

Educating for sustainability



A resource for teachers of children aged 7 - 14 years

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"We are concerned about the resource base for sustainable development, especially in line with meeting our needs without damaging future generations. This all depends on how well we balance our environmental, social and economic needs when deciding today.

Education for sustainability, which is the new focus for Environmental Education in The Gambia, is not about adding more content to an already overloaded curriculum and timetable. It is another dimension to education, a teaching and learning approach. It is aimed at changing attitudes, beliefs and actions. It gives pupils the opportunity to explore their personal reactions to sustainable development issues, and to nurture individual attitudes and values. It is about assisting young people to understand environmental and development issues affecting them, and to value the role they can play in decision-making for sustainable development.

For teachers, education for sustainability is:

- an approach to teaching and learning and not more content;
- an area to which most subject areas can contribute;
- a means to give linkages and coherence to subject led topics;
- an enhancement of classroom and whole school management.

We encourage you as teachers to use this publication as a starting point or supplement to help you with the activities that work best to fit your needs. Teachers, you have the power to change lives and serve as role models for your colleagues and pupils.

We wish you all the best in your initiatives."

Momodou Cham

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What is sustainable development?

- ◆ For background about sustainable development and the NEA see page 4.
- ◆ For background about educating for sustainability see page 5.
- ◆ For more teachers' and children's definitions, and activities, see pages 6 to 9.

Climate change

Sustainable development is about people all over the world behaving in a less polluting way, for instance using and providing energy in a responsible manner. It is about facing the effects of pollution, such as floods and droughts caused by the world's changing climate.

For information and activities on this theme see pages 18 to 21.

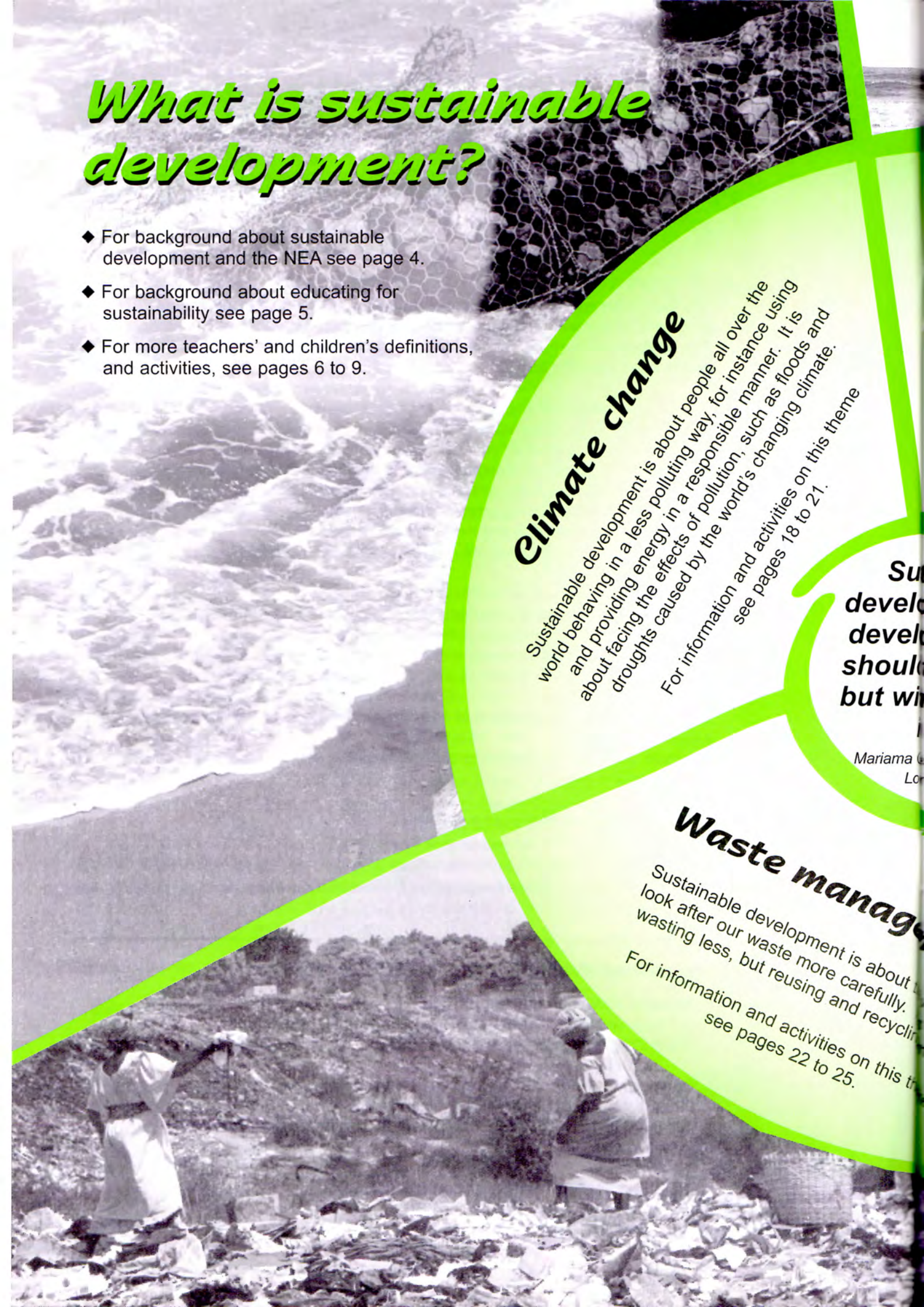
Sustainable development should be achieved but with

Mariama G.
Lor

Waste management

Sustainable development is about looking after our waste more carefully, wasting less, but reusing and recycling.

For information and activities on this theme see pages 22 to 25.





Natural resources

Sustainable development is about the way we use natural resources wisely, including the food we produce and the water we need.
For information and activities on this theme see pages 10 to 13.

Sustainable development is ...
development that
take place,
the future
mind

say, Bakau Newtown
Basic School

Tourism

Sustainable development is about looking after the economy carefully, including the tourism industry. It is about making sure tourism works for the benefit of local people as well as tourists, while caring for the environment.

For information and activities on this theme see pages 14 to 17.

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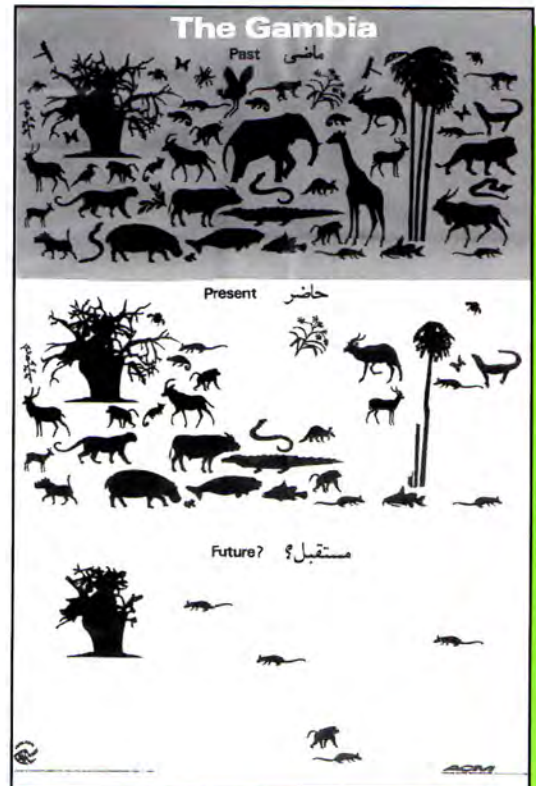
Sustainable development

... improves the quality of life for present and future generations. Environmental, economic and social issues are important parts of this process.

