

# Social Responsibilities



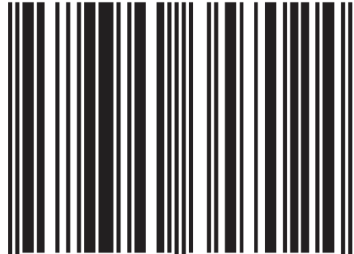
## Social Responsibilities



**Dr. T.X.A. Ananth**  
**Rev. Sr. A. Fatima Mary**  
**A. Libina Rachel**

## Social Responsibilities

ISBN 978-93-90357-02-4



9 789390 357024 >

Website: [www.skyfox.co](http://www.skyfox.co)

Email: [skyfox@skyfox.org.in](mailto:skyfox@skyfox.org.in)

# Social Responsibilities

## **AUTHOR INFORMATION:**

**Dr. T.X.A. Ananth., BBA, MSW, MBA, MPhil, PhD,**

President – University Council

DMI – St. Eugene University

P.O.Box: 330081, Chibombo

Zambia.

**Rev. Sr. A. Fatima Mary., M.B.A.,**

Lecturer

Department of Management Studies

DMI – St. Eugene University

P.O.Box: 330081, Chibombo

Zambia.

**Ms. A. Libina Rachel., M.S.W.,**

Lecturer

Department of Social Work

DMI – St. Eugene University

P.O.Box: 330081, Chibombo

Zambia.

**First Electronic Edition : July 2020**

**Cover Art and Design : Authors**

**Copyright : © 2020 by Authors**

**ISBN : 978-93-90357-02-4**

**DOI : <https://doi.org/10.22573/spg.020.BK/S/004>**

### [Creative Commons Attribution-Share Alike 4.0 International License](#)

You are free: to Share — to copy, distribute and transmit the work; to make commercial use of the work under the following conditions:

Attribution — you must attribute the work in the manner specified by the author or licensor (but not in any way that suggests that, they endorse you or your use of the work).

No Derivative Works — you may not alter, transform, or build upon this work.

### **Publisher Contact & Support**

#### **Skyfox Publishing Group**

#987, Medical College Road

Thanjavur-613004

Tamil Nadu, India.

Phone: +918300123232

Email: [skyfoxpublishing@gmail.com](mailto:skyfoxpublishing@gmail.com) / [skyfox@skyfox.org.in](mailto:skyfox@skyfox.org.in)

Website: [www.skyfox.co](http://www.skyfox.co)

### **Headquarters & Marketing Office**

#### **Skyfox Publishing Group**

333 Cedar Street, PO Box 208002,

New Haven, United States.

CT 06520-8002.

Tel: 203.737.5603 / Fax: 203.785.7446

Email: [skyfoxpublishing@gmail.com](mailto:skyfoxpublishing@gmail.com) / [skyfox@skyfox.org.in](mailto:skyfox@skyfox.org.in)

Website: [www.skyfox.co](http://www.skyfox.co)

# **Social Responsibilities**

**Dr. T.X.A. Ananth**  
**Rev. Sr. A. Fatima Mary**  
**A. Libina Rachel**

From the desk of

**Dr. T. X. A. ANANTH, BBA, MSW, MBA, MPhil, PhD,**

President – University Council

Dear Learner,

Welcome to DMI – St. Eugene University!

I am sure you are expert in using the PC Tablets distributed by us. Now your world is open to Internet and using the tablet for your educational learning purposes. The very same book you are holding in your hand now is available in your V-Campus portal. All the teaching and learning materials are available in your portal.

As our Chancellor, Rev.Fr. Dr. J. E. Arulraj , mentioned, it is not just the success for DMI-St. Eugene University alone, it is success for the technology, it is success for the great nation of Zambia and it is success for the continent of Africa.

You can feel the improvement in the quality of the learning materials in the printed format. Improvement is done in quality of the content and the printing. Use it extensively and preserve it for your future references. This will help you to understand the subjects in a better way. The theories of the subjects have been explained thoroughly and the problems have been identified at learners' level. This book is made up of five units and every unit is mapped to the syllabus and discussed in detail.

I am happy at the efforts taken by the University in publishing this book not only in printed format, but also in PDF format in the Internet.

With warm regards



Dr. T. X. A. ANANTH

President – University Council

Chapter	Table of Contents	Page No.
I	<b>Concept of Responsibility and Importance, Social Responsibility:</b> <ul style="list-style-type: none"> <li>• Meaning,</li> <li>• Importance and Need</li> <li>• Role and Role Conflict in taking responsibility.</li> </ul>	1
II	<b>Meaning, Nature and Importance of Global Environment:</b> <ul style="list-style-type: none"> <li>• Depletion of Ozone Layer</li> <li>• Green House Effect</li> <li>• Utilization of Energy</li> <li>• Irreversible Energy</li> <li>• Chemical Waste</li> <li>• Impact of Science and Technology on environment: Modernisation – Industrialisation – Secularisation – Westernisation– Automation – Globalisation</li> </ul>	29
III	<b>Hygiene:</b> <ul style="list-style-type: none"> <li>• Personal Hygiene</li> <li>• Mother and Child Health</li> <li>• Mother to Mother Health</li> <li>• Child to Child Health</li> <li>• Pandemic and Endemic Diseases - Current Scenario and Governmental Efforts to Control and Eradicate</li> </ul>	99

