

From Vision to Lesson Education for Sustainable Development in Practice

by Leif Östman, Staffan Svanberg and Elisabeth Aaro Östman







Editor in Chief: WWF Sweden

Authors: Leif Östman, Staffan Svanberg and Elisabeth Aaro Östman. For more information, see page 115.

Photos: Photos on pages 1:2, 1: 3, 1: 4, 1: 5 and 1: 7, 19, 30, 37, 61,

68-69, 100-101 and 111 by Germund Sellgren

Photos on pages 7, 31, 42:1, 42:2, 45 and 56 by Elisabeth Aaro Östman

Photos on pages 12:2 and 58:1 by Leif Östman other photos have been taken by Staffan Svanberg

Format and design: Odelius #12455 • odelius.se

Printed at: Norrmalmstryckeriet

Published: 2013 by WWF Sweden

Copyright: WWF and the authors, 2013

All rights reserved

WWF is one of the world's largest and most experienced independent conservation organizations, with over 5 million supporters and a global network active in more than 100 countries.

WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by: conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption.

2 WWF Sweden – Education for Sustainable Development in Practice

TABLE OF CONTENTS

- Foreword Whole school approach
- Background and introduction

Education for sustainable development

Transactive SD teaching

Creating a LORET – a plan for teaching

Results of working with LORET

The pedagogical journey

Teaching methods and exercises

Sustainability approach to education

Authority Governance and Local Owne a model for implementation and disser

Summary

Thank you

APPENDIX

Whole school approach - some summary points

	4
	6
	20
	30
g locally relevant themes	38
	45
	64
	72
	92
rship	
nination	102
	112
	114

113

WHOLE SCHOOL **APPROACH**

Schools engaged in the WWF programme Education for Sustainability are developing best practices in what is called a Whole School Approach in Education for Sustainable Development, ESD. This means that sustainability is guiding all activities and

operations of the schools.

ESD is infused the vision, mission and other policies of the school, it is central in the leadership, structure, management, planning and monitoring, in the teaching and learning, it supports students participation and influence and collaboration with communities. Thereby it involves and builds capacity of all students, teachers, parents and the wider community.

A Whole School Approach in ESD is divided into six themes: School culture and ethos, The school estate, The community, Pupils in the center, Teaching and learning and Monitoring and evaluation. Look at the illustration on page 18 and the appendix on page 114.

When implementing Education for Sustainable Development in local schools, WWF advocates the use of a holistic and sustainable approach in all aspects of teaching and learning. Such an approach must also be integrated into the local curricula. Theory is complemented by action. Although democracy can be taught theoretically, it also needs to be practised in school, so that students understand what it means. Being part of such a process also helps to develop the relevant skills and responsible attitudes.

The whole school approach calls for the active and participatory engagement of students, teachers, other staff at the school, parents and members of the local community. Sustainability must be embedded in all aspects of the school activities. The school grounds should also be a learning area. Maintenance of the school grounds offers good opportunities to learn by doing. The school yard provides opportunities for learning in terms of greening activities, gardening, water harvesting etc. Learning in school should take people's needs into account.

Nature and the local community are also learning areas. Students learn by being actively involved in the sustainable development of their community. This is what WWF calls Whole School Development, which is practised at the many pilot ESD schools supported by WWF. In this book you will find many examples of this approach.

Gunilla Elsässer Head of Unit for Ecological Footprints WWF Sweden



INTRODUCTION

BACKGROUND AND In December 2002, the United Nations General Assembly proclaimed the UN General Assembly proclaimed the UN Decade of Education for Sustainable Development (DESD), 2005-2014. With this proclamation, the Assembly highlighted the role of education as crucial for achieving

> sustainable development. The task of promoting and implementing the Decade was delegated to UNESCO, with its headquarters in Paris.

The importance of education when dealing with SD challenges is obvious. If we take into account that pupils communicate what they have learned in school to their parents and relatives, the estimation is that between 50-70% of a country's population can be reached. Schools are thus important channels for the dissemination of ideas about sustainability.

In this book, the acronym SD stands for sustainable development. The terms sustainability and sustainable development are used synonymously.

50-70%

OF A COUNTRY'S POPULATION CAN BE REACHED THROUGH LEARNING IN SCHOOL

WHAT IS ESD?

Education for Sustainable Development (ESD) has its origins in Environmental Education (EE), but goes far beyond the EE focus on the human-nature relationship. The concept of ESD gained ground as a result of the United Nations Conference on Environment and Development (UNCED), or 'The Earth Summit', held in Rio de Janeiro in 1992. ESD embraces the three dimensions of development that are vital for human survival and the well being of nature: ecological, economic and social/ cultural development. In other words, learners should problematize connections between environmental protection, economic growth and social development, which in turn connect to thematic topics such as natural resources for an increasing (global) population, international understanding, peace, human rights, gender equality, poverty alleviation and cultural diversity. UNESCO's proposed vision of ESD embraces learners of all ages who benefit from formal, non-formal and informal (quality) education and focuses on the values-behaviour-lifestyles that are required for a positive societal transformation and sustainable living for future generations. In Chapter 2 we describe the characteristics of ESD in more detail.

ESD PROJECTS

The Lake Victoria catchment area in East Africa

The countries of Kenya, Tanzania, Rwanda and Uganda are all situated in the huge catchment area of Lake Victoria, the largest lake in Africa and the second largest lake in the world. Some 27 million people live in this catchment area, which has an annual population growth rate of about 6% and a population density of 1200/km² (Kenya 69, Tanzania 44, Rwanda 395, and Uganda 127). 17 major rivers are included in the lake's drainage system. There is an abundance of natural resources in the area, as well as a rich and distinctive biological diversity.

In a socio-economic context, fisheries are important sources of income and supplement the agriculture-based economy. The latter embraces cash crops like tea, coffee, sugar and maize, as well as gardening and livestock production. With an increase in the population and also urbanisation, the reciprocal influence of human-nature requires conscious and joint actions in order to promote sustainable development. The challenges include the over-exploitation of natural resources, increasing poverty, unsustainable agricultural practices, soil erosion and the encroachment of wetlands.





"Some 27 million people live in The Lake Victoria catchment area, which has an annual population growth rate of about 6% and a population density of 1 200/km²."

The Lake Victoria Catchment Environmental Education Programme (LVCEEP) was run in the above-named countries from 2004-2011. The project had the double aim of promoting the conservation of the catchment areas and developing sustainable livelihoods. The key was education and the aim was to empower the catchment schools, communities and regional partners with knowledge, motivation and skills for the sustainable use and management of natural resources. In an educational context, issues like gender equality, human rights, agricultural development, health care and consumption patterns across the four countries fitted in well. LVCEEP was based on capacity building on environmental and sustainability issues in formal and non-formal education, greening initiatives, materials and networking, the involvement of other stakeholders and the efficient monitoring of programme activities. In the second phase of the programme, from 2008-2011, the perspective developed from environmental education (EE) to ESD and a 'whole school approach'. Capacity building workshops were conducted for teachers, school inspectors, district education officers, members of the community and other stakeholders. In formal education, EE and later ESD were integrated in the school curricula of primary and secondary schools. During this second phase, an additional number of schools and communities and a new district took part in the project. By the time the programme ended, a total of 53 schools, 53 outreach schools, five teacher training colleges, 37 community groups and two outreach community groups had

been involved.

In each country, a core-team network of eight members from communities, schools and local governments was formed and received training in EE/ESD methods for spearheading in schools and communities. A Regional Advisory Committee was also formed consisting of stakeholders from the government and NGO sectors in the four countries.



"A WWF programme was initiated in 2004 to safeguard the Mongolian grassland biodiversity by improving the livelihoods of nomadic herders and supporting a more sustainable use of their natural resources."

Mongolia

Mongolia's economy has traditionally been dependent on livestock as a livelihood base. Mongolia was never formally a part of the Soviet Union, but was closely linked to it. As the distribution of Mongolian livestock products was linked to regional Soviet markets, the collapse of the Soviet Union had a negative impact on the livestock industry. This forced many herders into a subsistence lifestyle, making them totally dependent on their herds and more vulnerable to natural conditions affecting their livestock. The dismantling of the herding collectives in 1992 resulted in many independent herders having to take full responsibility for their herds. People from the urban areas who lost their jobs after the collapse of the Soviet Union turned to livestock herding in order to sustain their families. This led to a downward spiral of unsustainable grazing practices. The lack of social security and alternative income opportunities resulted in a dramatic increase in the number of livestock, which led to degradation of the pasturelands.

A WWF programme was initiated in 2004 to safeguard the Mongolian grassland biodiversity by improving the livelihoods of nomadic herders and supporting a more sustainable use of their natural resources. This was achieved by addressing the basic needs of the nomadic herders and providing them with the means, skills and support to create sustainable livelihoods for themselves (Sub-project 1). A formal and nonformal education programme was launched for compulsory schools throughout the country in order to develop a long-term capacity to deal with future environmental and development issues (Sub-project 2).

Traditionally, environmental education (EE) was taught as a separate subject and focused on describing ecological problems rather than coming up with solutions. New national standards/curricula were introduced in 2005 with overarching goals for education that required a holistic approach and close subject integration, and



Black-winged stilt



Royal Bengal tiger

that expected individual schools to develop the local curricula. This opened up for the implementation of ESD. A national network of teacher trainer teams - one team/ aimag – was established, and a regional network of ESD pilot schools was set up in three north-western regions/aimags and in the northern part of Mongolia. (Mongolia has 21 aimags including the capital city of Ulaanbaatar). The main task for the trainer teams was to support the implementation of the national curricula at regional level. A total number of 140 teacher trainers were trained in the programme.

WWF is concerned about conservation and rural development in the north western part of Mongolia. In order to connect these ambitions to formal education, nine pilot schools were established in three aimags. The schools were expected to develop local examples of how the national standards can be implemented locally and to apply the principles of ESD by teaching about sustainability and introducing ESD support structures in all aspects of school life. Moreover, the goal was to develop the schools to become resources for sustainable development in the local community. In addition to a Steering Committee to guide the implementation of the entire programme, a Key Stakeholder group was appointed for each of the sub-components. In the education component, The Key Stakeholder group was composed of representatives from nine ministries and institutions, including the ministries for education and the environment and representatives from universities and teacher training institutions. A core-team was also formed to support the pilot schools.

India

In India the ESD programme is conducted in two regions: the Sunderbans programme that started in 2009 and the Satpuda Mailkal Landscape that started in 2010. The Sunderbans in the Ganges delta is the world's largest mangrove ecosystem. Apart from being a unique mangrove ecosystem, the region supports one of the highest densities of the Royal Bengal Tiger. The delta consists of 102 low-lying islands, of which 48 are inhabited. The human population density is very high and people are very poor. The ecosystems and the communities are under severe pressure when it comes to the availability of natural resources.



"Installations at the schools serve as demonstration sites and are actively used by members of the community."

The Satpuda Maikal Landscape (SML) is situated along the Satpuda and Maikal hill ranges in Central India and stretches from the Melghat Tiger Reserve of Maharashtra to the Achanakmar Wildlife Sanctuary in Chhattisgarh. Most of the landscape is in Madhya Pradesh, which is known to support about 30% of the Indian tiger population. This landscape is part of the central hills region of India and contains some of the best tiger habitats, which means that it is crucial for the long-term survival of the tiger. The area is also known for its immense cultural diversity, and is home to some of India's tribal groups. Many of the communities have strong traditions and a long history related to forests and wildlife. People are still largely dependent on the forest for their livelihoods, either directly through the collection and sale of forest products or indirectly through forest services that support subsistence agriculture. The socio-economic conditions of these communities are extremely poor.

The project seeks to strengthen eight ESD pilot schools by developing a 'whole school approach' to ESD, and to increase awareness in the community about health and sustainability issues. The pilot schools practise school-based community development, i.e. education equips students with skills and knowledge for active participation in community development. At the same time, schools take an active part in the development of the communities. Installations at the schools serve as demonstration sites and are actively used by members of the community. Examples of such installations are herb gardens, vegetable gardens, fishponds, solar cells, water distillation by solar energy, solar cookers, vermin composts, water harvesting, libraries etc.

A series of training sessions on ESD and sustainable livelihood issues, such as composting, fisheries and sustainable small-scale businesses, have been conducted at the schools. In order to achieve outreach and support for the pilot schools, in-service training has also been conducted for the state institution and the DIETS (District Institute of Education Training) related to the eight pilot schools. When training sessions have been conducted at the schools, teachers, students and parents have all taken part.

The Heart of Borneo in Indonesia

ABOUT 30%

OF THE INDIAN TIGER POPULATION IS SUPPORTED BY THE SATPUDA MAIKAL LANDSCAPE IN THE STATES OF MADHYA PRADESH AND CHHATTISGARH

The island of Borneo is divided between three nations - Indonesia, Brunei and Malaysia. The largest part of Borneo, amounting to more than 500,000 km², is called Kalimantan and belongs to Indonesia. Kalimantan is divided into four administrative provinces - the East, North, South and Central Kalimantan. The Indonesian part of Borneo is more than twice the size of Malaysia's territory and almost one hundred times the size of Brunei.

For the last few years, local and international investors have used the natural tropical forests in the 'Heart of Borneo' (HoB) for commercial uses, such as rubber, oil palm and pulp plantations, and consequently destroyed the natural rainforests of Borneo, a vast kingdom of endemic plant and animal species, and especially the threatened orang-utan.





"The Heart of Borneo programme is a political cross-boundary programme that aims to conserve the remaining rainforests and preserve the cultural heritage of the population."

The Heart of Borneo programme is a political cross-boundary programme that aims to conserve the remaining rainforests and preserve the cultural heritage of the population. The Heart of Borneo area comprises a quarter of the island's total landmass. Besides protecting large areas of forests, the initiative is also designed to provide water, ensure food security and support the culture survival of the people in HoB

WWF Indonesia is conducting extensive conservation and rural development programmes in the area. Since 2008, WWF Indonesia has introduced ESD in eight districts of the targeted 10 districts in three provinces of Kalimantan, the Indonesian part of Borneo. The activities began with basic training in ESD for teachers, heads of schools and supervisors in the HoB area. ESD is being developed in three pilot schools in each district and networks of trainers develop the capacities of others. Training undertaken by international consultants includes follow-up training sessions in the districts. The 'whole school approach' to ESD is applied. Five pilot schools in five different districts have been established as resourceor visitor centres, where students can practise their guiding skills. The centres are also developing their library facilities for study and research purposes. The resource centres arrange training courses and other events in order to disseminate information and develop the capacities of youths and other members of the community. Activities are arranged that enrich the knowledge of the local communities and which improve the economy and welfare (improved nutrition, awareness of hygiene, health, organic agriculture development, medicinal plants and

conservation).

The network of trainers expands the understanding and dissemination of ESD. Teachers who have received training have become trainers themselves. Teachers share experiences in Teachers Forums, which are regular meetings of teachers in the sub-districts. They form networks for cooperation and the development of the education. The core-team supports the pilot schools and the trainer teams.

"What is desirable in ESD is that subject knowledge is transformed into applied knowledge."

ESD research

This book is a result of the work outlined above as well as research. In 2012 we visited the schools mentioned in the Foreword in order to collect experiences and gather practical results. These experiences and results have been analysed, and some of the findings are presented in this book. Many schools have been involved in the above mentioned projects. Even though we have not been able to visit them all on our research trips, their work has inspired us when writing this book.

An important background to this book and the projects in which we have been involved is the extensive research that has been carried out in the Institute of Research on Education and Sustainable Development (IRESD), which gathers over 20 researchers and doctoral students.

Sustainability competence and education

One of the main goals of the projects is to help students to learn about environmental, health and sustainability issues. Another goal is to help them to practically apply the knowledge learned. This is a challenge, and the former Minister of Education in Mongolia, Mr. Tsanjid, formulated it for us in a very clear way during a discussion about a project that we were about to start up. He said that even if Mongolian pupils score highly in international tests in mathematics, they are not trained in how to use this knowledge to calculate a sustainable way of living.

What is desirable in ESD is that subject knowledge is transformed into applied knowledge. In this way, the hope is that students and schools can contribute to strengthening and developing sustainability - in terms of ecological, economic and cultural sustainability – in the community. Mr. Tsanjid's advice was to step out of the common framework of schooling, where learned knowledge is bound up with the activities in school, and instead aim for SD competence/SD literacy.

An education that aims for SD competence has to make sure that the students learn:

- 1. Knowledge and skills in different subjects.
- 2. How to apply this knowledge and these skills and achieve an understanding of sustainability issues and problems.
- 3. How to transform this understanding so that they can solve problems of sustainability and act accordingly.



"In order to achieve sustainability competence, theory (understanding) has to be integrated with practice."

problem.

in the local community.

- School
- Community
- Region/country
- Global

In order to achieve sustainability competence, theory (understanding) has to be integrated with practice. We can sometimes begin with a practical activity and add theoretical understanding by subject teaching, or vice versa. In Chapter 2 we describe the specific characteristics of ESD when it comes to teaching and content.

Locally relevant SD teaching

A specific characteristic of ESD is that the school, parents and students all become resources for sustainable development in the local community. In Chapter 4 we present a planning model for locally relevant SD teaching. This model is called Locally Relevant Themes, or LORET. LORET makes it possible to plan SD teaching using the three steps mentioned above.

In order to move from a theoretical understanding to practical problem-solving, we often need to learn practical knowledge, or "know-how". Practical knowledge is often acquired by taking part in a practical activity, such as planting trees.



3 STEPS ARE NECESSARY FOR SUSTAINABILITY LITERACY

These three steps are necessary for sustainability literacy. For example, this means that even if we have learned about the greenhouse effect in a physics class, we cannot take it for granted that we will automatically be able to apply this knowledge to climate change and the implications this has for our lives. We often need guidance in how to apply this knowledge in a relevant way. However, understanding a problem is not the same as solving it. We can have an advanced theoretical understanding of climate change without knowing how to practically adapt to or deal with this

In our experience all school subjects offer knowledge and skills that are important for understanding and solving sustainability problems. Practical activities can take many different forms, e.g. greening of the schoolyard or organising waste collections

Practical activities in the context of ...



"Experience is important. When students learn from the field they have more knowledge, understanding and skills." Parent in Indonesia

One parent in Indonesia expressed this in the following way: "Experience is important. When students learn from the field they have more knowledge, understanding and skills."

It is often an advantage to merge steps 1 and 2, because apart from saving time, it also makes students more motivated to learn subject knowledge. This motivation was observed by the head of Jambuk Makmur School in Indonesia, Sri Astuti:

- Lessons have become enjoyable learning situations. Nowadays it is fun to learn. Teachers integrate local issues into the subjects and that gives more knowledge to the students.

The chairperson of the school committee at the same school, who is also a parent, had arrived at the same conclusion: "children are more enthusiastic and practise what they have learned at home."

In Chapter 5 we present results from working with LORET in different pilot schools in several countries.



aster Vedasto Kachanga, Kirumi primary school in Tanzania demonstrates large plantations for food security and for income-generation for the school.

