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Contents

Introduction

Sustainable development is an issue all countries in the world are currently looking at. The degree of emphasis and the level investing resources invested however varies from one country to another; but regardless of whether we are talking about industrialised or developing countries, the quest for environmentally sound, socially just, economically viable and ethically acceptable development needs to be regarded as a priority by all nations of the world.

For many years now, a large number of initiatives have been carried out throughout the world to attempt to stoke up awareness about sustainable development and promote activities to achieve it.

The 1987 Report “Our Common Future” produced by the World Commission on Environment and Development (WCED), “Agenda 21” produced by the UN Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992 and the “Johannesburg Declaration” produced following the World Summit on Sustainable Development in 2002 are examples of the type of initiatives being worked on internationally. These have been complemented by the various “National Sustainable Development Strategies”.

Despite the various projects being run at international level, much still needs to be done at regional and local level: the need to make known information on the approaches, methods, projects and initiatives aimed at fostering the cause of sustainable development is as pressing as ever.

UNIT 1

Sustainable development definition

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs". This widely cited definition for sustainable development comes from the Report of the World Commission on Environment and Development "Our Common Future", commonly referred to as the Brundtland Report (after the commission's chair Gro Harlem Brundtland).

The concept supports strong economic and social development. At the same time it underlines the importance of protecting the natural resource base and the environment. Economic and social well-being cannot be improved with measures that destroy the environment. Intergenerational solidarity is also crucial: all development has to take into account its impact on the opportunities for future generations.

International and national debate and activity were triggered by the report's publication. It was soon pointed out that the concept was both broad and vague — its content could be given different interpretations.

Here's a more specific definition from the report that might aid the ambiguity of the first:

"The pursuit of sustainable development requires:

a political system that secures effective citizen participation in decision making;

an economic system that is able to generate surpluses and technical knowledge on a self-reliant and sustained basis;

a social system that provides for solutions for the tensions arising from disharmonious development;

a production system that respects the obligation to preserve the ecological base for development;

a technological system that can search continuously for new solutions;

an international system that fosters sustainable patterns of trade and finance;

an administrative system that is flexible and has the capacity for self correction".

There are more than one hundred definitions and variations on the term. There are even actual reports and studies on the use of the term, and a few have even attempted to determine where it has been implemented.

All definitions of sustainable development require that we see the world as a system — a system that connects space; and a system that connects time.

When you think of the world as a system over space, you grow to understand that air pollution from North America affects air quality in Asia, and that pesticides sprayed in Argentina could harm fish stocks off the coast of Australia.

And when you think of the world as a system over time, you start to realize that the decisions our grandparents made about how to farm the land continue to affect agricultural practice today; and the economic policies we endorse today will have an impact on urban poverty when our children are adults.

We also understand that quality of life is a system, too. It's good to be physically healthy, but what if you are poor and don't have access to education? It's good to have a secure income, but what if the air in your part of the world is unclean? And it's good to have freedom of religious expression, but what if you can't feed your family?

The concept of sustainable development is rooted in this sort of systems thinking. It helps us understand ourselves and our world. The problems we face are complex and serious — and we can't address them in the same way we created them. But we can address them.

Despite the cloud of ambiguity hanging over the concept of sustainable development, the international community has continued using it. The concept has been seen as inclusive and operational enough to make meaningful action in pursuit of sustainable development possible and broadly supported.

1. Read and remember the words.

sustainable development	устойчивое развитие
to meet the needs	удовлетворять потребности
to compromise	ставить под угрозу
ability	способность, возможность
to cite	цитировать
chair	председатель
concept	понятие, идея, концепция
to underline	подчеркивать
well-being	благосостояние, процветание
to improve	улучшать
measures	меры
crucial	ключевой, критический, решающий
impact	воздействие, влияние
opportunity	возможность, перспектива
to trigger	инициировать, дать начало
to point out	отмечать, обращать внимание
broad	широкий, общий
vague	неопределенный, неясный
content	содержание, суть, значение
to aid	способствовать, облегчать
ambiguity	неопределенность, неясность
pursuit	стремление
to require	требовать
to secure	гарантировать, обеспечивать
surplus	активный баланс, излишек
self-reliant	самостоятельный
to provide for	предусматривать
solution	решение
tension	напряженность, противоречие

production system	система производства
obligation	обязанность
to preserve	сохранять, сберегать
to foster	поощрять, стимулировать
flexible	гибкий
to capacity	способность
to attempt	делать попытку
to determine	определять, устанавливать
to implement	осуществлять, обеспечивать выполнение
to endorse	поддерживать
secure	надежный
complex	сложный
to address	решить (вопрос)
to continue	продолжать
inclusive	всесторонний, полный, всеобъемлющий
operational	практический

2. Match the words and their synonyms.

crucial	idea
foster	wide
concept	make better
broad	try
improve	indefinite
continue	threaten
attempt	influence
impact	important
vague	go on
compromise	encourage

3. a) Form nouns from the following verbs.

interpret	participate	correct
publish	define	vary

b) Form adjectives from the following nouns.

nature	politics	ecology
society	economics	technology

c) Find in the text other words with the suffixes you used.

4. Read and translate word combinations.

Sustainable development, future generations, widely cited definition, intergenerational solidarity, to take into account, different interpretations, political system, economic system, social system, production system, technological system, international system, administrative system, citizen participation, decision making, technical knowledge, sustained basis, disharmonious development,

to foster sustainable patterns of trade and finance, capacity for self correction, attempt to determine, quality of life, to face the problem, international community, meaningful action, broadly supported.

5. Read and translate the text.

6. Decide if the statements below are true or false.

1. Report of the World Commission on Environment and Development and the Brundtland Report are two different documents.
2. Environmental protection is as important as economic and social development.
3. The term "sustainable development" is clearly defined.
4. Broad public participation in decision making is a fundamental prerequisite for achieving sustainable development.
5. Sustainable patterns of trade and finance should be encouraged on a global scale.
6. The implementation of the concept of sustainable development has never been observed.
7. Sustainable development is an eclectic concept.

7. Definition of sustainable development has many versions. While each definition carries its own emphasis, there are some common themes present in them. Link the definitions with the following themes.

1. Importance of considering the needs of future generations.
2. The preservation of natural resources into the future.
3. Wise use of resources.
4. An appreciation for the connection between environmental, social and economic resources.

a) Sustainability refers to the ability of a society, ecosystem, or any such ongoing system to continue functioning into the indefinite future without being forced into decline through exhaustion of key resources.

Robert Gilman, President of Context Institute

b) "Sustainable growth" is a contradiction in terms: nothing physical can grow indefinitely. "Sustainable use" is applicable only to renewable resources: it means using them at rates within their capacity for renewal."

International Union for Conservation of Nature (IUCN)

c) Our vision is of a life-sustaining earth. We are committed to the achievement of a dignified, peaceful, and equitable existence. We believe a sustainable United States will have an economy that equitably provides for satisfying livelihoods and a safe, healthy, high quality life for current and future generations. Our nation will protect its environment, its natural resource base, and the functions and viability of natural systems on which all life depends.

President's Council on Sustainable Development

d) A sustainable society is one which satisfies its needs without diminishing the prospects of future generations.

Lester Brown, Founder and President, Worldwatch Institute

8. Make a list of various definitions of sustainable development. You may find relevant information in the Science Library, the American Center in Volgograd or in the Internet. Share your research findings with your groupmates. How many items have been entered in the group's list?

KEY VOCABULARY PRACTICE

9. Fill in the blanks with the correct words.

sustainable	*ability*	*preserve*	*pursuit*
flexible	*measures*	*opportunity*	*requires*

1. Putting varnish on wood is a way to … it.
2. … seldom knocks twice (a proverb).
3. The … of high productivity is prejudicing the quality of service.
4. Scientific research … a large investment of capital.
5. Visit … Development portal.
6. "Soft skills" are desirable qualities for certain forms of employment that do not depend on acquired knowledge: they include common sense, the … to deal with people, and a positive … attitude.
7. Cybersecurity is the state of being safe from electronic crime and the … taken to achieve this.