<p style="text-align: center;"><b>IV</b></p>	<p><b>Business Ethics:</b></p> <ul style="list-style-type: none"> <li>• Concept and Meaning, Nature, Importance</li> <li>• Ethical Dilemma</li> <li>• Corruption</li> <li>• Bribery</li> <li>• Adulteration</li> <li>• Duplication</li> <li>• Forms of Unethical Issues in different professions: Medicine, Engineering, Legal, Teaching, Finance and IT: Meaning, Nature and Measures to eradicate them.</li> </ul>	<p style="text-align: center;"><b>145</b></p>
<p style="text-align: center;"><b>V</b></p>	<p><b>Individual as Civilian:</b>          Responsibility towards Nation,          Society – Street Children – Orphans – OldAge, Conservations – Natural Resources – Nation Building</p>	<p style="text-align: center;"><b>175</b></p>

## Chapter I

### CONCEPT OF RESPONSIBILITY AND IMPORTANCE OF SOCIAL RESPONSIBILITY

#### Concepts

- Self
- Family
- Community
- Society
- Nation

**Family** is a system of relationship existing between parents and children.

#### Nature of family

**i. Universality:** Family is the most universal group. It is the first institution in the history of men. It has existed in every age and in every society and is found in all parts of the world. No culture or society has ever existed without some form of family organization.

**ii. Emotional basis:** The family is a fundamental unit of human society. It is based on our impulses of mating, procreation and parental care.

**iii. Limited size:** The size of a family is of necessity limited for it is defined by biological conditions which it cannot transcend. Other groups may be smaller than a family, but they are not so because of biological conditions.

**iv. Formative influences:** The family exercises the most profound influence over its members. It moulds the character of individuals. Its influence in infancy determines the personality structure of the individual. From its initial units the father and mother, the child receives his physical inheritance.

**v. Nuclear position of the family:** The family is the nucleus of all other social groups. The distinctive characteristics of functions and ceremonies that take place within a family such as marriages, other parental obligations and sibling relations make family the primary institutional cell of a society.



**vi. Responsibility of the members:** In the family the child learns the meaning of social responsibility and the necessary for cooperation. In is a great agency of the socialization of the child.

**vii. Social regulation:** The family is peculiarly guarded by social customs and legal regulations. It is not easy to violate them. Family is the group in which the consenting parties may freely enter but which they cannot easily leave or dissolve.

**ix. Permanent and temporary:** Family as an institution is permanent and universal, while as an association it is temporary and transitional. When the son marries he goes out of the family and starts another family which again may give rise to more families.

### **Functions of the family**

#### **Essential functions**

- i. Satisfaction of sex need
- ii. Production and rearing of children
- iii. Provision of a home

**i. Satisfaction of sex need:** Satisfaction of sex instinct brings the desire for life-long partnership among male and female. The satisfaction of sex instinct makes for normal personality. If sex instinct is suppressed, it may produce personality maladjustment and disrupt social relations. The modern family satisfies this instinct in greater degree than the traditional family.

It may be referred that while premarital or extramarital mating is permitted or tolerated in some societies, however, every society places some restrictions on such mating; though these restrictions may vary from culture from culture.

**ii. Production and rearing of children:** The inevitable result of sexual satisfaction is procreation. The task of race perpetuation has always been an important function of the family. The functions of child rearing are better performed today than in the past because now more skills and knowledge are devoted to the care of the unborn and new born child.

**iii. Provision of a home:** Whatever else he needs, man needs intimate human response. The family satisfies the need for affection by human beings. Most societies rely almost entirely upon the family

for affectionate response. Man after the hard toil of the day returns home where in the midst of his wife and children he sheds off his fatigue. Though in modern times there are hotels and clubs which also provide recreation to man but the joy that a man feels within the congenial circle of woman, parents and children stands far above the momentary pleasure which is provided by club and hotel.

**Community:** Community is a group of social being living a common life including all the infinite variety and complexity of relations which result from that common life or constitute it.

### **Elements of Community**

**i. Group of people:** Community is a group of people. Whenever the individuals live together in such a way that they share the basic conditions of a common life, we call them forming a community.

**ii. Locality:** The group of people forms a community when it begins to reside in a definite locality. A community always occupies a territorial area. The area need not be fixed forever. The people may change their area of habitation from time to time as nomadic community does. However most communities are now well settled and derive a strong bond of solidarity from the conditions of their locality.

**iii. Community sentiments:** Community sentiments mean a feeling of belonging together. It is 'we feeling' among the members. In modern times this sentiment very much lacks among the people occupying a specific local area.

Example: In big cities a man does not know even his next neighbour.

**iv. Permanency:** A community is not transitory like a crowd. It essentially includes a permanent life in a definite place.

**v. Naturality:** Communities are not made or created by an act of will but are natural. An individual is born in a community.

**vi. Likeness:** In a community there is a likeness in language, customs, mores etc. A community is a cluster of people living within a narrow territorial radius, who share a common way of life.

**vii. Wider ends:** In communities the people associate not for the fulfillment of a particular end. The ends of a community are wider. These are natural and not artificial.

**viii. Particular name:** Every community has some particular name. It points identity, it indicates reality, it points out individuality, it often describes personality and each community is something of a personality.

**ix. No legal status:** A community does not constitute a legal person. It cannot ensure, nor can it be used. In the eyes of law, it has no rights and duties.

