Preparing the Students for 21st Century

Theme – “Sustainable Development, need for Sustainable Development, Sustainable Education and Sustainable Teaching”

Sustainability and the Human Future

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Sustainable Development

• Sustainable development is the development that meets the needs of the present without compromising the ability of future generation to meet their own needs
• Use natural resources with the speed as nature is producing them
School, College and Universities must impart education and training about:

- Ecological Sustainability
- Social Sustainability
- Cultural Sustainability
- Economical Sustainability

1. They must incorporate sustainability into formal education and curriculum
2. Adopt sustain policies programs and projects that reduces humanity footprint
3. End harmful environmental practices
4. Sustainability consideration in managing resources
5. Fostering global awareness and understanding
6. Changes in social, cultural and economic attitudes to adopt sustainable paths
20th Century Education approach

• Developments and economic gain only
• Environmental Impacts Were Not Considered (indiscriminate dumping)
  Social impacts were ignored
• Engineering principles were only taught
• Management of natural cycles were badly damaged
21st Century Education approach

• Principles of Sustainable Developments
• Principles of Green Economy
• Conversion from high carbon economy to low carbon economy
• Recycling of resources
• Management of natural cycles
• Ecological relationship should be restored
This century education should consider

• Raw material and resources are going down and deeper & deeper.
• Environmental problems and stresses on the planet
• Population growth
• Urbanization

The development has to develop under these constraints
Unsustainable education in the last century resulted in environmental stresses and constraints on development

- Damage to photosynthesis
- Toxicity in food
- Global Warming
- Ozone Layer Depletion
- Acid Rain
- Deforestation
- Loss of Biodiversity
- Air Pollution
- Water Pollution
- Desertification
- Waste disposal
Techniques are changing.....
Overview of Industrial Process in the last century

Waste or effluent is a resource which is out of place.

This century sustainable education demand zero emission processes and complete recycling
What is Green Economy

• The Green Economy is an economy that seek to optimize the synergy among three sets of values
1. Financial/ Economic
2. Environmental
3. Social

That means Sustainable Development
Requirements of Green Economy

- Renewable Energy Sources
- Green Buildings
- Organic Produce and Products
- Alternative Fuel Vehicles
Objectives of Sustainable Education and Development

• A low carbon economy (LCE) is a term that refers to an economy which has a minimal output of green house gases (GHG) emissions into the biosphere, but specifically refers to the green house gas carbon dioxide. At present, atmospheric carbon dioxide concentration reaches to about 378 parts per million, which tends to reach as high as 700 parts per million by 2100 compared with about 300 parts per million 450,000 years ago.
Sources Of High Carbon Economy which make the world unsustainable

- Energy generation
- Transportation
- Industry
- Agriculture
- Commercial
- Residential
Education for Footprint and Ecological Footprint

How much “nature” your lifestyle requires
You must estimate the amount of land and ocean required to sustain your consumption patterns and absorb your wastes on an annual basis.
Calculate Ecological Footprint and learn how to reduce your impact on earth
What Is A Carbon Footprint?

A **carbon footprint** is a measure of the impact our activities have on the environment, and in particular climate change. It relates to the amount of greenhouse gases produced in our day-to-day lives through burning fossil fuels for electricity, heating and transportation etc.
Understanding the UK’s carbon footprint is the first step in reducing it.

- Aviation: 40 MtCO₂
- Education: 29 MtCO₂
- Other government: 18 MtCO₂
- Communication: 6 MtCO₂
- Hygiene & health: 80 MtCO₂
- Household: 82 MtCO₂
- Clothing & footwear: 59 MtCO₂
- Commuting: 48 MtCO₂
- Space heating: 88 MtCO₂
- Food & catering: 82 MtCO₂
- Recreation & leisure: 116 MtCO₂
Education for estimation ecological footprint and comparison standards

- Estimate your carbon footprint. Your carbon footprint is the area needed to absorb carbon emissions generated by your home energy use and transportation.
- Estimate your food footprint. Your food footprint includes the area needed to grow crops, fish and grains, animals, and absorb carbon emission from food processing and transport.
• Estimate your housing footprint. Your housing footprint includes the area occupied by your home and the area needed to supply resources used in construction and household maintenance.