UNIT 2

Three components of sustainability

The most often-quoted definition of sustainable development neatly packages together the three challenges facing humanity: economic growth, social equity and the carrying capacity of natural systems. The premise of sustainable development is that these three types of capital; social, economic and natural; must all be considered in relation to each other — the "triple bottom line".

The three components of sustainability are:

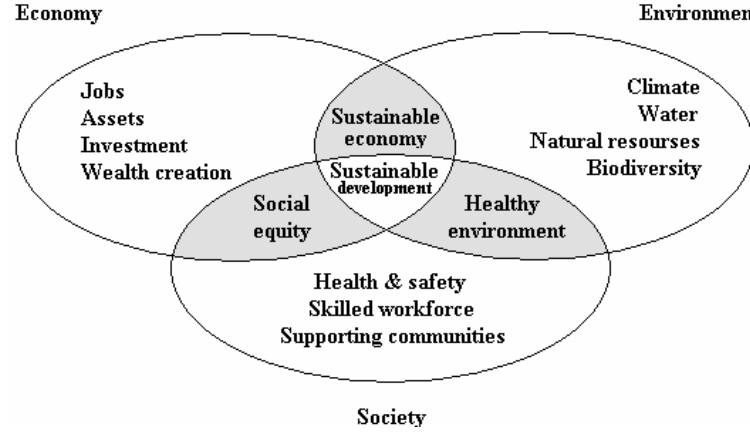
Environmental sustainability which requires that natural capital remains intact. This means that the source and sink functions of the environment should not be degraded. Therefore, the extraction of renewable resources should not exceed the rate at which they are renewed, and the absorptive capacity of the environment to assimilate wastes should not be exceeded. Furthermore, the extraction of non-renewable resources should be minimised and should not exceed agreed minimum strategic levels.

Social sustainability which requires that the cohesion of society and its ability to work towards common goals be maintained. Individual needs, such as those for health and well-being, nutrition, shelter, education and cultural expression should be met.

Economic sustainability which occurs when development, which moves towards social and environmental sustainability, is financially feasible.

With sustainable development as the goal of economic, social and environmental policy, what is needed is the redirection of economic activity in order to de-

tach it from environmental and social degradation. Once this has been achieved there will no longer be a conflict between economic growth and environmental protection.



Three pillars of sustainable development

Depicted as overlapping circles, we see that the three dimensions are not mutually exclusive but converge to produce sustainability.

1. Read and remember the words.

triple bottom line	тройной критерий (концепция, согласно которой предприниматели и менеджеры должны учитывать не только финансовые показатели, но также социальные и экологические результаты деятельности компании; применяется также по отношению и к государственной политике)
challenge	сложная задача, проблема
premise	исходное условие, предпосылка
component	компонент, составная часть
to remain	оставаться
intact	неповрежденный
to degrade	ухудшать
therefore	поэтому, следовательно
extraction	добыча
to exceed	превышать
to assimilate	ассимилировать, поглощать
absorptive capacity	абсорбционная (поглощающая) способность

furthermore	кроме того, более того
cohesion	единство, сплоченность
nutrition	питание
shelter	кров
to occur	происходить, иметь место
feasible	осуществимый, оправданный
goal	задача, цель
to detach	отделять, отодвигать

2. Read and translate the text.

3. Find in the text the opposites of these words.

a) renewable resources;
b) source function;
c) maximize;
d) backwards;
e) dissociation;
f) ill-being;
g) attach;
h) stagnation.

4. Sustainable development has three linked parts. These are sometimes called "People, planet and profit". Choose the correct word to complete the table.

a) People;
b) Planet;
c) Profit.

preserving biodiversity and using renewable energy	satisfying human needs in terms of health, education, housing, employment, inclusion and equality	creating means to improve material life

5. Use the information from the text, the diagram and the table above to explain:

a) what is meant by social sustainability;
b) what is meant by economic sustainability;
c) what is meant by environmental sustainability.

6. It has been argued through various international forums that there are four pillars of sustainable development. Visit www.en/wikipedia.org to find out what is considered to be the fourth policy area of sustainable development.

KEY VOCABULARY PRACTICE

7. Fill in the blanks with the correct words.

components	*furthermore*	*therefore*	*nutrition*
exceed	*extraction*	*feasible*	*occurs*

1. Metallurgy is the scientific study of the … refining, alloying, and fabrication of metals and of their structure and properties.

2. Sitology is the scientific study of food, diet, and ...

3. An amino acid is necessary for the normal growth of an organism but not synthesized by the organism and … required in the diet.

4. The field of sustainable development consists of three ...

5. The main problem with making business forecasts is predicting what your competitors will do. …, making forecasts should be a group activity, not the responsibility of a particular individual in the organization.

6. A solar eclipse … when the moon passes between the sun and the earth.

7. Lester had been doing some pretty hard thinking, but so far he had been unable to formulate any … plan for his entrance into active life.

8. I didn't … a speed limit.

UNIT 3

True sustainability

The word "sustainability" has evolved into an umbrella term referring to any activity that, once created, maintains itself indefinitely. The Iroquois Confederacy mandated that chiefs consider the effects of their actions on their descendants through the future seven generations, which has inspired many of our contemporary concepts.

An economic system viable over time describes "Economic Sustainability". It pays off the initial capital investment and is able to produce income covering operating costs. However, these costs do not always take into consideration the "costs" of sea-level rise, habitat destruction, desertification, etc. and focuses only on monetary costs.

Environmentalists phrase sustainability in terms of repairing and sustaining our environmental world, often to the detriment of our manufactured world and without consideration for established economic systems. This is a general concern with the current semiotics and language of the environmental movement. The negative outlook towards humanity, technology, business, and the need for sacrifice turns the public off.

Social Sustainability focuses on meeting the necessities of people in a community. Things like food, shelter, equality, education, creating an engaging social environment, etc. A society that does not look after its own cannot be sustained, social resources cannot be wasted any more than physical ones.

For something to be truly sustainable it must fulfill all of these requirements. Any one without the others does not create a complete picture. (e.g. A business that focuses on providing green services without being able to pay rent will not be around long, not be able to prosper, and thus not be "sustainable").

1. Read and remember the words.

to evolve	развиваться
mandate	поручение
effect	влияние, воздействие

descendants	потомки
to inspire	влиять, воздействовать
contemporary	современный
viable	жизнеспособный
income	доход
costs	расходы
engaging	привлекательный
complete	полный, завершенный
to prosper	преуспевать, процветать

2. Read and translate word combinations.

Umbrella term, Iroquois Confederacy, contemporary concept, habitat destruction, initial capital investment, operating costs, sea-level rise, to take into consideration, monetary costs, established economic systems, to meet the necessities, general concern, negative outlook, need for sacrifice, to fulfill requirements, complete picture, to pay rent.

3. Read and translate the text.

4. Sustainable or not? Look at the three examples and judge how sustainable they are. Think about the three areas: environmental effects, economic development and social opportunity. How could each example be made more sustainable?

1. A new office block is being built in your neighborhood. It uses recycled building materials and will employ people when it is completed. The building has been designed to use solar power, has good insulation and uses the minimum amount of water possible.	Very sustainable Quite sustainable Not sustainable
2. A farmer produces vegetables which she sells in a local farmers market. She uses organic methods to fertilize her crops and control pests. She grows less than if she used intensive farming methods but can sell her vegetables at a higher price to make a reasonable profit. She thinks that all food should be made organically.	Very sustainable Quite sustainable Not sustainable
3. A new, out-of-town shopping centre has just opened. It is close to a motorway and about 10 miles from the centre of town. Each day thousands of people travel there in their cars to do their shopping. The centre is a major employer and has helped to regenerate the local economy.	Very sustainable Quite sustainable Not sustainable

Tips. The office will provide employment and so help in economic and social sustainability. Building offices will use up natural resources but it does contain recycled materials, have good insulation and use solar power.