**Society:** Society is the union itself, the organization, the sum of formal relations in which associating individuals are bound together. Society is not a group of people, it is the system of relationships that exists between the individuals of the group.

#### **Society is a web of social relationship**

- Society means likeness
- Society also implies difference
- Inter-dependence
- Co-operation

#### **Types of society**

- i. Tribal society
- ii. Agrarian society
- iii. Industrial society

**i. Tribal society:** Tribe is a social group in which there are many clans, nomadic bands, villages or other sub-groups which usually have a definite geographical area, a separate language, a singular and distinct culture and either a common determination against the strangers. The tribal group is based on the need for protection, on ties of blood relationship and on the strength of a common religion. The tribe is a group of persons having a common definite territory, common dialect, common name, common religion and a common culture.

#### **Characteristics of tribe**

- **Common Territory:** The tribe lives on a common territory
- **Sense of Unity:** The members of a tribe are possessed of a sense of unity
- **Common Language:** The members of a tribe speak a common language
- **Endogamous:** A tribe is an endogamous group

- **Blood Relationship:** The members of a tribe are related by blood
- **Political Organization:** Each tribe has its own political organization
  - The chief of the tribe who exercises authority over all the members of the tribe
- **Importance of Religion**
  - Religion plays an important part in the tribal organization
  - The members of the tribe worship a common ancestor
- **Common Name**
  - The tribe has a common name
  - A tribe differs from clan
  - The clan has no definite territory, and no common language and is an exogamous group

**ii. Agrarian society:** The economic activity in this type is agriculture. Even today, two-third to three-fourth of the world's people live in agrarian societies. Their economy consisted of seed and root gathering, of hunting and fishing. The development of agriculture greatly altered the social structure and institutions. The new form of economy made possible a more growth in population

#### **Features of Agrarian society**

- Occupational structure
- Forms of land ownership in agrarian society
- Village community system
- Minimal division of labour
- Role of family
- Sense of unity
- Informal social control
- Simplicity and uniformity

**iii. Industrial society:** A very important factor in the history of society has been the industrial revolution which has brought about far-reaching consequences in the structure of societies. Prior to the industrial revolution most workers secured their own raw materials

and owned their own tools. They worked under their own roofs on their own time, and determine both the quality and quantity of what they produced and sold the finished product to the consumer. The worker took pride in his product and he established his reputation as a man who had made the best product. This social structure began to change with the beginning of industrial revolution.

### **Features of industrial society**

- Emergency of modern family
- Economic institutions
- Occupational sub-cultures
- Segmentalised roles
- Impersonality of relationship
- Status to contract
- Social mobility
- Position of women
- Deviance and anomie

**Poverty:** Poverty is hunger. Poverty is lack of shelter. Poverty is being sick and not being able to see a doctor. Poverty is not having access to school and not knowing how to read. Poverty is not having a job, is fear for the future, living one day at a time. Poverty is losing a child to illness brought about by unclean water. Poverty is powerlessness, lack of representation and freedom.

Poverty has many faces, changing from place to place and across time, and has been described in many ways. Most often, poverty is a situation people want to escape. So poverty is a call to action -- for the poor and the wealthy alike -- a call to change the world so that many more may have enough to eat, adequate shelter, access to education and health, protection from violence, and a voice in what happens in their communities.

To know what helps to reduce poverty, what works and what does not, what changes over time, poverty has to be defined, measured, and studied -- and even experienced. As poverty has many dimensions, it has to be looked at through a variety of indicators -- levels of income and consumption, social indicators, and indicators of vulnerability to risks and of socio/political access.

## **Measuring Poverty**

**Measuring poverty at the country level:** A common method used to measure poverty is based on incomes or consumption levels. A person is considered poor if his or her consumption or income level falls below some minimum level necessary to meet basic needs. This minimum level is usually called the "poverty line". What is necessary to satisfy basic needs varies across time and societies. Therefore, poverty lines vary in time and place, and each country uses lines which are appropriate to its level of development, societal norms and values.

Information on consumption and income is obtained through sample surveys, with which households are asked to answer detailed questions on their spending habits and sources of income. Such surveys are conducted more or less regularly in most countries. These sample survey data collection methods are increasingly being complemented by participatory methods, where people are asked what their basic needs are and what poverty means for them. Interestingly, new research shows a high degree of concordance between poverty lines based on objective and subjective assessments of needs.

**Measuring poverty at the global level:** When estimating poverty worldwide, the same reference poverty line has to be used, and expressed in a common unit across countries. Therefore, for the purpose of global aggregation and comparison, the World Bank uses reference lines set at \$1 and \$2 per day (more precisely \$1.08 and \$2.15 in 1993 Purchasing Power Parity terms). It has been estimated that in 2001, 1.1 billion people had consumption levels below \$1 a day and 2.7 billion lived on less than \$2 a day. These figures are lower than earlier estimates, indicating that some progress has taken place, but they still remain too high in terms of human suffering, and much more remains to be done.

## **Goals for the 21<sup>st</sup> century**

**Millennium Development Goals (MDGs):** The uneven progress of development is worrying. The flows of trade and capital that integrate the global economy may bring benefits to millions, but poverty and suffering persist. Responding to such concerns,

governments and international development agencies have begun to reexamine the way they operate. In September 2000, 189 countries signed the Millennium Declaration, which led to the adoption of the Millennium Development Goals (MDGs).