6 TEACHING STRATEGIES ARE COLLECTIVELY **CALLED TRANSACTIVE SD TEACHING**

"How can a teacher relate"

students in a class?"

to students when you have 125

Strategies and methods for SD teaching

All teaching requires us to choose the relevant subject content, teaching strategies and teaching methods. In Chapter 3 we present six SD teaching strategies, which we collectively call Transactive SD teaching.

The six strategies are:

- I. Using a participatory approach
- II. Blending individual and collective learning
- III. Paying attention to companion meanings
- IV. Marrying theory lessons with practical exercises
- V. Offering learning through experience
- VI. Creating meaning

In Chapter 7 we describe some of the SD teaching methods that in our experience are useful in Transactive SD teaching.

One of the consequences of SD teaching is that students become more motivated to learn subject knowledge because they experience that subject knowledge can be useful. Transactive SD teaching also has other advantages. One of the teachers at Kirumi primary school in Tanzania stressed the advantage of engaging students by working with practical activities: "Now the pupils have become very active and that attitude is a good prerequisite for learning."

At the same school, the head teacher, Vedasto Kachanga, said that it is not only the students who change: "Earlier the teacher was the preacher, talking and talking and talking and writing on the blackboard. Now teachers facilitate the learning process."

Relations between the students and teachers have also changed. Mr. Santanu at Dhablat Laksman School in Sunderbans, India, expressed it like this:

- How can a teacher relate to students when you have 125 students in a class? That is not possible, but when you have the other activities, space is created where students and teachers talk more to each other. Relations have become much closer. A different behaviour between students and teachers develops. They behave like friends. They listen to each other.





"Sustainability is also a perspective that can be used to organise the school as a whole - not just the teaching."

Other positive effects have been identified. Tombang Masao primary school in Indonesia is a good illustration of SD teaching changing the relationship with parents. The dominant teaching method in the school used to be lecturing, and students were expected to adopt the role of listener. When students and teachers started to green the school garden, the teachers realised that they were not gardening experts, and asked parents to come and help them. An exchange of knowledge and skills between the parents and the teachers became important, and a new and crucial relationship was born.

Further examples of the pedagogical consequences and effects of SD are presented in Chapter 9.

Sustainability perspective on education

Sustainability is also a perspective that can be used to organise the school as a whole, and not just the teaching. This is usually called a "whole school approach". In Chapter 8 we present two aspects of a sustainability perspective:

- 1. Developing a good school environment.
- 2. Developing fruitful prerequisites for education and learning.

Both these aspects can be approached by combining ecological, social/cultural and economic perspectives. Examples that are described include the creation of positive relations with students and parents, team building amongst teachers, reductions in the number of dropouts and the development of the school estate and schoolyard.

AGLO **STANDS FOR AUTHORITY**

GOVERNANCE AND LOCAL OWNERSCHIP

Implementation and dissemination

In Chapter 9 we present a model for the implementation and dissemination of locally relevant ESD in a school, community, region or country. This model combines bottom-up and top-down perspectives, which is unusual. In concrete terms, it means that the model combines governance by authority with local ownership in such a way that they reinforce each other. This model, which we call AGLO (Authority Governance and Local Ownership), points to necessary actions that create a productive interplay between governance and local ownership.

These actions include:

- The creation of locally relevant in-service training
- Assigning ownership to teachers as driving forces at a school
- textbooks etc.)
- Long-term commitment.



- The involvement of parents, the local community and the authorities
- Establishing a supporting norm at the school
- Establishing supporting norms at national level through authoritative
- resources (steering documents, teacher training, approved in-service materials,

Whole School Approach

"WWF goals to reverse the negative trends of declining biodiversity."

How do schools successfully become an important driving force for social change? How can schools contribute to sustainable development? How can the voice of young people in society be strengthened?

To create an ESD school is much more than changing teaching methods. It's also about leadership and participation, how decisions are made, the use of the schoolyard, how students develop their knowledge and competence to be active citizens, educators view on teaching and how to monitor and evaluate.

WWF goals to reverse the negative trends of declining biodiversity and increasing ecological footprints call for transformational change of our societies. This will demand us to reflect, rethink and reform our understanding, attitudes and behavior. Our knowledge, understanding and values are all learnt and continuously developed. Education is therefore playing a key role to help us change.





"Schools engaged in ESD involve and build capacity of all students, teachers, parents and the wider community." Schools engaged in the WWF programme Education for Sustainability are developing best practices in what is called a Whole School Approach in Education for Sustainable Development, ESD. This means that sustainability is guiding all activities and operations of the schools. ESD is infused the vision, mission and other policies of the school, it is central in the leadership, structure, management, planning and monitoring, in the teaching and learning, it supports students participation and influence and collaboration with communities. Thereby it involves and builds capacity of all students, teachers, parents and the wider community.

SUSTAINABLE DEVELOPMENT

EDUCATION FOR The purpose of this chapter is to present the characteristics of education for the characteristics of education for sustainable development (ESD). We will do this by also looking at two other traditions of environmental education. After that we will look at the content of SD teaching in more depth.

"The aim in the Enlightenment tradition is to equip students and the public with scientific knowledge about environmental and health problems and their causes."

THREE TRADITIONS OF TEACHING AND COMMUNICATION

The three traditions that are presented below are not limited to environmental education, but can also be found in teaching relating to health and other topics. The media also makes use of these three traditions when communicating about these issues. They differ quite a lot when it comes to ideas about how to educate people to take responsibility for dealing with nature and health. They also have different origins and time-scales. We will use examples from Swedish environmental education and fictional anti-smoking advertisements in order to illustrate the differences and similarities. The Swedish examples come from an investigation led by Leif Östman and Johan Öhman on environmental teaching in Sweden, in all subjects and from preschool to adult education.

The Enlightenment tradition

In the Enlightenment tradition, which is sometimes referred to as the Fact-based tradition, environmental or health problems are viewed as knowledge or information problems. In other words, these problems can be dealt with by means of more research and information supplied to the public (including students). This tradition has a very long history. By way of example, radio reporting on environmental issues in the 1960s in Sweden followed this tradition very strictly. It is noteworthy that in both education and the media, natural science and natural scientists totally dominate the content.

The aim in the Enlightenment tradition is to equip students and the public with scientific knowledge about environmental and health problems and their causes. The reasoning is that if we learn this scientific knowledge we will automatically behave in an environmental friendly, healthy or sustainable way. This notion of "automatically" has been criticised by supporters of the other two traditions.



WWF Sweden - Education for Sustainable Development in Practice 21



In terms of teaching, it means that if we want our students to do something about climate change, for example, we will need to teach them scientific knowledge about carbon dioxide, its function, the emissions caused by human activities and how this affects the climate, and perhaps also the consequences of climate change for nature and humans.

If we imagine an anti-smoking advertisement in the Enlightenment tradition, it could look like this.



The aim in this advertisement is to communicate facts about the chemical substances found in cigarettes and how they damage human health. The conclusion is that smoking causes health problems. Cigarette packets in Sweden and other countries usually carry a warning message about the health problems that smoking can cause.

"The Normative tradition brings in the idea that values and attitudes are important for our decisions."

THE NEW NATIONAL CURRICULA **IN SWEDEN EMBRACED** THE NORMATIVE TRADITION

The Normative tradition

In the Normative tradition, environmental or health problems are viewed as being caused by incorrect human behaviour. In Sweden, this tradition became visible in teaching and the media during the 1970s and 1980s. The new national curricula in 1980 embraced this tradition, and one of the causes of this change in traditions was the popular vote on nuclear power in the same year. Before this vote, many educational activities were pursued with the idea of enlightening the public. The researchers and professors of nuclear physics who were engaged in these activities were not able to arrive at any one unifying answer to the question of the danger of nuclear power and its waste. This was of course very dramatic, since in the Enlightenment tradition scientific knowledge is supposed to automatically lead to a single and clear answer about the best decision and solution for humans and the environment.

Thus, the Normative tradition can be seen as a reaction to the Enlightenment tradition, and especially the idea of "automatically". The Normative tradition brings in the idea that values and attitudes are important for our decisions. In the Normative tradition, the consequence of this insight is that important decisions about the environment must be taken by society, and that these decisions need to be communicated to the public in an efficient way, for example through legislation and education.

In education, the focus was to ensure that pupils adopted environmentallyfriendly standpoints and behaviour founded on knowledge-based arguments. The logic is: because of this scientific knowledge you must behave like this. The ultimate goal is to make people adapt to the opinions and behaviour decided on by society and at the same time to be familiar with the scientific knowledge that supports these decisions.

In teaching, it means that if we want our students to do something about climate change, we will have to teach them the same scientific facts as in the Enlightenment tradition, i.e. scientific knowledge about carbon dioxide, its function, emissions caused by human activities and how this affects the climate and perhaps also the consequences of climate change for nature and humans. In the Normative tradition, you would add the impact this scientific knowledge has, for example, on our food habits and our consumption of meat: stop eat meat!.

• Nicotine



If we imagine an anti-smoking advertisement in this tradition it could look like this:



SMOKING

CAUSES HEALTH PROBLEMS AND CIGARRETTES CONTAINS DANGEROUS SUBSTANCES NICOTINE ETC If we want to equip the students with the possibility of doing something about climate change, we will teach them the same scientific facts as in the Enlightenment and Normative traditions: scientific knowledge about carbon dioxide, its function, emissions caused by human activities and the affect this has on the climate and perhaps also the consequences of climate change for nature and humans. In the Pluralistic tradition, this teaching would also include a number of different options as to what could be done, including the possibility of not doing anything. Instead of prescribing a certain action, as in the Normative tradition, students are given an opportunity to make their own valuations of which action, if any, is desirable and to justify this.

Again, if we imagine an anti-smoking advertisement within this tradition, it could look like the poster below. The same scientific facts are communicated as in the two previous posters, but as in the Normative tradition, one thing is added. But, what is added now is quite different. Here, a number of 'voices' and viewpoints are included about smoking. The idea is that on being exposed to different voices and reasons for smoking and not smoking, the individual will need to take a personal stance and make up his or her own mind.

• Nicotine

• Etc

"The idea in the Pluralistic tradition is that students need to be educated to make choices that build on their commitment and are sustained by knowledge."

The Pluralistic tradition

The Pluralistic tradition became visible in the media and education in Sweden during the 1990s and has increased in strength since then. The Normative and the Pluralistic traditions agree on one thing, but disagree on two other things. The agreement concerns the criticism of the Enlightenment tradition's idea that if we learn scientific knowledge we will automatically behave in an environmentally- friendly, healthy or sustainable way: both traditions regard values as important in our decisionmaking and as crucial for the development of, for example environmentally-friendly behaviour.

The disagreement is about the idea within the Normative tradition that education should prescribe morally correct behaviour without any critical discussion. You could argue that such education would only lead to rule-followers: people who follow the norms but do not believe in them. When nobody watches we do not care about them. The idea in the Pluralistic tradition is that students need to be educated to make choices that build on their commitment and are sustained by knowledge. Such choices will become sustainable, because they are connected to and grounded in commitment. Thus, the argument is that this type of education is more efficient and also connected to the idea of democracy and democratic education: education should aim towards students embracing the idea of democracy; an embracement that is based on free will and rational reflection.

If we follow this reasoning, it means that the purpose of education is to ensure that students are able to critically consider different alternatives and, from this consideration, arrive at a personal standpoint. The focus on different alternatives is the reason for calling this tradition Pluralistic. The Pluralistic tradition is today often associated with the term ESD.

Use your money on charity Life is short Other people have to pay for your medical



SD teaching content

SD teaching focuses on three areas of knowledge and skills.

TEACHING	THE STUDENTS LEARN
1. SD knowledge	A. Theoretical SD knowledge B. Skills to apply subject knowledge to a SD issue
2. Argumentation and decision-making skills	C. Skills to apply theoretical SD knowledge in order to make wise decisionsD. Environmental ethical knowledge: clarification, moral standpoint
3. Action capability	F. Skills to apply theoretical knowledge in order to carry through SD decisions in everyday life G. Practical SD knowledge

"Knowledge about climate change forces western people to consider whether they need to change their way of living as private persons and as citizens." The first area concerns the teaching of SD knowledge. As we mentioned in Chapter 1, it is crucial for SD teaching to shed light on a sustainable issue from three perspectives: an ecological, social/cultural and economic perspective. The teaching of SD knowledge can be organised in different ways. A common way is to teach the students how to apply subject knowledge to an SD issue. For example, in geography, we can first teach the students the principles of meteorology. When the students have learned this subject knowledge, they can be taught how to apply this knowledge to the issue of climate change. The result of this application could be that students learn what defines climate and climate change. This is an example of theoretical SD knowledge. Another way of organising this first step is to start with the issue of climate change and then introduce the relevant meteorological knowledge.

The advantage of the first way of organising the teaching is that the students will not only learn theoretical SD knowledge, but also the skills to apply subject knowledge to a SD issue. This application skill is crucial if the students are to learn. The advantage of the second way of organising the teaching is that the motivation for learning subject knowledge often increases, because right from the beginning learning is connected to everyday life situations. Both ways have advantages, and a mixture of both is worth considering.

Teaching students how to apply subject knowledge to SD issues takes time. Sometimes people complain that it means that students will have less time to learn subject knowledge. Many teachers, parents and students have witnessed to the opposite: the learning of subject knowledge often becomes more efficient. Since they need to apply the knowledge, their understanding of the subject knowledge increases and they become more motivated. It is one thing to learn by rote, and another to develop an understanding – in the process of application students develop understanding.

The second area of knowledge and skills is connected to argumentation and decision-making. SD issues often require decisions about how we want to live our lives, and the direction in which we want our society to develop. For example, knowledge about climate change forces western people to consider whether they need to change their way of living as private persons and as citizens. Such decisions involve valuations: for example, do they want to prioritise solidarity with their family or with the global world when they make their personal decisions? How do they want to prioritise the economic dimension in relation to the moral dimension of responsibility for people in other parts of the world? Such questions become very important, since it is the people in the western world who cause climate change



"All decision-making about SD issues involves valuations, and in view of this, values are a necessary component." but do not suffer from it as much as people in other countries. If they prioritise not spending money on reducing their carbon dioxide omissions it means that someone else will suffer. If they on the other hand prioritise the reduction of such omissions, it will cost a lot of money. All decision-making about SD issues involves valuations, and in view of this, values are a necessary component.

In that we want to come to the wisest possible decision, we also need to become skilled in clarifying different values and the consequences of different valuations. Thus, we need to make considered ethical reflections. Among other things, sustainable development concerns the balance between human needs and the protection of nature. That balance differs between different situations and is in constant change. For example, the balance changes when we as human beings invent new technology, or the population of humans increases in a certain area. Deciding what is a wise balance is an ethical question.

It is possible to discern between three different situations when we make value judgements: moral commitment, norms for correct behaviour and ethical reflection. Moral commitment is when moral judgements are connected to deep feelings, for example love, shame and repulsion. These feelings are connected to moral responsibility or care. This situation is quite different to a situation where norms about correct behaviour are at stake. Norms are social rules for how to behave in a correct way in a specific situation. We can learn to follow a rule without believing in it or committing to it. For example, a teacher can repeatedly comment on students' littering, with the effect that they will stop littering at school but continue outside school. Ethical reflection occurs in situations where we make rational and systematic reflections about the reasons for our commitment and moral norms, and make a general enquiry into what is "good" and "right." This means that ethical reflections are usually made at arm's length, i.e. at a distance. Thus, ethical reflection is a skill that can be acquired and is an important part of environmental ethical knowledge. In Chapter 7 you will find a teaching method called Clarification of values, which is especially good for training students to clarify values and value judgements.

In decision-making, we are always coming up against situations where different valuations oppose each other. This means that we have a dilemma. The best way forward in a dilemma is to make wise decisions. However, all humans are fallible, which means that in order to make wise decisions, it is often a good strategy to maximise the number of voices and thereby maximise the input of SD knowledge. This means that wise SD decisions benefit from freedom of speech and equity. This is why democratic knowledge is part of the second area of SD knowledge.

Democratic knowledge can be divided into four interrelated aspects:

- Critical knowledge and skills
- Arguing skills
- Respect
- Decision-making skills

4 ASPECTS DEMOCRATIC KNOWLEDGE

CAN BE DIVIDED INTO FOUR INTERRELATED ASPECTS

The first aspect relates to the ability to critically analyse different options for decisions, i.e. to investigate the pros and cons of each option. The results of such work can be called critical knowledge. Another important aspect of critical knowledge is the ability to identify the interests that are often interwoven in the different options. Think, for example, about the international negotiations on how to deal with climate change and the different interests that each optional solution serves.

Arguing skills include listening to another person's point of view and using knowledge to support your own claims. Listening also means listening with a purpose, for example to find new arguments. When students are debating they don't always use their knowledge to support a claim, and that is something that they need to learn.

Respect for other people's opinions is a necessary attitude if wise decisions are to be reached. When this attitude becomes a norm, people dare to express their arguments, opinions, etc. Again, many voices are often better than one.

The final skill is the most difficult one, because it means making responsible decisions and justifying them by using knowledge from different areas.

We deal with the more practical teaching aspects of democratic knowledge in the next chapter and in Chapter 7.

The third area of knowledge is the ability to act on the basis of decisions. Having theoretical knowledge about climate change is not the same as knowing what to practically do in order to bring about such change. We need extra knowledge, which is often called "know how". "Know how" is practical SD knowledge. In Chapter 4 there are good examples of how students have learned both theoretical and practical SD knowledge.

If someone has achieved knowledge in all three areas, you can say that they have acquired sustainability literacy, or SD literacy.



See further: Sandell, K., Öhman, J. & Östman, L. (2005). Education for sustainable development: Nature, school and democracy. Lund: Studentlitteratur.

WWF Sweden - Education for Sustainable Development in Practice 29

TRANSACTIVE Transactive teaching is a concept that is based on the idea that learning takes place when we encounter the human and the physical **SD TEACHING** we encounter the human and the physi environment. Moreover, in encounters - between people or between a person and the physical environment – all the participants acquire meaning in relation to each other, simultaneously.

> We can take an economic transaction as an illustration. If you give a pen to somebody, no-one will know the meaning of that action. But if that that person gives you money as a response, you, the pen and your action acquire a specific meaning: you become a seller, the pen becomes a commodity and the action becomes an economic transaction. In this transaction the other person becomes a buyer, but would not have assumed this role if you had not given the pen away in the first place. Thus, you, the pen, the money, the other person and the whole act acquires meaning contemporaneously and mutually.

"The consequence for teaching is" that as teachers we do not know what meaning our teaching will have until we get a response from the learners."

The consequence for teaching is that as teachers we do not know what meaning our teaching will have until we get a response from the learners. As teachers we are totally dependent on the responses we get from the learners in order to know whether we are helping or not. In other words, from the responses we receive from the learners, we learn whether our teaching is making sense or not, and what kind of effect the teaching is having. Moreover, we learn what we need to change in order to make our teaching more efficient and fruitful. Thus, a very important aspect when arranging teaching and in-service training is to perceive these activities as mutual possibilities for learning. In order to make that happen, we need to create a dialogue and have a close collaboration with the learners.