Organic farming doesn't use pesticides or chemical fertilizers. Some people say that food produced organically tastes better and is good for the environment.

She produces less and so sells her vegetables at a higher price compared to ones grown by intensive farming. Not everyone can afford them. This could affect social and economical sustainability.

Out-of-town centres have a lot of shops in one area. They are convenient for people with cars and employ large numbers of people. This helps make them socially and economically sustainable. However, traveling by car produces a lot of carbon dioxide which is environmentally unsustainable.

KEY VOCABULARY PRACTICE

5. Fill in the blanks with the correct words.

contemporary	*engaging*	*evolved*	*inspire*
costs	*effect*	*complete*	*prosper*

1. Antioxidant is a substance, such as vitamin C, vitamin E, or beta carotene, that counteracts the damaging … of oxidation in a living organism.
2. Modern economies … from historical institutions.
3. In the … western world, rapidly changing styles cater to a desire for novelty and individualism.
4. The results of the experiment were significant enough to … a new research.
5. It is the most … quality of his character.
6. Global search is a word-processing operation in which a … computer file or set of files is searched for every occurrence of a particular word or other sequence of characters.
7. These companies … in foreign trade.
8. The operating … of a company were decreased by reducing the number of people it employs.

UNIT 4

Sustainable development — achievements and challenges

Experience of the implementation of decisions on sustainable development shows that the challenges are less related to the definition of the concept than to the political and practical preparedness for action within the consensus of the concept on which the Brundtland Commission agreed.

The concept presented in 1987 became one of the most successful approaches to be introduced in many years. In fact, it helped to shape the international agenda and the international community's attitude towards economic, social and environmental development.

The Brundtland Commission found an eager audience for its proposals at the United Nations Conference on Environment and Development in Rio de Janeiro in 1992. The documents approved at the Conference, notably the comprehensive Agenda 21, included ambitious commitments by world leaders to ensure sustainable development in many areas and on all levels of society.

The Rio Conference gave a boost to both national and local action. National committees for sustainable development were established on a high political level

in many countries. Local Agenda 21 documents and action plans were drawn up in a great number of municipalities. The newly established United Nations Commission for Sustainable Development started to examine the implementation of the Rio decisions at its annual meetings.

The preparations for the 2002 Johannesburg Summit on Sustainable Development showed that the enthusiasm of Rio had started to wane, but high-level political support for the process persisted. The focus, however, clearly changed from attempts to cover a great number of areas simultaneously to a more practical approach with the emphasis on a limited number of substantive areas at a time.

Johannesburg also boldly highlighted the implementation of commitments rather than spending time on drafting new declarations. In this context the United Nations regional commissions were given stronger recognition than before. Using the same global actions for all regions was considered to be too rigid. The regional contributions from the outset brought an additional dimension to the process. Also the identification of key problem areas has become more specific and the conclusions more action-oriented.

The decision to choose three different items for each two-year cycle of the Commission on Sustainable Development has helped greatly to focus the work. For example, the items for 2004—2005 were water, sanitation and human settlements. Even if these areas are also still quite diverse, they are more manageable than was the case with the pre-Johannesburg way of treating Agenda 21 at the level of the Commission on Sustainable Development.

Experience of sustainable development work has produced both successes and challenges. One of the clearest successes is the widespread local activity. Thousands of municipalities have seriously taken the promotion of sustainable development.

But, of course, many problems still persist. At a recent course for government officials from Central and Eastern Europe, participants raised a number of concerns: lack of understanding of the concept in administrations, insufficient political support, limited resources at different levels for effective action, inadequate involvement of civil society, inertia in education systems and various problems in specific sectors of the economy.

One of the cross-cutting issues to promote sustainable development that has gained prominence recently is education. The United Nations Decade for Education for Sustainable Development starting in 2005 and led by the United Nations Educational, Scientific and Cultural Organization (UNESCO) illustrates the importance of education in achieving sustainable development.

1. Match the words from the text with their meanings.

1) approach	a) inflexible, strict
2) proposal	b) obligation, promise
3) notably	c) different, having variety
4) comprehensive	d) plan, suggestion
5) commitment	e) at the same time

6) annual	f) means adopted in tackling a problem
7) wane	g) particularly or especially
8) simultaneously	h) to decrease gradually in size, strength
9) rigid	i) occurring once a year or every year
10) diverse	j) of broad scope or content

2. Read and translate the text.

3. What are the main successes and challenges in implementing sustainable development practices?

4. Why does education have a great potential in promoting sustainable development?

5. Make a list of international reports and agreements mentioned in the text. Choose one of them for more detailed study.

KEY VOCABULARY PRACTICE

6. Fill in the blanks with the correct words.

emphasis	*implementation*	*rigid*	*experience*
approach	*simultaneously*	*proposal*	*challenges*

1. … is the mother of wisdom (a proverb).
2. The committee rejected the … to reduce taxes.
3. The time that you spend researching your customers and users, will pay off when it comes to taking tough decisions during the … phase.
4. We are faced with technological … from other countries.
5. Creativity tests will be given to those applying for jobs in our company where new … is needed to solve old problems.
6. Multiwindow is a visual display unit screen that can be divided to show a number of different documents ...
7. “You know” is a parenthetical filler phrase used to make a pause in speaking or add slight … to a statement.
8. You have to make your own decision about whether to patronize a store with a … refund or exchange policy.

WRITING

7. Summarize the information of the texts you have read.

What is Summarising?

Summarising is expressing the ideas of the text in your own words in a shorter form, including only the key ideas and the main points that are worth noting.

How to summarise?

1. Read the text at least twice to identify the main ideas and key points.
2. Identify the main sentence of every paragraph, it can serve as a summary of that paragraph.
3. Look for the key points that should be included in the summary.
4. Explain those key points in simple words and in shorter way.

UNIT 5

Market system and consumerism

Most people agree with what classical economists have assumed for decades: that the market with its tendency to come to an equilibrium point between the needs of suppliers and the needs of consumers, will provide for the common good. Implied here are actually two assumptions that need to be challenged.

The first is that the motor of the whole system is consumer need, that products will come and go on the market according to the needs of the people and their willingness to pay a price that will adequately reimburse the producer. Not to be ignored, in the 20th century, is the desire on the part of producers for ever larger profit margins. In the late 19th century American industrial productivity began to outpace the demand for consumer goods. In order to find markets for their products, industry focused on finding new markets overseas and bolstering the demand for goods here at home. This latter venture was the birth of modern advertising. Consumer needs are still important, but with modern advertising, producers have begun to realize that those needs can be created. People can be manipulated into thinking that they need to buy a product. The question of whether this is ethical or sustainable arises. The result is a whole society of people conditioned to think that "more is better" and that happiness can be attained through the acquisition of material things.

The second assumption of the classical model of economics is that "the common good" refers primarily to material needs: food, shelter, transportation etc. But this fails to take into consideration such things as the environment, future generations, and human fulfillment. A market that, for instance, encourages planned obsolescence (deliberately making goods that quickly go out of style or no longer function in order to assure profits both on the original purchase and on replacement purchases in the future) may be pumping out goods that consumers will buy, and from which producers can profit, but it is also contributing to the overloading of our landfills and the depletion of finite natural resources. It contributes to what Lester Brown aptly names our "throwaway society".

A Master Card Ad suggests that while there are some things money can't buy, there is also so much that can be bought to make you better or happier. The ad ends with the saying, "There are some things money can't buy. For everything else, there is Master Card". Clearly, the underlying message in much of modern advertising is precisely that you can buy happiness. If you are lonely, or you are feeling poorly about yourself, a simple purchase can bring you contentment.