The MDGs are a set of eight goals for which 18 numerical targets have been set and over 40 quantifiable indicators have been identified. The goals are:

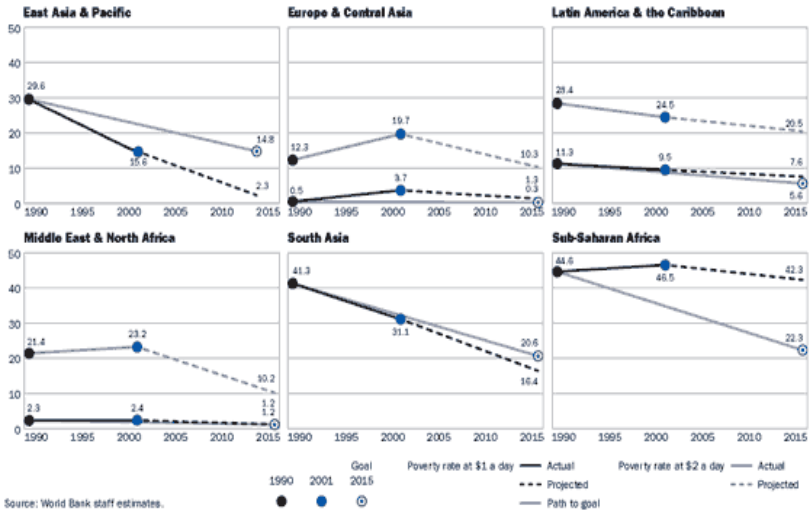
- Eradicate extreme poverty and hunger
- Achieve universal primary education
- Promote gender equality and empower women
- Reduce child mortality
- Improve maternal health
- Combat HIV/AIDS, malaria, and other diseases
- Ensure environmental sustainability
- Develop a global partnership for development.

While each goal is important in its own right, they should be viewed together as they are mutually reinforcing. Achieving them will require building capacity for effective, democratic, and accountable governance, protection of human rights, and respect for the rule of law. The World Bank will systematically monitor progress in achieving these goals in the countries it assists.

**Achieving the goals:** The first Millennium Development Goals initiated the call to halve the proportion of people living in extreme poverty in Zambia – and of those suffering from hunger – between the twenty five years, 1990 and 2015. According to projections by the World Development Indicators Report 2004, poverty rates will fall fastest in East Asia and the Pacific outside of China, but the huge reduction in the number of people below the \$1 a day line in China will dominate global totals. In Europe and Central Asia and in the Middle East and North Africa, where poverty rates measured at \$1 a day are low, a continuation of current trends will cut poverty rates to half their current levels.

### Most regions are on a path to cut extreme poverty by half by 2015

Share of people living on less than \$1 (or \$2) a day (%)



Source: World Bank staff estimates.

(Source: World Development Indicators 2004)

South Asia, led by continuing growth in India, is likely to reach or exceed the target. But growth and poverty reduction are proceeding more slowly in Latin America and the Caribbean, which will not reach the target unless growth picks up. The most difficult case is Sub Saharan Africa, where poverty has increased since 1990 and will, on present trends, fall very slowly in the next 11 years, unless there is a major change in prospects.

**The Global Monitoring Report 2004 suggests areas for particular attention for the three main groups of actors involved.**

#### Priorities of developing countries:

- Improving the enabling climate for private sector activity
- Strengthening capacity in the public sector and improving the quality of governance
- Scaling up investment in infrastructure and ensuring its effectiveness
- Enhancing the effectiveness of service delivery in human development

#### Priorities of developed countries:

- Sustaining stable and strong growth in the global economy



- Ensuring a successful, pro-development and timely outcome of the Doha Round
- Providing more and better aid
- Improving policy coherence for development

**Priorities of international financial institutions:**

- Refining and strengthening institutional roles in low-income countries
- Furthering progress on the results agenda
- Improving selectivity and coordination of agency programs

**Conflict**

**The reasons for conflict can be**

- Disagreeing with another.
- Difference of opinion with another.
- Complaints about our performance.
- Criticism of our behavior or attitude.
- Negative evaluation of our performance.
- Fighting with another.
- Stress inducing event in which we are confronted in a negative way.
- A test of our power.
- A threat to our control.
- Matching of wills.
- An anger producing event.
- A threat to our security.
- Taking a risk.
- Speaking out for our beliefs.
- Risking the loss of acceptance.
- A time when no one is communicating; whether people are angry silently or are yelling at one another.
- Someone acting in direct opposition to our request.
- Defending our rights when they are being ignored.

**In a positive sense, conflict can be**

- Time of growth for the parties involved.
- Time in which problems can be solved creatively by looking together at a variety of alternatives.

- Chance to evaluate our performance objectively.
- Time for us to increase our knowledge of one another.
- Chance to reveal our unique ways of thinking, acting, and feeling.
- Chance to show understanding, respect, and acceptance of the unique ways in which others think, act, and feel.
- Chance to be “devil's advocate” in regard to our position, attitudes, and beliefs.
- Opportunity to clarify our roles and functions in certain situations.
- Opportunity to clarify and define the rules of interaction in an attempt to strengthen our relationships.
- Process by which feelings ultimately can be aired openly and freely.
- Compromise that will leave all parties involved in a winning situation.
- Breath of fresh air in a stagnating relationship.
- Moment of honesty, which can result in a lifetime of improved communication.
- Opportunity to draw close to one another in intimate self-disclosure.
- Way in which we recognize our deficiencies and brainstorm alternatives to correct them.
- Challenge to growth.
- Chance to “problem solve,” creating a more productive environment.
- Time to talk and communicate openly and honestly, reducing hostility, anger, or misunderstanding in relationships.
- Time to clarify our expectations of others; a time to modify existing rules or sanctions based on our expectations.