In 1992, participants from many countries, including The Gambia and Britain, met in Rio de Janeiro, Brazil for the 'Earth Summit'. Its central agreement was Agenda 21, 'The Action Plan for the 21st Century'. This was signed by 179 countries, which then produced their own national and local action plans based on it.

Sustainable development involves everybody, including schoolchildren and teachers. In this context, teachers and educators from the Midlands, in the United Kingdom, and The Gambia are working together to share ideas, experiences and exchange information.

The Gambia Environmental Action Plan [GEAP] was also adopted in 1992. It provides a framework for continuous policy planning and decision-making on national environmental issues and natural resource management. The plan is an important part of the Government's Programme for Sustained Development.



The Banjul Declaration, 1977

It is a sobering reflection
that in a relatively short period of our history
most of our large wildlife species have disappeared
together with much of the original forest cover.
The survival of the wildlife still remaining with us
and the setting aside
of protected habitats for them
is the concern of all of us.
It would be tragic
if this priceless natural heritage,
the product of millions of years of evolution,
should be further endangered or lost
for want of proper concern.
This concern is a duty we owe to ourselves,
to our great African heritage and to the world.
Thus I solemnly declare
that my Government pledges its untiring efforts
to conserve for now and posterity
as wide a spectrum as possible
of our remaining fauna and flora.

The Republic of The Gambia, 18th February 1977

Following this plan, programmes were developed to ensure economic growth and development, and to protect and manage the environment in a sustainable way.

As a result of the plan, The National Environment Agency [NEA] was set up to take the lead in all environmental matters in the country. The NEA is involved in capacity building, studies on environmental matters, promoting public awareness and facilitating co-operation between relevant partners.

Its programmes include: chemical and pesticide management, desertification, environmental quality enforcement, monitoring renewable energy resources, information exchange and integrated coastal management. The Agency has prepared a national education for sustainability strategy, which addresses all levels of Gambian society, including schools.

Educating for sustainability



One of the key pillars of education for sustainability is interconnectivity. This is how we are linked to our environment and situations. We have found our work is most effective when it includes and solicits the participation of all stakeholders: the community, parents, teachers and pupils.

Key resources and contacts

The Gambia Environmental Action Plan
NEA, 1992 [simplified version].

State of the Environment Report - The Gambia NEA, 1997.

Disappearing wildlife poster Peace Corps.

The Gambia Social and Environmental Studies [SES] Grades 1-6, Macmillan, 1994.

Educating for sustainability supplements the SES resource, which has been used throughout - although activities do not specifically require it.

We have also used:

The Tide~ website www.tidec.org

Learning today with tomorrow in mind - Sustainable development education, Tide~DEC, 2000.

Our aim in preparing this resource is to assist teachers and other educators working in schools to develop strategies creating effective education for sustainability. In Gambian schools it supplements work on Social and Environmental Studies from Grades 1-6 in particular. It could also be used with other subjects and age groups, and to enhance work in UK schools. It contains information which would be useful for both the teacher and pupil.

Children sustain development because they are tomorrow's leaders, resource users and managers. Furthermore, children can influence parents and other community members to change attitudes positively and take action.

Teachers and other educators who work in schools can make a big difference by increasing awareness and knowledge, by helping form attitudes and creating opportunities for education for sustainability.

This resource focuses on a variety of themes relating to sustainable development, giving background information, case studies, teaching and learning ideas and suggestions for outcomes and assessment.

Remember that we do not tell you what to use in this resource. What we attempt to do is provide you with information and ideas to assist you in developing activities suitable for your school, community and situation, abilities and interests.

This is work in progress. Feedback is welcome.

**'Think Globally,
and Act Locally'**

What is sustainable development?

The process in which human and other natural resources are sustained, to make sure that development continues.

Development which is permanent and can finance itself.

Working towards a more modern and industrial economy.

Development that should take place but with the future in mind.

Development whereby the economy of the country is stable.

Development that is continuous and will always be supported by the users, especially those at the grassroots.

Self development, and to serve and develop others.

The reflection of development from one to another, including government and citizens, on issues of agriculture and the environment.

Something that has to do with human resource development, starting from the grassroots level.

Maintainable development.

Development whereby support and maintenance continues.

Plans or projects that continue in some way so that they can last.

Development for continuity without interfering or destroying the environment, economy, agriculture and the tradition of the people.

A progressive development which is controlled.

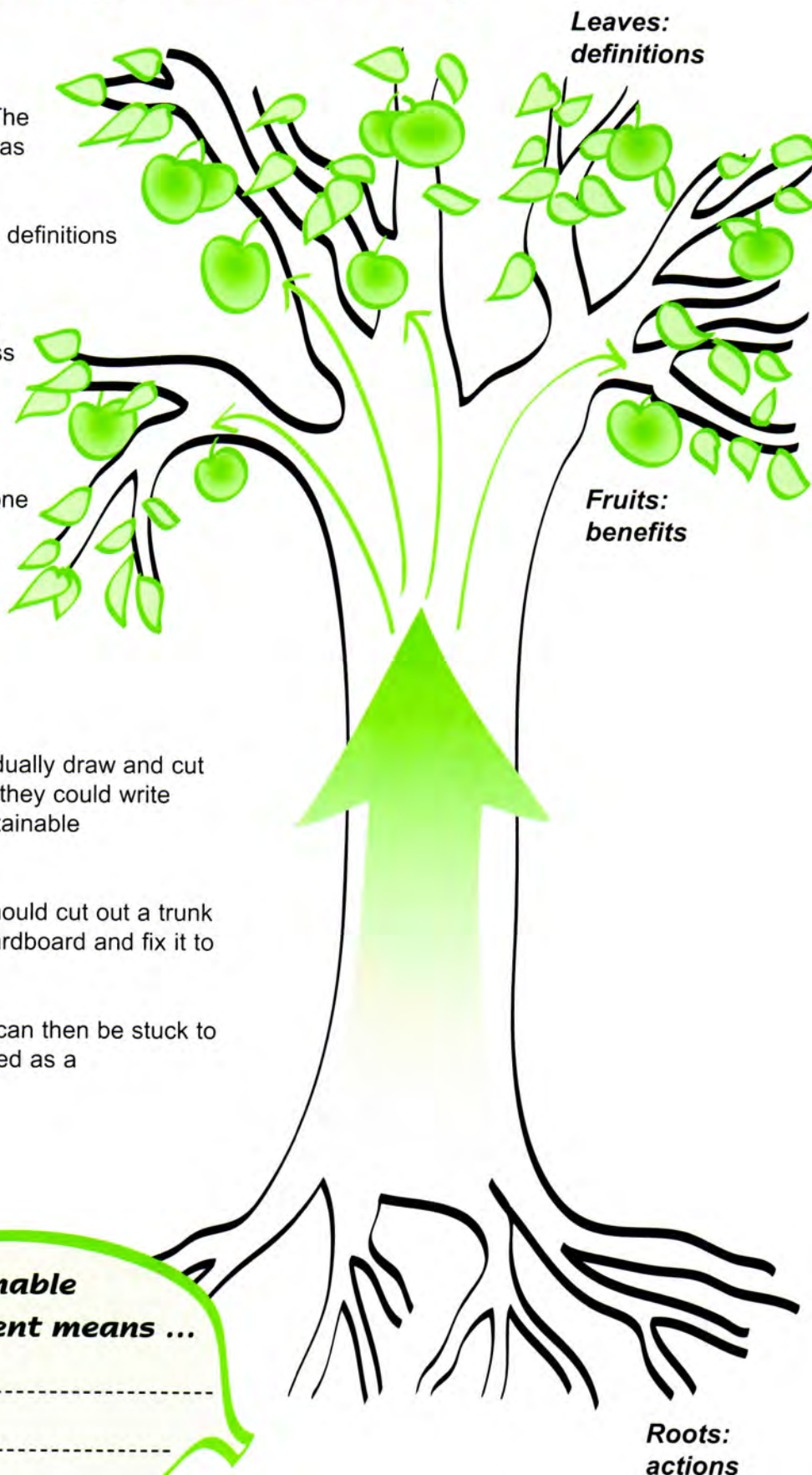
A kind of development which will sustain a nation for a long period of time. It can also be a continuous self-help project which is geared towards the development of a nation.

