langinkosken lukio, Kotka; Ministry of Education, Helsinki
- Germany: Frankfurt am Main Municipality; UNESCO Germany
- Latvia: Carl Bro Ltd. Environment Consulate; Lielvärde Secondary School
- Lithuania: Kaunas Anima Basic School; Klaipeda Tailors School; Klaipeda Construction School; Azuolas Secondary School, Varena
- Poland: I Liceum, Krakow; II Liceum Katowice
- Russia: Kolpino School; School No. 179, St. Petersburg; Kaliningrad Eco-centre
- Sweden: Chapmanskolan, Täby; Haraldsbogymnasiet, Falun; Hjalmar Lundbomskolan, Kiruna; Norrevångsskolan, Lund; Gripenskolan, Nyköping

Sustainable Industry - From Resource to Product to Rusty Heaps - or?

Instructors:
Dan Sterup, teacher of Danish and biology
Bodilsker Skole, Pederskervejen 11, DK-3730 Nexø,
Denmark (resigned in 2001)
Contact e-mail: dansterup@get2net.dk or
Bodilsker.Skole@Nexo.dk

Per Werge, teacher of history and geography
Nykøbing Falster Katedralskole, Poul Martin Møllersvej,
DK-4800 Nykøbing Falster, Denmark
Contact e-mail: PW@Nykat-gym.dk

Participants from the following schools and authorities:
- Denmark: Bodilsker Skole, Nexø; Ministry of Education, Copenhagen
- Finland: Puolalanmäen yläaste ja lukio; Pori Municipality
- Great Britain: Luton Sixth Form College, Bedfordshire
- Latvia: Ilguciema Secondary School, Riga; Valmiera Gymnaisum
- Lithuania: J. Luksa Gymnasium, Kaunas
- Malta: Carlo Diacong Junior Lyceum
- Poland: Gdansk Municipality; Glogow Municipality; III Liceum Glogow
- Russia: Kolpino School

Appendix II

ACKNOWLEDGEMENTS

Photos:

Page 4 Jan Zimmermann, Denmark
Page 4 Participant in the World Summit on Sustainable Development
Page 49 Charlotte Haslund-Christensen, CARE Danmark
Page 53 Ole Malling, Denmark
Page 54, 58, 66 ,67, 73, 76, 79, 83, 84, 85, 101, 104, 116, 117, 118, 119, 124, 137 Birthe Zimmermann, Denmark
Page 55 Birgit Kristensen, Denmark
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Page 60, 61, 70, 72, 80, 81 BSP workshop participants
Page 62, 68 Søren Møller, Denmark
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Page 71, 110, 111, 112 Risto Hamari, Finland
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Page 108, 109 Mall Schmidt, Estonia
Page 114 Danuta Madroszkieiwcz, Poland
Page 120 Mats Lindfors, Sweden
Page 122, 123 Teresa Kaminska, Poland
Page 125 Anda Deksne, Latvia
Page 127, 128, 129 Urmas Tokko, Estonia
Page 131, 134 Walter Koser, Germany
Page 135 Ute Grönwoldt, Germany

Drawings:

Page 1 Liis Laugas, Estonia
Page 6 Zane Zardina, Latvia
Page 11 Alex Tulina, Russia
Page 12 Pierre Geisler, Germany
Page 13 Benjamin Mühlichen, Germany
Page 14 Malene Priske Meier, Denmark
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Page 41 Aleksandra Pisarska, Poland
Page 47 Pawel Piatek, Poland
Page 57 Andrius Smetona, Lithuania
Page 95 Beoita Joiwis, Poland
Page 100, 102 The Fishery and Maritime Museum, Esbjerg, Denmark
Page 115 Alicja Chyla, Julia Wojciechowska, Malgorzata Bogulecka, Poland
Page 121 Helen Litvinova, Russia

Language editing:

Steven Gardner
Ministry of Foreign Affairs
Asiatisk Plads 2
DK-1171 Copenhagen K
Denmark

Authors and contributors

Elizabeth Khawajkie, International Co-ordinator
Associated Schools Project Network
UNESCO,
7 Place de Fontenoy
75352 Paris 07 SP
France

Andris Mikulis,
Riga Special Secondary School no 66, Latvia

Chapter 1

Compiled from www.baltic21.org by
Birthe Zimmermann, former general
and national BSP co-ordinator
Amtsgymnasiet i Sønderborg, Grundtvigs Alle 86,
DK-6400 Sønderborg, Denmark
Contact e-mail: bz@amtsgym-sdbg.dk
Website: www.amtsgym-sdbg.dk

Chapter 2

Siv Sellin, chairman of working group 1 (schools)
in Baltic 21 Education, former general
and national BSP co-ordinator
National Board of Education, Stockholm, Sweden
Contact e-mail: Siv.Sellin@brevet.nu

Kaisa Lindström, principal, member of working group 3
(non-formal education) in Baltic 21 Education
Otava Folk High School, Otavantie 2,
50670 Otava, Finland
Contact e-mail: kaisa.lindstrom@ofw.fi

Per Eliasson
Lärarutbildningen Malmö högskola,
Malmö, Sweden
Contact e-mail: per.eliasson@lut.mah.se

Chapter 3

Bjarke Larsen, journalist
Presto, Blegen 11,
DK-6400 Sønderborg, Denmark
Contact e-mail: BL@Pressto.dk

Christina Jakobsson, former general secretary
Baltic 21 Secretariat,
S-103 33 Stockholm, Sweden
Contact e-mail: Christine.Jakobsson@baltinfo.org
Website: www.baltic21.org

Jens-Otto Andersen, visiting assistant professor
Royal Danish Veterinary and Agricultural School,
Bülowsvej 17,
DK-1870 Frederiksberg C, Denmark
Contact e-mail: joa@kvl.dk
Website: www.kvl.dk