### **Feelings involved in conflict**

#### **The behaviours that help in managing conflict**

**Use “I” statements:** Let the other party know how you **feel** when the conflict is occurring. Let the other person know how you

**react** to the conflict. Let the other person know which of your rights you feel is being ignored in the conflict.

**Be assertive, not aggressive;** Speak about your feelings and your reactions. Keep the statements focused on how you are behaving, thinking, and feeling rather than on how the other is acting.

**Speak calmly, coolly and rationally:** In this way you will be listened to, and you will be able to maintain better control of yourself. Otherwise the other person may be put in a defensive attitude.

<b>Negative feelings before or during conflict</b>	<b>Positive feelings after proper handling of conflict</b>
Hurt	Cared for
Scared	Confident
Frightened	Relieved
Ignored	Listened to
Confused	Clear on things
Isolated	More intimate with others
Challenged	Challenged to grow
Threatened	Open to truth
Unwanted	Accepted by others
Disliked	Respected
Put down	Supported
Controlled	Understood
Judgmental	Accepting of differences

**Avoid blaming:** This will keep the communication flow going. It encourages understanding and empathy for each other's feelings. It recognizes that for a conflict to exist there must be at least two parties who are adversely affected by the conflict.

**Create an atmosphere of healing:** In an attempt to heal the wounds resulting from a conflict, all parties involved must feel that they are being listened to and understood; that their rights are being respected. They must feel the desire to work things out and a

commitment to the process of working out the problems. They must feel wanted and cared for by the parties involved.

**Be willing to forgive:** Forgiveness is a powerful tool of healing. You have a chance for personal growth by forgiving others for their part in the hurt and pain you suffered. At times, this is the only way to resolve a conflict.

**Be willing to forget:** Once you have "resolved" a conflict and felt like you were listened to, cared for, and understood, then "let go" of the conflict. Once you have implemented an agreed resolution, put aside the conflict. Put it behind you. Get it out of your mind. Forget it. Do not bring it up in the future as if it had not been resolved. If you write down the resolution of the conflict, you will have written proof that it is over and is to be forgotten.

**Be honest:** In resolving a conflict it is imperative that you be honest with yourself and others about your feelings, and reactions to the conflict and to the resolutions. If you are feeling in a way you think you must, or in a way the others wants you to, not "being yourself," then the resolution of the conflict is a false one. The conflict is sure to recur. You gain nothing by being dishonest in the management of conflict. You waste your time and energy and end up feeling failure or guilt rather than growth.

**Focus on feelings rather than on content:** Effective listening and responding are key elements in the productive resolution of conflict. Listen for the feelings and emotions of the other and reflect them with empathy and understanding. This creates an atmosphere of being cared for and listened to. It reduces defensiveness. It focuses on the process involved rather than on the issues, and it brings the parties to a clearer recognition of their individuality and humanity. To focus on feelings clarify the issues, eliminating extraneous items.

**Show respect for yourself and for others:** You will gain more in resolving a conflict by showing respect, than by showing disrespect, e.g., being vindictive, taking revenge, threatening, yelling, accusing, belittling, ostracizing, ignoring. If you are on the receiving end of disrespect, remove yourself as soon as possible. When the other has cooled down, perhaps the discussion can be continued in a

respectful manner. If you lose your “cool” and become disrespectful, stop as soon as you can by either removing yourself or by silencing yourself. Maintaining a respectful atmosphere is essential in resolving conflict.

**Be willing to apologize or admit a mistake:** It is necessary to admit to one's mistake and to apologize for one's behaviour before a stalemate in conflict resolution can be overcome. It takes courage, character, and fortitude to admit an error: a lack of judgment; an uncalled for action; disrespectful behavior; or a lack of caring, concern, or understanding. Stronger relationships can result when such willingness is exhibited.

**Be willing to compromise:** If you cling to your position as the only one to be considered, you are closing out the other person(s). To succeed in resolving conflict, all parties must feel like they have gained in the resolution. In order to resolve a conflict where the opposing parties are at opposite extremes on an issue, there is a need to come to the middle if all are to experience a “winning” posture. Only through compromise can each be a winner in conflict resolution. Without compromise, you have either given in and lost, or have gotten your own way with the other party having lost. Ideally, all parties should feel that they have won.

### **Steps that can be taken to handle conflict**

**Step 1:** Clarify that conflict exists. If you sense a conflict, answer the following questions in your journal:

- a. What is the content (or issues) involved in the conflict?
- b. For whom is this a conflict?
- c. When does the conflict manifest itself? For how long?
- d. Under what circumstances is this a conflict?
- e. What are the hidden issues, those below the surface, in this conflict?
- f. Why is this a conflict?
- g. What is the worst possible consequence if this conflict is:
  - i. Never addressed?
  - ii. Addressed and not resolved?
  - iii. Addressed and I give in?
  - iv. Addressed and the other gives in?