Planning development for the future, and finding a suitable means of maintaining this development progressively and continuously.

A sustainability tree activity

How would teachers and children describe or define sustainable development? The opposite page lists some ideas from Gambian schools.

- Children could read these definitions in small groups.
- Which do they agree with most? Which are they less sure of? Are there some definitions which conflict with others?
- Each group could select one definition it particularly likes and one which it is less sure of. These could then be presented to the whole class.
- What are the priorities?
- Children could then individually draw and cut out a leaf shape. On this they could write their own definition of sustainable development.
- The teacher or children should cut out a trunk and branch shape from cardboard and fix it to the classroom wall.
- Children's leaf definitions can then be stuck to the branches, and displayed as a 'sustainability tree'.



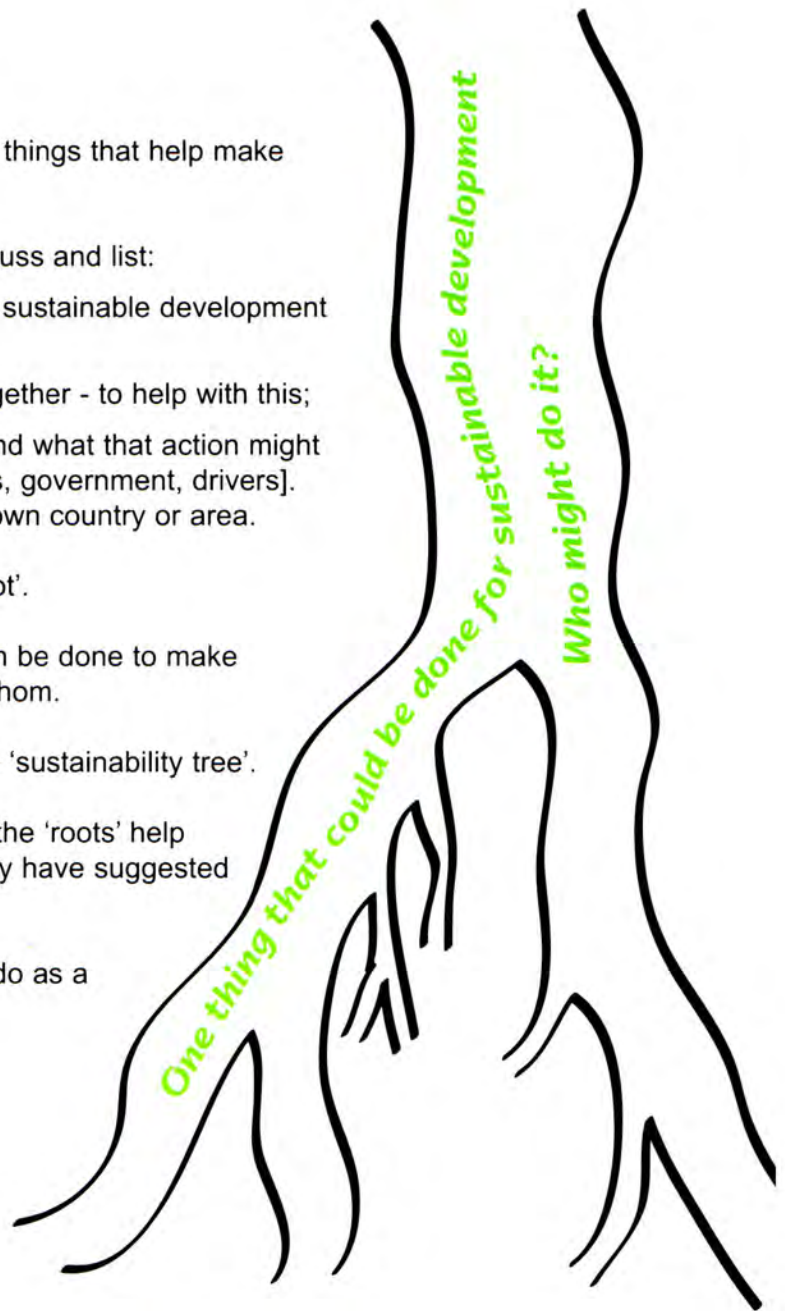
Roots and fruits activity

The 'sustainability tree' activity could be extended further, by looking at 'roots' and 'fruits'.

Roots

The 'roots' of the 'sustainability tree' are the things that help make sustainable development work.

- The children work in small groups to discuss and list:
 - what action might be needed to make sustainable development work;
 - what they could do - individually or together - to help with this;
 - who else might need to take action, and what that action might be [eg farmers, communities, teachers, government, drivers]. This might not just be people in their own country or area.
- Each child then draws and cuts out a 'root'.
- On their root they write one thing that can be done to make sustainable development work, and by whom.
- The roots are attached to the base of the 'sustainability tree'.
- The class then discusses ways in which the 'roots' help nourish the 'leaves' - how the actions they have suggested further sustainable development.
- Is there anything practical the class can do as a result of discussing these actions?



Key words:

Indicators - signs which show that change is taking place. Indicators should be things which are specific and measurable [eg an indicator for careful resource use might be the number of batteries a class collects for safe disposal]

Fruits

The 'fruits' of the 'sustainability tree' are the benefits of sustainable development:

- these include benefits for people, the environment, the economy, or several of these things together;
- this covers benefits to the local community, the nation and the wider world;
- they might be the results of particular actions, or they might be more general.



One benefit of sustainable development

- Children work in small groups to discuss and list:
 - what good things come from sustainable development [the teacher could use the points on page 8 as a prompt];
 - who would benefit from this;
 - how these benefits would arise from the actions they have written as 'roots'.
- The children each draw a fruit, cut it out, and on it write one good thing which comes from sustainable development.
- These 'fruits' are then added to the 'sustainability tree'.
- The children read these and discuss them. How would they know if such a benefit was being achieved? What indicators would they use?