Another important consequence for teaching is that it is not only the teaching content that participants learn from, but also the way we teach. For example, students' ways of looking at themselves are dependent on how you approach them. We become somebody - for example a seller or a buyer - by the way we engage with each other.





to learn, and an efficient way of doing that is to develop a participatory strategy."

HOPE

ENGAGEMENT AND THE FEELING

OF BEING IMPORTANT

ARE ESSENTIAL PARTS

OF THE SOUL OF SD

- I. Use a participatory approach
- II. Blend individual and collective learning
- IV. Marry theory-lessons with practical exercises
- V. Offer the possibility of learning from experience
- VI. Create meaningfulness

Strategy I. A participatory strategy

Teachers want all their students to learn, and an efficient way of doing that is to develop a participatory strategy. A participatory strategy means connecting to participants' knowledge and skills when teaching. If this connection is not made, there is a big risk that the gap between students' prior knowledge and understanding and the content of the teaching activities will become too huge: the consequence is that the participants will not be able to understand and will therefore be left behind. In order to avoid this trap, teachers need to create a good dialogue with participants and ensure that they have plenty of opportunity to express their understanding. Beginning a new teaching theme with a brainstorm is an example of a suitable method, although it is more important to provide space for the participants to ask questions and discuss. This is naturally also important in in-service activities. As SD teaching is quite different from traditional teaching, it is important to have a good dialogue with the participants in order to create a collective journey.

Creating a good dialogue requires a safe and secure learning atmosphere: no questions are stupid questions! Everybody's experiences are important, because learning is a collective process. Moreover, when working with locally relevant SD teaching, it is crucial that everybody feels that they count: that they can make a difference at school and in the local community! Hope, engagement and the feeling of being important are essential parts of the soul of SD.

A participatory approach is thus both an effective means for SD learning and offers a learning bonus that is crucial SD knowledge: I am important in the creation of sustainable development and so are other people!

Strategy II. Blending of individual and collaborative learning

Collaboration is an important part of learning. By talking, discussing and listening, participants have an opportunity to express their experiences and to learn from other people's experiences. In collaboration, we often become more engaged than we do when just sitting and listening to a teacher. Teacher-centred teaching naturally also has its advantages and disadvantages, but in order to be most effective, it needs to be blended with group work. Although individual work has its advantages, there are also disadvantages. For example, in group work there is a danger that the strong voices will do the talking and many will be silenced. It is therefore important to blend individual and group work in a well reasoned way. For example, if your goal is to train students to clarify their values or opinions on a certain issue, it would be wise to allow the participants to work individually first, and then do group work. The reason is that if one starts directly with group work, it might lead to many of the students not reflecting, but following what others value. If that happens, the intended learning will not be reached. The specific blending of individual and collaborative learning is important for creating good learning conditions.

This specific blending also offers bonus learning, namely that each pupil experiences that expressing his/her opinion is valuable. This bonus learning is also an important aspect of democracy - everybody's voice is important.

In the following we present six Transactive SD teaching strategies that we have given priority to and that teachers have used when teaching pupils:

- III. Pay attention to companion meanings



Strategy III. Pay attention to companion meanings

In the two previous strategies, we pointed to the bonus learning that these strategies produced. Östman and Roberts invented the concept of companion meanings in order to highlight the content of this bonus learning. In education, a central aim is that students learn facts, models and theories. But education is much more than that. For example it is not possible to teach students knowledge about nature without at the same time communicate a view about nature. And it is not possible to teach a subject without communicating a view what is the benefit of studying the subject, for example to pass an exam or to become an active agent in the development of the local community. All these extras in teaching and learning are known as "companion meanings". It is important to note that companion meanings are communicated and learned while learning knowledge, i.e. companion meanings accompany scientific and other knowledge. The recognition of companion meanings means that the invisible learning can become part of one's teaching plans. Below, we show how such planning can be done.

Strategy IV. Marrying theory-lessons with practical exercises

Practical exercises can facilitate the learning of theoretical SD knowledge. In Chapter 7 we present an exercise called the "Closed bottle". This exercise can be used to learn about scientific concepts like photosynthesis and cellular respiration. It is much more efficient than simply explaining these two biological processes through chalk-andtalk. A well prepared mixture of theory and practice makes the learning fruitful. For example, using a bottle to stimulate the interest of the students and make them to ask questions or wonder about things is a perfect way of giving a theoretical explanation of the processes involved.

Exercises can also be used to teach theoretical knowledge or skills. In Chapter 7 we present a teaching method called "Clarification of values". This exercise is designed to train the student in the art of making environmental ethical reflections. Ethical reflection is an important part of ethical research, and this exercise trains the student in this theoretical skill.

Another way of consciously marrying theory with practice it to pay attention to the bonus learning that an exercise produces. For example, the "Clarification of values" method produces bonus learning in the form of democratic knowledge. We dealt with the learning of democratic knowledge in Chapter 2. One aspect of this is learning to listen as a way of improving one's argumentation skills. One of the tasks in the mentioned exercise is to report to the big group what has been said in the small group. The task of the reporting student is to summarise the discussion in the small group. When students get used to the method, they realise that they have to listen to each other in case they are asked to give the report from the group to which they belong. In this way, the skill of listening becomes a companion skill that is learned while students are learning to ethically reflect.

When conducting in-service training, we often take the bonus learning of companion meanings into account when designing the programme, and we recommend doing the same thing when educating young people and children. Let us given an example of what such a planning might look like.

One of the sessions is focused on communicating to the participants the importance of values for SD decisions, and that ethical reflection is crucial SD knowledge. We use one of the Clarification of values exercises in order to help the participants learn this SD knowledge. One of the learning bonuses is that participants will experience this type of ESD method. In the next session, we use this experience to discuss the practical steps of doing the exercise. In this way, we save time and the learning of SD theory becomes more interesting and efficient.



"Another way of consciously *marrying theory with practice it to* pay attention to the bonus learning that an exercise produces."



In the clarification of values methodology you start by clearing out your personal standpoint. Then you compare your arguments with people who have the same conclusion in small groups followed by reporting and discussing in the whole class.



"Working with values and visions" is very motivating, because it connects to what the participants believe in, what they think is important."

It is sometimes more efficient to allow participants to learn from experience rather than just teach about such experiences through the chalk-and-talk method. The participants in the in-service training we mentioned did not only learn SD knowledge, they also did the exercise and thereby gained first-hand experience of taking part in it. Such experience is a good complement to theoretical knowledge. When teaching about gardening is complemented with practice learning will be more effective. When teaching about tree planting includes practice the chance is bigger that students will also do it on their own. The challenge is to complement theory with practice.

Strategy VI. Create meaningfulness

Motivation fuels learning. Working with values and visions is very motivating, because it connects to what the participants believe in, what they think is important etc. The strategy thus means connecting to the students' everyday lives. As this also involves actions in the local community, it is both authentic and meaningful. In Chapter 6 and Chapter 8 we describe the effects of this strategy.

Strategy V. Offering the possibility of learning through experience

- A PLAN FOR TEACHING LOCCALY RELEVANT THEMES

CREATING A LORET In this chapter we are going to present a model for locally relevant SD teaching a model for locally relevant SD teaching. This model, which we call LORET (Locally Relevant Teaching), was invented by Östman and Svanberg in 2004, while working on the Mongolian project. A LORET is a teaching plan for locally relevant SD teaching. In Chapter 2 we identified three areas of teaching and seven learning outcomes. We repeat them here because they are the basis for LORET.

Conditions vary in different countries and in different regions. In order to achieve locally relevant SD teaching that is adapted to local needs and to local conditions, planning should be done by the teachers at the local school. In the following we present a four-phase procedure for creating a LORET.

Phase 1. Identify key SD issues in your local community The first phase of developing a LORET consists of three steps:

- 1. Gather a number of colleagues, preferably from different subjects.
- 2. Each person (individual work) lists key issues for sustainable development in the local community.
- 3. Discuss the different key issues in the group and choose one to work with and develop one LORET (the excluded key issues can be used in other LORETs).

TEACHING	THE STUDENTS LEARN
1. SD knowledge	A. Theoretical SD knowledge B. Skills to apply subject knowledge to a SD issue
2. Argumentation and decision-making skills	C. Skills to apply theoretical SD knowledge in order to make wise decisionsD. Environmental ethical knowledge: clarification, moral standpoint
3. Action capability	F. Skills to apply theoretical knowledge in order to carry through SD decisions in everyday life G. Practical SD knowledge



EXAMPLE OF KEY ISSUES

- reduction of biodiversity
- energy
- consumption
- air pollution,
- poverty
- sustainable use of pastureland wate
- fuels
- forest

Key issues for sustainable development vary according to local conditions!

Discuss the

different key

issues in the group

- food security
- sustainable mining
- green economy
- working environment
- health

 - climate change mitigation and adaptation
 - flooding



Discussion: Identify goals for the development.

Phase 2. Identify goals for the development

The second phase consists of two steps:

1. Individual work:

List the goals of the sustainable development you want to achieve in the local community. If for example you have chosen the reduction of desertification as your key issue, ask yourself what would need to happen in order to achieve that. The result might be

- a reduction in the number of cattle
- a better rotation system for the cattle
- herders improve their economy by alternative income generation
- an improved veterinary system
- better marketing
- improved breeding
- refining the products
- return to old traditions

2: Discuss in the group and make a common list.

Phase 3. Identify the knowledge needed

Phase three contains four steps. In phase two you identified the goals for the development. In order to reach these goals, you need to act in some way. In order to make wise actions you need knowledge. To identify this knowledge you need to:

A mind map identifying and sort-

ing what content need to taught

about concerning a key issue for

development.

- Traditional methods of rotation
- will need to "know about".
- 2. Compare the lists in the group.
- under the headlines.
- are necessary.



1. Individual work: Make a list of the things you need to "know about" in order to reach the goals. For example, in order to improve the veterinary system (see above), you need to know something about the veterinary system and how it works. Thus, the veterinary system is an important piece of knowledge. Or, if you want to create a better rotation system for cattle, you will need to "know about": · The ecosystem and how it works

- The different ecosystems in different places
- The ethology of different animals, i.e. the scientific study of animal behaviour
- Do not forget to include any ethical and/or democratic aspects that the students

3. Make a mind map: construct headlines for goals and sort the necessary knowledge

4. Determine the school subjects that will be needed in order to cover the knowledge areas marked in your mind map. Indicate these on your mind map using different colours for different subjects. You will probably find that several school subjects

WWF Sweden - Education for Sustainable Development in Practice 41



Clean and safe drinking water is one key issue for development in East Africa.



Mini g

Phase 4. Creating a teaching plan; LORET

The mind map is a perfect step for creating a teaching plan for locally relevant SD teaching. The key issue you have chosen is the teaching theme. The goals in the mind map can be regarded as topics for one lesson or a series of lessons. Thus, a theme can consist of several topics and each topic can embrace one or several lessons.

The creation of a plan for a topic consists of eight steps:

- 1. In the mind map you have listed things that you need to "know about" for each goal. You have also highlighted which school subject need to be involved in order to provide the students with the necessary knowledge. For each school subject, list the subject knowledge that you want to teach the students. If we connect to the example above, we might want to ask which biological knowledge about ecosystems is relevant for the students to learn.
- 2. If more than one school subject is involved, decide how you will organise the work so that the students can effectively integrate the knowledge from the different school subjects.
- 3. Identify connections to the local community:
 - a. Do the students need to gather knowledge in the local community, for example by interviewing a farmer, a parent, etc.?
 - b. Will students take any action in the local environment:
 - i. On the school estate or in the schoolyard?
 - ii. In the local community?
 - iii. At home?
- 4. Determine the number of lessons that will be needed and the content for each.
- 5. Identify teaching methods that will help students to get involved and learn the required knowledge. Remember that teaching methods can also communicate content, or companion meanings. See Chapter 3 for ideas about teaching methods.
- 6. Identify connections to the national syllabi. This step is crucial, because it justifies SD teaching (see Chapter 9). In step 1, you identified which school subject knowledge would be taught to the students. It is very likely that your identified knowledge is already prescribed in the syllabi: make reference to the page in the syllabus or use a quotation.





The way forward should be directed by our priorities and not by random.

Conduct the teaching with your plan and re necessary.

LORET MODEL

Which key issue is a

Give a short overvi and the educationa

List the topics cov

• The theme

Summary

Topics

A LORET is also pos class, together with

	For each topic describe the following:
overed?	Goals Which learning outcomes or results
w of the plan	are expected?
bulpose	Connection to steering documents
ed and how they	Describe the goals, skills, values and so on prescribed in the national ste- ering documents that will be covered in the LORET
	Organisation Briefly describe the lessons and how the different school subjects will be integrated
in accordance vise the plan as	 Methods Describe the pedagogical methods and exercises that will be used.
ible to make in tudents.	Resources List the important literature, resource materials and other sources.

7. Critically examine the plan and revise it as necessary:

- Is this a key issue for development in the region?
- · Are ecological as well as economic and social aspects covered?
- Does the plan include argumentation- and decision-making skills?
- Are there connections to the local society?
- Does the plan build upon integration between different subjects.
- What action components are involved?
- Will students learn both practical and theoretical SD knowledge?

8. Write the final plan. In Mongolia many LORETs have been produced. Some have been published in books and distributed to teachers in the country. Since the plans explicitly show the connection to steering documents, they can be regarded as local curricula. We strongly recommend that you document the LORETs in such a way that they can be read and used by other teachers.



Besides learning about production of maize during lessons it is also practiced in the school yard. Practice is added to theory.

WITH LORET



925 MILLION

PEOPLE IN THE WORLD WAS SUFFERING FROM **MALNUTRITION IN 2010**

In the following pages we will illustrate some of the remarkable results that the pilot schools have achieved. It should also be pointed out that these illustrations are only a few examples of the good work being done by the pilot schools. We will start by describing examples of locally relevant SD teaching and then illustrate how this teaching has affected the local community.

LOCALLY RELEVANT SD TEACHING

In the following examples, theoretical SD teaching is combined with action, which means that students also learn practical SD knowledge.

Food security

In 2010 the number of people suffering from malnutrition in the world was 925 million. That was 98 million fewer than in 2009; a reduction of 7.5 %. This decrease primarily related to Asia. In sub-Saharan Africa, one third of the population is still hungry and the number of starving people has increased in the last decade. Women and children account for the highest proportion of chronically hungry. The number of malnourished children in sub-Saharan Africa has increased by 79 % in the last 30 vears.

Some schools in Africa serve meals made from produce grown on the school premises. Some schools are able to serve students meals for part of the year, depending on the availability of maize flour and vegetables. Schools that cannot produce the necessary ingredients are only able to serve very simple meals, usually consisting of porridge of maize, to students whose parents can pay the minimal cost charged. Access to meals during the school day naturally affects students' learning capacities.

Kitaasa primary school in Uganda has a large schoolyard that provides good possibilities for agricultural production. The school grows its own maize, lettuce, green peppers, bananas, yams, beans, mangoes and guava beans. Every Thursday all the students and teachers work in the garden after lessons. The school also has three cows, a number of hens, five goats, six rabbits and eight pigs. They get milk from the cows and eggs from the hens. All the students are served porridge with milk every day. "We no longer teach hungry children", the teachers said.

Most of the food that is produced at the school is used for the boarders, who have all their meals at the school. Many are orphans with no families to support them. To them, access to food and learning how to prepare meals is crucial. The school has to both educate them and help them to become independent, self-reliant citizens.

RESULTS OF LORET is a model that facilitates the implementation of sustainability issue implementation of sustainability issues into subject teaching, thereby creating locally **WORKING** subject teaching, thereby creating locally relevant SD teaching. Loret also facilitates the integration between SD teaching in different subjects and the promotion of sustainable development in the local community by combining SD teaching with actions.

"A hungry man takes no responsibility. He is an easy victim for unserious ambitions. He will only take responsibility when his stomach has a sufficient amount of food in it. That makes food security a key issue for sustainable development."

Richard Ogeto, Eco Committee at Asumbi Teacher Training College

The school produces so much food that students and teachers can take foodstuffs home to their families. Students are also given seedlings to support agricultural production at home. This encourages parents to learn how foodstuffs are produced, and it is usually their children who teach them.

The pedagogical ambition of the school is to combine theoretical and practical learning by adding practical experience to the theory that is taught in class. In the interviews teachers said:

- They look after their garden plants. They give them water. We train them to make manure and bio-pesticides to treat their plants. They learn that if they do not treat their plants well, their yield will not be good.
- · Now children benefit from what we teach them. They are self-reliant. They grow and eat and sell. They help themselves and their families. They learn about a better life.

According to Richard Ogeto, the chairperson of the Eco Committee at Asumbi Teacher Training College, food security is an essential part of sustainable development.

- A hungry man takes no responsibility. He is an easy victim for unserious ambitions. He will only take responsibility when his stomach has a sufficient amount of food in it. That makes food security a key issue for sustainable development. That makes efficient and sustainable gardening an important part of ESD at our college.

The college has 16 cows. They are used to supplement the meals at the school and the practice of looking after them is integrated into the teaching of gardening and natural science.

Some years ago, Tombang Masao primary school in Indonesia was an ordinary school. After becoming part of the ESD programme, students and teachers started to plant crops in the school garden. As the teachers were not experts in the subject, they asked the parents to come and teach them. The teachers learned more and more and the more they learned the more they developed the school garden. The crops are now consumed at the school in the form of meals for the students. Students have also contributed with knowledge to parents who have in turn started kitchen gardens in their backyards. Before creating kitchen gardens they only had farmland. Now it is easier to have fresh vegetables on a regular basis. With gardening and the garden products parents can also generate income to support their children going to school.



WWF Sweden - Education for Sustainable Development in Practice 47



"All the schools practise ecoagriculture without using synthetic fertilisers and pesticides and are not dependent on complicated irrigation systems. They give priority to old varieties of seeds and practise small-scale systems."

Kimaanya School trains students to conduct gardening around their homes and has achieved considerable results, as expressed by the deputy head teacher:

- Students are now taking responsibility to become self-reliant and some are even producing so much that they have started to sell their products. For instance, cabbage and eggplants are being taken to the market and sold. In this way they will learn to be self-reliant when they grow up.

All the schools practise eco-agriculture without using synthetic fertilisers and pesticides and are not dependent on complicated irrigation systems. They give priority to old varieties of seeds and practise small-scale systems, like sack and tyre planting. Planting in sacks with sand and topsoil means that the sacks can be placed anywhere. Planting in car tyres with an added base also means that they can be placed anywhere, even in town. If the tyres are suspended they will also be protected from grazing animals. This model is often used for nurseries. Micro-irrigation is conducted by filling a plastic bottle with water and making a tiny hole at the bottom and the top. The bottle is then placed close to a plant and will slowly leak water to the plant over a long period of time.

Kitaasa School in Uganda combines bananas with maize, thereby producing a higher yield. The bananas provide the maize with a favourable microclimate. Banana leaves and other crop residues remain on the ground as a surface mulch and maintain the fertility and humidity of the soil. Legumes are grown as green manure.