- v. Addressed and we both win?
- h. What are my feelings when facing this conflict?
- i. How does this conflict fit into my belief system about myself?
- j. What does this conflict say about the personality of the people involved?
- k. What is the conflict, really?

**Step 2:** Summarise the answers to the questions in Step 1 into a clear, detailed description of the conflict with its variables.

**Step 3:** Begin to problem solve in your mind. Write out alternative resolutions to the conflict. Use the *Tools for Coping Series* Creative Problem Solving model in *Tools for Relationships*, which involves brainstorming alternatives.

**Step 4:** Narrow down the alternatives until you come to the top priority resolution in your mind. Write it in your journal and decide if the resolution:

- a. Respects the rights of all parties.
- b. Will ultimately have all parties feeling like winners.
- c. Will allow a healing process to begin, with no one being blamed.
- d. Provides for finality of the conflict with no recurrence.
- e. Will result in better understanding by all parties with all feelings being respected.

**Step 5:** Once you have completed Steps 3 and 4 on your own, you are ready to speak directly with the those with whom you are in conflict. Ask the person (s) to consider the script (i.e., written document) concerning the conflict. Go over all points on the conflict (Steps 1 and 2), possible resolutions to the conflict (Step 3), and analyze how the top priority resolutions are beneficial to all parties involved (Step 4).

Ask the party(ies) if they have done a similar exercise in conflict management on their own; if not, would they like time to try Steps 1 through 4?

**Step 6:** All parties closely examine the top resolutions (Steps 3 and 4). Jointly analyze the options based on the questions in Step 4. Spend time discussing them, then use a joint problem solving

**Step 7:** Once a jointly owned conflict resolution is decided upon, the parties set an implementation time and an evaluation procedure to determine if the resolution is successful in averting similar conflict(s). They commit to implement the resolution and set a specific date to meet and review the resolution.

**Step 8:** If, during the subsequent meeting, it is determined that the conflict has gone unresolved, alter the resolution accordingly, continuing to consider all feelings. If you find yourselves at an impasse, return to Step 1 and begin again. Occasionally professional help or that of an objective outsider might be necessary.

### **Responsibility**

#### **Responsibility to Humankind**

- Value of Helping Others
- Safety and Health of Others
- Consequences of Own Action for Others
- Respect for Others
- Value and Dignity of the Individual

#### **Responsibility to Society and Government**

- Loyalty to Friends and Country
- Existence and Necessity of Rules and Laws
- Importance of Compliance with Rules and Laws
- Volunteer Service in Community Programs
- Obligation to Protest Unjust Laws and Rules
- Value of Personal Rights and Freedoms
- Citizen Participation in a Democracy
- Interrelation of One Person's Rights and Those of Others

#### **Responsibility to the Environment**

- Appreciation of Nature
- Balance of Nature
- Implications of Societal Changes for the Environment
- Importance and Need for Preserving Natural Settings
- Fragile Character of the Ecological System
- Humankind's Obligation to Future Generations
- Effects of Individual Action

## **Responsibility for Self**

- Responsibility for Tasks
- Responsibility for Actions
- Family Responsibilities
- Care for Self
- Personal Integrity
- Acceptance of Responsibility

## **Labour Distribution Overview**

The term "labour distribution" refers to how payroll expenses have been or will be charged to specific cost centers. The University of Arkansas maintains payroll information for each employee for each payroll. Through the HRLY-TS and PSB applications we can determine what percentage or how many hours of an employee's salary or wages will be charged to a particular cost center. In addition to providing a mechanism for viewing such historical information, the LABOUR application gives departments a way to correct mistakes in past payroll distributions for employees.

Labour Distribution provides departmental users with detailed payroll data associated with their payroll charges through lists. The discussion of lists in the documentation is divided between the use of lists for accounting reconciliation (viewing payroll data) and the use of lists for the purpose of finding data that will be used in the initiation of retroactive adjustments.

Labour data is oriented by employee and by pay record and is associated with cost centers, not budgetary units. When you are working with departmental information, you will need to know cost centers and compensation types. LABOUR data is also associated with specific pay dates. All of this related information--cost centers, compensation types (via association with account numbers), and pay dates--is shown on the DBR and the BIS DTAL screen; it is also readily available through the LABOUR list commands.

## **Unemployment**

- Unemployed are people without jobs
- Unemployment threatens the stability of the family as an economic and social unit



- Without income or with a loss of income the head of the family cannot play a role
- An unemployed person loses self- respect and influence among the employed, may be rejected by working companions, loses pride and confidences in the end.

### **Causes of unemployment**

- Excessive increases in population
- Limited sources of employment
- Dependency on the seasons
- Unscientific method of production
- Technological advancement and utilization of modern technology
- Downsizing or right sizing policies of the companies
- Cultural practices – not allowing the young ones to leave the native place
- Labour unrest/ strikes
- Influx of MNCs and closing down of small industries

### **Measures to overcome**

- Compulsory primary education for all
- Programmes for self-employment
- Training and development programmes for skill development
- Providing competitive higher education facilities
- Creation of employment opportunities
- Providing information about employment

### **Types of unemployment**

- i. Frictional Unemployment
- ii. Structural Unemployment
- iii. Cyclical Unemployment
- iv. Normal Unemployment
- v. Seasonal Unemployment

#### **i. Frictional Unemployment**

- It is transitional or short run in nature.
- It usually originates on the labour supply side.
- Labour services are voluntarily not employed.