Outcomes

Children develop their own working understanding of sustainable development.

Children consider appropriate actions for sustainable development.

English - writing, communication and listening skills.

SES - concepts of environmental and social responsibility.

Arts - creation of 'sustainability tree'.

Assessment - written contributions to 'tree'.

Suitable for Grades 1-6 [ages 7-14]

What you now have in your class is a unique 'concept map' of the children's ideas about sustainable development, the inputs that are needed to make it work, and the outputs of positive human action.

Keeping this displayed will serve as a touchstone during your class's work on sustainable development. It will give something for children to think about and for you and them to refer to.

It may be useful to return to the 'sustainability tree', and in particular the 'leaves', at the end of any work you do on sustainable development themes. Have children's ideas, priorities and definitions changed in the course of this work? Are there things they have written which they now want to amend?

My teachers

*Stop cutting down the trees,
My teacher always, always says,
It leads to deforestation and soil erosion.
Avoid overgrazing, my teacher says,
It causes soil erosion, making the soil poor.
Don't grow crops on the same land every year
Or else you add manure and fertilise.
Oh my teacher! Stop this stop that,
He always says. I, however, wonder
Whether it is for his or our own good.
The population, we learn, is always
increasing,
Which means we have to find better works
Of taking care of our rubbish, to protect and
care for our environment.*

*Oh my dear friends, I now know that my
Teacher talks not for himself
But for society and all of us,
To prepare a bright future for all.
So, my teacher, please continue to advise
And teach to save tomorrow.*

- Jerreh Njie

Theme: Natural resources

Food production

- a comparison between Bakau Newtown Lower Basic School and Bakau Women's Gardening Association

Market gardening is an important area of food production in The Gambia.

Gardening mostly involves women, who produce vegetables like onions, carrots, cabbage, lettuce, garden eggs [a variety of aubergine] and tomatoes for the local community. Gardening is an important part of Gambian school life. School gardens give the opportunity for children to carry out stimulating practical work, enhancing learning and giving healthy outdoor exercise.

Key words:

Agriculture - changing the natural environment to produce food for our survival.

[Market] gardening - intensive growing of crops such as vegetables, throughout the year and often in a small space.

Further reading:

State of the Environment Report - The Gambia
NEA, 1997.

A gardening guide: production of vegetables and fruit trees in The Gambia, M L Sarr, BPMRU, 1990.

Activity

- Find five similarities and five differences between the school garden and the women's garden below.
- Discuss and list the kinds of food you eat for breakfast, lunch and dinner.
- Who grows the food you eat? Where?

	School	Community
Beginning - Sept / Oct	The beginning of the school year.	After the end of the rainy season.
Sources of soil improvers	Compost - collected by children from school compost heap.	Composting, groundnut shells - collected by children. Animal products.
Types of gardening tools	Hoe, rake, spade, watering cans.	Hoe, rake, spade, watering cans.
Types of food grown	Okra, greens, lettuce, sweet pepper, carrots, tomatoes, bananas, corn, cassava, mangoes, oranges.	Okra, greens, lettuce, sweet pepper, carrots, cabbages, garden eggs, peppers, beans, rice, sorrel, bitter tomatoes.
Nursery	The school buys seeds and prepares nurseries from which it gets seedlings. Children at times bring seedlings donated by their parents.	Association members contribute 50 dalasis every year. This money is used to buy seeds for the nurseries.
Sources of water	Taps in the school, some funded through an environmental award.	Shallow wells, about three metres deep. Some funded by the government, NGOs and the British High Commission.
Advisors	Teachers, State Department of Agriculture.	Agricultural assistants from the State Department of Agriculture.
Work is done by ...	Teachers, caretakers, pupils.	Mostly women - they also get assistance from their children.
Marketing	Crops are mostly harvested and sold to teachers and pupils. Moneys go to the school development fund. Produce is used to feed the children.	Local market, and sometimes hotels. Funds go to the family, especially costs of schooling [eg uniforms].

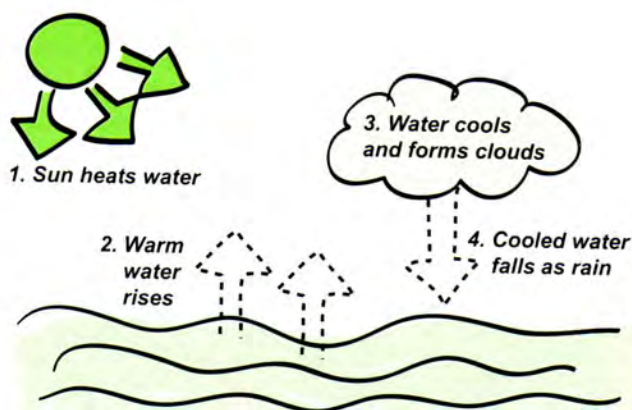
Water

Water is a very important element in our lives. 70% of the earth's surface is covered by water, most of which is salty. Only 2.5% is fresh water. 70% of the human body is made up of water, thus making it a basic necessity of life.

Only a very small fraction of the earth's water is available for human use. During the last 20 years, rainfall patterns have changed and there has been increased drought in The Gambia. Average rainfall has decreased by about $\frac{1}{3}$. This fall in annual rainfall has affected the ground water level. In rural areas, many wells have dried up.

Among the reasons for this are:

- deforestation;
- climate change;
- increased water use.



Key words:

Surface Water - the water in oceans, seas, rivers, lakes and streams, this is particularly important for food production.

Underground Water - water reached through wells and boreholes. Most Gambians use this source of water in their homes.

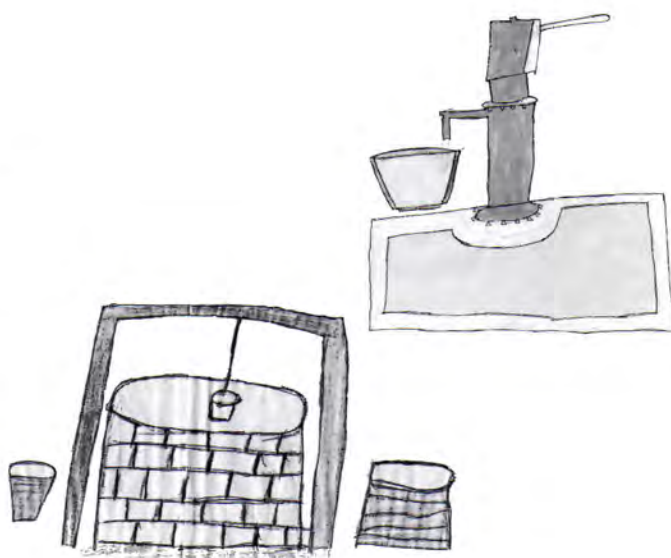
Further reading:

GLOBE programme - www.globe.gov

This website shares information from hundreds of schools around the world.

Environmental lessons for schools
Nova Scotia - The Gambia, 1997.

Gambia Environmental Action Plan
NEA, 1992 [simplified version].



Uses of Water

- List six ways in which you and your family use water.
- List six other ways in which water is used in your community.
- List six ways in which you could save more water.
- Make a poster which encourages people to use water more wisely.