• Estimate your goods and services footprint, which includes the area needed to supply consumer items your purchase and absorb carbon emissions from their manufacturing, transport, and disposal.
The pie chart above shows the main elements which make up the total of an typical person's carbon footprint in the developed world.
KINDS OF FOOTPRINTS

• 1. The **primary footprint** is a measure of our direct emissions of CO2 from the burning of fossil fuels including domestic energy consumption and transportation (e.g. car and plane). We have direct control of these.

• 2. The **secondary footprint** is a measure of the indirect CO2 emissions from the whole lifecycle of products we use - those associated with their manufacture and eventual breakdown. To put it very simply – the more we buy the more emissions will be caused on our behalf.
Food/Energy Changes 1900-2000 (world)

- Cultivated area increased by 1/3
- Harvest of edible crops increased by 6 times
- People per cropland acre increased by 2.7 times
- World population increased by 3.8 times
- Fossil fuels use increased by 150 times!!!

20 lbs of CO2 emitted every gallon of gasoline burning by the vehicle.
Current per capita CO₂ emissions and Target

US: delay for tech development, global warming business
EU: Initiatives toward LCS
Japan: Need long-term vision
Developing countries: earlier guidance toward LCS is key

Target for Low Carbon Society

Shuzo Nishioka, Junichi Fujino; NIES COP11 and COP/MOP1 side event
Global Challenges Toward Low-Carbon Economy (LCE), Dec.3, 2005
Global carbon emissions

Global annual carbon emissions (MtC)
Atmospheric carbon concentrations

CO2 concentrations (parts per million)

- 1959 = 316ppm
- 2005 = 380ppm
Greenhouse Effect

Without

With
What will Happen with More CO$_2$?

2x CO$_2$  

4x CO$_2$
Consequences of High Carbon Economy

• The global and the local climate may change faster than natural and social system can adapt by powering our present forms of civilization with fossil fuels.
Threat Of Fossil Fuels

• The use of fossil fuels, which enabling human civilizations to develop and to function has now become a threat to our natural living conditions.
Impacts Of Global Climate Change

• By changing our global climate we also change local living conditions with potentially severe implications for plants, animals and humans. Food chain may be interrupted. Populations of plants & animals may change. Infrastructure for human civilization may be flooded or blown away. Climate change is an assault on the developed forms of life which here emerged through long processes of evolution.
Caution

• It is more than just about having clean fuels and engines. It is one path to sustainability.

• If carbon has been reduced by 60% but if everything else is same.

• It would be a sad world.
Preserving the natural environment is the only pathway that is sustainable. Sustainable development means using soil, water, air, and biological and mineral resources in ways such that they are not degraded or depleted but that quality and amounts are preserved for future generations.

Education for sustainable route.
ECOLOGY AND NATURE
MAIN THEME OF SUSTAINABLE EDUCATION
PHOTOSYNTHESIS BASIS FOR FOOD PRODUCTION

**Pollutant gases**
Contact with acid fumes and gases may cause leaf scorch and leaf rolling in some plants. Acid rain may lower the soil pH and mobilize metals such as aluminium, zinc and lead in the soil.

**Acid rain**
Many plants do not show physical signs of damage by pollution. However, the efficiency of the leaves may have been altered, or photosynthesis reduced. The overall effect may reduce the growth rate.

**Dust**
Small airborne dust particles can block the leaf pores and stomata. This will inhibit gas exchange and may reduce photosynthesis.

**Particles**
Larger airborne particles settle on leaves and decrease the amount of solar radiation received. This may lower the rate of photosynthesis.