- It occurs when people are changing jobs or searching for new jobs.

### **ii. Structural Unemployment**

- A relatively low demand for labour in a given market may be due to several factors
- Technological changes
- Changes in consumer preferences for products expand production and employment in some areas but reduce them in others.
- Immobility of labour prolongs the period of unemployment that may have originated due to technological change and changes in consumer tastes.

### **iii. Cyclical Unemployment**

- Unemployment caused by economic fluctuations
- Cyclical unemployment is due to reductions in aggregate or total demand for goods and services in the overall economy.
- A decline in aggregate demand in the economy reduces total production and caused general unemployment throughout the economic system
- Cyclical unemployment is usually the culprit when the unemployment rate goes above 6 percent.

### **iv. Normal Unemployment**

- In complex economic organization it is difficult to provide full time employment for everyone

### **v. Seasonal Unemployment**

- Caused by shutting down of seasonal industries like sugar industries and cotton ginning.

### **Social Roles**

There are a number of ways in which we socially construct the world around us. In other words, we use our social interactions with others to make sense of and give purpose to our lives. One way in which we do this is to create social structures that give us cues for how to behave. Statuses and roles are two of these structures. We previously discussed statuses in depth, so now we turn to social roles.

A **social role** defines a set of behaviour that is expected of someone who holds a particular status. It's easy to confuse a status and a role, but the basic difference between them is that we occupy a status and play a role. Every status has an expected set of behaviour - a role. A woman becomes a mother when she has a child and so occupies the status of mother. She is expected to also play the role of mother by caring for and loving her children among other things.

Interestingly, role expectations can change over time and also differ between cultures. Not that long ago, it was a role expectation for mothers to stay at home with their children and 'keep house' while the fathers played breadwinner. Today in our culture, this still occurs but is no longer a strict expectation of the mother's role - just an acceptable option. In other cultures, however, a mother working outside the home is still considered to be strange or even unacceptable.

All of us typically occupy many statuses and play the roles attached to each one. Sometimes, a status has more than one role associated with it. This is known as a **role set**. For example, a teacher plays one role in relation to his students, another role in relation to his fellow teachers, another in relation to the school board and so on.

**Role Ambiguity:** Role ambiguity occurs when a person is uncertain as to the exact nature of a particular role. It arises when the sent role is unclear. Poor job descriptions, vague instructions from a supervisor, or unclear cues from coworkers can result in role ambiguity.

**Role conflict** occurs when there are incompatible demands placed upon an employee such that compliance with both would be difficult. We experience role conflict when we find ourselves pulled in various directions as we try to respond to the many statuses we hold. Role conflict can be something that can be for either a short period of time, or a long period of time, and it can also be connected to situational experiences.

Intra-role conflict occurs when the demands are within a single domain of life, such as on the job. An example would be when two superiors ask an employee to do a task, and both cannot be

accomplished at the same time. Inter-role conflict occurs across domains of life. An example of inter-role conflict would be a husband and father who is also Chief of Police. If a tornado strikes the small town he is living in, the man has to decide if he should go home and be with his family and fulfill the role of being a good husband and father or remain and fulfill the duties of a "good" Chief of Police because the whole town needs his expertise.

Conflict among the roles begins because of the human desire to reach success, and because of the pressure put on an individual by two imposing and incompatible demands competing against each other. The effects of role conflict, as found through case-studies and nationwide surveys, are related to individual personality characteristics and interpersonal relations. Individual personality characteristic conflicts can arise within personality role conflict where "aspects of an individual's personality are in conflict with other aspects of that same individual's personality." (Truett 79) Interpersonal relations can cause conflict because they are by definition "having an association between two or more people that may range from fleeting to enduring, which can cause that conflict." Example: "People in modern, high-income countries juggle many responsibilities demanded by their various statuses and roles. As most mothers can testify both parenting and working outside the home are physically and emotionally draining. Sociologists thus recognize role conflict as conflict among the roles corresponding to two or more statuses" (Macionis 90).

The discipline of group dynamics in psychology recognizes role conflict within a group setting. Members of a group may feel that they are responsible for more than one role within this setting and that these roles may become disagreeable with each other. When the expectations of two or more roles are incompatible, role conflict exists. For example, a supervisor at a factory may feel strain due to his or her role as friend and mentor to the subordinate employees, while having to exhibit a stern and professional watchful eye over the employees.

Role conflict requirements for different roles might compete for a person's limited time, or could occur due to various strains

associated with multiple roles. Some people can play one role and play it well while others can play multiple roles and also play them well. For example, we see a father as the provider and the protector while we see the women as the housewives, cooking and cleaning. If a man were to enter into the kitchen and proceed to cook, we might feel that he is acting inappropriately for his role and the same goes as if a woman was to do handy work in the household.

This attitude is a root cause for the conflict many women feel when they become full-time workers and mothers. Women's rights have evolved greatly in the past forty years and women share most of the same rights as men. While women have stepped up to fill different roles, men have not stepped in to help balance out the work load. Modern day mothers are expected to be able have the career capacity of a man and the domestic grace modeled after the ideal mother/wife of the 1950s. Realistically women have a hard time balancing the two. Many women feel that they are forced to choose between career and family, then are made to feel guilty about their choice by society.