1. Guess the meaning of the nouns from the text.

Verb			Noun
supply	поставлять	→	supplier
consume	потреблять	→	consumer, consumerism
produce	производить	→	producer
advertise	рекламировать	→	advertising

acquire	приобретать	→	acquisition
assumption	предполагать	→	assumption
obsolete	устарелый	→	obsolescence
purchase	покупать, приобретать	→	purchase

2. Read and translate the text.

3. Questions to explore.

1. What are the elements of a product that make it valuable?
2. In what ways and for what reasons might people overconsume?
3. How does per capita consumption in the U.S. compare to that in other countries?
4. Why do companies advertise?

4. Think of ads that use each technique.

Advertising Techniques

1. Advertising Strategies

a) slogans/puffery:

phrases/songs/images that sound great but mean little;

b) rational appeal:

logic or reasoning to convince consumer to buy;

c) emotional appeal:

famous people endorsements, claims that everybody is using product, popularity/well being improved by products, sex appeal.

One or all of these strategies are used in an ad to convince consumers to buy.

2. Targeted Groups

a) belonger lifestyle traditional values, conservative, old fashioned;

b) emulator lifestyle impressionable group, in search of identity, seeking group acceptance, important to "be cool", often younger people;

c) achiever lifestyle materialists, successful professionally, frustrated by being stuck just under top rung of economic ladder, King or Queen for the day;

d) inner directed lifestyle seeking personal fulfillment, "I am me", experimental, socially/environmentally conscious, self constrained in purchasing power, hard group to target with ads.

Ads may target one or more of these lifestyles. A product may have different ads to reach different audiences.

5. Media Watch: Creating Demand. Watch five television advertisements and record the following information.

Television advertisement	What is the ad trying to sell?	Is the product a basic need or a luxury?	What strategies are used to get people to buy more?	Who might be the target groups of this ad? Why?

6. Discuss the homework in small groups.

1. What types of products were chosen (luxuries or necessities)?
2. What strategies did advertisers use the most?
3. What groups were targeted the most?
4. Based on this information, what things do consumers care about the most?

7. Discuss the ethics of creating demand.

1. How do advertisements affect how people feel about themselves? What they need?
2. What are the effects on the environment of producing unnecessary goods? (List them on the board.)
3. Derive the concept of consumerism.

UNIT 6

Population, human resources, health, and environment: getting the balance right

While issues like climate change, freshwater deficits, and degradation of food-producing systems and ocean fisheries were appearing on the horizon in 1987, they have now moved to the foreground. Today, it is evident that these changes pose threats not only to economic systems, environmental assets, infrastructural integrity, tourism, and nature, but also to the stability, health, and survival of human communities.

The population issue is reemerging in public discussion, reflecting renewed recognition that population growth, along with rising consumption levels, is exacerbating climate change and other global environmental changes.

If the commission's assessment were re-run this decade, its updated terms of reference would necessarily focus more attention on the social and health dimensions of the "development" process, both as inputs and, importantly, as outcomes.

Today, human capital and social capital — both of which were first properly understood and factored into the development calculus in the 1990s, along with the need for sound governance — are better recognized as prerequisites for environmentally sustainable development. At the same time, realization is growing that the attainment of positive human experience is the core objective of human societies.

Brundtland report gave only limited attention to considering how environmental degradation and ecological disruption affect the foundations of human population health. The report focused primarily on the prospects for achieving an "ecologically sustainable" form of social and economic development that conserves the natural environmental resource base for future human needs. It paid little attention to the fact that the conditions of the world's natural environment signify much more than assets for production, consumption, and economic development in general; the biosphere and its component ecosystems and biophysical processes provide the functions and flows that maintain life processes and therefore good health. Indeed, all extant forms of life have evolved via an exquisite dependency on environmental conditions.

It is misleading and an injustice to the human condition to see people merely as consumers. Their well-being and security — old age security, declining child mortality, health care, and so on — are the goal of development.

Clearly, some fundamental changes are needed in how we live, generate energy, consume materials, and dispose of wastes. Population arithmetic will impose a further dimension of challenge: 4.8 billion in 1987; 6.7 billion in 2007; perhaps 8 billion by 2027. Beyond that, the numbers and outcomes will be influenced by what current and future "Brundtland reports" formulate, and how seriously and urgently we and our governments take their formulations and recommendations.

1. Find the words in the text and then choose the correct meaning according to the context in which they have been used.

1) issues (para 1)	a) editions of a magazine b) important subjects requiring a decision
2) exacerbating (para 2)	a) reinforcing b) irritating
3) inputs (para 3)	a) the data fed into a computer from a peripheral device b) resources required for industrial production, such as capital goods, labour services, raw materials, etc.
4) sound (para 4)	a) valid b)pronounced
5) realization (para 4)	a) selling b)understanding
6) attainment (para 4)	a) knowledge (skills) b) achievement
7) disruption (para 5)	a) destruction b) blowing up
8) evolved (para 5)	a) underwent evolution b)emitted
9) condition (para 6)	a) situation with respect to circumstances b) state of health or physical fitness
10) formulations (para 7)	a) mixtures prepared according to a particular formula b) target settings

2. Use the words after each sentence to make a new word that fits in the space in the same sentence.

1. "The end of the road" is the point beyond which … or continuation is impossible. *SURVIVE*

2. Demography is the scientific study of human populations, esp with … to their size, structure, and distribution. *REFER*

3. Ethiopia has the lowest oil … in the world. *CONSUME*

4. New Urbanism is an international movement concerned with tackling the problems associated with urban sprawl and car ... *DEPEND*

5. B (black) and H (hard) on British pencils … degree of softness or hardness of lead. *SIGNIFICANT*

6. The first part of the paper is a descriptive survey of … data from United Nations sources. *MORTAL*

3. Decide if the statements below are true or false.

1. Issues like climate change, freshwater deficits, and degradation of food-producing systems are now less important than in 1987.

2. The stability, health, and survival of human communities are threatened by environmental changes.

3. Population growth strongly influences climate change.

4. Social and health issues were the main point of the World Commission on Environment and Development in 1987.

5. The need for sound governance is required as one of prior conditions of sustainable development.

6. The necessity to change our consumption habits is considered to be essential.

7. Human population is decreasing.

WRITING

Changes in key global indicators of environment and population health (1987—2007)

	1987 (1985—1939)	207 (2005—2009)	Comments
World population size	4.9 billion	6.7 billion	Slight reduction in absolute annual increment
Annual population growth rate	1.7 %	1.2 %	—
Fertility rate (births/woman)	3.4	2.4	—
Percent over age 60 years	6 %	8 %	Low income countries have increased from 4 % to 5.5 %
Life expectancy, years	65	68	—
Maternal mortality (per 100,000 births)	430	400	—
Under 5 mortality, per 1,000 births	110	70	—
Infant mortality, per 1,000 births	68	48	—
Primary schooling	~60 %	82 %	—
Malnutrition prevalence	870 million	850 million	Recent increase, relative to the turn of century (~820 million)
Child stunting, less than age 5, prevalence	~30 %	25 %	Down from 35 % circa 1950, but a persistent and serious problem in sub-Saharan Africa (highest prevalence) and South Asia
HIV/AIDS, prevalent cases	10 million	40 million	—
AIDS deaths per year	~0.2 million	3.2 million	—
Lack safe drinking water	1.3 billion (27 %)	1.1 billion (15 %)	Percent of world population shown in brackets
Lack sanitation	2.7 billion (54 %)	2.6 billion (40 %)	Percent of world population shown in brackets
CO_2 atmospheric concentration	325 parts per million	385 parts per million	Approx 0.5 % rises per year, currently accelerating. (Pre-industrial concentration 275 parts per million.)
Increase in overage global temperature relative to 1961—1990 baseline	0.1 degrees Celsius	0.5 degrees Celsius	Warming faster at high latitude, especially in northern hemisphere
Global ecological footprint	1.0 planet Earths	1.3 planet Earths	Estimate of number of planet Earths needed to supply, sustainably, the world population's energy, materials and waste disposal needs.

Source. Compiled from various international agency reports, databases, and scientific papers.

4. Write a report for a university lecturer describing the information shown in the chart above. Use the words and structures below.