Leaves killed or damaged by a combination of pollutants

Soil acidified by long term exposure to acid rain leading to mobilisation of phytotoxic materials in the soil due to lower pH

Deposition of particles and dusts from industrial processes may add heavy metals or other toxic materials to the soil.
ENERGY PYRAMID FOR SUSTAINABLE DEVELOPMENT
Causes of Unsustainability in 20th Century due to lack of sustainable education
1. Population explosion (we want to feed them)
2. Complex lifestyle (cars)
3. Urbanization (2% area)
4. Wasteful habits of individuals & industry
5. Out of sight, out of mind approach
6. Use of fossil fuels (Environmental global problems)
Ice Melting in Arctic

Since 1979, more than 20% of the Polar Ice Cap has melted away.
Surface Melt on Greenland
Melting Glaciers: Qori Kalis Glacier (Peruvian Andes)
Upsala Glacier: Argentina
7. Working against nature (destruction of natural cycles)
Damage to Photosynthesis

- **Pollutant gases**
  - Exhaust, smoke, and fumes may enter the soil via the stomata and individual cells, leading to reduced photosynthesis.

- **Dust**
  - Small airborne dust particles can block the leaf pores and stomata, inhibiting gas exchange and reducing photosynthesis.

- **Acid rain**
  - Directly damages some plants. Lowers soil pH and mobilizes metals such as aluminium, zinc, and lead in the soil.

- **Particles**
  - Larger airborne particles settle on leaves, decreasing the amount of solar radiation received. This may lower the rate of photosynthesis.

Leaves killed or damaged by a combination of pollutants.

Soil acidified by long term exposure to acid rain leading to mobilisation of phytotoxic materials in the soil due to lower pH.

Many plants do not show physical signs of damage by pollution. However, the efficiency of the leaves may have been altered, or photosynthesis reduced. The overall effect may reduce the growth rate.

Deposition of particles and dusts from industrial processes may add heavy metals or other toxic materials to the soil.
8. Use of fertilizer, pesticide & insecticide (toxicity in food cycle)
9. Lack of proper management of pollution
10. Integrated approaches was not adopted (all stakeholder together)
11. Lack of sustainable education (social, environment, economic)
12. Inventory of natural, human, social, built capitals was not kept
13. Recycling of nutrients into motherland (nutrient drain)
14. Pathways for sustainable development were not established
15. Use of science and technology (not in proper way)
16. Working in local context, not globally
17. Industrial processes not studied on life cycle approach
Product Life-Cycle

Use of Products

Manufacturing

End of Product Life
18. Ecology & nature and their relationships (prey, predator relationship) were ignored
ECOLOGY AND NATURE

SOLAR RADIATION

- Light energy
- Used by Pasture grasses and lucerne

Producer 1st

Feeding or trophic level

Consumer (herbivore)

- Eaten by sheep
- Eaten by dingo

Consumer (carnivore)

- Decomposer 4th
- Decomposed by decomposers (bacteria, fungi)
Earth is finite, all life shares its resources and the energy from the sun and therefore has limits to growth.

**Network**

All members of an ecological community are interconnected in a vast and intricate network of relationships, the web of life. The derive their essential properties and, in fact, their very existence from these relationships.
Cycles
The interactions among the members of an ecological community involve the exchange of energy and resources in continual cycles. There is no waste; one species’ waste is another’s food.

Balance
All ecological cycles act as feedback loops, so that the ecological community regulates and organizes itself, maintaining a state of dynamic balance.
**Development**
The unfolding of life, manifesting as development and learning at the individual level and as evolution at the species level, involves an interplay of creativity and mutual adaption in which organisms and environment coevolved.

**Flows**
All organisms are open systems. They need to feed on a continual flow of energy and resources to stay alive. The constant flow of solar energy sustains life and drives all ecological cycles.