Our environment

Oh my people, what a bad habit you have started. Everybody is cutting down trees, destroying our environment. Just look at the desert as an example. No one lives there because there is no rainfall. No plants, not trees, only oases - and only a few of them are there.

Look at the woodcutter cutting down the trees. Some people cut down trees just for homes or farms. Today we have few trees and wild animals. If this continues, the Sahel will be turned into a desert. A desert with little or no rainfall.

Oh, what a difficult life we will then live. Rulers, elders and teachers help save our flora and fauna. To make a bright future for us the children.

- Galaie Jah

Natural resources: Case study



Growing mangoes at Bakau Newtown.

Bakau, Sukuta and Bakoteh schools did work on natural resource issues:

- Pupils from Bakau Newtown visited the Bakau Women's Garden at Mile 7, to find out about community based food production, compared to school based food production.
- Pupils from Sukuta and Bakoteh Schools worked with their local communities on school farming.
- As part of the GLOBE Programme, school children from Sukuta and Bakau Newtown worked on water.

These two GLOBE schools have established study sites. Teachers and children conducted temperature readings, cloud type observation and rainfall measurements. They measured water temperature and pH, salinity and transparency. Schoolchildren were divided into groups, with teachers guiding each group in conducting their experiments. The results were collected and recorded, and the information shared with other GLOBE schools using the Internet.

My river so nice

Oh my country the country I love
Diamond you lack oil and gold
But blessed you are with a river so nice
Boats, ferries and ships sailing up and down
Transporting goods and people across my river
so nice.

Fish in abundance in this river I love
Crocodiles and hippos you always come by
Yet you continue to pollute this river so nice
The crocs and hippos are killed and no-one cares
We should care for the animals that make my
river so nice.

For fencing and roofing you clear the mangroves
For cash we catch all fish both big and small
To reproduce and replenish our river so nice.

Food and electricity the river may provide
The constant power cuts would be but of the past
So don't deny future generations this vision so
nice

Are we to let them suffer like we all do?
Please save the future and protect my great river
so nice.

- Grade six pupils, Bakau Newtown

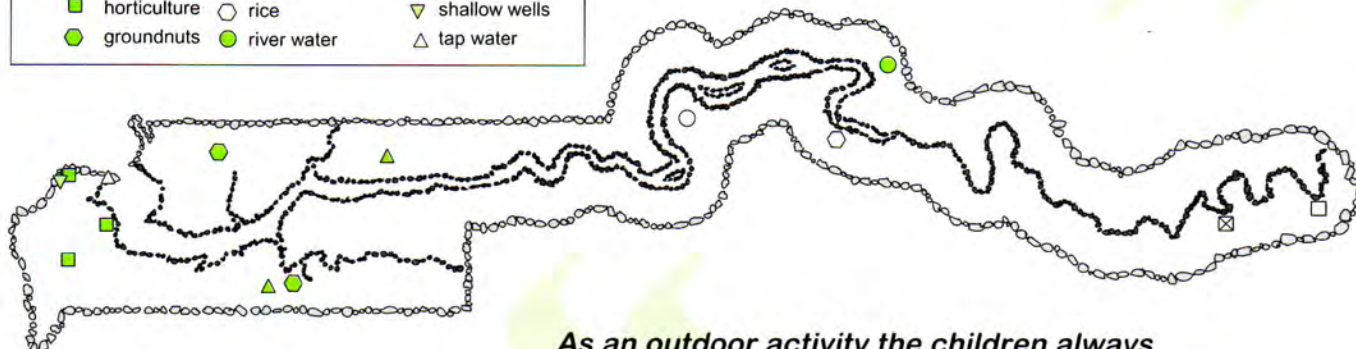


*Taking water measurements on the coast:
Sukuta and Bakau Newtown schools.*

Activity:

The interactive map

border	hand pump wells	very deep wells
river	cous	"findi"
horticulture	rice	shallow wells
groundnuts	river water	tap water



Another important thing in the school is that we don't only learn about the environment but we also learn through it. For example, we have a ground map made from stones, which we use with children to identify and locate features/places/sites on the map.

As an outdoor activity the children always enjoy it, and they have a better understanding of the map and topics that are being taught.

Getting started

- Mark a simple map of the Gambia or your area on the ground [see above]. Use stones to show the boundaries and other physical features [eg water, food growing areas].
- Using stones of different colour or sizes helps keep it clear.
- We have used the map to reinforce teaching and learning of sustainable development topics/themes such as natural resources.

Using the Map

The teacher briefs children on the topic.

- On card [or other suitable material] s/he writes out physical features to be located on the map.
- He/she displays the cards at different places in the school.
- The children collect the cards, individually or in pairs.
- They then locate the position of their card on the map, and stand there.
- The teacher reads out the cards and the children check that they are correctly located.
- After identifying the locations, the teacher then asks the children about them [eg the importance of the site they are standing on].
- Children name some of the physical features around their site.

Outcomes

Children understand resource use issues [water, food production].

Children consider their own responsibilities in relation to those issues.

Science - observation and listening skills, collecting environmental data.

SES - drawing maps, understanding concepts.

English - writing, communication and listening skills.

Arts - drawing and role play.

Maths - data collection and counting skills.

Assessment: written tests, questions and answers, drawing, recording experiments.

Suitable for Grades 4-6 [ages 11-14]

Everybody can participate actively in the learning process.

It is a quick method of learning for children.

Learn about important things in our life and in an exciting way.

Theme: Tourism

How can The Gambia manage the tourism industry in a sustainable way?

Key words:

Eco-tourism - "...responsible travel to natural areas that conserves the environment and sustains the well-being of local people." [The Ecotourism Society, 1991]

Mass tourism - "Mass tourism is less sustainable, expensive, not very environmentally friendly and may not be responsive to the needs of the local people." [George Trawally, Educators for Sustainability]

Further reading:

Eco-tourism strategy National Environment Agency, 2000.

Changing Nature Tourism Department for International Development, London, 1999. [See www.dfid.gov.uk]

Beyond the brochure - video and educational booklets. Tourism Concern, London, 1999. [See www.tourismconcern.org.uk]

The Gambia Tourism Concern website: www.gambiatourismconcern.com

Environmental Education in the schools: creating a program that works! Peace Corps, Information Collection & Exchange, manual M0044, Washington, USA.

Pay a visit to Tanje eco-tourism site. There you will enjoy nature learn culture and traditional history. The centre promotes sustainable development.