This chart shows us that …

Between 1987 and 2007 … (was) dramatically increased.

In 87 there was about … Since 87 number of … went up dramatically (until …).

The number of … increased from … to … per year.

In terms of the number of … we see that …

… much greater … in … compared to the number … remains stable, (which is about …). From 1987 to 2007 it rose slightly.

As for …, the figures rose to … and … respectively.

Between 1987 and 2007 … increased (sharply/ slightly) … which is almost … times more.

… began declining slowly.

… approximately similar.

It is clear from the data given that there are some significant differences in …

The figures for … show that … more than doubled.

The major conclusion that I've drawn using the chart, is that …

In contrast, … Meanwhile, … However, … Finally, …

CASE STUDY

Working for sustainable development in primary industry

1. Anglo American is one of the world's largest mining and natural resources companies. It operates in more than 60 countries, and is involved in the production of precious metals such as gold and platinum, other metals such as copper and iron ore, coal, paper and packaging and industrial materials. Anglo American operates in the primary sector. These are industries that are involved with the extraction or production of raw materials. Primary production can be divided into two parts: those materials that produce renewable resources (if well managed) such as farming, forestry and fishing, and those that deal in non-renewable resources such as mining coal and metal. Anglo American principally works in the second part, but still tries to meet the challenge of sustainable development.

2. To be "sustainable" means passing on a stock of resources to the next generation at least equal to the one this generation started with. Emerging economies increase the demand for such materials and, in addition, many poorer countries need to extract raw materials in order to make enough money to fund social capital such as schools and hospitals. The United Nations has set out Millennium Development Goals for 2015. These include: developing global partnerships for sustainable development, halving the number of people living on less than a dollar a day, or suffering from hunger, ensuring all children complete primary schooling, halting the spread of AIDS and other major diseases. Anglo American believes that it contributes to all of these through its work in developing countries.

3. Stakeholders are those individuals or institutions that have an interest in the success of a business. There can be conflict between stakeholders as not all have the same priorities. Anglo American believes that shareholders' interests are best served by having due regard to all stakeholders. Importantly, this also means those stakeholders in the countries in which it operates.

4. Anglo American's commitment to sustainable development and acting in an ethical — or morally correct — manner is shown in its “Good Citizenship Business Principles”. This states the ways in which Anglo American can be accountable to each of its stakeholders by acting in a responsible and open way.

5. Anglo American believes that a company can be judged on “how well it treats people and the environments and communities in which it operates”. Each major operation has a three year Community Engagement Plan set out and reviewed by local managers to address stakeholder concerns. Anglo American also uses its business to contribute to social capital (such as transport and education) in the communities where it operates. For example, Anglo American provided anti-AIDS drugs to its HIV employees in South Africa, recognising a problem and helping to solve it. It also has a system to measure whether it is helping to replace what is taken in natural capital (like metals) with social capital (like schools, training and infrastructure), through the taxes it generates.

6. Anglo American extracts natural resources. Many of these cannot be replaced. However, it is concerned for the future supply of resources. It is also concerned for the communities where it works. It therefore takes all the steps it can to act in a sustainable way.

1. Read and remember the words.

to operate	работать, действовать
precious	драгоценный
raw	сырьевой
emerging	развивающийся
demand	спрос
to fund	финансировать
partnership	сотрудничество, совместное действие
halt	остановка, прекращение
stakeholders	заинтересованное лицо (любое лицо или группа лиц, имеющих интерес в компании: акционеры, работники, поставщики, клиенты, кредиторы, государство, общественность и т.д.)
due	должный, надлежащий
accountable	ответственный, подотчетный
HIV (human immunodeficiency virus)	ВИЧ
to replace	восстанавливать

2. Read the text. Choose from the list below the heading for each part of the article. There is an extra one you don't need to use.

a) Ethics;
b) Company account;
c) Introduction;
d) Long term commitment;
e) Stakeholders;
f) Conclusion;
g) Background.

3. Find the odd one out. Explain your choice.

a) silver	platinum	gold	copper
b) fishing	packaging	forestry	farming
c) employees	shareholders	resources	communities
d) metal mining	coal mining	shaft mining	ore mining

4. Link the following sectors to the type of activities you would associate with them.

TERMS	EXPLANATIONS
	Forestry
	Manufacturing
Primary	Retail
Secondary	Hunting
Tertiary	Services
	Assembly
	Agriculture

5. Anglo American is an organisation that operates in the Primary sector of the economy. Which of the following activities would you relate to a primary sector industry such as Anglo American?

a) fishing;
b) mineral extraction;
c) banking services;
d) mining;
e) manufacturing.

6. Organisations such as Anglo American carry out an environmental audit to analyse the impact of their operations on the environment. Which of these would not be included in an environmental audit?

a) profit;
b) pollution;
c) recycling;
d) waste levels.

7. Read the following statements and choose the best response.

YES	if the statement is true
NO	if the statement is false
NOT GIVEN	if it there is no information in the text

1. Anglo American mines and extracts natural resources.
2. Anglo American seeks to improve skills and opportunities for local people.
3. Anglo American has a set of sustainable development principles.
4. Anglo American only works in the UK.
5. The company is continually looking to discover new mineral sources around the world.
6. Anglo American tries to increase noise pollution.
7. Anglo American is involved in sustainability projects.

8. Complete the gaps below to summarise the importance for businesses to act in an ethical manner.

customers	*economic*	*goods*	*jobs*
growth	*profit*	*transform*	

Businesses have the potential to … lives and alleviate poverty through generating … growth. They produce … and services that customers want and they create … However, if a business does not stay in tune with the wishes of society, it runs the risk of alienating its shareholders, stakeholders and ... This would be bad for business, reducing … and potentially affecting ...

9. Go to the "SD Case Studies" section of the web site www.sustainability-ed.org. Choose one of the case studies to make a 5 minute Power Point presentation.

KEY VOCABULARY PRACTICE

10. Fill in the blanks with the correct words making changes when needed.

precious	*replace*	*demand*	*emerging*
stakeholders	*halt*	*accountable*	*fund*

1. As a director, he must be … for his decisions.
2. Most Asian … countries belong to the dollar zone, as do countries in Latin America.
3. Carat is a measure of the weight of … stones, esp diamonds.
4. Schools and educational institutions are … directly by central government.
5. HD-DVD and Blu-ray discs are expected … current DVD as the standard for watching movies at home.
6. We … at a fork where two roads diverge.
7. The Consumer Communications department aims to promote the consumption of seafood by stimulating consumer ...
8. Corporate governance is the balance of control between the … managers, and directors of an organization.

GENERAL TRAINING: READING

Reading Passage

1. Read the passage. From the list below choose the most suitable title for the whole of the Reading Passage.

a) Pollution control in coal mining;
b) The greenhouse effect;
c) The coal industry and the environment;
d) Sustainable population growth.

2. The Reading Passage has four sections A—D. Choose the most suitable heading for each section from the list of headings below.

1. Global warming
2. The dangers of the coal industry
3. Superclean coal
4. Environment protection measures
5. Coal as an energy source
6. Coal and the enhanced greenhouse effect
7. Research and development
8. Mining site drainage

Section A. Coal is expected to continue to account for almost 27 per cent of the world's energy needs. However, with growing international awareness of pressures on the environment and the need to achieve sustainable development of energy resources, the way in which the resource is extracted, transported and used is critical.

A wide range of pollution control devices and practices is in place at most modern mines and significant resources are spent on rehabilitating mined land. In addition, major research and development programmes are being devoted to lifting efficiencies and reducing emissions of greenhouse gases during coal consumption. Such measures are helping coal to maintain its status as a major supplier of the world's energy needs.

Section B. The coal industry has been targeted by its critics as a significant contributor to the greenhouse effect. However, the greenhouse effect is a natural phenomenon involving the increase in global surface temperature due to the presence of greenhouse gases — water vapour, carbon dioxide, tropospheric ozone, methane and nitrous oxide — in the atmosphere. Without the greenhouse effect, the earth's average surface temperature would be 33—35 degrees C lower, or –15 degrees C. Life on earth, as we know it today, would not be possible.