**Nested Systems**
Throughout nature we find multi-leveled structures of systems nesting within systems. Each of these forms an integrated whole within a boundary while at the same time being a part of a larger whole.
19. Change of land use pattern (25% tree)
20. Massive deforestation (especially in NWFP)

FIGURE 13–11
Dieback of forests. A retardation of growth and a dieback of a number of species are being observed in many areas impacted by acid rain. Acid precipitation, in addition to other factors of pollution, is apparently stressing forests to the critical point. Shown here: Dieback of forest on Mount Mitchell, western North Carolina (1985). (Courtesy of Dr. Dwight Billings, Duke Univ.)
Loss of Tropical Rain Forests
21. Biasness and conflict of interest
22. Poor risk assessment, management and communication (carcinogens in food, radioactive waste)
23. Destruction of wetlands
24. Lack of scientific and technical information in environmental policies
25. Contaminated ground-water and soil site are created
26. Market signals conflict with environmental objectives
27. We focused on achievement of goals, did not concern ourselves with environmental impacts.
Sustainable Education and Research should be based

- Carbon dioxide capture & storage
- Pathway to Sustainable development
- Measures of Low Carbon Economy/Society
Carbon dioxide Capture & Storage
CO$_2$ Storage and Capture

- Mineral carbonation
- Industrial uses
- CO$_2$ geological storage
- Ocean storage (ship & pipeline)
Sustainable Development Indicators

- Sustainable consumption and production
- Climate change and energy
- Natural resource protection and enhancing the environment
- Creating sustainable communities and a fairer world
Carbon Labelling
HOLLAND
Green Industry

- Use of Solar Energy for Power Generation.
- Fuel Cell System
- Co-generation
- 100% Waste water recycling
- Use of Green Engineering Principles & Clean processes
Fuel Cell
Green Agriculture
Cycling Holidays
low-energy lifestyle
Low Carbon Transport Pyramid
Current trend of houses
Future houses
Change the thinking

We can’t solve problems by using the same kind of thinking we used when we created them.

Compatibility between civilization and the natural world be restored; in view of world population approaching 10 billion with growing economic need otherwise be ready for big disaster.
Examples of Carbon Footprint

- For each gallon of petrol fuel consumed, 10.4 kg carbon dioxide (CO$_2$) is emitted. Travel from Lahore to Rawalpindi add 60 kg of CO$_2$
- Production of 2 plastic bottles add 1kg of CO$_2$
- Production of 5 plastic bags add 1kg of CO$_2$
- Operating computer for 32 hours add 1kg of CO$_2$
- Production of one cheese burger add 3kg of CO2
Reduction of Primary & Secondary Foot Prints

1. Use public transport, bicycle or walk for travel
2. Use car sharing
3. Reduce your air travel
4. Do not buy imported items
5. Use local food items and drinks
6. Don’t use bottled water
7. Use renewable energy source
8. Reduce your consumption of meat
9. Don’t use clothes from far off lands
Reduction of Primary & Secondary Foot Prints

10. A wide goods and services that have unnecessary packaging
11. Take measures to safe energy
12. Think before you drive and offset your car’s emissions
13. Recycle and compost resources and solid waste
14. Buy recycle products
15. Use green electricity
16. Buy local products and climate friendly products
Reduction of Primary & Secondary Foot Prints

17. Educate yourself about climate change
18. Create climate friendly environment and discuss recycling and energy efficient measures
19. Get involved, seminar, workshops, guest speaker, library
20. Grow plants
21. Conduct research on CO$_2$ capture and storage
22. Change your economic social and cultural attitudes
Sustainable Education is Required for

• Climate change
• GHG reduction
• Recycling
• Ecology
• Ecological footprint
• Energy conservation and saving measures
• Renewable energy sources
• Insulation
• Green physics
• Green chemistry
• Green chemical
• Sustainable cities
• Green design
• Zero mission in industrial processes
• Use of recycled, natural and organic materials in life
What is Sustainability?

• Sustainability is the capacity to endure.
• In ecology, the word describes how biological systems remain diverse and productive over time.
• Long-lived and healthy wetlands and forests are examples of sustainable biological systems.
Contd…

• **For humans**, sustainability is the potential for long-term maintenance of well being, which has environmental, economic, and social dimensions.
Environmental dimension

• Healthy ecosystems provide vital goods and services to humans and other organisms.
• There are two major ways of reducing negative human impact and enhancing ecosystem services.
• The first of these is environmental management. This direct approach is based largely on information gained from earth science, environmental science, and conservation biology.
A second approach is through demand management of human resource use.