Polyethen bottles with very small holes offers micro irrigation to specific plants.





Sea Back Thorn is the berry with the highest concentration of vitamin C of all berries.

9.3 BILLION

PEOPLE IS EXPECTED BY 2050 IN THE WORLD AND FOOD PRODUCTION NEEDS TO INCREASE **BY APPROXIMATELY 50%**

Biodegradable waste is composted and added as bio-fertiliser to maintain the level of organic matter in the soil. Crop rotation is practised. Bio-pesticides are produced from Aloe Vera, chilli and ash. The diversity of micro-ecosystems in the gardens contributes to a high biodiversity that reduces the need for pesticides.

The global population is expected to increase and peak at approximately 9.3 billion people by 2050. Food production thus needs to increase by approximately 50% in order to feed this expected population as well as the one billion people who are starving today. How is that food going to be produced?

During the Green Revolution the world's food production doubled. New high yielding varieties of plants were introduced in large-scale farming programmes. Production depended on a heavy input of synthetic fertilisers, pesticides and irrigation. If we are going to have to double the world's food production now, it will not be through a new Green Revolution. We cannot increase the amount of synthetic fertilisers because phosphorus is a limited resource that is already in short supply. Nitrate is a component that is produced by fixations of nitrogen in the air. This process requires a lot of energy, and energy consumption leads to climate change that is not acceptable. An increased use of environmentally harmful pesticides is not acceptable either. Large-scale irrigation programmes are not possible due to water shortages. If we are going to double the world's food production we have to look at different strategies. It would seem that strongly diversified but intensive ecological agriculture is the only alternative.

- We have added practice to theoretical knowledge. We used to teach about vegetables. Now we even experience them in practice, because students help with the planting and harvesting in order to learn more.

these things.

Zereg School has a greenhouse and produces vegetables for the kindergarten. community have been invited to use part of the area as private allotment gardens. Mankan School has its own livestock and produces food for the school. 280 goats

In addition, the school has been offered the use of one hectare of land by the local community for gardening purposes. Teachers and students go there together to harvest the products planted by the school. In their lessons students learn when and how to plant and about health aspects. In addition to theory, they also experience practical gardening. Since the area is larger than the school needs, members of the and sheep are looked after at the school. The meat is used to feed the 180 boarders living at the school. The school is now planning to create a large plot for potatoes and vegetables and an underground storage area.

Mongolia does not have the same need for local food production as the countries in the Lake Victoria programme, but there is still a need for some local production of food products in order to provide meals at the schools. At Chandman School in Mongolia, the teaching is connected to livelihood activities.

Teachers have identified that some products, such as potatoes, tomatoes, cabbage and sea buckthorn, are not produced locally and have therefore started up initiatives of their own. The primary purpose has been to learn how to teach the students about

Herb garden

"Mongolian people are very deeply devoted to nature. This is a strong tradition and emanates from their nomadic *lifestyle. The lyrics of* Mongolian songs usually express respect and love for nature. Not surprisingly, ESD in Mongolia starts with greening activities."

ABOUT 45%

OF MONGOLIA IS DESERT AND APPROXIATELY 90% IS ARID OR SEMI-ARID

In 2009, a WWF Coastal Forests Programme team visited the village of Mbouroukou at the foot of Mt. Muanenguba in Cameroon. They were greeted by two old men, who immediately engaged them in a long discussion about nature after having learned about the WWF mission.

At one point in the discussion one of the men pointed to the top of a nearby mountain and told the team about the medicinal plants that used to grow in abundance there and were now becoming extinct. Not every member of the village can afford medical treatment and these plants have been used for medicinal purposes since ancient times. Unsustainable exploitation and possibly climate change have severely reduced the number of medicinal plants. Villagers regret that with the current rate of extinction their children will no longer have the opportunity to learn about these plants, let alone their medicinal and economic values.

A staff member of Lycee Bilingue de Melong, an upper secondary pilot school in Cameroon, started a herb garden at the school. At present the garden occupies about 20 square metres, although the school intends to increase the size in the future. The purpose of the herb garden is to increase students' knowledge about medicinal plants in the locality and to motivate their conservation. The garden will also serve as a seed bank, which will help the already threatened species in the area to survive.

This is a typical example of a herb garden. Every pilot school in East Africa, Indonesia and India that we visited had a herb garden. The herb gardens are maintained by students, and teaching is conducted on site. They also serve as seed banks to support the development of herb gardens in the community. At Dhablat Laksman School, students borrow four seeds for sowing purposes but are expected to return eight seeds. In this way, the number of medicinal plants is expected to increase in the community.

Planting trees

When we asked the pilot schools in Mongolia, East Africa and India which activities they were most proud of, they almost always mentioned tree planting as one of their biggest achievements. Dhablat Laksman School in the Ganges delta conducts what they call "social forestry". Students plant tree saplings and each sapling has a tag with the name of the student who planted it written on it. Each student takes responsibility for his/her sapling by feeding it with bio fertiliser and watering it. The headmaster of the school, Mr. Santanu, said that he had seen students saving water in their drinking bottles to share with their trees. The students are proud of their trees and care for them. This develops responsible attitudes towards nature. Within the space of three years the trees have grown to some 30–40 feet. According to the tradition in the community, if a tree is cut down 20 new trees should be planted.

Mongolian people are very deeply devoted to nature. This is a strong tradition and emanates from their nomadic lifestyle. The lyrics of Mongolian songs usually express respect and love for nature. Not surprisingly, ESD in Mongolia starts with greening activities. Mongolia is a desert country – approximately 45% of the country is desert and approximately 90% of the total territory is arid or semi-arid and prone to desertification. The winters are very cold and the summers are hot. In spring it is often windy, and the air can be filled with sand. This explains the need for trees. Darvi School in western Mongolia planted 3,200 trees over a four-year period. 1,000 of these trees were planted at a monastery as a contribution to the local community. In their lessons, students learn about the causes of desertification and how to deal with this. They are taught how to plant trees and do this practically in their spare time. All the pilot schools are planting trees both in the school grounds and in the local community. The challenge is to water them and prevent the goats from destroying them.





WWF Sweden – Education for Sustainable Development in Practice 53







Cooking demands for much firewood.

The pilot schools in East Africa also plant trees. Asumbi Teacher Training College has planted more than 10,000 indigenous and exotic trees in the college compound. Before the trees were planted, the area was barren land with only dry bushes. Today there is a considerable forest at the college and trees are continuously being planted. When we visited the school on one occasion it had rained intensively during the Night. The college took their chance and cancelled the first lesson of the day. Everybody went out and planted trees, because the soil was wet and conditions for planting were just right.

At Kisojo primary school in Uganda, each student was given four tree samplings. Two were planted at the school and two planted at the home of the student. By planting two trees at home, the intention is to influence the parents and the local community to care for the trees. The students are expected to care for the trees and make sure they grow well.

At Kitaasa primary school in Uganda they distinguish strongly between the planting and growing of trees. There is no value in planting trees if they do not grow well. All too often the outcome of tree planting campaigns is not very good in terms of the quality of the trees. The place to plant must be considered carefully. What is the soil quality like? Is additional organic matter necessary? What is the optimal species for that place? Will the tree get watered? Is there a danger that termites or grazing animals will harm the tree? Might people harm it? Can you protect it, or do you need to find a better place for it?

The forest at the Asumbi Teacher Training College contributes to a pleasant and beautiful environment that is also used for teaching. Students learn to identify different species and about their different values. Some trees are useful for fertilising the soil, while others are good for logging, giving shade or as fodder for animals. The trees at the college have been used to produce school benches. The college has 43 training schools and tree planting is an important activity at each of them. Student teachers have also begun to plant trees as part of their training.

Climate change

"Teachers and students in the African schools that we visited were not concerned about the impact of fossil fuels on the climate and did not think that they could do anything about it. Their only possibility to do something about the climate in their area was to care for the local nature."

At Kitaasa School we asked teachers about climate change and the response we got was as expected. When trees are cut down the soil becomes hot and dry. When there are no trees there is nothing to break the wind and there is no regulation of water flow. That results in climate change.

Students who are members of the Environmental Club at Kimaanya School said: - The weather is not like it used to be. Sometimes it rains too much and

sometimes it rains too little. It does not rain at the times we are used to getting rain. - The reason for deforestation is that people have too little land, so they need

to cut down too many trees. They should not do this. They should plant more trees instead. They have not heard about sustainable development.

Words for a	water			
Maji (Swahili)	Water (English)	Pana (Hindi)	Mazzi (Luganda)	Shouei (Chinese)
Wasser (German)	Pula (Botswana)	Biyo (Somali)	Rano (Malagasy)	Mvura (Shona) (Zambia, Zimbabwe)
Mizu (Japanese)	Woda (Polish)	Eau (French)	Air (Bahasa)	Zou (Bobo) (Burkina Faso, Mali)
El agua (Spanish)	Vatten (Swedish)	Água (Portugese)	Acqua (Italian)	Amazi (Kinyarwanda)
Omi (Yoruba) _(Nigeria)	Madiba (Dualla) (Cameroon)	Amanzi (Zulu) (Malawi, Mozambique, South Africa, Swaziland)	Yaku (Quechua) (Argentina, Bolivia, Equador, Northerna Chile, Southern Colombia)	Water (Afrikaans) (Botswana, Malawi, Namibia, South Africa, Zambia)

At Kimaanya School we asked the teachers about climate change, and the answer was: - It does not rain at the times it should rain, and it rains less and has become

hotter. The explanation of what causes climate change is based on factors that determine the microclimate:

- Deforestation and the drainage of swampland. Trees help in the formation of rain. When trees are cut down on a large scale, there will be no rain. People clear swamplands for settlement and for industry and roads. These swamps also help in the formation of rain. After a while people experience drought, because the swamps that help to produce rain have been drained.

Students at Dhablat Laksman School who are engaged in the maintenance of the solar cell system explained the value of the solar system as saving money instead of buying electricity from the newly installed grid. They were also aware that electricity in the grid was produced by coal, which results in air pollution and emissions of carbon dioxide that lead to climate change. Cyclones and flooding also cause problems in the Ganges delta where this school is situated.

Teachers and students in the African schools that we visited were not concerned about the impact of fossil fuels on the climate and did not think that they could do anything about it. Their only possibility to do something about the climate in their area was to care for the local nature. Fewer forests and swamplands mean less generation of humidity and less rain. Trees give shade, and provide humidity and protection against the wind. Vegetation on the ground regulates the flow of water and keeps moisture in the ground. When people drain the swamplands there is a danger of flooding when the heavy rains arrive.



At Dhablat Laksman school electricity is supplied by solar cells causing no carbon dioxide emissions and no climate change.



Normative messages in the school compound talks to the students.

Biodiversity

water before it enters Lake Victoria.

People are encroaching on the wetlands, cutting down trees and papyrus and killing animals. The wetlands are also being converted into farming areas. The final degradation occurs when farmlands are occupied by brick plants that consume all the soil that is left. At Kitaasa School, the teachers declared their ambition to train students to become ambassadors for wetland protection.

- Children learn that God created each and everything, so that if we spoil natural resources like rivers and swamplands, we spoil the creation that we are part of. Our students are ready to conserve the nearby swamps, forests and will teach people in the community what to do.

- Children write messages to each other which are then placed in the schoolyard or on the walls at the school. These messages include things like: "Do not cut down trees!" "Plant more trees". "Trees help us to get rain." The children produce drawings and learn the importance of conserving nature. Sometimes we have nature walks and remove things like polythene bags that destroy the soil.

Dhablat Laksman School has monitored the available varieties of rice, coconuts and mangoes in the area as a database for biodiversity protection. At present, all four pilot schools, in the delta of Ganges, are monitoring the prevalence of an identified number of plants, mammals, fishes and insects. Students are asking their parents about the presence of different species and varieties, both now and in the past.

The schools along the shoreline of Lake Victoria in Uganda are especially concerned about the degradation of the wetlands. This part of the coast has a very high biodiversity and some areas are classified as Ramsar sites. These wetlands are also important for water purification. Water from River Katonga passes over the wetlands before entering Lake Victoria, and the wetlands function as a filter for cleaning the

If mathematics is to be considered as

ESD depends on if it contributes to

Connecting education to the local community

"Asumbi Teacher Training College

development by arranging meet-

ings and campaigns in the com-

munity. This includes meetings

to inform people about local key

gender equity, waste reduction,

and agricultural practices."

30 MILLION

US DOLLAR WERE SPENT

ON IMPORTING POTATOES

TO MONGOLIA

issues, such as HIV/AIDS, malaria,

water purification, soil and biodi-

versity conservation, tree planting

takes an active part in local

One of the important aspects of LORET and ESD is to connect SD teaching to the local community, the needs of the country and to global needs. If education is to support development it has to be based on the society that we are part of. All the pilot schools have expressed a strong ambition to not only teach students, but also to contribute to the development of the local community. They regard their schools as resources for the sustainable development of the local community.

On 4th October 2006, we met the former Minister of Education in Mongolia, Mr Tsanjid. He opened our meeting by saying that he was proud to tell us that Mongolia had been ranked 19th out of 80 nations in a PISA assessment concerning mathematics. He said he was really proud of that, but still had one problem: - When we, the people of Mongolia, are not capable of calculating how to live a decent life in our country, then there is something wrong with our mathematics. *Education in mathematics as well as education in all the other school subjects* must start with the needs of the people. It must be based on the needs of the local

community.

By way of example, he mentioned that Mongolia imported potatoes at a cost of 30 million US \$ rather than producing them in the country. He wanted local schools to become centres that taught the art of sustainable living to everyone. He said that the role of teachers was to train the population, but that first they needed support to develop their own knowledge.

The pilot schools have developed many examples of sustainable technologies, such as greening of the compound, sustainable eco agricultural practices, protection against soil erosion, water harvesting, water purification, energy efficient stoves etc. Schools do not only prepare students to take responsibility for developing their local communities, but often play a leading role in this development. Parents learn from their children and these initiatives attract community members to come to the schools to learn. The schools have become change agents for the development of local communities.

proramme:

mind-set of the entire community.

Asumbi Teacher Training College takes an active part in local development by arranging meetings and campaigns in the community. This includes meetings to inform people about local key issues, such as HIV/AIDS, malaria, gender equity, waste reduction, water purification, soil and biodiversity conservation, tree planting and agricultural practices. These activities are usually carried out at primary schools, in marketplaces and other places where members of the community gather. Attendance is usually very high.

meanings. Drama is a strong method for changing attitudes.

Example of a drama performed by Asumbi TTC:

- for the cows.
- · Some people cut down the forest for money.
- and humans.

fulfilment of the needs of the people?







In a report concerning achievements by the LVCEEP programme in the Katonga river basin in Uganda, Daniel Babikwa, Nature Uganda, summarises the value of the

- The value of these projects greatly lies in their ability to empower schoolchildren to transfer knowledge and skills to their homes in order to improve the well-being of the household, and at the same time help to change the culture and

The college has a drama group with 15 members, which stages performances using plays, poems and dancing in order to create awareness of SD issues. The drama teacher, James Onuyango Abila, illustrates the educative power of drama: - Drama expresses important issues, but usually not directly, but by symbolic

Nature is wonderful, nice climate, drinking water for humans and livestock, fodder

• No water for humans or cows. No fodder. Desertification.

• Need for deforestation. We must restore nature to restore a happy life for animals







Dhablat Laksman School has set up teams of students and teachers to give drama performances on sustainable development themes in the community and at neighbouring schools. An example of such a drama is one that informs about the need to preserve the mangroves. The school is situated on an island in the Ganges delta. As the island is low lying and in a cyclone prone area, mangrove forests provide important protection. Another drama that was performed concerned water pollution. On 14 February 2013, when the goddess of knowledge, Saraswati, is celebrated, a drama was performed about climate change. The goddess is worshiped by Muslims as well as by Hindus. The drama was performed at the school as part of the religious celebrations, and also as a street play.

A fishpond is under construction at Asumbi. The excavations are complete and a polythene sheet will soon be put in place to prevent water seeping into the ground. The pond measures 20 m x 30 m and 2,000 Tilapia fingerlings will be put into the pond as soon as everything is ready. Maintenance work will be conducted by members of the Environmental Club. The finances have been provided by the Ministry of Fisheries, which is also contributing with knowledge. The Ministry and staff at the school will use the pond to train primary schoolchildren and community members. The plan is to train trainers to train others.

Dhablat Laksman School and Pulbari Sitala School in India also has a fishpond to protect rare local species of fish for biodiversity reasons and also to support school meals. The school runs training courses in fish farming for members of the local community in order to develop more fish farms, and the school has promised to buy fish when they get started.

Dhablat Laksman School has also become an ambassador for organic manure. The students take care of the compost and take bio-fertiliser home for their homestead gardens. They have been taught how to build a compost heap and how to teach their parents in the art. Mr Santanu, the headmaster of the school, said that: "The school has become the epicentre for organic manure".



Diversifying gardening with vegetables and fruit trees is done at most pilot schools.



Energy efficient stoves reduces cutting of trees by at least half.



Poultry is a valuable complement to animal husbandry in Mongolia.

Kimaanya School in Uganda has trained students to train parents in how to grow vegetables, how to cook them and how to eat them. They teach them crop rotation and other effective farming practices. Students are now taking responsibility to become self-reliant and some are even producing so much that they have started to sell their products. For instance, cabbage and eggplants are being taken to the market and sold. In this way they learn to be self-reliant when they grow up.

Kitaasa School in Uganda is training parents to make nursery beds and to use dung as fertiliser. They also teach parents to make compost heaps with dung and plant residues so that they do not have to buy synthetic fertilisers that are expensive and harmful to the environment. For a number of years only synthetic fertilisers were used. Earlier, farmers only grew crops during the rainy season, but have now been taught to grow crops during the dry season as well, and to water their crops using plastic bottles as micro-irrigation. Uganda has two dry and two wet seasons. Members of the community have learned how to vary their production by growing sugar cane, passion fruit, eggplants, cabbages and tomatoes to eat and to sell. Kirumi primary school in Tanzania is actively trying to prevent the pollution of the River Mara. One cause of the pollution is animal husbandry and agricultural activities on the river banks. The school engages in the removal of these activities from the river banks by educating parents and members of the community. As the

river banks should be forested, the school is planting trees there.

Kitaasa School has held special workshops to train members of the community to build energy-efficient stoves. This helps to reduce the consumption of firewood and the cutting down of trees. In Kitaasa School in Uganda and Kirumi School in Tanzania, students have built stoves in the community. This is just one example of ESD developing entrepreneurship as a tool for better living. Energy-efficient stoves contribute to a reduction in air pollution, better health and fewer trees being cut down. These stoves have also become very common in the villages around the pilot schools.