There is concern that this natural phenomenon is being altered by a greater build-up of gases from human activity, perhaps giving rise to additional warming and changes in the earth's climate. This additional build-up and its forecast outcome has been called the enhanced greenhouse effect. Considerable uncertainty exists, however, about the enhanced greenhouse effect, particularly in relation to the extent and timing of any future increases in global temperature.

Greenhouse gases arise from a wide range of sources and their increasing concentration is largely related to the compound effects of increased population, improved living standards and changes in lifestyle. From a current base of 5 billion, the United Nations predicts that the global population may stabilise in the twenty-first century between 8 and 14 billion, with more than 90 per cent of

the projected increase taking place in the world's developing nations. The associated activities to support that growth, particularly to produce the required energy and food, will cause further increases in greenhouse gas emissions. The challenge, therefore, is to attain a sustainable balance between population, economic growth and the environment.

The major greenhouse gas emissions from human activities are carbon dioxide (CO_2), methane and nitrous oxide. Chlorofluorocarbons (CFCs) are the only major contributor to the greenhouse effect that does not occur naturally, coming from such sources as refrigeration, plastics and manufacture. Coal's total contribution to greenhouse gas emissions is thought to be about 18 per cent, with about half of this coming from electricity generation.

Section C. The world-wide coal industry allocates extensive resources to researching and developing new technologies and ways of capturing greenhouse gases. Efficiencies are likely to be improved dramatically, and hence CO_2 emissions reduced, through combustion and gasification techniques which are now at pilot and demonstration stages.

Clean coal is another avenue for improving fuel conversion efficiency. Investigations are under way into superclean coal (3—5 per cent ash) and ultraclean coal (less than 1 per cent ash). Superclean coal has the potential to enhance the combustion efficiency of conventional pulverised fuel power plants.

Ultraclean coal will enable coal to be used in advanced power systems such as coal-fired gas turbines which, when operated in combined cycle, have the potential to achieve much greater efficiencies.

Section D. Defendants of mining point out that, environmentally, coal mining has two important factors in its favour. It makes only temporary use of the land and produces no toxic chemical wastes. By carefully pre-planning projects, implementing pollution control measures, monitoring the effects of mining and rehabilitating mined areas, the coal industry minimises the impact on the neighbouring community, the immediate environment and long-term land capability.

Dust levels are controlled by spraying roads and stockpiles, and water pollution is controlled by carefully separating clean water runoff from runoff which contains sediments or salt from mine workings. The latter is treated and re-used for dust suppression. Noise is controlled by modifying equipment and by using insulation and sound enclosures around machinery.

Since mining activities represent only a temporary use of the land, extensive rehabilitation measures are adopted to ensure that land capability after mining meets agreed and appropriate standards which, in some cases, are superior to the land's pre-mining condition. Where the mining is underground, the surface area can be simultaneously used for forests, cattle grazing and crop raising, or even reservoirs and urban development, with little or no disruption to the existing land use. In all cases, mining is subject to stringent controls and approvals processes.

In open-cut operations, however, the land is used exclusively for mining but land rehabilitation measures generally progress with the mine's development. As core samples are extracted to assess the quality and quantity of coal at a site, they

are also analysed to assess the ability of the soil or subsoil material to support vegetation. Topsoils are stripped and stockpiled prior to mining for subsequent dispersal over rehabilitated areas. As mining ceases in one section of the open-cut, the disturbed area is reshaped. Drainage within and off the site is carefully designed to make the new land surface as stable as the local environment allows: often dams are built to protect the area from soil erosion and to serve as permanent sources of water. Based on the soil requirements, the land is suitably fertilised and revegetated.

3. Choose the appropriate answer.

3a. The global increase in greenhouse gases has been attributed to …

a) industrial pollution in developing countries.
b) coal mining and electricity generation.
c) reduced rainfall in many parts of the world.
d) trends in population and lifestyle.

3b. The proportion of all greenhouse gases created by coal is approximately …

a) 14 per cent.
b) 18 per cent.
c) 27 per cent.
d) 90 per cent.

3c. Current research aims to increase the energy-producing efficiency of coal by …

a) burning it at a lower temperature.
b) developing new gasification techniques.
c) extracting CO_2 from it.
d) recycling greenhouse gases.

3d. Compared with ordinary coal, new, "clean" coals may generate power …

a) more cleanly and more efficiently.
b) more cleanly but less efficiently.
c) more cleanly but at higher cost.
d) more cleanly but much more slowly.

3e. To control dust at mine sites, mining companies often use …

a) chemicals which may be toxic.
b) topsoil taken from the site before mining.
c) fresh water from nearby dams.
d) runoff water containing sediments.

4. Do the following statements reflect the opinions of the writer in the Reading Passage?

YES if the statement reflects the opinion of the writer
NO if the statement contradicts the writer
NOT GIVEN if it is impossible to say what the writer thinks about this

1. The coal industry should be abandoned in favour of alternative energy sources because of the environmental damage it causes.

2. The greatest threats to the environment are the gases produced by industries which support the high standard of living of a growing world population.

3. World population in the twenty-first century will probably exceed 8 billion.

4. CFC emissions have been substantially reduced in recent years.

Reading Test

You should spend about 20 minutes on Questions 1—14 which are based on Reading Passage below.

Part One

Air pollution is increasingly becoming the focus of government and citizen concern around the globe. From Mexico City and New York, to Singapore and Tokyo, new solutions to this old problem are being proposed, mailed and implemented with ever increasing speed. It is feared that unless pollution reduction measures are able to keep pace with the continued pressures of urban growth, air quality in many of the world's major cities will deteriorate beyond reason.

Action is being taken along several fronts: through new legislation, improved enforcement and innovative technology. In Los Angeles, state regulations are forcing manufacturers to try to sell ever cleaner cars: their first of the cleanest, titled "Zero Emission Vehicles" are already available. Local authorities in London are campaigning to be allowed to enforce anti-pollution laws themselves; at present only the police have the power to do so, but they tend to be busy elsewhere. In Singapore, renting out road space to users is the way of the future.

When Britain's Royal Automobile Club monitored the exhausts of 60,000 vehicles, it found that 12 per cent of them produced more than half the total pollution. Older cars were the worst offenders; though a sizeable number of quite new cars were also identified as gross polluters, they were simply badly tuned. California has developed a scheme to get these gross polluters off the streets: they offer a flat $700 for any old, run-down vehicle driven in by its owner. The aim is to remove the heaviest-polluting, most decrepit vehicles from the roads.

As part of a European Union environmental programme, a London council is testing an infra-red spectrometer from the University of Denver in Colorado. It gauges the pollution from a passing vehicle — more useful than the annual stationary test that is the British standard today — by bouncing a beam through the exhaust and measuring what gets blocked. The council's next step may be to link the system to a computerized video camera able to read number plates automatically.

The effort to clean up cars may do little to cut pollution if nothing is done about the tendency to drive them more. Los Angeles has some of the world's cleanest cars — far better than those of Europe — but the total number of miles those cars drive continues to grow. One solution is car-pooling, an arrangement in which a number of people who share the same destination share the use of one car. However, the average number of people in a car on the freeway in Los Angeles,

which is 1.0, has been falling steadily. Increasing it would be an effective way of reducing emissions as well as easing congestion. The trouble is, Los Angelenos seem to like being alone in their cars.

Singapore has for a while had a scheme that forces drivers to buy a badge if they wish to visit a certain part of the city. Electronic innovations make possible increasing sophistication: rates can vary according to road conditions, time of day and so on. Singapore is advancing in this direction, with a city-wide network of transmitters to collect information and charge drivers as they pass certain points. Such road-pricing, however, can be controversial. When the local government in Cambridge, England, considered introducing Singaporean techniques, it faced vocal and ultimately successful opposition.