Peter Laut, professor
Technical University of Denmark, Building 376,
DK-2800 Lyngby, Denmark
Contact e-mail: Peter.Laut@dtu.dk
Website: www.dtu.dk
Fig. 3.8 from: JT Kiehl and KE Trenberth 1997 Earth's
Annual Global Mean Energy Budget. Bull. Am. Met.
Society 78-(2) 197-208

Jakob Kjøller, voluntary CARE Danmark member
Danish Refugee Council, Borgergade 10, P.O.Box 53,
DK-1002 Copenhagen V, Denmark
Contact e-mail: Jakob.Kjoeller@drc.dk
Website: www.flygtning.dk

CARE Denmark
Nørrebrogade 68B,
DK-1165 Copenhagen N, Denmark
Contact e-mail: care@care.dk
Website: www.care.dk

Nanna Jordt Jørgensen, former chairman
of "Natur og Ungdom"
Contact e-mail: nannajordt@get2net.dk
Website: www.natur-og-ungdom.dk

Marie Søndergård Larsen
Holstedvej 20, Bolbro,
DK-5200 Odense V, Denmark
Contact e-mail: tunfisk81@hotmail.dk

Dr. Hans Henrik Bruun, senior researcher
Danish Forest and Landscape Research Institute, Hørsholm
Kongevej 11,
DK-2970 Hørsholm, Denmark
Contact e-mail: hhb@fsl.dk

Chapter 4

(see appendix I)

Chapter 5

Niels Madsen, teacher of biology
Esrum Møllegaard, Klostergade 12, Esrum,
DK-3230 Græsted, Denmark
Contact e-mail: niels@esrum.dk

Kaisa Lindström, principal
Otava Folk High School, Otavantie 2,
50670 Otava, Finland
Contact e-mail: Kaisa.Lindstrom@ofw.fi

Franziska Von Gadow
Auguste-Viktoria-Schule, Südergraben 34,
D-24 937 Flensburg, Germany
Contact e-mail: Gadow@foni.net

Indicators listed in »Guidelines,
Indicators for a Local Agenda 21«
(Leitfaden – Indikatoren im Rahmen
einer lokalen Agenda 21)
FEST - Forschungsstätte der Evangelischen
Studiengemeinschaft e.V., Schmeilweg 5,
D-69118 Heidelberg, Germany
Contact e-mail: volker.teichert@fest-heidelberg.de

Anna Figiel, teacher of biology
Nowodworski Secondary School, Krakow, Poland
Contact e-mail: figiel@uci.agh.edu.pl

Sigitas Zudys, principal
Raguva Secondary School, Panevezys region, Lithuania
Contact e-mail: c/o Laima Galkute, LaimaREC@mail.lt

Hans Jørgen Bruun Olesen, teacher of biology,
national BSP co-ordinator
Esbjerg Gymnasium, Steengaardsvej 345,
DK-6705 Esbjerg Ø, Denmark
Contact e-mail: Hans.Joergen.Bruun.Olesen@skolekom.dk
Website: www.e-gym.dk
Website: www.bsp-dk.dk

Mette, Ditte, Bettina, Mie and Regitze, Sabrina, Maiken,
Jannie and Carina
Bodilsker skole, Pederskervejen 11,
DK-3730 Nexø, Denmark
Contact e-mail: Bodilsker.Skole@Nexo.dk

Maria Adamiak and Andrezej Kropidlowski
Zespol Szkol No. 2,
Kolobrzeg, Poland
Contact e-mail: M.adamiak@gazeta.pl

Kaidi Karu, Mari Sarv and Diana Revjako, students
Mall Schmidt, teacher
Kohtla-Järve Gümnasium, Katse 2,
Kohtla-Järve,
30327 Estonia
Contact e-mail: Erala@jarve.edu.ee

Risto Hamari, principal
Langinkosken lukio, Allintie 10,
Kotka, Finland
Contact e-mail: risto.hamari@pp1.inet.fi

Danuta Madroszkieiwcz
III Liceum Ogolnoksztalcace, Ul. Obozowa 3,
67-200 Glogow, Poland
Contact e-mail: danalo3@wp.pl

Dr. Anna Obukhovskaya and Dr. Irina Krichevskaya
School No. 179, Ushinskogo Street 35-11,
St. Petersburg, Russia
Contact e-mail: Pryalukhin@mail.ru

Malin Davelius, Sofie Renemar,
Veronica Gustavsson and Sanna Elstad, Nv2b, students
Susanne Mellvig, teacher
Nacka Gymnasium, Griffelvägen 17,
S-131 40 Nacka, Sweden
Contact e-mail: Susanne.Mellvig@nacka.se
Website: www.nacka.se

Teresa Kaminska, teacher of biology
Junior Secondary Shool No. 1
Ustka, Poland
Contact e-mail: Teresa.Kaminska@wp.pl

Anda Deksne, teacher
Rujiena Secondary School, Riga Street 30,
4240 Latvia
Contact e-mail: Ruja@Valmiera.lanet.lv

Urmas Tokko, teacher of biology and chemistry
Tartu Tamme Gümnasium, Tamme Puiestee 24A,
Tartu, 50404 Estonia
Contact e-mail: tokko@tamme.tartu.ee

Chapter 6

Martin Jarrath, teacher of geography,
chemistry and computer science
Agenda 21 NOW! co-ordinator
Kandel Comprehensive School, Jahnstr. 20,
D-76870 Kandel, Germany
Contact e-mail: martin@jarrath.de
Website: www.agenda21now.org

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CEMA AG Manheim, Germany
Website: www.cema.de

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