Management of human consumption of resources is an indirect approach based largely on information gained from economics.
Herman Daly has suggested three broad criteria for ecological sustainability:

- **Renewable resources** should provide a **sustainable yield** (the rate of harvest should not exceed the rate of regeneration)

- For **non-renewable resources** there should be **equivalent development** of renewable substitutes

- **Waste generation** should not exceed the **assimilative capacity** of the environment.
Social dimension

- **Peace, security, social justice**
- Social disruptions like [war](#), [crime](#) and [corruption](#) divert resources from areas of greatest human need, damage the capacity of societies to plan for the future
- **Broad-based strategies** for more sustainable social systems include:
  - improved education
  - Political empowerment of women, especially in developing countries;
  - Greater regard for social justice, notably equity between rich and poor both within and between countries;
  - Intergenerational equity.
Economic dimension

• Sustainability interfaces with economics through the social and ecological consequences of economic activity.

• Sustainability economics represents: "... a broad interpretation of ecological economics where environmental and ecological variables and issues are basic but part of a multidimensional perspective..."
Contd…

• At present, the average per capita consumption of people in the developing world is sustainable but population numbers are increasing and individuals are aspiring to high-consumption Western lifestyles.

• The developed world population is only increasing slightly but consumption levels are unsustainable.
The challenge for sustainability is to curb and manage Western consumption while raising the standard of living of the developing world without increasing its resource use and environmental impact.

This must be done by using strategies and technology that break the link between, on the one hand, economic growth and on the other, environmental damage and resource depletion.
Education For Sustainable Development ESD

- Sustainability education (ES), Education for Sustainability (EfS), and Education for Sustainable Development (ESD) are interchangeable terms describing the practice of teaching for sustainability.
ESD Contd…

• ESD seeks to engage people in
  – negotiating a sustainable future
  – making decisions
  – acting on them

• While it is generally agreed on that sustainability education must be customized for individual learners
Skills for ESD

• According to Tilbury and Wortman, the following skills are essential to ESD

1. ENVISIONING – being able to imagine a better future. The premise is that if we know where we want to go, we will be better able to work out how to get there.
2. **CRITICAL THINKING** and reflection – learning to question our current belief systems and to recognize the assumptions underlying our knowledge, perspective and opinions. Critical thinking skills help people learn to examine economic, environmental, social and cultural structures in the context of sustainable development.
Skills for ESD

3. SYSTEMIC THINKING – acknowledging complexities and looking for links and synergies when trying to find solutions to problems.
Skills for ESD

4. BUILDING PARTNERSHIPS – promoting dialogue and negotiation, learning to work together.

5. PARTICIPATION IN DECISIONMAKING – empowering people.

6. COOPERATION POLICY NOT COMPETITION
Programs for ESD

• The Walmart corporation offers a program for employees focused on sustainability education that includes these skill sets.

• The Green Education Foundation (GEF) promotes sustainability education with a K-12 curriculum.
Contd…

• GEF's National Green Week encourages students to become environmental stewards within the context of their own lives.

• GEF offers the Green Energy Challenge, Green Thumb Challenge and Green Building Program as part of its sustainability education efforts.
Traditional Teaching

- **SEVEN PRINCIPLES**
  1. Encourages contact between students and faculty,
  2. Develops reciprocity and cooperation among students,
  3. Encourages active learning,
  4. Gives prompt feedback,
  5. Emphasizes time on task,
  6. Communicates high expectations,
  7. Respects diverse talents and ways of learning.
1. Encourages Contact Between Students and Faculty

- Frequent student-faculty contact in and out of classes is the most important factor in student motivation and involvement.
- Faculty concern helps students get through rough times and keep on working.
- Knowing a few faculty members well enhances students' intellectual commitment and encourages them to think about their own values and future plans.
2. Develops Reciprocity and Cooperation Among Students

• Learning is enhanced when it is more like a team effort that a solo race.