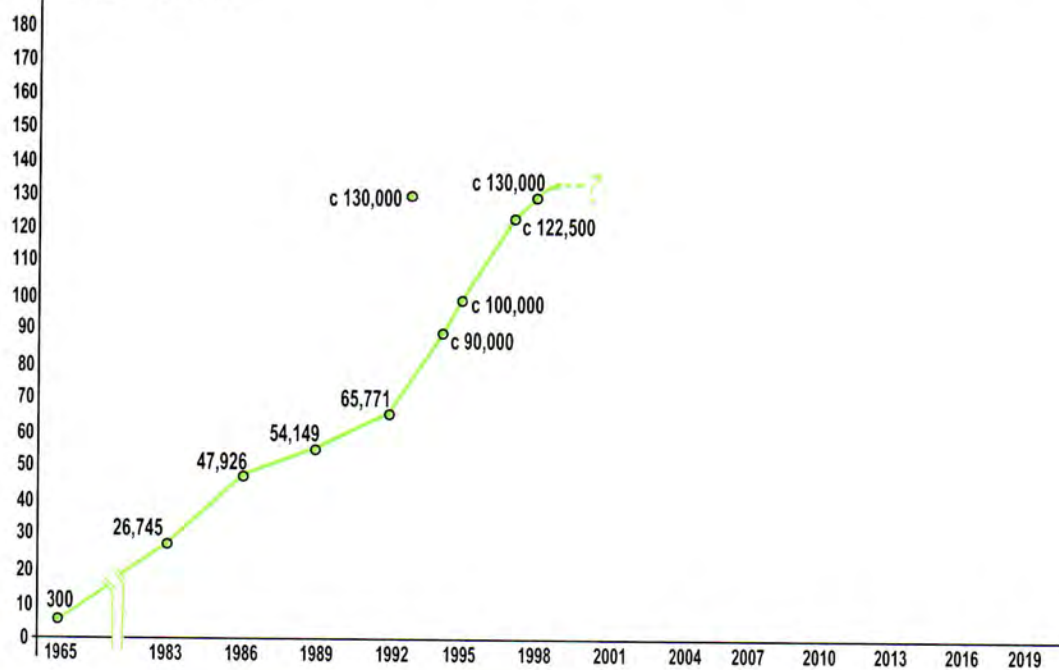


Eco-tourism

- Cheap locally produced materials are used for buildings.
- Forests are managed by local people.
- All other natural resources are carefully controlled.
- Culture and traditions are maintained.
- There are opportunities for interactions between visitors and local people.
- Visitors have contact with some of the host's cultural values and norms.
- Encourages close partnership in the community.
- Can reduce unemployment in the community.
- Forest parks are maintained and support plant and animal wildlife.
- More of the money goes to the local community [eg at Tanje, the museum provides a community garden from resources it generates].
- Domestic animals have more land to graze.
- Discourages rural - urban drift.
- The local people are involved in decision making.
- People learn about the importance of the wildlife and culture, and try to preserve them.

Number of tourists from foreign countries visiting The Gambia

Thousands of tourists



Figures: 1963 - Ecotourism discussion paper, NEA, 1998;
1983-1992 - SES Pupil's Book 6, Macmillan, 1994;
1992 onwards - Ecotourism discussion paper, NEA, 1998
and State of the Environment report, NEA, 1997.

Trends in tourism

- Children could complete this graph, researching and adding the most recent figures.
- They could then extend the graph into the future - what trends do they predict?
- Can tourism be managed for the benefit of people and the environment? How can it be sustainable?

Mass tourism

- Visitors have little contact with local people, which may lessen their appreciation of local culture.
- Tourism is centered around the urban area where the culture and traditions are more accommodating.
- The natural environment is changed to build facilities such as hotels and restaurants.
- The environment can be affected in a negative way.
- Benefits may be small for the local community.
- Most of the material used in hotels [including furniture and food] is imported.
- Encourages rural - urban drift.
- The local people are not usually involved in decision making.
- 'All inclusive' packages do affect local small-scale businesses.



Making furniture with locally available materials for an eco-tourism centre at Makasutu. The community here has been involved in plans for this hotel, where many of them are employed, and where many trees and other environmental features have been included.

Children could take one characteristic of eco-tourism and discuss in a small group how they might make that work [eg how would you find cheap local materials for building? Which materials would you use and why?]

Tourism - Case study

Sukuta and Bakoteh schools worked together on tourism as a theme. Teachers and pupils made a stimulus visit to eco-tourism sites. They sought to use an experiential approach to teach and learn about sustainable development issues.

A visit to Tanje Village Museum started with a brainstorming session, providing some background information about tourism. The visit stimulated the group of pupils to prepare guide sheets for people intending to visit the place. These promoted eco-tourism as a sustainable route for tourism development in the country. They also wrote picture and trail poetry, and did drawings and songs.

The children learnt about the history and life-style of the people of Senegambia in the past, plants and their uses, traditional arts and musical instruments.

Environmental realisation

Sitting under the big cotton tree watching
The nature of tabata kaolong as it used to be
I try to recap on how it used to look like
In my imagination, I saw a lot of beautiful birds
And different species of wild animals
I can even feel how it used to be

At first I felt it was a dream but in reality it wasn't
I could also clearly hear the beautiful birds singing
Coupled with the kind of breeze at the moment
My recapitulation shocked me like a sharp knife's edge
Piercing and lacerating my skin right to my bones
This made me motionless and then I shivered
Like a person suffering from acute cerebral malaria

When I again recovered from this dangerous realisation
I thought it was a dream but in reality it wasn't
I started to blame nature but my consent told me
Boldly without hesitation that the root cause was human

- Grade 6 class poem, Bakau Newtown School

Facilities for tourists

An exhibition building with natural history displays of shells, fish, birdlife, plants and their natural uses.



A display of musical instruments of different ethnic groups of Senegambia - Kora, Tama, Konting and drum.



An art gallery room for temporary exhibition by Gambian artists.



A traditional mud brick Mandinka compound.



A natural trail of over 80 species of labeled plants, trees and shrubs, and their uses.



Child's guide sheet for visitors to Tanje

I learned at the Tanje Museum that in eco-tourism, people can use very simple local materials for sustainable development.

Grade 6 child

Tanje Village Museum

PO Box 172

Banjul

The Gambia

Tel [+220] 37 10 07

E-mail Tanje@dds.nl

Web: <http://huibzen.dds.nl/~tanje/>



Other places you could visit:

- Tumani Tenda village
- Mandinari village
- Makasutu eco-tourism site

Activity

Eco-tourism sites:

- provide space, shelter and food for plants and animals;
- have aesthetic, educational, economical and recreational values for humans.

The main purpose of this activity is for pupils to learn about eco-tourism and appreciate its benefits for sustainable development.

Take the pupils to a suitable location, eg an eco-tourism site, nature reserve or gardens. Establish four different writing stations within the area [eg plant and bird life area, exhibition area, bee-keeping area, craftsman's workshop].

- Divide the pupils into four groups - one group per site.
- At each site ask the pupils to use one or two specific senses [hearing, touch, sight, smell] to explore the area.
- Children can make a list of descriptive words based on that sense.
- Children can use their list to create poems and artwork.
- Share some of the poems and drawings in the whole class.
- Children can then create an exhibition based on their work [eg in the hall or on the classroom wall].
- Discuss the group experience.

I was amazed to see how birds' feeding is done and how bird life is encouraged.



Children at Tanje watching traditional weaving

Eco-tourism teaches me that life in the past was more sustainable than life now. I also learnt more of our tradition, culture and life style.

We made conservation pledges to prevent bush fires and keep the environment green.

Outcomes

Children understand trends in tourism and concepts like eco-tourism and mass tourism.

Children consider first-hand experiences of eco-tourism.

Children consider ideas about sustainable tourism.

Science - observation, listening and recording skills.

SES - concepts about tourism and sustainability.

English - writing, communication and listening skills, poetry.

Arts - drawing and role play, creation of tourism guide.

Maths - data collection.

Assessment: written work, drawings, tourism guides, display and exhibition.