Part Two

The scope of the problem facing the world's cities is immense. The United Nations Environmental Programme and the World Health Organization (WHO) concluded that all of a sample of twenty megacities — places likely to have more than ten million inhabitants — already exceeded the level the WHO deems healthy in at least one major pollutant. Two-thirds of them exceeded the guidelines for two, seven for three or more. Of the six pollutants monitored by the WHO — carbon dioxide, nitrogen dioxide, ozone, sulphur dioxide, lead and particulate matter — it is this last category that is attracting the most attention from health researchers. PM10, a sub-category of particulate matter measuring ten-millionths of a matter across, has been implicated in thousands of deaths a year in Britain alone. Research being conducted in two counties of Southern California is reaching similarly disturbing conclusions concerning this little understood pollutant.

A world-wide rise in allergies, particularly asthma, over the past four decades is now said to be linked with increased air pollution. The lungs and brains of children who grow up in polluted air offer further evidence of its destructive power. The old and ill, however, are the most vulnerable to the acute effects of heavily polluted stagnant air.

The pressure on public officials, corporations and urban citizens to reverse established trends in air pollution is likely to grow in proportion with the growth of cities themselves. Progress is being made. The question, though, remains the same: "Will change happen quickly enough?"

Questions 1—5

Look at the following solutions (Questions 1—5) and locations. Match each solution with one location. Write the appropriate locations in boxes 1—5 below.

NB **You may use any location more than once.**

SOLUTIONS	**LOCATIONS**
1. Manufacturers must sell cleaner cars.	a) Singapore
2. Authorities want to have power to enforce anti-pollution laws.	b) Tokyo c) London
3. Drivers will be charged according to the roads they use.	d) New York

4. Moving vehicles will be monitored for their exhaust emissions.

5. Commuters are encouraged to share their vehicles with others.

e) Mexico City
f) Cambridge
g) Los Angeles

1		2		3		4		5	

Questions 6—11
Do the following statements reflect the claims of the writer in Reading Passage?

YES if the statement reflects the opinion of the writer
NO if the statement contradicts the writer
NOT GIVEN if it is impossible to say what the writer thinks about this

6. According to British research, a mere twelve per cent of vehicles tested produced over fifty per cent of total pollution produced by the sample group.

7. It is currently possible to measure the pollution coming from individual vehicles whilst they are moving.

8. Residents of Los Angeles are now tending to reduce the yearly distances they travel by car.

9. Car-pooling has steadily become more popular in Los Angeles in recent years.

10. Charging drivers for entering certain parts of the city has been successfully done in Cambridge, England.

11. A patient may die from respiratory failure during a severe attack of asthma if not treated with inhaled oxygen or other appropriate measures.

6		7		8		9		10		11	

Questions 11—15
Choose the appropriate answer.

12. What can californians get for an old car?
a) a new car;
b) a new flat;
c) a fixed sum;
d) a decrepit vehicle.

13. How many pollutants currently exceed WHO guidelines in all megacities studied?
a) one;
b) two;
c) three;
d) seven.

14. Which pollutant is currently the subject of urgent research?
a) nitrogen dioxide;
b) ozone;
c) lead;
d) particulate matter.

15. Which of the following groups of people are the most severely affected by intense air pollution?

a) allergy sufferers;
b) children;
c) the old and ill;
d) asthma sufferers.

12		13		14		15	

ADDITIONAL READING

Sustainability means caring

Sustainability refers to how we can maintain our existence both as an individual and as a community. When we are faced with challenges, sustainability measures our ability to surpass the trials with sound decision making and capital allocation for the next generations. Our investment and consumption is the main driver of sustainability. We say that lack of resources prevents us investing in sustainable projects, but this is short sighted.

Sustainability takes care of our children's well being, welfare and future. This is not limited to just allotment of budget and financing to make certain that future generations are comfortable and fulfilled. But how are we able to do that if we need financing for our well being today?

As we are all aware, many in the third world face problems in education, poverty, unemployment and financial hardship. There will always be a conflict whether we should live the way that we dream against preparing for our children and grandchildren's needs in the future. From what I can see, we should choose to get our dreams started. Like most of the Western world who have had improved their material standard of livelihood this has impacted on our environment. This is already evident with the climate change that is happening to us today.

When listening to the world news, thunderstorms, hurricanes, flood, fires and other disasters are already happening. Not only this, has been news in Europe that some sea creatures like jellyfishes have risen from the depths to the upper sea level. We are experiencing this because of global warming and if we are already experiencing these effects today then we can conclude that we are in an unsustainable condition. If this continues our future heirs will have far worse to deal with.

Preventing global warming is not as easy as we think. It is not enough to completely shift our customs, attitude and behavior because we might end up sacrificing what we already have. It will be better if we do it gradually so that we are not compromising our lives. We can also find effective strategies that will improve our sustainability and at the same time take care of the environment. We need to balance both strategic benefits and costs so as to ensure the success of our chosen approach.

This is not a question of whether third world or the West needs to change. We all need to! Global warming leaves us with huge equity concerns. It will be better

if first world countries can help other countries not only in environmental projects but also in developing awareness. All of us must understand the adverse effects of global warming and how we can avoid it.

At the end of the day, to stay away from dangers brought about by global warming, we have to make some very tough choices. But one thing is certain! We need to be careful with our decisions because our children will blame us because of their dim future.

Moveover "Climategate", here's why even skeptics should support the climate deal

One does not need to believe in climate change to support the potential climate deal which is scheduled to replace the Kyoto Protocol after 2012. The climate deal means much more than just carbon cuts, carbon trading and adaptation fund. A scientifically sound climate deal would bring many other positive changes for the environment, economy and the society.

Sustainable Development. No one can challenge the concept of sustainable development, the world needs no scientists or intergovernmental panel to tell you that sustainable development is the most efficient way for an economy, a country, a country or a household to work and grow.

What the proposed climate deal would do is that it would lay down certain minimum standards of emission outputs which various countries would be legally bound to achieve. These standards would be connected with each country's own predictions and projections about their future economic growth rates. Sustainable economic growth would not only help the environment but would also result in better and more efficient use of resources, which includes both energy and non-energy resources, so that they are available for the future generations.

Inclusive Growth. Better resource utilization would also help the poor and needy get access to the relatively cheap resources since the renewable energy sources will continue to be costlier than conventional fuels. The poor cannot wait for the scientists to achieve cost parity between electricity generated from solar, wind and coal, natural gas.

The World Bank, in a report earlier in the year, justified India's tough stand against mandatory emission targets as it intends to invest heavily in rural electrification, broadly based on coal fired power plants, over the next few decades. With India's goal of reducing carbon intensity by 24 percent by 2020 it becomes important that the existing power plants become more efficient thereby giving the new power plants meant for rural electrification some leeway as far as cost of production is concerned.

Energy Independence. The race for new energy resources could very well lead to direct confrontation between countries. We have seen the sudden increase in the attempts of Arctic countries to lay claims to the vast undiscovered energy reserves of Greenland. There are possibilities of international confrontations for sharing of water resources as some areas of the world experience prolonged droughts.

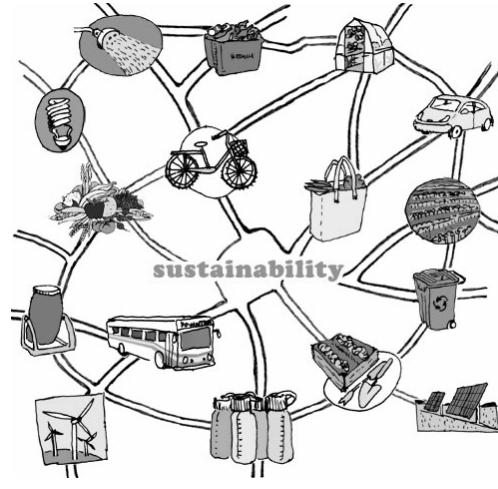
The climate deal would boost investment in renewable energy infrastructure which is vital for achieving energy independence. The Europeans have learned the importance of energy independence after Russia's arm-twisting tactic brought Europe's gas supplies to a standstill. In order to insulate the economy from the rising fuel prices and not to become victim of an international power showdown each country must endeavor to achieve complete or partial energy independence.