• Good learning, like good work, is collaborative and social, not competitive and isolated.

• Working with others often increases involvement in learning.

• Sharing one's own ideas and responding to others' reactions sharpens thinking and deepens understanding.
3. Encourages Active Learning

- Learning is not a spectator sport.
- Students do not learn much just by sitting in classes listening to teachers, memorizing pre-packaged assignments, and spitting out answers.
- They must talk about what they are learning, write about it, relate it to past experiences and apply it to their daily lives.
- They must make what they learn part of themselves.
4. Gives Prompt Feedback

• Knowing what you know and don't know focuses learning.

• Students need appropriate feedback on performance to benefit from courses. When getting started, students need help in assessing existing knowledge and competence.

• In classes, students need frequent opportunities to perform and receive suggestions for improvement.

• At various points during college, and at the end, students need chances to reflect on what they have learned, what they still need to know, and how to assess themselves.
5. Emphasizes Time on Task

• Time plus energy equals learning. There is no substitute for time on task.
• Learning to use one's time well is critical for students and professionals alike. Students need help in learning effective time management.
• Allocating realistic amounts of time means effective learning for students and effective teaching for faculty.
• How an institution defines time expectations for students, faculty, administrators, and other professional staff can establish the basis of high performance for all.
6. Communicates High Expectations

- Expect more and you will get more. High expectations are important for everyone -- for the poorly prepared, for those unwilling to exert themselves, and for the bright and well motivated.

- Expecting students to perform well becomes a self-fulfilling prophecy when teachers and institutions hold high expectations for themselves and make extra efforts.
7. Respects Diverse Talents and Ways of Learning

- There are many roads to learning. People bring different talents and styles of learning to college.
- Brilliant students in the seminar room may be all thumbs in the lab or art studio.
- Students rich in hands-on experience may not do so well with theory.
- Students need the opportunity to show their talents and learn in ways that work for them. Then they can be pushed to learn in new ways that do not come so easily.
Sustainable Teaching

- Sustainability is a truly interdisciplinary—perhaps even transdisciplinary field and includes so many realms of human existence it is hard to imagine an area or class that would have no relation.
- So sustainability can be a cross-cutting set of concerns that are widely available across the university curriculum.
• The purpose of sustainable teaching is to spur on thinking about **how to incorporate sustainability across any class** based on the assumption that sustainability is something more than environmental improvement but is rather a structural concern.
Make Your Lectures More Sustainable

- Teacher’s aim should be making his lectures more sustainable.
- The importance of sustainability education and awareness raising should not be underestimated.
- Include resources for incorporating sustainability into the subject of his lectures.
Why bother?

- The challenge is to provide students with an in-depth understanding of sustainability and environmental issues.
- Giving them a platform to integrate sustainability into their own lives and future careers.
• As well as teaching sustainability via theory, there is the opportunity for institutions to ‘walk the talk’ by demonstrating sustainability in practice.

• It is about institutions operating to the highest possible environmental standards.

• Lectures are a good opportunity to increase student awareness of sustainability issues.
Inspiring Sustainability Education

- It is worth spending some time thinking about how your subject area fits into the global, environmental, social and economic contexts of sustainability.

- A number of sustainability teaching resources are available online covering a variety of topics, for example: carbon management, renewable energy, sustainable use resources, climate change and general sustainability.
Most of these are not specifically designed for undergraduate bioscience teaching but can be adapted and could provide a starting point to introduce sustainability concepts.
1. Student involvement

Students should be encouraged to study in a sustainable way, for example by:

• using less paper and, in lectures, taking notes on reused or recycled paper / notepads

• recycling any waste at the end of a lecture, e.g. scrap paper and drinks cans
Methods Contd…

• borrowing library books rather than buying new
• giving or selling on purchased books to the next set of students after finishing the course
• travelling to lectures by foot, bike or on public transport
2. Mode of delivery

- *PowerPoint is fast* becoming the main method for delivering lectures.
- It is potentially a paper free system and the presentation is reusable.
- There are, however, benefits of using the *old fashioned methods of chalk and board* as no electrical equipment and only minimal resources are needed.
Methods Contd…