We found another example of teachers incorporating entrepreneurial skills in their teaching at Chandman School. The teachers started by identifying a number of business initiatives that were desirable at their place. In order to be able to teach about these issues teachers needed to learn and practice on their own. They realized that they themselves needed practice. Individual teachers started to produce potatoes, vegetables, sea buckthorn, poultry and even started a bakery. The purpose was to contribute to the development of local businesses and at the same time supplement their own income. Some of the products are sold, but more often than not products are exchanged between the teachers. Students visit these businesses on a regular basis in order to learn how things are done. Parents are also encouraged to get involved, with a view to inspiring them to take more initiatives to develop the community. This is vocational training as an integrated part of formal and nonformal education that connects to practical and private initiatives.





The schools can be agents for change in the local community.

Another example from Mongolia is Zereg School, where students have produced waste bins that have then been distributed to different parts of the community and are emptied by the school's cleaning staff. The waste is taken to the school, and glass and plastic bottles are sorted and taken to the community centre in Khovd for recycling. On specific days, the waste is collected from the school and transported by lorry to the community's waste dump. The purpose is not to develop the school to become the waste handling body in the community. When the system is established community administration is expected to take over.

At Chandman School, teachers have developed local curricula on a number of themes. They call it team teaching. One of the themes is the production of honey. Honey was sometimes available in a local shop, but was expensive. People wondered whether it would be possible to produce honey locally and the teachers decided to include it as a special research theme in school.

The teachers identified that the following needed to be addressed:

- Biology the bee and its life, pollination of plants in gardens and in nature.
- Geography distribution, climate.
- Technology construction of bee hives.
- Mathematics calculate the economy and the volume produced.
- Social studies benefits for people.
- Drama students as bees visiting flowers

Developing the plan required a lot of effort, because the teachers knew very little about bees and information about them was not very accessible. When the plan was ready they started to teach with the expectation that someone in the village might start keeping bees. The teaching was done in civic education classes, project work and natural science lessons.

At Kirumi School a large area has been planted with Jatropha. The seeds are rich in oil, which can be used for the production of biodiesel. One field has recently been planted and they expect the first yield in two years. The seeds will also be sold and the hope is that biodiesel can be produced directly at the school. The technology is very simple. The production of Jatropha generates valuable income for the school. The school needs to buy more schoolbooks and other study materials. Jatropha can be planted in places in the community that are not suitable for agriculture.



WWF Sweden - Education for Sustainable Development in Practice 63

THE PEDAGOGICAL In the previous chapter we described some of the results of working with LORET. of the results of working with LORET. **JOURNEY** In this chapter, we will continue the description by adding the real description by adding the pedagogical achievements that result from LORET and the Transactive teaching concept. We will

> begin by describing a typical transformation of a pilot school, and then add other people's experiences of the pedagogical development in different parts of the world.

The journey of a typical pilot school

Most pilot schools start to implement ESD by planting trees and initiating waste cleaning campaigns in the schoolyard and the surrounding areas. These are concrete actions and the results are very visible. The continuation of the work is quite similar in all pilot schools. Let's follow the journey in one particular school!

Kirumi primary school in Tanzania became a pilot school in 2004. At first the main focus of the school was on tree planting and greening. We visited the school in 2008. It was obvious that they had achieved a lot concerning the school environment. The learning environment had also greatly improved. Teachers were working together with students in the schoolyard and students were learning about tree planting and greening during the course of the work.

When we returned to the school in 2012 we saw more changes. They were still strongly engaged in greening activities, and the school garden had increased a lot and was still expanding.

When teachers were asked about their greatest achievements, they mentioned all these activities and also pointed to important pedagogical achievements. such as:

- · Local curricula had been developed, including cross-curricular activities that integrated all subjects.
- New teaching methods had been introduced in schoolwork.
- The schoolyard had been developed as a learning area for things other than gardening and greening.
- The school had actively begun to educate the local community.
- The school had achieved higher performance results in national exams.

One of the teachers stressed the advantage of engaging students by working with various activities. The students seek the answers from society, and also ask parents, teachers and others for their views. As well as learning from the community, the students also contribute knowledge to society. Although there is still a need for traditional teaching, many new teaching methods are now available. The student is now at the centre, and the teacher has become a crucial facilitator. The result is that students have become very active - a perfect precondition for learning.

A typical sequence for schoolwork on sustainability issues is:

- The teacher defines the topic and gives background information.
- Students listen carefully and ask questions.
- · Students work in groups to find answers to the questions raised. They seek information in literature and by asking teachers, parents and community members. They make study visits. They discuss the issues and come to conclusions. They present their findings by making presentations in class, through pictures, poems, role-play and drama.
- · They then practise their knowledge out of school.







Bottom picture: The engaged team at Kirumi school planning for continued development.

Women's rights

Entrepreneurship

National celebrations

• AIDS

• Drug abuse

• Gender equity Children's rights

When appropriate, these topics are addressed by all teachers. Special occasions include the many days that are dedicated to special topics during the year, for example Women's Day and Environmental Day. In addition, two weeks are set aside for environmental work.

answers from society, and also ask parents, teachers and others for their views."

"While working with various"

activities, the students seek the

IN 2004

KIRUMI PRIMARY SCHOOL IN TANZANIA BECAME A PILOT SCHOOL

Teachers sit together and plan together more often. They teach together more often. Teachers switch assignments to complement each other more often. The composition of student groups has also been changed in order to help students to learn to cooperate more effectively with each other.

Topics that are suitable for cross-curricular activities include:

Environmental degradation

• National festivals, Easter, Christmas etc.





A lesson concerning health at Kisojo school.

African voices

At Suneka primary school in Kenya, teachers pointed out that all subjects are interrelated.

- When talking about the population, we also need to talk about the environmentand people's living conditions.

Kimaanya has only been a pilot school since 2010. Despite this, much has changed with regard to the school's pedagogical approach.

- Friendly teaching methods have been promoted. We teach the pupils what they want to be taught. There is an open atmosphere in the classroom. We have a close relationship in the classroom. There is no gap between the learner and the teacher. Communication can be characterised by dialogue. The learners and the teacher share experiences with each other. Schoolwork is student-centred. In the past most methods were teacher-centred. Now learners learn from their peers as well as their teachers.

In an interview with the teachers at Kisojo primary school in Uganda, they summarised how teaching had changed since they started implementing ESD:

- We have changed. Lessons have become more interesting, because we use nature and the schoolyard as learning grounds. We make demonstrations. Students look and see. They take what they have seen and learned at school home with them. The wood saving stoves is an example of this. After learning about them, students then go outside and make them. They make them in the village. In the lessons we integrate theory and practice.

Asumbi Teacher Training College has taken a whole institution approach to ESD. All the tutors and staff are involved. ESD is mainstreamed into the college curriculum and included in all the activities and teaching in subjects like English, Kiswahili, drama, creative arts, ICT, social studies, science, maths and home science. Important learning also takes place in a number of clubs and societies (the latter with a religious perspective) at the school.

"It is easy to understand that WWF pilot schools that are working according to the principles of ESD and developing the capacities of their students are already one step ahead in terms of the ambitions expressed in official policies."

IN 2009 **A SYSTEM FOR THE EVALUATION OF ALL KINDS OF** STUDENT ACHIEVEMENTS WAS INTRODUCED IN INDIA



In India, ESD perspectives are also being incorporated at policy level. Nowadays India has what is known as "Continuous and Comprehensive Evaluation". This is a system for the evaluation of all kinds of student achievements. The idea was introduced in 2009 and implemented in 2010. Evaluation is conducted by multiple tests throughout the school year, rather than one single test at the end of the school year. These multiple tests take the form of written and oral assessments. This system of continuous assessment means that students are less stressed. The aim is to reduce the workload and to improve the skills and abilities of the students by an all-round evaluation of a range of activities.

The students are also examined in terms of the activities they undertake. It is not only about academic ability, but is also about the students' performances as a whole, including aspects like work experience, skills, creativity, reliability, teamwork, public speaking, behaviour etc. The ambition is to evaluate and present an overall measurement of each student's capabilities. This helps those students who are not so good at academic subjects to demonstrate their talents in other fields, such as the arts, the humanities, sport, music, athletics etc. It is easy to understand that WWF pilot schools that are working according to the principles of ESD and developing the capacities of their students are already one step ahead in terms of the ambitions expressed in official policies.

Teachers at Pulbari Sitala School in India pointed to TML (Teaching and Learning Materials) as their biggest achievement. These are workbooks written by the students. The teachers ask questions and the students are supposed to provide answers in the form of short essays in their workbook. The answers should be well written and are often decorated. Students can get information from the teachers but also from books and by asking parents or people at the Panchayat (village administration) or the governmental office. Earlier, students only copied exactly what the teacher had written on the blackboard in their books:

- Working on their own learning becomes more enjoyable and students learn better.



Achievements at Dhablat Laksman school documented on the leaves of the ESD tree of the school

Santanu, the head of Dhablat Laksman School in India, says:

- We already had ESD when this new policy came, so it is very easy for us. We have many activities at our school, so we do not have to recreate these kinds of activities. In this new education framework, evaluation relates to the development of body, mind as well as soul, and that is already happening in our school.



WWF Sweden – Education for Sustainable Development in Practice 69





Almost half of the primary rainforest is still preserved at Kalimantan.

Indonesian voices

At Jambuk Makmur School the teaching has become student centered and interactive methods have been developed. Practice has been added to theoretical learning. Outdoor and indoor activities have been combined and students are enthusiastic and happy with the new methods. Teachers demonstrate and students learn by doing. Through practice students achieve: "I can and I do".

The head of Jambuk Makmur School, Sri Astuti, summarises the pedagogical achievements:

- The biggest change in this school is improvements in the teaching methods. Lessons have become enjoyable learning situations. Nowadays it is more fun to learn. Teachers integrate local issues into the subjects and that gives more knowledge to the students.

The chair of the school committee, who also is a parent, says:

- Students are happy with the new system. The children are more enthusiastic and practise at home what they have learned in school.

Another parent:

- Experience is important. When students learn from the field they have more knowledge, understanding and skills.

At Tombang Masao primary school, ESD is included in all the subjects taught at the school. A typical ESD lesson could concern locally important issues, such as forests. The work starts by a teacher giving a presentation. Students are then asked to draw a mind map of the forest - what kinds of trees and animals are there in the forest? What kind of natural resources, e.g. gold, diamond and nickel, can be found in the forest? Students look for the information in books. As the students' parents are farmers, the students often accompany them to the fields. During the lessons teachers teach about the environment and ask questions. The students are then expected to talk to their parents to find the answers. Students make field studies and discuss issues in their groups. Finally, they compile their findings in a report and present it to the class. Lessons like this are conducted every week.







Mongolian pilot schools have developed team teaching in key issues to connect school work to local development.

At Mekar Tani School teachers expressed their appreciation for a totally new learning environment – not only the physical learning environment, but also the psychological learning environment:

- As educators we take full responsibility for the students. Before we just felt that we were teaching mechanically, without feelings. Now we feel that we must educate the students with all our heart.

Teachers have developed many of the teaching methods themselves. When asked about the best one, several teachers mentioned "discussion" as an excellent new method. They said that students appreciated discussions very much. Teachers present the students with problems and ask for their ethical, moral or other standpoints. After the discussion they present their conclusions. Other new methods include outdoor activities in the schoolyard and in the school garden. Teachers expressed their satisfaction at having developed a new role as teachers:

Mongolian voices

The Mongolian pilot schools have also demonstrated great pedagogical achievements. -We have developed the ability to practise this knowledge in our teaching. In Mongolia, teachers usually only teach one school subject. At the four pilot

At Chandman School, the teachers are proud of their developed knowledge of ESD: Curriculum and lesson plans are developed in such a way as to integrate ESD. schools, teachers have developed team teaching on sustainability issues. Depending on the content, the teachers cooperate with colleagues in related/relevant school subjects. At Chandman School, teachers of different school subjects form a team to

plan and teach the topic:

- Sometimes one teacher is acting in class, sometimes we teach together. We have also introduced study days on central themes such as waste and waste reduction, animal husbandry, sustainable livelihood, desertification, protection of the snow leopard and the Saiga antelope.

respective school subject:

and the students' learning:

- The learning among students has improved a lot! In the last two years, 70-80% of the school's graduates were able to enrol into higher education. The teachers' cooperation and use of new teaching methods is now common for the pilot schools. Teachers at Zereg School express that participatory teaching methods have been developed and resulted in a very productive learning

environment. Teachers at Darvi School highlight that:

care for the environment.

In the Mongolian pilot schools, questions on sustainability are estimated to cover 5-10% of the content in tests, and are most common in the natural science subjects. At Mankhan School, all tests include material on sustainability amounting to 10-20 % of the test content. The teachers explain:

- Depending on the content, our effort is to include sustainability in tests as much as possible. Students are also assessed on how they apply the knowledge obtained in the classroom in practice.

The teachers at the pilot schools point out a great improvement of cooperation and mutual respect among the students.

- Now we can explain things as knowledgeable resource persons.

At Zereg School, every teacher works to integrate sustainability into their

- In teaching, our emphasis is on the correlation between nature, society and economics and we practise a number of teaching methods.

At Darvi School, the teachers work regularly on integrating ESD in joint curriculum and lesson plan development, and regularly review and discuss how to improve the content. They emphasise the impact of pedagogical achievements on ESD

- Students very enthusiastically respond to questions on sustainability. They are also creating the right psychological atmosphere that appeals to everyone to

TEACHING METHODS In traditional teaching, the teacher imparts knowledge and the students are expected to knowledge and the students are expected to **AND EXERCISES** receive this knowledge by listening. Education for sustainable development is different in that it calls for involvement by the students.

> When students take an active part in the learning process, learning becomes much more efficient and meaningful. In this chapter we provide examples of teaching methods that will engage students in various ways.

> Some of the methods and exercises presented here are designed to train the students in ethical reflection and argumentation. As we described in Chapter 2, these two skills are crucial in SD literacy. We also present a teaching method that builds on the idea of training the students to think in fruitful metaphors, and another method that is designed to support the students to integrate their subject knowledge and skills in order to solve an SD problem. We end the presentation with two exercises that can be used to train planning skills.

"Ethical reflection is clarification of your own and other people's values and value judgements. By enlightened argumentation, we mean that value judgements can be defended by relevant knowledge and experience."

CLARIFICATION OF VALUES

Different exercises are available that help students to develop ethical reflection and enlightened argumentation skills. Ethical reflection is clarification of your own and other people's values and value judgements. By enlightened argumentation, we mean that value judgements can be defended by relevant knowledge and experience.

Standing on figures

The teacher starts by describing an important issue. Any issue will do, but for the purpose of this presentation we will look at the problem of rapidly increasing road traffic. The exercise is continuous and conducted in three steps.

Step 1. Individual work in silence

After providing the description, the teacher continues by saving:

- I have a statement concerning solutions that I would like you to judge. To do so, I would like you to draw a line in your notebook and write the figures 1 to 6 along the line, like this:

1	2	3	4	5	6

- If you totally agree with the statement, I want you to put a circle around the figure 6. If you totally disagree, I want you to put a circle around the figure 1. Otherwise, if you think that another figure best corresponds with your judgement, put a circle around that instead.

- This is the statement: "The problems of road traffic can be solved by technical development."

- Please, save your discussions for a moment, I would like you to work in silence.

- When you have made up your mind, indicate clearly which figure on the line best represents your considered response.

It is important that students do not talk to each other at this stage of the exercise. They must come to a personal standpoint. If they talk to each other those with most influence might affect the others. When everybody has arrived at a personal standpoint, and indicated this on the line in their notebook, it is time for the next step.





Step 2. Discussion in small groups

Put six sheets of paper with the figures 1-6 on the floor – one number on each sheet. Ask the students to stand beside the figure they have marked on their own line in their notebook.

- Dear students, compare your own arguments with those standing beside the same figure as you have chosen.

Being a student, you might find that standing beside your chosen figure is a bit scary. You might see that your best friend, who is very knowledgeable, has chosen another position. You might therefore wonder whether you have arrived at a good conclusion or not.

When students discuss their judgements in their small group they will find people who have arguments like their own. They may even develop new arguments, and grow in confidence as a result.

Step 3. Discussion in the entire group

When everyone is satisfied with the discussion, it is time for the next step.

- Dear students, I have a little extra task for every group - who in your group has the shortest name?

The group is given time to find this out.

- Dear students, I would like that person to give a summary of the discussion in your group.

The groups then report one by one. Make sure that the person with the shortest name gives the report. It often happens that the most influential student tries to report, instead of a not so influential one. Do not let him/her do that. The student with the shortest name, whoever that is, must give the report. Do not let anyone comment or add anything at this stage.

portunity to express his/her opinions, knowledge and experiences, and be encouraged to do so."

"Everybody should be given the op-

When all the groups have summarised their discussions, other people can then speak. Everybody should be given the opportunity to express his/her opinions, knowledge and experiences, and be encouraged to do so.



74 WWF Sweden - Education for Sustainable Development in Practice

Engaged students at Kimanya primary school in Uganda

"When students get used to the

method, they realise that they have

to listen carefully to each other in

case they are picked at random to

give the report from the group. In

this way they train themselves to

listen to each other."



The reason why you ask the person with the shortest name to report from each group is to ensure random reporting. Other alternatives would be to ask the person with the youngest sister or brother, the shortest little finger or maybe the lightest coloured clothing to do that. Usually, a few students will take the initiative to answer the questions posed by their teacher. Using this method, everybody will have an equal chance to make his/her voice heard.

The task of the reporting student is always to give a summary of the discussion that has taken place in the small group. When students get used to the method, they realise that they have to listen carefully to each other in case they are picked at random to give the report from the group. In this way they train themselves to listen to each other.

Do not be too clear when developing a statement for this kind of exercise. If you explain everything in very great detail you will probably end up with all the participants standing on the same position on the floor and no discussion will occur. In the example above, you could ask what kind of problems the statement embraced and what is meant by technical development. Let the students discuss these details and as far as possible respond to each other.

Be wary about students asking you for your own opinion. If you immediately reveal your own opinion there is a risk that all the students with different standpoints will regard your opinion as the right one and their own as wrong. There is also a risk that students will try to guess the opinion of the teacher instead of thinking about their own responses. If students ask about your own standpoint, let the revelation wait until the next lesson.

Why use this method?

The aim with this method is to help students to make judgements, arrive at personal standpoints, and to develop and communicate their arguments. The aim is not to transfer the standpoint of the teacher to the students. The idea is to train students in critical thinking and to listen to other people's arguments. When using this and other exercises related to the clarification of values (see below), the students are trained in ethical reflection and also practise democracy.

Some practical aspects for the teacher to consider

Thinking takes time, and it takes time to develop an opinion. Make sure you give the students enough time to come to a personal standpoint.

It is important that students indicate their personal opinion by circling the relevant number in their notebooks. When they have done this, they will probably stand in the corresponding position on the floor. If they have not made a definite mark in their notebooks, they can choose a position on the floor where a knowledgeable person is already standing. That may feel safer for them.

In this kind of exercise there are no right and no wrong answers; only different opinions about how to tackle a problem. Make it clear to the students that all standpoints are of equal value, and teach them to respect each other's views.

More exercises related to the clarification of values

The exercise described above is just one example of exercises used in the clarification of values. Here are some other examples:



Four corners

A slightly different variant of the same method is called the 'Four corners exercise'. The sequence of steps is the same as in the previous exercises:

- Step 1. Individual work in silence.
- Step 2. Discussion in small groups.
- Step 3. Discussion in the entire group.