These concepts are extremely important for building an equal society with equal opportunities for all, for maintaining a healthy economic growth rate and safeguarding national interests. We must remember that carbon cuts are merely a part of the climate deal. Reducing our carbon outputs would bring many other positive results with it which are beneficial to the environment and the society as a whole.

Where are you on path to sustainability?

The path to sustainability is a path anyone can be on. You don't have to be a card-carrying environmentalist. In fact, most people on the path don't even realize they're on it.

Have you carried groceries home in a cloth bag recently? You're on the path. Did you put a CFL (compact fluorescent lamp) in your porch light so it would stop burning out? Carrying one of those shiny stainless steel water bottles? Just prefer the taste of organic strawberries? Take the bus because it costs less than driving and parking? Congratulations — you're well on your way to a sustainable lifestyle, whether you realize it or not. Maybe you've found that you have a few non-toxic cleaning supplies under your sink, a kitchen drawer full of recycled yogurt containers, or a goat munching on grass in the backyard. It really doesn't matter where you are on the path — hanging out anywhere along it is a good place to be.



Global Carbon Cycle

The global carbon cycle can be divided into two categories: the geological, which operates over large time scales (millions of years), and the biological — physical, which operates at shorter time scales (days to thousands of years) and as humans we meddle with both categories.

The global carbon cycle refers to the movements of carbon, as it exchanges between reservoirs (sinks), and occurs because of various chemical, physical, geological, and biological processes. The ocean contains the largest active pool of carbon near the surface of the Earth, but the deep ocean part of this pool does not rapidly exchange with the atmosphere. Below in the diagram, you can get some idea where and how carbon is stored in the whole Earth system. The global carbon cycle is usually thought to have four major carbon sinks interconnected by pathways of exchange. These sinks are:

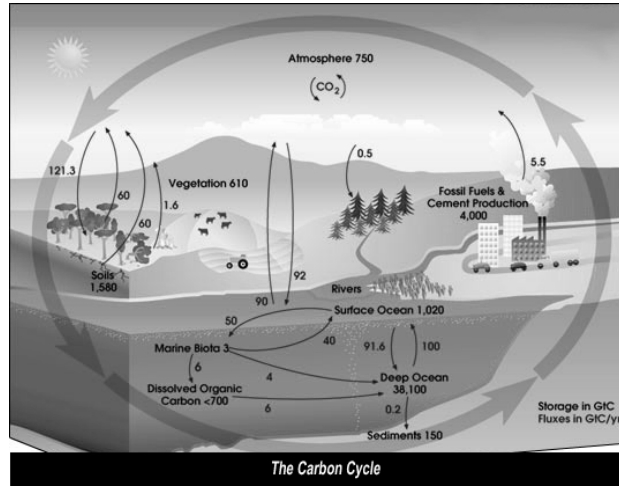
the atmosphere;

the terrestrial biosphere (which usually includes freshwater systems and non-living organic material, such as soil carbon);

the oceans (which includes dissolved inorganic carbon and living and non-living marine biota);

the sediments (which includes fossil fuels).

Carbon exists in the Earth's atmosphere primarily as the gas carbon dioxide (CO_2). Although it is a very small part of the atmosphere overall (approximately 0.04 % and rising fast), it plays an important role in supporting life. Other gases containing carbon in the atmosphere are methane and chlorofluorocarbons (the latter is one we introduced and are still adding to). These are all greenhouse gases whose concentration in the atmosphere are increasing, and contributing to the rising average global surface temperature.



The Carbon Cycle

Global Carbon Cycle — Sinks and Storage. Carbon is taken up from Earth's system in several ways:

1. When the sun is shining, plants perform photosynthesis to convert carbon dioxide into carbohydrates, releasing oxygen in the process. Deforestation and land clearing pose serious problems to the carbon cycle, and obliterating this sink means more carbon is forced into the atmosphere.

2. At the surface of the oceans towards the poles, seawater becomes cooler and CO_2 is more soluble. Cold ocean temperatures favour the uptake of carbon dioxide from the atmosphere whereas warm temperatures can cause the ocean surface to release carbon dioxide. With seas warming this means CO_2 is not so easily absorbed, and remains in the atmosphere. This is coupled to the ocean's thermohaline circulation which transports dense surface water into the ocean's interior. During times when photosynthesis exceeded respiration, organic matter slowly built up over millions of years to form coal and oil deposits. All of these biologically mediated processes represent a removal of carbon dioxide from the atmosphere and storage of carbon in geologic sediments.

3. In upper ocean areas of high productivity, organisms form tissue containing carbon, and some also form carbonate shells or other hard body parts. Apart from trees in forests, phytoplankton in the Earth's oceans are very important organisms that soak up carbon. The seas contain around 36000 gigatonnes of carbon, and again and in warmer seas, organisms cannot produce carbonate shells at the same rate, and increasingly acidic seas dissolve shells, or make it difficult to create shelly material. This means of course that carbon dioxide is not being taken up as quickly through this process and more carbon remains in the atmosphere, propelling global warming.

4. As shelled organisms die, bits and pieces of the shells fall to the bottom of the oceans and accumulate as sediments. Only small amounts of residual carbon from plankton settle out to the ocean bottom but over long periods of time these represent a significant removal of carbon from the atmosphere.

Global Carbon Cycle — Sources. Carbon can be released back into the system in many different ways:

1. Through the respiration performed by plants and animals.

2. Through the decay of animal and plant matter. Fungi and bacteria break down the carbon compounds in dead animals and plants and convert the carbon to carbon dioxide if oxygen is present, or methane if not. The melting permafrost is releasing large amounts of methane, which contributes to global warming at a rate 21 more times than carbon dioxide.

3. Through combustion of biomass which oxidizes the carbon it contains, producing carbon dioxide (as well as other things, like smoke). Burning fossil fuels such as coal, petroleum products, and natural gas releases millions of tonnes of carbon that has been stored in the geosphere for millions of years. Fires also consume biomass and organic matter to produce carbon dioxide (along with methane, carbon monoxide, smoke), and the vegetation that is killed but not consumed by

the fire decomposes over time adding further carbon dioxide to the atmosphere. Wildfires and forest fires are likely to increase as land masses dry out with higher rates of evaporation.

4. Production of cement. A component, lime, is produced by heating limestone, which produces a substantial amount of carbon dioxide, and impacting upon the global carbon cycle.

5. At the surface of the oceans where the water becomes warmer, dissolved carbon dioxide is released back into the atmosphere.

6. Volcanic eruptions and metamorphism are part of the global carbon cycle and release gases into the atmosphere. These gases include water vapour, carbon dioxide and sulphur dioxide. Find out how volcanic gases are measured here.

Latest Trends and Cause for Alarm. There has been a decline in the efficiency of natural land and ocean sinks which soak up carbon dioxide (CO_2) emitted to the atmosphere by human activities (anthropogenic) , according to findings published in late Oct 2007, in the Proceedings of the National Academy of Sciences of the US (PNAS).

The swift increase in atmospheric CO_2 is due to faster economic growth coupled with a halt in carbon intensity reductions, in addition to natural sinks removing a smaller proportion of emissions from the air. Carbon intensity is the amount of carbon emitted to produce one dollar of global wealth.

The rise in growth in atmospheric CO_2 is generating climate forcings that are bigger and sooner than expected. By altering the global energy balance, these mechanisms “force” the climate to change.

Taking Action. We already possess the scientific, technical, and industrial know how to solve the carbon and climate problem for the next half-century. A concept known as “carbon wedges” proposes to limit the human contribution to the global carbon cycle, in an effort to reduce global warming. Adoption of the wedge concept is essential if we are going to curb our extraordinary abuse of fossil based fuels.

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