3. Handouts

- Print handouts double sided and on recycled or FSC certified paper, online teaching support and e-learning may reduce the need to have paper copies.
- Students may print their own handouts, so ensure any copying facilities provided by the institution and your department also use environmentally friendly paper and print double sided.
4. Group size

- The cost of lighting and heating room does not change significantly if there are 5 or 50 students,
- So try to book rooms which suit your capacity needs.
- These economies, however, have to be balanced against the student learning experience.
5. Timing

- Organizing lectures in blocks can save on resources as it reduces the time that lecture theatres and rooms stand empty.
- In addition blocking together the time rooms are empty means that everything can be turned off.
- Lights are often dimmed during lectures, turned on at the end and then often left on until the next lecture, unnecessarily lighting an empty room.
Methods Contd

6. Is it really rubbish?

- If a lecture room is undergoing a facelift, make sure that desks, chairs, electrical goods etc. are donated to charity or a local school instead of thrown in the skip.
Methods Contd...

7. Recycling

- A lecture should not generate too much waste but replacing waste bins with recycling bins in a lecture theatre or room can encourage people to recycle more.

- Provide clearly labeled sorting containers for paper, plastics, cans, glass and organic matter.
8. Energy Efficiency

• Switch off electrical appliances when not in use, and check to ensure power saving modes on projectors, computers or any other electrical equipment are switched on.

• If replacing equipment then consider buying low energy models.
• Make use of natural light by removing anything blocking light from windows and, if possible, arranging desks closer to the windows.

• Switch to low energy light bulbs and compact fluorescent tubes, and fit mirror reflectors on twin tube fittings.
9. Green purchasing

- Institutions represent a large section of the consumer market, and purchasing power can really make a difference.

- Purchase reusable or refillable goods wherever possible and avoid disposable items.
• buy recycled or reclaimed products, taking their construction and ease of recycling at the end of the product life into account;
• if possible avoid products that must be shipped from overseas; and
• purchase as locally as you can, reducing transport impact and supporting the local economy
Methods Contd...

10. Travel

- Encourage staff and student use of public transport and minimize use of personal cars.
- Make cycling to lectures an attractive option by providing secure lockups and pleasant changing facilities.
- Install a transport notice board where car and lift sharing opportunities between students, and details of local public transport services, can be displayed.
Methods Contd…

11. Tea Breaks

- Vending machines are wasteful in terms of energy, and produce a large quantity of waste.
- If they must be used collect the plastic cups for recycling, large insulated thermos flasks are a good alternative.
- Encourage fair trade tea and coffee, whole foods and organic produce in canteens, and home cooked food instead of highly packaged and processed snacks.
Background of ESD

Education for sustainable development is about learning to:

• Respect, value and preserve the achievements of the past;

• Appreciate the wonders and the peoples of the Earth;

• Live in a world where all people have sufficient food for a healthy and productive life
• Assess, care for and restore the state of our planet;
• Create and enjoy a better, safer, more just world;
• Be earning citizens who exercise their rights and responsibilities locally, nationally and globally
• Promote and improve basic education
• Reorient existing education programs at all levels to address sustainable development
• Develop public awareness and understanding of sustainability
• Provide training
Education for Sustainable Development

- Locally Relevant, Culturally Appreciate Values
- Participatory
- Multi-Method
- Critical Thinking
- Holistic & Interdisciplinary
- Values-based
ESD is

- Interdisciplinary and holistic learning rather than subject based learning
- Values-based learning
- Critical thinking rather than memorizing
- Multi-method approaches: word, art, drama, debate, etc.
- Participatory decision-making
- Locally relevant information, rather than national
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Sharp contributes to the creation of a low-carbon society by developing solar power generation system and energy saving products.

Sharp aims to realize carbon-neutral living

- Solar Power Generation increases the amount of CO₂ reductions.
- Energy-saving home appliances reduce CO₂ emissions.

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THANK YOU