You instruct in the same way, but this time you ask the students to write down which one of the four alternatives, given by you, they judge to be the best answer. Instead of numbers on the floor, each corner in the room corresponds to one of the four alternatives. While the students are

Why is there so much flooding nowadays?

• Climate change

- It rains more
- People build houses on wrong places
- Deforestation

Who is responsible for spreading of environmentally harmful substances in our surroundings?

- The politicians
- The consumers
- Those who sell the products
- The producers

What characteristics distinguishes true knowledge?

- Absolute true facts
- Results in good behaviour
- Gives a deep and comprehensive
- understanding of important issues
- Your own alternative

thinking, put signs with each of these alternatives in each corner of the room (i.e. one alternative per corner) and let the students place themselves according to their judgements.

In the next step, students discuss in small groups. Form small groups according to your own criteria. For example, groups can be formed according to the colour of the students' clothes: a red group, a blue group, a black group etc., or when students have their birthdays: a January group, a February group, a March group etc.

The third step is the same as above (the reporting student is chosen at random).

How can the impact of fuel wood collection best be reduced?

- More use of handblowers
- More use of droppings
- Use CNG
- Sustainable forest use practises

What is the most effective way to achieve a sustainable society?

- By legislation that supports a good behaviour
- Taxes and fees that supports a good behaviour
- By the educational system
- International agreements

How can conflicts between man and wildlife best be reduced?

- Moore fences
- · Pay compensation when livestock is killed
- Protect larger areas
- Relocate population in questioned areas

Ranking exercises

Another variant is called 'Ranking exercises' and uses the same steps: Step 1. Individual work in silence.

Step 2. Discussion in small groups.

Step 3. Discussion in the entire group.

What are the best alternative sources for income generation as alternatives to illegal logging? Fishery Agriculture Handicraft Starting a shop Ecotourism Rank 1-3	What is the biggest reason for forest degeneration? Collection of non timber forest products Grazing Fires Fuel wood collection Encroachment Rank 1-3	If I would be the president of our country I would
What could you do for a better environment? Getting engaged in a relevant NGO Getting engaged in politics Try to be a good example to inspire other people Something else, Rank 1 - 3	Ecotourism is a potential source of alternative income generation in rural areas. What do you believe a foreign tourist is most interested in? Natural forests Disco Wild animals Local traditions Luxury hotels Beautiful scenarios Local food Warm and sunny weather Rank 1-3	The best with our school is
What is the biggest value of a cow? Droppings Milk Religious value Meat Status of owner Rank 1-3	What should be avoided to protect forests? Cutting of big trees Collection of dead wood Cutting small trees Cutting of dead trees Cutting of branches Rank 1 -3	Elephants 1. When I think of elephants I think of 2. The best with an elephant is 3. A condition for elephants to coexist with farmers is that 4. The best way of protecting elephants is to

Unfinished sentences

above.

'Unfinished sentences' is another variation of the same

method and uses the same steps as above. In this case,

the task for each student is to end the sentence (step 1,

individual work in silence). Steps 2-3 are conducted as

If I would be the head of our village I would •••••

••••••

An improvement in our school could be to

•••••

To reflect about before next seminar

The most important issue last seminar was

The most important environmental issue in our country is

In my school I could contribute by

Then I need to

Making lists

The simplest and most usual variant is to make lists, but remember the three steps: Step 1. Individual work in silence.

- Step 2. Discussion in small groups.
- Step 3. Discussion in the entire group.











Moral dilemma

The exercise 'Moral dilemma' is dealt with in the same way as above.

Step 1. Students start by listing all the possible alternatives - good as well as bad ones.

Teacher: What would the consequence be if you acted according to the different alternatives?

A spontaneous moral reaction turns into an ethical reflection?

Moral dilemma

When walking along a beautiful creak one late evening you happened to se a man throwing out lots of waste from his car. Many boxes of waste thrown into the water. When coming close you saw that it was your new chief.

What would you eventually do?

Write down all possible alternatives regardless if they are bad or good alternatives.

1.	
2.	
3	
J.	
4.	
ጛ.	
6.	
7.	

Mark with: S = what you should do. W = what you would do. Compare 'Should' and 'Would'. What is t he consequence of the different choices S and W? Continue with steps 2 and 3.

Final discussion: Have the students experienced similar situations in real life?

Opposites

When we have to take a standpoint in relation to a specific situation or statement it becomes difficult, and often gives a good ground for ethical reflection, i.e. an explanation for why you have chosen one alternative and not another. In such explanations both the consequences and the alternatives are of interest.

Opposites



- It is always wrong to kill an animal
- It is always wrong to kill an elephant
- It is always wrong to kill a human being
- It is always wrong to slap a child
- Hunting is only acceptable when it is needed to get food

No

• It is ok to sell licenses for hunting of rare animals if the money goes to conservation of nature

Divide the room in two parts. Students move to the part that corresponds to their standpoint. Open discussion after every statement.

- A human being has a higher value than an animal
- Capture breeding is the best way of conserving rare species
- The biggest value of nature is to support our living
- Tourism has negative effects on nature
- Child labour is always wrong
- Extra freedom in the families is the reason for drug addicts
- Globalization is good for the people in our country



The endangered Orang-utans at Kalimantan.

> "A role-play is focused on how a group or professions with different interests would act in certain situations."

Role-play

Role-play has similar strengths as exercises for the clarification of values. The difference is that role-play is focused on how a group or professions with different interests would act in certain situations. In the exercise below, the issue concerns a proposal to develop a national park in the Heart of Borneo.

- Dear representatives of the local community, people living in this area, conservationists/ environmentalists, representatives of tourist companies, gold mining companies and logging companies! I have come to you as a representative of the central government in Jakarta to ask you for your opinion concerning a proposal to develop a national park in this part of the country.

in the area.

- Several rivers that support people with water further downstream are - There is a proposal to establish a national park in this area, but as yet no

included in the area. The soil is rich and has great agricultural and farming potential. A couple of thousand people live in the area. They are mainly forest dwellers. In the central part of this area, gold has been found but not yet exploited. decisions have been taken. In order to make a wise decision, the government is asking for your opinions and reflections concerning the need for the park and the consequences that such an establishment might have. It is just as important to focus on the advantages, as on the negative consequences.

small groups to prepare this meeting.

Groups represented at the meeting are:

- Local municipality
- People living in the area
- Conservationists/environmentalists
- Tourist companies
- Gold mining companies
- Logging companies

How to conduct the exercise:

- 3. The groups present their opinions.
- 4. Debate/discussion.

The teacher introduces the exercise like this:

- The area consists of deep rainforests with a rich biodiversity. Here we find a great variety of mammals, birds and rare plants. Orang-utans are quite abundant

- We will soon ask you for your opinions, but I would like you to start by forming

1. The teacher is the facilitator and presents the role-play. 2. The different groups prepare the coming meeting.

5. When the role-play has ended, there needs to be a session in which every student can express his/her personal standpoints and feelings.



Here we have a bottle with soil, a green plant and a limited amount of air. The bottle is closed and no one will open it. How long will the green plant survive? This is simply a metaphor for mother earth being a closed ecosystem.





FOR HOW LONG WILL PLANTS AND **ANIMALS SURVIVE IN THE BOTTLE?**

HOW LONG WILL WATER. NATURAL FERTILISERS AND AIR LAST?

WHAT WILL BE THE WEIGHT OF THE BOTTLE IN A YEAR'S TIME?

Thinking in metaphors: The closed bottle

in a limited world.

When starting a bottle, use soil from nature that is not too wet and not too dry. If you add extra water there is a danger that mould will develop inside the bottle. Take a pot plant out of its pot and plant it in the bottle. Put a top on the bottle. Keep the bottle in a light place, but not in direct sunlight.

Nobody should open the bottle again. Nobody should water the plant or remove any wilted parts of the plant. Study what happens over a long period of time. Ask the students, in small groups, to discuss the following questions:

Observe the students while they are discussing. Some of them may start moving their hands in circles to illustrate their thinking.

The bottle can be regarded as a miniature model of an ecosystem. Green plants produce plant matter out of carbon dioxide and water by using energy from the sun. The only living organism that is visible to the human eye in the bottle is the plant, although there are billions of microscopic organisms in the bottle that are invisible. There are as many microorganisms in a spoonful of soil as there are human beings living on Mother Earth. Actually, there are only minor differences between microorganisms and human beings in this sense. We are all 'animals' and depend on green plants for survival. The microorganisms decompose plant matter into carbon dioxide and water, releasing energy that the green plants once absorbed from the sun. The carbon dioxide and water are utilised again by green plants, and so it goes around and around in eternal cycle.

This experiment is just as valuable for preschool children as for university students. For small children, the message is to realise that we have to be careful about how we use natural resources. We live in a closed system. Nobody will ever fill it up if we run out of resources. We only have one Mother Earth to share with ourselves and with coming generations. With adult participants we can talk in more depth about the cycles of nature.

resources.

THE MISSION

The mission is an exercise in which a spaceship is used as a metaphor for achieving sustainable development on our planet, Mother Earth. The challenge is to develop a desirable life in a limited space for a very long time to come.

"You have been appointed by the Planet Council to participate in the greatest adventure in the history of mankind. You have been chosen to travel on a giant spaceship that is capable of travelling an unimaginable distance.

Resources

List the important literature, resource materials and other sources.

This exercise uses a metaphor - the closed bottle - to illustrate ecosystems in nature. By working with it, students will learn to think in terms of cycles. They will understand the need to make the best use of natural resources and to make priorities

The most important thing with this exercise is that it leads to new patterns of thinking: thinking in terms of cycles instead of more traditional thinking in terms of linear consumption and that we have to look after the finite number of natural

The journey will take 6,000 years.

- You do not have to worry about piloting the ship. It is already equipped with an engine and fuel for the journey.
- The gravity is the same as on Earth.
- · You may only use already known technology.
- You will have access to solar energy throughout the journey.
- The diameter of the ship is 5 km.
- What do you suggest to bring?

An intellectual experiment to plan a sustainable society with a metaphor regarding life on earth as a space ship.



Scenarios

Scenarios can be used in order to train students to integrate the knowledge, skills and experiences gained in school subject teaching to solve an SD problem.

This is the task given to the students:

"There will soon be a meeting with the Planet Council where you are expected to contribute with your proposals what to bring. Right now the ship has an empty floor with the diameter of 5 km.

Prepare for this meeting by writing a list. Please work on your own and save your discussions for later."

After 15–30 minutes gather the students in smaller groups and ask them to compare their lists. They are expected to agree on one common list for each "ship". These discussions will take at least one lesson.

Ask each group to draw a picture illustrating the ship. Draw it as a circle. The ship must be a nice and pleasant place to live in, although the picture should also describe the different functions in the ship. Short texts describing the important functions can be added.

THE MISSION

One group of students wrote milk on their list

• "How much milk will you need?" the teacher asked.

The students started to calculate. 100 people in 6000 years and every person drinks 3 dl milk a day. After some time they came up with an answer

• "You have done a great job. You managed to calculate the amount of milk needed. ... but, how will you keep the milk fresh?

"In refrigerators powered by compressed natural gas", said the students

• "How many will you need?".... "If necessary, I can help vou with the maths.

After some calculations the students came up with an answer

• "You have done a great job. You managed to calculate the number of refrigerators needed. ... but how much gas will you need?'

So they started calculating again. After some time, one of the girls got irritated and said:

• "Aren't these calculations ridiculous!? Why don't we take a cow instead?

• "Why don't you? You were the ones who decided to bring refrigerators." said the teacher

"It is very important that the students have both the time and support to find answers to the different questions on their own. The process of thinking takes time."

problems have to be solved.

It is very important that the students have both the time and support to find answers to the different questions on their own. The process of thinking takes time. The following sequence illustrates how some students and their teacher cooperated. Give students acknowledgements for their solutions and ask them if everything is set for a happy life for 6 000 years.

Ask the students to write a short text in connection with their ship under the heading: "Population". Some of the students might consider gender equity and cultural diversity, while others might consider health issues and reproduction. When the students have finished the task, repeat the question: "Will everything function well for the coming 6000 years or does anything more need to be discussed?" Do not tell your students which issue you have in mind. After some time

they will come up with the questions.

- How are we going to take decisions about important questions that arise? The solutions will be very different in the different groups. Some will invent direct democracy. Some will invent the parliamentary system. Some will appoint a dictator, a king, or the smartest person, who is given the right to take all decisions. Different groups will invent all the decision-making systems ever practised in the history of mankind.

prisons, or are their other possibilities?

farming, or a capitalistic system?

traditional school? Let's make curricula.

Earth?"

Sometimes students might ask: "Why should we go on this trip?

Well isn't that a way of putting the eternal question: "What is the meaning of life?" You can work with the metaphor of the spaceship for a full school day or for a number of lessons over the course of time. Since this task requires competencies in many school subjects, it would be good to find a way of integrating it with other subjects than your own. One way could be for students to work with their ships in other teachers' lessons.

It is very important to give students time for reflection. Thinking takes time and in this task the process of thinking is more important than the result itself.

It is very important that you, the teacher, do not tell the students which issues and

Usually students start by solving the need for food, accommodation and clothing. They will describe the water cycle and how to access clean drinking water.

Repeat this question: "Will everything function well for the coming 6000 years or is there anything more that need to be discussed?"

A student may come up with the following question:

- How many can accompany our group on the ship – and who?

"Do we need laws? Some groups will develop the laws of their ship.

"What happens if somebody does not obey the laws? Do we need police? Do we need

How are the resources going to be distributed? Are we going to have collective

How will knowledge be transferred to coming generations? Will we have a

Some will invent the apprentice system, where people with special occupations work together with youngsters who are learning the trade.

Are discos, sport facilities, theatres and music halls necessary? Food is a necessity, but is culture? What makes life worth living? What are the preconditions for people to live a life in harmony and peace? Why do we have so many wars on

Methods for planning SD

Developing and prioritising ideas for development

This exercise could concern the development of your village, your school or some other institution.

Each student/participant writes four concrete suggestions of what could be developed (one idea/sheet of paper). Groups are then formed with approximately 4–8 participants in each group. The participants in each group put their sheets with suggestions, upside down, in the middle of the work sheet. The suggestions should be in mixed order.

One student starts by reading the first suggestion. He/she suggests where to put it on the various axes.

The next student can suggest that this idea be moved if he/she regards it to be more or less important, or more or less easy to realise. The participants in the group then discuss the issues and try to reach consensus.

In the last part of this session all the groups should report their suggestions. They start with the idea that has been ranked as the most important and easiest idea to implement – one idea at a time. The suggested idea is then discussed in the entire group/class. The next group then shares its results.

The exercise results in a collection of ideas for development that are regarded by the groups as important and easy to realise. The next step is then to discuss and develop work plans for how these ideas could be put into practice.



Back casting

The following exercise belongs to the back casting method. The purpose here is to illustrate the method and to illustrate an important aspect of ESD, i.e. to change from analysing the problems of today to a focus on a desirable future. The method can be applied to any issue concerning the future, and can be conducted with students, student teachers or teachers.

- hands.

- Who influences your tasks?
- With whom do you cooperate?
- How do you cooperate with parents?

- What happens to waste?
- From where do you get energy?

Play some soft music for a few minutes.

vision into reality.

"The back casting method

vision into reality?"

produces a desirable vision and asks the question: What

should be done today to turn the

The traditional method for planning for the future is based on extrapolation. For example: How many cars did we have in 1980? ... in 1990? in 2000? in 2010? How many cars will we have in 2020? ... in 2030? The result might be that we build a society with an infrastructure that is not wanted!

The back casting method produces a desirable vision and asks the question: What should be done today to turn the vision into reality? The method is used by business to work out a desirable vision for their activities and can be illustrated with a story about Alice in Wonderland, who met a cat one day in the middle of a dense forest: - Please tell me in which direction I should walk, said Alice.

- I do not know, said Alice.

direction.

- I want you to sit comfortably and put away everything you have in your

- Please close your eyes and sit in silence.

- What do you want your school to look like in ten years time? Not what you believe it will be like, but what you want it to be like. - You come to this desirable school in the morning. What does it look like? - You meet some colleagues. What do they talk about? - You meet some students. What do they talk about? - What is your job at the school? - What difference does it make if you are a male or a female teacher? - What difference does it make if a student is a male or a female student?

- How do you integrate your teaching with other school subjects?

- What kind of influence do students have?

- How do you connect schoolwork with the local society?

- To what extent do you use nature in your work?

- What does the schoolyard look like? How is it used in schoolwork?

- How do you get food for meals at the school?

- I will now be silent for a few minutes and I would like you to concentrate on the question of what you WANT your school to be like in ten years from now. - I will tell you when it is time to open your eyes again.

- Now it is time to open your eyes again and return to the present moment and our seminar/lesson. I hope you can see your vision for your school very clearly. Now your task is to try to work out what you can do today to turn this

- That depends on where you want to get to, said the cat.

- Then it does not make any difference which direction you walk in.

We must start by developing our desirable visions for the future. We might then be able to determine which steps are necessary in order to move in a desirable



APPROACH TO EDUCATION

SUSTAINABILITY As indicated in Chapter 1, sustainability is also a perspective that can be used is also a perspective that can be used to organise the overall work at school, and not only the teaching activities. This is usually called a "Whole School Approach".





A learning school compound.



In the following we will deal with two particular aspects of a sustainability perspective:

- Developing a good school environment.
- · Developing fruitful preconditions for education and learning.

Both aspects can be approached by combining ecological, social/cultural and economic perspectives. Questions about teaching, learning and connections to the local community are dealt with in depth in other chapters.

SCHOOL ENVIRONMENT

As we have seen in a previous chapter, the point of LORET is that the work to create and manage a sustainable schoolyard and school building should be connected to the teaching in the different school subjects. But even if that is not done, managing the school environment – school buildings and schoolyard – in a sustainable way is an important educational issue, and can help to teach the students practical SD knowledge.

In East Africa, the most apparent change is the greening of schoolyards. According to a photograph taken in 2004, the Kirumi primary school in Tanzania was typical of its kind. Like many schools in such countries, the schoolyard looked like a desert. Today, however, it is like a green oasis, with lots of trees providing shade. There is also a large kitchen garden for the school's own use, pathways marked with white stones to illustrate how soil erosion can be prevented and other pedagogical installations, such as geometrical figures, numeric lines, letters of the alphabet etc. The schoolyard is used for pleasure as well as for learning, and in this way complements theoretical lessons. In many cases the schoolyard is used as a pleasant "classroom" for outdoor lessons, and an alternative to sitting indoors. All the pilot schools in East Africa have become visitors' centres, to which other schools and community members come to learn. The schoolyards of the pilot schools are also used to train students in sustainable agricultural practices.

The East African pilot schools also practice what they call "talkative schoolyards". This means putting up signs with straightforward requests, such as "Stop Global Warming", "Save the Forests", "AIDS is Real" etc. These signs have an impact on other students and visitors. The process of developing them is just as important, in that they help students to focus on priority areas and how to formulate the message.