Suitable for Grades 1-6 [ages 7-14]

Theme: Climate change

The Gambia is one of ten countries in the world most vulnerable to rising sea-level due to global warming.

United Nations Environmental Programme Report

Banjul, the capital city, is the most important commercial centre in The Gambia. It is also the Government seat, the principal port, and an important site for most employment and services. The capital is two metres above sea level at its highest point. Most parts are about 0.5 metres above sea level. A study conducted in 1997 indicated that "a one metre sea level rise would lead to the loss of Banjul".

In 1992, a Climate Change Committee was set up in the Gambia to look at greenhouse gas emissions and the impact of climate change on the economy [this covered forestry, crop production, water resources and fisheries].

Key words:

Climate change - climate change is about changes in the average trend in the weather.

Global warming - this refers to an overall increase in global temperature, and is caused partly by greenhouse gases.

Greenhouse gases - atmospheric gases that reflect and store the earth's heat, including carbon dioxide, nitrogen oxide and methane.

Ozone layer - the atmospheric layer that protects the earth from the sun's harmful ultra-violet rays. The destruction of the ozone layer by gases such as CFCs is harmful, but is not believed to lead to global warming.

Further reading:

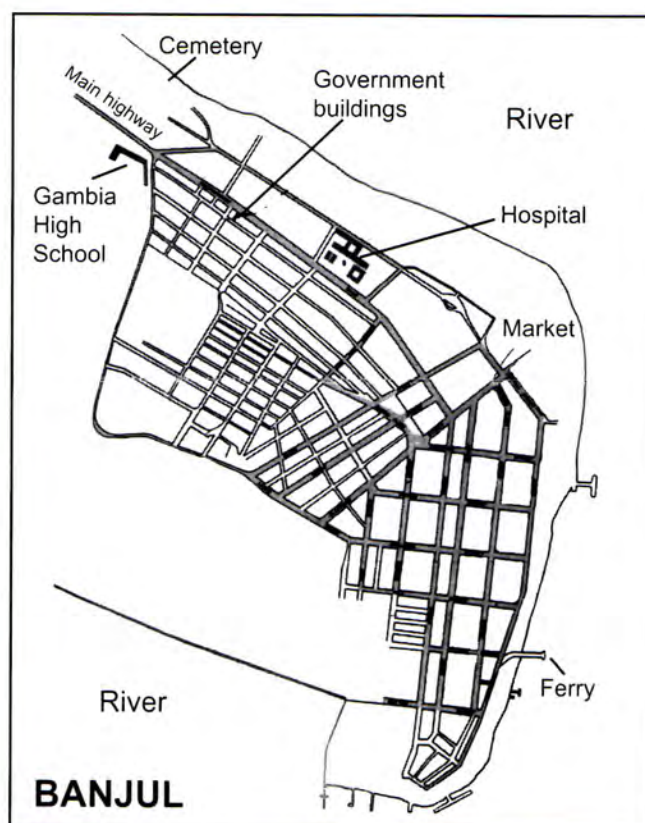
Climate Change Network website - www.canuk.org.uk

The Globe Programme - www.globe.gov

Climate change study report Department of The Presidency, Fisheries and Natural Resources, Banjul, 1997.



In February 2001 a group of teachers from the UK and The Gambia visited the Department of Water Resources in Banjul, as part of this initiative. The Department is the focal point for work on climate change in the Gambia, and the teachers were trying to find out what this major global issue means for the Gambian people and their environment.



Main human causes of climate change:

- the release of gases, especially CO₂, into the atmosphere;
- the fumes or smoke produced and released from industrial activity, including most power stations;
- the reckless cutting down of trees and bush burning;
- the increased use of cars and other vehicles which use fuel and release smoke or fumes.

Beware

Beware beware people beware
The ocean is coming you better beware
It's eating your coastline so beware
Your corpses are carried aren't you aware?
Your buildings are falling you must beware
So beware beware you better beware.

The millions you throw aren't you aware
I work night and day and never go to sleep
While you snore aren't you aware
Of me the ocean you should beware
For I continue to work while you sleep
Beware beware you better beware.

Your city I invade you aren't aware
Slowly but surely I will one day
Invade your city you must beware
Is it ignorance or aren't you aware
That I am the ocean and you must beware
So beware beware people beware.

- Grade 6 pupils, Bakau Newtown School

Possible effects of climate change on The Gambia:

- rising sea levels will cause low-lying land to flood [eg in Banjul];
- many people may lose their homes, land and livelihoods due to flooding;
- farmlands in low-lying areas may be lost, leading to food shortages;
- salt water intrusion may harm crops such as rice;
- more rainfall will lead to severe flooding, while less rainfall will lead to drought;
- animals and plant habitats may be damaged, including livestock and fish;
- beaches will be damaged through sea level rise and greater coastal erosion.

Children could make a presentation to their class, through drama, about:

- possible effects of climate change in their area;
- what they can do to make a difference.



The sea breaching coastal defences,
Muslim cemetery, Banjul

Climate change case study

All that we saw at this once beautiful beach are broken graves, trees that have fallen down and most shockingly, the skeleton of our dear ones. Why is this kind of thing happening here?

- Grade 6 child



Climate change and coastal erosion are already having effects. The "washing away of the graves" at the Banjul cemetery is one dramatic example of this.

Pupils from Wesley Lower Basic School, situated in the heart of Banjul, worked on the theme of climate change. They visited the National Environment Agency, the Banjul cemetery, and Gambia Technical Training Institution in order to find out more about it.

They were shocked to discover that almost three quarters of the Muslim cemetery had been washed away by the advancing ocean. They learnt that the entire Gambian coastline is about 80km long, with very narrow beaches. This puts this important natural resource particularly at risk. The water is now coming up to the main Banjul-Serrekunda highway.



Children's questions revealed that human attitudes and actions were largely responsible for this: beach sand mining for construction, tree felling, global warming and pollution.

Children asked:

What should we do now?

How can we save Banjul?

Are we not worried about our capital?

Let us not be selfish, let us join hands together to save Banjul and the world in general.

Grade 5 child

After the field visits, they did the following:

- told the whole school at assembly about climate change and related matters;
- an experiment on recreating the greenhouse effect;
- created poems, songs and drawings about the theme;
- carried out a survey of climate change trends;
- participated in a quiz competition;
- planted cashew trees around the school fence;
- performed drama.

Activity

Monitoring environmental trends

- Brainstorm the theme of climate change to find out what the children know.
- Give brief information about climate change [see pages 18 and 19].
- Divide the pupils into 2-4 groups. Take a walk around the locality to observe changes in the environment, including the weather. At selected spots, children can stop and study the site, recording interesting features and changes. Where possible provide children with past photos or maps of the area.
- Ask the children to draw a picture of one place in the past, present and future. What causes the change? What can be done to stop negative changes? Discuss.
- The children could go on to keep a record of weather conditions over a period of time [eg drawing graphs and charts of cloud shape, sunshine, wind and rainfall - children to write their observations and draw what they see]. This to be followed by a class discussion and display.
- Invite a local specialist for a question and answer session in the school.
- This activity could be used for exploring other issues, as well as climate change.

Outcomes

Children understand concepts about climate change, including causes and effects and the greenhouse effect.

Children consider measures that could be used to minimise the impact of climate change.

Science - observation and listening skills, experimentation, data collection.