Another programme that contributed to girls' attendance at schools in Madhya Pradesh in India was the building of new fresh lavatories. Special funds were allocated by the state for this. The Dhablat Laksman School, in the Ganges delta, has built 11 new water toilets for girls. 3,000 litres of water are collected from the school's roofs. The sewage goes to a separation tank with three chambers, which are emptied every second year. At Mankan School in Mongolia, new fresh toilets for the youngest children have been built. 40% of the world population does not have access to proper sanitation.







The East-African model schools are strongly engaged in the teaching of hygiene. However, they do not just teach facts or theories, but also practise what they teach. At Kitaasa primary school, the outdoor closets are complemented with simple installations where water is obtained from a can. By stepping on a piece of wood, a string turns the can and you get flushing water. This is a very simple and efficient technology that can easily be replicated in people's homes.

The pilot schools in Mongolia are working with the environmental performance of the schools in a very systematic way. The Eco Committee, consisting of student and teacher representatives, synchronises the environmental reviews of the school's environmental performance. The committee looks at littering, greening, energy consumption, temperature, light, ventilation, noise, moisture and dust. These reviews are conducted by all the students together with the teachers during lessons in civic education and in specific project hours. Action plans are developed and acted upon. All the schools have done a lot to reduce their environmental impact. For example, when they needed better lighting they switched to low energy light bulbs. They have also reduced the amount of dust by adding lots of flowerpots, changing into indoor shoes and more efficient cleaning programmes. Some schools have also changed from wood-fuelled kitchen stoves to electric ones, thus reducing deforestation. The knowledge that is developed by addressing the environmental performance of the school is spread in the local community by means of various campaigns, usually initiated and coordinated by the Eco Clubs.

The methodologies that were used in the reviews were simple and did not require expensive equipment. Of course, these assessments could also be regarded as a perfect activity in which students learn practical SD knowledge by learning by doing. The results of the assessments were disseminated and usually displayed on notice boards in central positions in the school. Many of the schools also developed illustrative graphs showing the results of the review and the actions taken.



Students at Dhablat Laksman school living for three months at the school to prepare for national exams.



48 SOLAR PLATES HAVE BEEN INSTALLED **ON THE ROOF OF DHABLAT** LAKSMAN SCHOOL Mekar Tani School in Indonesia has developed an interesting method for monitoring their achievements. They assessed the desirable visions of students and teachers concerning the school and then monitored the actual situation of the school and their achievements in relation to these desirable visions. The usual approach for monitoring is to document all the shortcomings and then begin to address them. The approach used by Mekar Tani School is based on "the back casting" method. In this method, the desirable vision is developed first and is then followed by the development of an action plan for the implementation of the vision. This is much more positive than focusing on the shortcomings and working from there. This method is also used by western industries and is highly appreciated.

At Dhablat Laksman School, 48 solar plates have been installed on the roof and a windmill is located in front of the school. The system has a total effect of 5 kW and is used to light up the hostel rooms and the office and to power the school's computers. There is also simple equipment for distilling water by solar heat. When water is heated by the sun's radiation, it evaporates and condenses on the glass covering the equipment. Water flows along the glass and into a container. This has meant that the school is now self-sufficient in distilled water and can also supply people in the community with solar cells. The system is maintained by a group of 20 students, who are well versed in the advantages of electricity from solar cells compared to electricity from the grid.

Most East African schools have hostels that are often used by orphans who have lost their parents due to AIDS. All Mongolian schools have dormitories (hostels) in order to support students whose families live a long way away, conduct animal husbandry and live a nomadic life, or are marginalised in some way.



Elder students at Zereg school in Mongolia are teaching younger students.

PRECONDITIONS FOR EDUCATION AND LEARNING

Engaged and empowered students

In all the schools we visited in Mongolia, East Africa, India and Indonesia, our main guides were usually students. They guided us around their schoolyards and told us about their gardening, farming and greening activities. They told us about different plants and animals, their values and how to take care of them. They demonstrated vermin composts and waste bins, solar cells and solar ovens. Everywhere we went the students were highly engaged and motivated.

Mekar Tani School in Borneo, Indonesia, is situated in a place where only a few decades ago there were deep rainforests and wet peat lands. Large international and most often illegal companies cut the forests down and offered people jobs. When the forests were gone and the companies left, there were no jobs and the entire area became depressed. The school experienced increasing problems with student dropouts. But, as a result of the introduction of the ESD approach, things changed. Students became engaged in the learning process. Now the school has 100% attendance because children enjoy schoolwork. The school also cares more for the students. If a student does not attend school a teacher goes to the student's home, talks to the parents and encourages the student to go back to school.

The role played by the students in the process of implementing ESD is very important. Not only are they the main workforce when it comes to greening the school, they are also very enthusiastic. Staff at all the schools talk about the students' commitment and attitudes changing for the better. In Mongolia, the results have also shown that students become more empowered. At first students take part in practical activities, such as greening the schoolyard and surroundings, and after a while also take over the responsibility for the organisation of activities and events. Eventually students exert more influence by initiating activities, proposing specific actions and setting up funds for coming efforts. All this indicates that student engagement is increasing and that students are empowered.





Creating positive relations

There are several signs that the work of implementing ESD has multiple positive effects. When teachers and students work together on greening and cleaning activities they talk to each other in a different way, which leads to new and closer relations between students and teachers being developed. This achievement was expressed by Mr. Santanu at Dhablat Laksman School in the following way:

"How can a teacher relate to students when you have 125 students in a class? That is not possible, but when you have the other activities, space is created where students and teachers talk more to each other. Relations have become much closer. A different behaviour between students and teachers develops. They behave like friends. They listen to each other. Teachers ask questions instead of only giving information."

The question of how relations have changed was answered by teachers at Kimaanya primary school in Uganda:

- Students express their ideas very freely.

- The students are free with us. When a teacher picks up a polythene bag the learners feel concerned that if a teacher can pick it up, why cannot I do the same? We have become equal. The relationship is there, that what a teacher can do the learner can also do.

In East Africa the relations between students and teachers have become very deep, to the extent that teachers engage in the personal problems of the children. Another teacher at Kimaanya School said:

- There is a relationship. We always listen to each other in such a way that if a child has a problem they always share the problem with the teacher, and the teacher then finds a way of solving it. Pupils are free with us. A child cannot suffer behind the curtain. If the problem is big they write about it and put it in the suggestion box. They are always free with their teachers because of our close relationship.



96 WWF Sweden - Education for Sustainable Development in Practice

Richard Ogeto is the key person for implementation of ESD at Asumbi Teacher Training college

"At Kirumi primary school in

Tanzania, teachers traditionally

connecting them to other school

subjects. Every teacher worked

alone. Today there is close cooperation, and teachers even exchange

subjects with each other in order to

widen their experience."

taught school subjects without



Relations between the tutors and students at Asumbi Teacher Training College are also warm and open. When teachers address students in assemblies the students often respond by using their nicknames. When an older male teacher in philosophy addresses students they all respond loudly with "papa", his nickname, which indicates the close relation with their tutor.

In Mongolia the schools point to improvements in cooperation and teamwork in extra-curricular activities, and to mutual respect and learning from each other by people sharing their experiences. Student participation in wider scale communitytargeted activities also influences the relation with other residents positively.

Team building

At Asumbi Teacher Training College, Richard Ogeto is a key ESD person. He is the head of the ESD Committee and a member of the core team of LVCEEP. He explained that his strategy builds on participation:

- When I see something that needs to be done I do not do it at once, but I bring it up in the Eco Committee or discuss it with my colleagues. The job will be done, but there will also be lessons learned.

Richard understands the need to gain support from all his colleagues if ESD is to be mainstreamed at the college. It is apparent that staff at the college work as a well coordinated team with intellectual fellowship and common ambitions. The college has taken a whole institution approach to ESD, with all tutors and staff being involved. This was not the case at the beginning. Richard slowly convinced his colleagues about the need for ESD and managed to build a strong team from the tutors at the college. They have worked closely together and today there is a total agreement. All the student teachers are trained to be ambassadors for ESD in the college's training schools.

The head of Dhablat Laksman School constantly emphasised his ambition to develop a team spirit between the students and the teachers and between teachers and students. "That is what makes us successful."

Teachers at Kirumi primary school in Tanzania explained how teachers traditionally taught school subjects without connecting them to other school subjects. Every teacher worked alone. Today there is close cooperation, and teachers even exchange subjects with each other in order to widen their experience.





An anemometer to register wind speed at Dhablat Laksman school

When teachers at Darvi School in Mongolia were asked about the achievements they were most proud of, they started by pointing out the improvement in cooperation among teachers. "Earlier we worked alone. Now we work together as a team and our work has become more enjoyable." As a result, learning among the students has improved a lot.

Teachers in the other Mongolian pilot schools used to work in isolation in the same way.

Cooperation is about co-teaching, observing colleagues' teaching/classes and joint planning. Depending on the content, the teachers cooperate with teachers in related/ relevant subjects.

The need for team building to make all education effective can be illustrated with the following saying: "If you want to travel fast – go alone. If you want to travel far –



Children to nomadic herders have the right to live for free at dormitories at the schools

go together."

Reducing dropouts

In most schools in the world, meals are usually only served to students who are able to pay for them. ESD pilot schools are experimenting with producing all the ingredients needed for meals at the schools themselves, so that no charges need to be made. When schools have the capacity to serve meals to all students, a basic precondition for learning is met.

In Mongolia there was a big problem with children from nomadic families dropping out of school after the collapse of the soviet system. During the transition period from a centralised communistic planned economy to a decentralised capitalistic market economy, lots of people lost their jobs and returned to a nomadic lifestyle. The number of nomads doubled and they often kept their children at home to help with the everyday work. In an attempt to get children back to school, a law was passed that offered nomadic children free meals and accommodation in school dormitories. The conditions in the dormitories have improved enormously, and today the attendance of Mongolian children in schools is among the highest in the world.

IN 2009 CYCLONE AILA STRUCK SUNDER-BANS AND WIPED OUT MOST

OF THE HUMAN SETTLEMENTS ON THE ISLANDS



In Madhya Pradesh in India, students dropped out of schools at an early age. Especially girls had a tendency to leave school around grade seven. When the conditions were analysed it became obvious that many of these girls had a long way to go to school. As it was common to have to walk several kilometres to get to the school, it was hardly surprising that students stayed at home. In an attempt to get the girls back to school, the State Government passed a law that gave every girl a brand new bike, which they could only keep if they attended school. The girls were very proud of their beautiful shiny bikes and school attendance improved dramatically. Sunderbans in India is an area that is susceptible to cyclones. In 2009, cyclone Aila struck Sunderbans and wiped out most of the human settlements on the islands. The worst thing was that brackish water entered the rice paddies, harming agricultural production for years to come. Amazingly, the death toll was only around a couple of dozen. Since almost everybody on the islands was affected, the fear of new cyclones is very real. One consequence has been that families keep their children at home if they are concerned about the weather. Another consequence is that community members who have to travel by boat to get to their workplaces also stay at home when they fear the arrival of a cyclone.

Dhablat Laksman School on the island of Sagar in Sunderbans has created a weather station. Members of the Eco Club record the temperature, humidity, atmospheric pressure and wind speed. A meteorologist regularly comes from Kolkata to guide the students and the teachers. The ambition is to build up a database of weather recordings and competence to predict the arrival of a cyclone. When this happens, people are warned by signals from big loudspeakers at the school. The volume is very high and the signal can be heard in the far distance. Loudspeakers at other schools, in marketplaces and on local administration buildings pick up the warning and broadcast it further. Now people feel confident that they will be warned about the arrival of a cyclone and can take the appropriate action. Even though the weather station has not been in use for very long, the school already experiences a better attendance by students. Weather forecasting has become a precondition for pupils coming to school and for workers going to work.

added to theory.



It is worth mentioning that the weather station is also used in the teaching of physics. All students have visited the station and been taught about weather forecasting. All students have been trained to read the instruments. Practice has been

n 1920 IEAK 115 117 2 4 2 1.5 (Artist) 8 1 115 117 2 4 2 1.5 85°C 212 11°C 22°C 15°C 10°C 12°C 12°C 766 66 2.5C 21°C 22°C 2.0 14 14°C 16°C 17°C 5«TT) 2.4 %TF 10°C 12°C 12°C 10°C 12°C 12°C 12°C 12°C 10°C 12°C 12°C 12°C 12°C 10°C 12°C 12°C 12°C 12°C 12°C 10°C 12°C 12°C 12°C 12°C 12°C 12°C 10°C 12°C 12°C 12°C 12°C 12°C 12°C 12°C 12	তারিখ	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Arron 3 1 1'5 1'7 2 4 2 1:5 85°C 212 11°C 21°C 21°C 21°C 21°C 15°C 15°C 10°C 12°C 22°C 76°C 16°C 12°C 12°C 87°C 11°C 12°C 12°C 87°C 11°C 12°C 12°C 87°C 11°C 11°C 12°C 87°C 11°C 11°C 11°C 87°C 11°C 11°C 11°C	n .				1PM	IRA										F
इडि २२२ २२२ 15° ७७१ १४९ १८ २८ 7% ८७ २३२ २८ २० १५ १४२ १८ २८ ३४७ २८ १५ १४२ ३४४ २८ २८) /ঘ'টা)				3	1	1.5	1.7	2	9	2	1:5			T	t
ISC 10° 12° 12° 12° P6 66 256 24° 24° 20 14 4° 16° 17° 20 14 4° 16° 17°						350				210	210	228			T	T
P6 66 232 24°C 242C 2.0 14 14°C 16°C 17°C (mm) 2.4 श्रीवा 1						ISe				10°C	12°C	12°C			T	+
 २० २० २० २५ २५ २५ २५ 						76			66	210	240	240	-			1
হুবা) (mm) (মিমি) (মিমি)						20			14	140	16°C	170	-			1
(mm) (태제) (태제)	কৰা)															
	(mm) (মিমি)				24	after.										
	4															

WWF Sweden - Education for Sustainable Development in Practice 99



WWF Sweden – Education for Sustainable Development in Practice 101

GOVERNANCE AND LOCAL OWNERSHIP A MODEL FOR IMPLEMENTATION AND DISSEMINATION

AUTHORITY The aim of this chapter is to present experiences of the implementation and experiences of the implementation and dissemination of ESD using the AGLO model (Authority Governance and Local Ownership). The idea of AGLO, which was invented by Ostman and Svanberg, is to link governance by authorities to local ownership, which is unusual because they are often perceived as conflicting forces.

> In the experiences presented below, it will be obvious that governance and local ownership are complementary driving forces, and that by using them both, implementation and dissemination can be more effective, e.g. in school, in a community, a region or a country.

Some major preconditions must be fulfilled in order to achieve local contextualisation, i.e. that teaching and learning will aim for sustainability literacy. Local ownership is one of them. However, a successful implementation of ESD in a school will also depend on the existence of authority governance, such as support by the head of the school or the local authority. This is also true at a regional and national level.

In a district, region or country

If a pilot school wants to disseminate a project or its results in a region or a country, some activities are worth considering. Here we will mainly focus on the work that we have been involved with in Mongolia, as an illustration. As will become obvious, it is the interplay between authority governance and local ownership that is important. Authority governance is a way of maximising the dissemination of the idea of locally relevant ESD, and local ownership is the means of supporting the educators to implement locally relevant ESD. In other words, without an implementation process, dissemination will have no effect.

ISSEMINATION	IMPLEMENTATION of local relevant esd
 Authoritative resources: Steering documents Teacher training and in-service training Manuals Approved in-service materials Textbooks Assessment schemes and grading 	Decentralised structure of responsibility: local curricula Authoritative resources: for example, textbooks and in-service materials contain examples of how to work with locally relevant themes (LORET) and focus on sustainability literacy Factors like time
Authoritative networks and actions:Sanctioned networks of in-service personnel	Locally relevant in-service training: local people involved



WWF Sweden - Education for Sustainable Development in Practice 103



"If the students are to be given the opportunity to learn how to use knowledge and skills in their roles as consumers and citizens, the teaching may need to include a component of action in the local community. Such a contextualisation requires that the teachers are given some form of responsibility for educational choices."

Implementation: assigning teacher ownership

Local relevance can only be achieved by the contextualisation of the teaching content prescribed by a national curriculum. If the students are to be given the opportunity to learn how to use knowledge and skills in their roles as consumers and citizens, the teaching may need to include a component of action in the local community. Such a contextualisation requires that the teachers are given some form of responsibility for educational choices. In order to achieve "ownership", it can be crucial to decentralise the responsibility regarding the choice of content and teaching methods.

In a centralised curriculum, the content and the teaching methods are prescribed in detail. In a decentralised curriculum, the space for the teachers to use their professional knowledge in the choice of content and teaching methods is bigger. One can argue that the teacher knows the students and the local context and is therefore well suited to making wise decisions in relation to the students' capacities and earlier knowledge. A decentralised curriculum thus gives the teacher a greater ownership of and responsibility for the educational choices than a centralised curriculum. In Mongolia, the national standards are decentralised and call for the local schools to develop local curricula. The standards have been revised to include ESD.

The importance of authoritative resources for implementation

An authoritative resource is a resource that authorities stand behind, which means that it has almost a mandatory status. Examples of such resources are goals, aims and content in steering documents such as the curriculum and syllabi, approved literature for teacher education and in-service training and approved textbooks for pupils and students. These are resources that all educators are supposed to read and use.

1997-2005

A NATIONAL PROGRAMME FOR ECOLOGICAL EDUCATION FOR ALL WAS CARRIED OUT IN MONGOLIA



The Director of the Department of Primary and Secondary Education at the Ministry of Education, Culture and Science in Mongolia, Mr. Batbold



Mr. Luvsandorj, at the Ministry of Education, Culture and Science

In order to shoulder the responsibility that follows from ownership, it is necessary for teachers to have both the skills and possibilities – in terms of time etc. – to transform the national curriculum into a local curriculum with a focus on key issues related to sustainable development. LORET is a resource that can help teachers to transform a national curriculum into a local curriculum. Developing in-service materials that contain examples of how to work with locally relevant issues is also important and supports teachers' transformative work. In Mongolia, 21 teams were formed – one in each region ("aimag") - composed of teachers (informal or non-formal education) representing different subjects and heads of school. Each team developed a LORET covering issues of pastureland use, desertification, forests, freshwater systems, mining, toxic waste, food security, etc. Twenty-eight of these were published in a 286-page book, and 1000 copies were produced and distributed to schools throughout Mongolia, free of charge. As we had developed a close cooperation with the Ministry of Education, Culture and Science (MECS) and the Ministry of Nature and Environment (MNE), they saw the potential in this material and supported it. The Director of the Department of Primary and Secondary Education at the Ministry of Education, Culture and Science, Mr. Batbold, said:

reality.

dissemination

The 21 teams in Mongolia were not only expected to develop or test new methods and content in their local context and to produce LORETs. The intention was also that these teams would form a national network of in-service trainers, and that each community would have access to a team of trainers/teachers representing different subjects, with considerable knowledge about ESD and the skills to develop locally adapted in-service materials and courses. As indicated above, this was done because teachers often need help to design teaching that aims for sustainability literacy. A locally anchored in-service trainer can include examples in in-service courses of how different subjects can work with specific topics that are relevant for that specific location, thereby strengthening the possibility for teachers to practise ownership. Locally relevant in-service training is also an important means of dissemination.

The importance of local ownership for dissemination

The work done by the teams was a source of inspiration for the policymakers. One of the initiatives was to review the national standards to implement ESD and make ESD mandatory in all school subjects. During our meetings with the Key Stakeholder group for the project, policy issues were regularly discussed. According to Mr. Luvsandorj at the Ministry of Education, Culture and Science (MECS), these discussions inspired the Ministry to revise the national standards of education to implement ESD as a crosscutting aspect in all education. The process to revise the standards started in 2008. By 2012, three standards still had to be revised before the end of 2013. The new Ministry of Education and Science (MES) formed by the government that came into power in September 2012 declared its ambition to complete the revision.

A National Programme for Ecological Education for All was carried out in Mongolia from 1997-2005. It was a broad programme that not only targeted the education sector, but also the entire civic society with education and public awareness programmes. In 2008 an initiative was taken to develop a corresponding programme concerning ESD: The National Programme for ESD for All. This initiative was a result of the project we were involved in. Mr. Luvsandorj, at the Ministry of Education, Culture and Science, said:

- The project has influenced the drafting of The National Programme of ESD for All, which has recently been submitted to the government.

- These local curricula are the first concrete examples of the implementation of the national standards of education in Mongolia. They have become the curricula in

The importance of locally relevant in-service training for implementation and



IN 2013

THE NATIONAL PROGRAMME **OF ESD FOR ALL IS PLANNED TO BE REALISED IN MONGOLIA**

In 2009 the programme was expected to be approved by the parliament (State Great Khoral), but the decision was never taken. The proposal was taken up again when the new democratic government took office. Mr. Enibish Dugerjav, the head of the Department for Strategic Planning at the Ministry of Environment and Green Development (MEGD), and the chair of the Working Group for the Development of the National Programme of ESD for All declared the government's ambition to realise the programme in 2013.

Thus, here we can see that the interplay between authoritative governance and local ownership is crucial. The effect of this interplay is that ESD is mandatory in Mongolia and that each teacher has been given some ownership concerning the choice of content and teaching methods when teaching for sustainability literacy.

In a school

Perhaps the most important precondition for implementation is the school's driving forces. They take the lead and are forerunners. They will start to implement ESD, although without authority governance, the work may, in the long run, peter out. Authority governance is also crucial for facilitating dissemination in a school, although without the driving forces the process often collapses. In the following we will look more closely at the different ways in which ownership and authority governance affect the implementation and dissemination processes.

The importance of assigning the driving forces ownership for implementation and dissemination.

As mentioned above, driving forces are crucial for implementation and dissemination. Even if the national curriculum is decentralised, and ESD is mandatory in the curriculum, it does not automatically follow that the driving forces will have the necessary legitimacy and power to take the lead. Therefore, it is often necessary for the head to give his or her support, and show that the work the driving forces do is important for the school. In other words, the driving forces need to be given ownership so that they can function as forerunners and leaders.



"One of the most important prerequisites for implementing locally relevant ESD is the establishment of a norm at the school that emphasises the work with sustainability literacy as something desirable".

Establishing a supporting norm at the school

One of the most important prerequisites for implementing locally relevant ESD is the establishment of a norm at the school that emphasises the work with sustainability literacy as something desirable. This is often initiated by the head. It is commonly recognised that most of the teachers at a school should be involved in a project in order to develop a supporting norm. If the group of teachers is small, there is a risk that other teachers, and also the students, may perceive ESD as something strange and abnormal. Such a situation will inevitably lead to failure, both for the implementation work and the dissemination process. We have ourselves experienced the importance of involving almost all teachers in a project.

We started our programme in Mongolia with nine pilot schools. Representatives from the schools met for training twice a year. The ambition was that these teams were to encourage their schools to develop into pilot schools for ESD. Although the participants were very engaged and skilful, the outreach at the schools failed to materialise. Realising this, we changed strategy. Instead of conducting seminars for representatives of the schools, we went to the schools and conducted shorter seminars for all staff. Things then began to change, because the driving forces were supported in their efforts to establish a norm in their school. The effect was a broad and enthusiastic engagement by all teachers at the schools.

It is interesting to note that the norm is now taken for granted by almost everybody at the schools. One indication of this is that cooperation between the teachers of different subjects has increased a lot, which is remarkable, since many teachers only teach one subject. At Darvi School, teachers work regularly on integrating ESD in joint curriculum and lesson plan development, and regularly review and discuss how to improve the content. Co-teaching takes place as a result of better cooperation among teachers. At Chandman School, different teachers form a team and plan together. Sometimes, one teacher teaches the class, and sometimes they teach together. A similar pattern can be seen at Mankhan School and Zereg School, where the teachers plan together and include various aspects, and the teaching is either conducted by one teacher or by the team.



WWF Sweden - Education for Sustainable Development in Practice 107



Head master at Mankan school in Mongolia, Enkktur.



Head master Mulvono Merkartani school

The importance of other kinds of support from the head

The head is crucial in other ways as well. In Mongolia, the teachers at the respective pilot schools seem to be very pleased with the role played by their heads of school. In relation to proposals from teachers and students, the heads have acted in a very sensitive way and handed over responsibility for ESD at the school to the teachers and students. Examples of support include:

- Making the schedule more favourable for teachers to accommodate and cooperate
- Allocating time for team-teaching
- · Enabling teachers to attend relevant training sessions
- Fundraising
- Provision of required teaching aids.
- · Without such support, the implementation and dissemination process would have been almost impossible.

Support by the parents and the local community

It is not only important to establish a supporting norm at the schools, but also to achieve acceptance and support amongst the parents that ESD is highly desirable.

Kirumi primary school experienced hesitation among parents who were concerned about their children starting to engage so much in ESD activities. Parents feared that their children would get lower results in the national exams if they were taught less traditional lessons. The teachers tried to convince the parents that students learned much more when theory was linked to practice. Students also developed valuable skills by applying the knowledge they learned. But the parents were still afraid that this kind of knowledge and skills would not be measured in the exams. What happened was that the school achieved considerably better results in the national exams, in spite of the national exams assessing a somewhat different kind of knowledge than that prioritised at the school. Teachers explained this by concluding that students learned better when they combined theoretical knowledge with practical experience. When theory is combined with practice students find it easier to remember. During the practical work the teachers and students also communicate freely, and students reflect on the issues they are working with. In short, the joyful learning environment inspires students to engage more in the learning process.



ter Santanu Dhablat Laksman school





"In addition to assessed theoretical achievements, students also learn a lot of knowledge and develop skills and capabilities that are of great value in their personal life and for the local community."

In addition to assessed theoretical achievements, students also learn a lot of knowledge and develop skills and capabilities that are of great value in their personal life and for the local community, but are not acknowledged at all in national exams. So, the result of work at Kirumi School is even better than documented in the national exams. When parents also experienced this extra learning, they became even more convinced supporters of ESD. At Kirumi School teachers say that nowadays all parents realise these values and there is total support for the ESD approach.

Also in Mongolia the schools have noticed better results in national exams. For example, in the last two years 70-80% of the graduates at Darvi School have been able to enrol in higher education. Further, due to its performance rates, the school is now very highly ranked in the region (aimag). The pilot schools have also received plenty of praise from parents for the new innovations that have been initiated in the community. Parents are interested in their children's learning on sustainability issues and both contribute to and support their children and the school in their environmentally friendly approach.

This kind of hesitation and worry on the part of parents is not uncommon, and has been reported by many teachers in different countries. It is therefore important to develop good communications with the parents from the beginning. Luckily, this hesitation often turns into support when parents realise that students produce better results in national exams or that the school is playing an important role in the development of the local community.

OF THE GRADUATES AT DARVI SCHOOL HAVE BEEN ABLE TO **ENROL INHIGHER EDUCATION IN** THE LAST TWO YEARS

70-80%

At Kisojo primary school in Uganda, teachers said:

- Some parents complain that we spend too much time on outside work that is not examined. So we try to tell them about the importance of ESD. Some parents appreciate ESD. We have this struggle.

WWF Sweden - Education for Sustainable Development in Practice 109



3-6 YEARS

THE PROCESS OF IMPLEMENT-ATION AND DISSEMINATION TAKES APPROXIMATELY THREE TO SIX YEARS

Support from the national authorities

As indicated above, the support for ESD in the national steering documents is crucial for helping teachers to own and take responsibility for their educational choices. It is also crucial for gaining the support of parents and local authorities. If ESD is mentioned in the steering documents, you can always refer to them if somebody is hesitant about implementing ESD.

We realised the importance of support from national authorities when working in Mongolia. As indicated above, a Key Stakeholder group, with representatives from the ministries, the education institutes and the universities, was appointed. The director of the Department for Primary and Secondary Education wrote letters on a couple of occasions to the directors of the regional (aimag) education departments asking them to support the project. This was a door opener that contributed enormously to the achievements of the trainer teams in the various regions.

Support from local authorities

All the Mongolian pilot schools have experienced an improvement in local authority support over the years, although this support may have been even better if we had included local authorities in the training. Still, the local authorities have helped by for example allocating land and providing financial support for specific activities and for the purchase of seedlings of shrubs and trees.

"The most crucial precondition for implementation and dissemination is that all the involved teachers and leaders commit themselves to a longterm engagement and support. Change takes time, and sustainable change takes a bit longer."

Long-term commitment: a necessity for implementation and dissemination

The most crucial precondition for implementation and dissemination is that all the involved teachers and leaders commit themselves to a long-term engagement and support. Change takes time, and sustainable change takes a bit longer. The process of implementation and dissemination takes approximately 3-6 years. The pilot schools in Mongolia have been working with ESD since 2004, and from our observations the biggest changes appear to have occurred in the last five years. In Indonesia the pilot schools began to implement ESD in 2008, and especially the year of 2012 was very constructive and successful. A typical pedagogical journey of a pilot school is described in Chapter 6.

SUMMARY

In Education for Sustainable Development (ESD), learners shall have opportunities to problematize connections between environmental protection, economic growth and social development. In the countries focused in this book – India, Indonesia, Mongolia, Kenya, Tanzania and Uganda – pilot schools have become resources for sustainable development in the local community.

"This book is a result of many years of work with in-service training as well as research."

The teachers have used a systematic approach, LORET (Locally Relevant Themes), a concept originally developed during our work with pilot schools in Mongolia. In this book, we describe step by step how a LORET is made.

All teaching requires us to choose the relevant subject content, teaching strategies and teaching methods. In this book, six strategies of what we collectively call Transactive Sustainable Development Teaching, and some methods according to our experience are useful in this kind of teaching, are described.

The plentiful examples from the pilot schools, presented in this book, include sustainability as a perspective used to organise the school as a whole - but also the emerged positive relations between teachers, students and parents, team building amongst teachers, reductions in the number of dropouts and the development of the school estate and schoolyard.

We also present a model for the implementation and dissemination of locally relevant ESD in a school, community, region or country. This model combines bottom-up and top-down perspectives, which is unusual. The model, which we call AGLO (Authority Governance and Local Ownership), points to necessary actions that create a productive interplay between governance and local ownership.

This book is a result of many years of work with in-service training as well as research.



APPENDIX: WHOLE SCHOOL APPROACH - SOME SUMMARY POINTS

Source: Pathways, A development framework for school sustainability, WWF UK, 2004, Surrey, UK.

School culture and ethos

Whole school approach

- The whole school is involved in decision-making.
- · Participatory decision making addresses all aspects of school life.

Whole school policy

· Learning for Sustainability is embedded in the school's mission and ethos.

Monitoring and evaluation

Monitoring and evaluation for good practice

• The school is a learning organisation and uses a cycle of planning, acting, observing, reflecting and revising to develop good practice.

Teaching and learning

Formal curriculum (core and non-core)

- If education for sustainable development (ESD) is statutory, curriculum requirements are addressed.
- · A progression describes age-appropriate Learning for Sustainability that explores key concepts, theories, skills, values and attitudes.

Diversity

- Direct experiences with 'nature' inspire learners and link learning with values and attitudes that advance sustainability.
- The curriculum has a global dimension that offers a relevant context through which pupils enrich their understanding of other cultures and societies.
- The ways in which the school respects and values diversity are apparent to pupils.

Quality teaching

- Stimulating learning resources and rich learning environments are available.
- · Child-centred learning models, modes and strategies are applied.

Professional development

· Professional development opportunities that advance Learning for Sustainability are available to all teachers and staff.

Pupils

Safe and supportive learning environment

- Pupils are supported as they take creative risks.
- Pupils appraise their own learning.
- Pupils are developing action competence for a sustainable future.

Pupil participation and empowerment

- Pupils have meaningful opportunities to participate in school-based decision-making.
- · Pupils have opportunities to practise leadership and citizenship skills.

Theme 5: Community

Links with parents, governors and school boards

- The school and its governors or school board - fosters productive relationships with parents.
- The school values the contributions of parents and governors or staff members.

Links with community

- The school is valued as part of the community.
- The community is valued as part of the school.
- Pupils have the capacity and the opportunity to make a positive contribution to the community.

Links with the wider community

- The school recognises that it is locally based and globally placed.
- This recognition figures prominently in decision-making.

School estate

School resource management

- Sustainability guides decision-making about
- procurement, waste management, energy and water use.
- The school models good practice for sustainability.

School build and restoration

- The school employs and models technologies that advance sustainability.
- The school is a 'building that teaches'.

School grounds

- The school grounds support the curriculum
- Pupils are engaged in school ground research, design, construction and maintenance that advances sustainability.

THANK YOU!

We are very grateful to have been able to work with schools in India, Indonesia, several countries in East Africa and Mongolia. This collaboration has been a great inspiration to the authors of this book. We are grateful to the following schools and teacher training institutes that kindly received us when we did our follow-up research in 2012:

Mongolia

Chandman soum school in Khovd Aimag (536 students, 21 teachers in grades 1-12). Darvi soum school in Khovd Aimag (627 students, 30 teachers in grades 1-12). Zereg soum school in Khovd Aimag (602 students, 37 teachers in grades 1-12). Mankan soum school in Khovd Aimag (836 students, 43 teachers in grades 1-12).

India

Dhablat Laksman school (2470 students, 41 teachers in grades 1-12). Pulbari Sitala school (935 students, 22 teachers in grades 1-12).

Indonesia

SDN 10 Jambuk Makmur (315 students, 16 teachers in grades 1-6). SDN Mekar Tani (130 students and 9 teachers, grade 1-6). SDN Tombang Masao-2 (202 students, 10 teachers in grades 1-6).

East Africa

Asumbi Teachers Training College in Kenya (800 students becoming primary school teachers).

Suneka primary school in Kenya (400 students, 12 teachers in grades 1-7). Ndege primary school in Kenya (370 students, 8 teachers in grades 1-8). Kirumi primary school in Tanzania (70 students, 7 teachers in grades 1-7). Kitaasa primary school in Uganda (312 students, 11 teachers in grades 1-7). Kimaanya primary school in Uganda (800 students, 23 teachers in grades 1-7). Kisojo primary school in Uganda (533 students, 10 teachers in grades 1-7).

There are many more schools, which belong to the WWF network of schools, setting up models how Education for Sustainable Development can be implemented in practise, which we did not have the possibility to visit.

We also strongly appreciate the engagement by the entire staff of the schools, parents and representatives of the local communities as well as the staff of WWF in the visited countries. We are grateful for having taken part in the work as international consultants and we are grateful for economic support given by SIDA.

Leif Östman, Staffan Svanberg and Elisabeth Aaro Östman

The authors



Leif Östman is professor in curriculum studies at Uppsala University. He leads the research environment SMED (Studies of Meaning-making in Educational Discourses) containing 30 researchers and doctoral students. He is director of IRESD (The Institute for Research in Education and Sustainable Development) and of the Swedish Graduate School of Education and Sustainable Development (GRESD) and member of the Swedish National Commission for UNESCO. Östman has besides in Sweden, worked with research and school development projects in countries as China. India, Indonesia, Mongolia and Vietnam. He has also been involved in and leading International Training Programs in EE and ESD, financed by Sida for the last ten years involving teachers from almost all countries in Asia and Africa as well as representative from NGOs and ministries. Östman have published widely in well renowned scientific journals and are co-author of two international books concerned

with scientific literacy.







Staffan Svanberg is a Swedish teacher with 22 years practise of teaching. He is a specialist in EE and ESD. During the last 15 - 20 years he has been working with school development projects in Russia, Ukraine, Belorussia, Estonia, Latvia, Moldova, Albania, Mongolia, China, Indonesia, India, Kenya, Uganda, Tanzania and Cameroon, During these assignments in foreign countries. he has conducted 250 seminars for policy makers and teachers. Many of these seminars have been conducted together with local trainers, other together with Swedish colleagues. He has a lifelong experience in the field of environmental issues from the NGO sector. He also works as a consultant on behalf of the Swedish National Traffic agency

and he is the chief ranger of

a Swedish national park.





Elisabeth Aaro Östman has worked as a teacher in Swedish secondary schools for over 15 years and have participated in several research projects on environmental education. For over eight years she worked as a national expert with the Green School Award and its substitute the Sustainable School Award. both managed by the Swedish National Agency for Education The target group for the award comprises preschool, compulsory school, upper secondary school and municipal adult education She has worked at WWF Sweden with education for sustainable development (ESD), for example with in service training and with production of textbooks and teaching aids, as well as a consultant on the municipal level developing education strategies for connecting environmental and health issues with climate change. She is also part of a group at Uppsala University producing national standardized tests in Geography.



This document has been financed with the support of Sida, the Swedish Agency for International Development Cooperation Sida does not necessarily agree with the pinions expressed for the content

From Vision to Lesson



This book offers innovative models and strategies to develop an effective ESD program.

LORET (Locally Relevant Themes), a model for

the local development of curricula that facilitate

oriented teaching

the introduction of sustainability issues in subject



<text><section-header><section-header><section-header>

The AGLO model (Authority Governance and Local Ownership), which combines governance by authority with local ownership in such any that these reinforce each description

WHOLE SCHOOL APPROACH

The book contains many concrete examples from schools taking part in WWF's programme for school improvement, where a Whole School Approach is fundamental.

WWF

Why we are here

To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature. www.panda.org

© 1986 Panda Symbol WWF – World Wide Fund For Nature (Formerly World Wildlife Fund) ® "WWF" is a WWF Registered Trademark. WWF International, Avenue du Mont-Blanc, 1196 Gland, Switzerland. Tel +41 22 364 9111 Fax +41 22 364 0332. For contact details and further information, please visit our international website at www.panda.org

TRANSACTIVE SD TEACHING

Transactive SD teaching strategies, choosing subject content and teaching methods to foster student motivation



Description Brian J. Skerry / National Geographic Stock / WWF