SES - concepts of change and action.

English - writing, communication and listening skills.

Arts - drawing, drama and creating a display.

Maths - data collection and analysis.

Assessment: written work, dramatisation and presentation, display.

Suitable for Grades 1-6 [Ages 7-14]

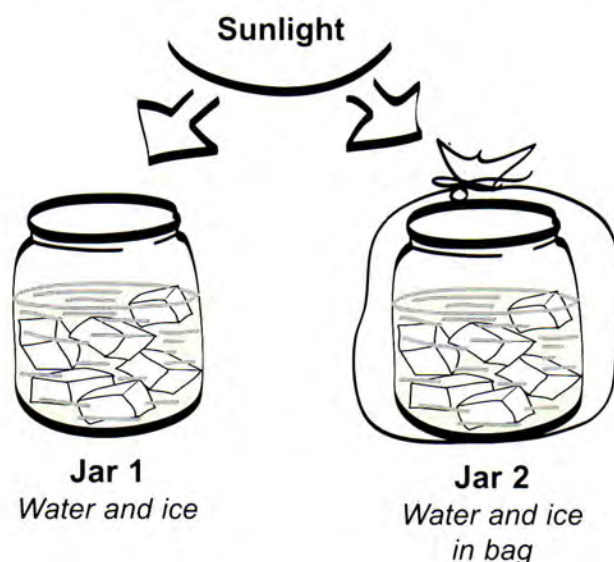
How does the greenhouse effect work?

What you will need:

- two identical glass jam jars;
 - cold water;
 - ice cubes;
 - 1 clear plastic bag;
 - thermometer.
- Take the two jam jars and fill with equal amounts of cold water.
 - Add an equal number of ice cubes to each jar.
 - Wrap one in the plastic bag [this is the 'greenhouse'].
 - Leave both jars in the sun for one hour.
 - Measure the water temperature in each jar.

What happens?

- Which jar is warmer?
- Why do children think it is warmer?
- Why do children think one jar was wrapped in a plastic bag?
- What kind of problems might the 'greenhouse effect' cause?



I learnt a lot from working on climate change, I will try to make a difference.

Not to know is bad, not to wish to know is worse. Let us sensitise everyone about sustainable development and environment matters.

Theme: Waste management

Waste management has become a big problem in The Gambia, due to the increasing amount of waste being produced every day. This is due to a number of factors - fast population growth, unplanned city settlements, more factories and changed living patterns. Improper management of our waste has led to environmental and health problems, and greater pressure on the land.

Carry out an investigation into what happens to waste in your locality, such as:

- the school surroundings;
- the market place;
- the health centre;
- the community playing ground.

How is waste disposed of?

In the findings column write down what you can find happening against each of the gradings below.

How would you make improvements?

Mark your ideas in the improvements column below.

You could discuss your ideas and decide what action to take.

Waste management choices

The choices which are best for the environment are at the top.

Grading	Finding	Improvement
REDUCE waste can be completely avoided by not choosing to buy disposable goods		
RE-USE items can be repeatedly used		
RECYCLE original form or use is changed		
COMPOSTING nutrient recycling		
CONTROLLED INCINERATION burning		
LANDFILL disposing of waste into a hole in the ground		

Key words:

Waste - things generated by human activity, which have little or no value to the owner.

Recycling - the original form or use of waste items is changed but their essential properties remain [tyres cut to resole shoes, aluminum cans moulded into cooking pots].

Composting - changing organic wastes [crop and plant residues, sawdust, animal dung, paper] into a soil mender or conditioner.

Further reading:

The State of the Environment Report - The Gambia NEA, 1997.

Birmingham Box 21 Tide~DEC, 2000.

Recycling case study

During social, cultural, religious and other ceremonies, people always purchase and distribute a lot of bottled and canned drinks. Although the bottling factory reclaims most of the bottles, the cans are always a problem. They don't decompose during the rainy season, they are always filled with water and serve as breeding places for mosquitoes, which in turn carry malaria - one of the deadliest diseases in The Gambia.

Children in Grade Six at Bakau Newtown Lower Basic School followed work on waste management by collecting empty cans.

The few iron cans were used to make toys.

Aluminium cans were taken to the grandfather of one of the pupils, who uses cans, car batteries and other materials to make cooking pots, spoons, ladles, colanders, bowls, pans etc.



An environment

Environment! Environment! Oh Environment!
On you the environment we all live
We must therefore keep you clean and tidy
Every hour, every day and every night.

Without a clean environment we will suffer
If we leave any dirt or rubbish around
We cannot be healthy and strong
Let's work and keep our environment clean.

Plant more trees for a better environment
For a clean environment we must all strive
A healthy body and a very healthy mind
Clean the environment and save the future.

- Mariam J Ceesay

At first I was working in a hotel as a cook, but I had my services terminated. I became a commercial vehicle driver, until I met two Guinean friends who used to make these pots and so on. I quickly learnt the trade, left driving, and opened my own workshop. Since then there has been no turning back.

Although the workshop doesn't work on a large scale, I still manage to earn enough to maintain my family. I educate my children and even some of my grandchildren from the workshop.

I have sons but they are not ready to learn the trade. As you know, a lot of people believe that this is not the kind of job for educated people.

Pa Jatta

Activity - aluminium can recycling

Instructions

This practical activity should be done with responsible adult supervision, and with appropriate safety procedures in place.

Sorting activity

You could give these eight statements to children in a random order, and they could work in pairs or small groups to put them in the right sequence.

Which of these statements match photographs on the opposite page?

Collect as many empty cans as possible.	Get another box filled with wet sand. Make a hole through the sand. Cover the mould with it and allow the sand to dry a bit.
Use a magnet to sort out the iron and aluminium cans [the magnet doesn't attract the aluminium].	When the cans have melted, pour the aluminium into the mould through the hole on the upper box.
Put the cans in an iron container and melt them.	Leave it for 5-10 minutes to cool down, then uncover the mould. You have your product ready.
While the cans are being melted, get wet sand and mould whatever you want to make.	The product is then filed to smooth it.

I used to see people walking around town to collect these cans and I had always wondered what they do with them, but now I know.

My younger brother said I was filthy when he saw me collecting these tins, but I will show him the pots we got from it.

Outcomes

Children understand concepts such as composting, recycling and waste management.

Children consider measures that could be used to minimise waste.

Children learn how to recycle aluminum cans into cooking pots.

Science - observation and listening skills, experimentation.

SES - environmental concepts and responsibilities.

English - writing, reading, communication, listening and sequencing skills.

Arts - drawing.

Maths - data collection and analysis, counting skills.

Assessment: written tests, dramatisation of events, finished products, writing poems and songs.

Recycling activity suitable for Grades 4-6 [Ages 11-14].
Other practical and written activities suitable for Grades 1-6 [Ages 7-11]



The Government should build big recycling plants. This will help people get more jobs and it will also help us to manage our waste properly.



Educating for sustainability

A resource for teachers of children aged 7 - 14 years

These materials are designed to supplement work on the Gambian Social and Environmental Studies curriculum at Grades 1 to 6, and for a wide variety of other educational contexts - in The Gambia and elsewhere.

Written by practising teachers and educators, they combine information on sustainable development themes with educational case studies and lively classroom activities which draw on their own experience.