### **Role clarity and role ambiguity**

One of the main causes of role conflict is role ambiguity, which is the lack of certainty in what a certain role in an organization requires. This can be the result or poor communication of job duties or unclear instructions from a supervisor. This can lead to role conflict when there are contradicting ideas as to what tasks are supposed to be accomplished. Team members can then be uncertain of their role and their teammate's roles to the team and team objectives begin to conflict with one another.

The solution to this problem and role conflict as a whole can come from role clarity. As its name suggests, role clarity is clearly defining roles and objectives so as to reduce role conflict and role ambiguity. To do this, employers need to clearly communicate with employees as to the goals of a project. Also, employees should be fully aware of their role in the group and their responsibilities.

It is helpful if one develops and maintains a working environment where workers have communication and if needed, feedback can be provided. Encouraging is another form for clarity. It will not be used against you, if one has a question or is not clear about a specific role that has been given to them, workers can communicate. Make sure the person understands their roles and duties so this can avoid any mistakes that can occur. Ensure workers have an up to date role so they can manage their roles accordingly.

### **Interpersonal roles**

Interpersonal role conflict occurs when the source of the dilemma stems from occupancy of more than one focal position. For example, as a husband and a father in a social system a superintendent may think his wife and children expect him to spend most of his evenings with them. However, his school board and P.T.A. groups, he may feel, expect him (as their school superintendent) to spend most of his after-office hours on educational and civic activities. The superintendent usually cannot satisfy both of these incompatible expectations.

### **Intra-personal role**

Intra-personal role conflict occurs when an individual in one role believes that others have many different expectations for him/her in regards to that role. "The school superintendent, for example, may feel that the teachers expect him to be their spokesperson and leader, to take their side on such matters as salary increases and institutional policy. However, the superintendent may feel that the school board members expect him to represent them, to "sell" their views to the staff because he is the executive officer and the administrator of school board policies."

### **Recognizing responsibility in roles**

As the world each day becomes more interconnected and interdependent, we becomes less capable of tolerating the pointless damage and destruction that accompany a fear of differences. At the same time, a rapid expansion in the power and effectiveness of risky conflict resolution techniques makes it increasingly unnecessary to return to antiquated, fearful, senseless, selfish and domineering responses to diversity and the conflicts they engender. Whether

conflicts arise from cultural variations, personality differences, divergent belief systems, competing self-interests, or antagonistic demands for attention, wealth and resources, we always have a choice about how we respond when it does arise.

We can play it safe, retreat from dialogue, and move against our opponents based on a fear of differences, a desire to suppress them and a need to satisfy our own selfish interests. Or we can take a risk, engage in dialogue and move toward our opponents based on celebration of differences, a desire to learn from them and desire to collaboratively satisfy everyone's underlying interests.

Every conflict, without exception, creates an unparalleled opportunity to wake up. It increases our awareness of what is actually happening around us and teaches us how to become more skillful and successful in our communications and relationships. It allows us to understand and discuss, and learn from our differences, and to recognize that each of our conflicts offers us a unique opportunity to turn our lives around. Taking a risky approach to conflict resolution allows both sides to discover newer and deeper levels of understanding improve their skills and relationships and find better solutions than either side thought possible. For these reasons, conflict is a valuable personal and organizational resource and a powerful source of learning, development and growth.

### **Responsibility for Conflict**

Feedback, coaching, mentoring, assessment and supportive confrontation can all be used to help employees resolve their workplace conflicts. But to be successful, these methods require the person offering assistance to take risks and ask both sides to accept responsibility for whatever they did or failed to do that resulted in, sustained or escalated the conflict. Without their acceptance of some responsibility for the conflict, each will blame other for what is actually within our control.

While we all recognize that "it takes two to tango," we often forget the corollary that it takes only one to stop the tango. We learn much more when, instead of accepting 50 percent of the responsibility for our conflicts, we accept 100 percent. By doing so,

we force ourselves to consider why we decided to join the dance, and why we seem unable to stop.

Taking responsibility for our conflicts extends not only to our acts and omissions but to those the other person executes in response. When we accept responsibility for what we have contributed to the conflict, they are encouraged to do the same. When both parties accept responsibility, impasse begins to disappear. Here are some risky questions that can assist conflicting parties in accepting responsibility for their actions:

- What did you contribute to making this conflict happen?
- With hindsight, how could you have handled it better?
- How would you evaluate your responses so far? What have you done that has been effective? What hasn't been effective?
- How have you suffered as a result of your own actions?
- How have others suffered?
- What does this conflict ask you to let go of or learn to accept?
- What is the most important lesson you can learn from this conflict?
- How would it be possible for your version of what happened and that of your opponent to both be correct?
- In what way could this conflict improve your life?
- Is there anything funny or ridiculous about your role in this conflict?
- What would it take for you to let go of this conflict completely?
- What would happen if you did?
- Has your communication been effective in creating understanding in the other person? What could you do to improve it?
- What additional skills could you develop in handling the conflict? In responding to negative behavior?

By answering these questions, employees in conflict begin to confront themselves and wake up to the role they have played in aggravating or sustaining the impasse. Each person may then be willing to communicate more openly, agree to take actions leading to resolution, or apologize and make amends for their behavior. Together they may commit to correcting the underlying systematic



sources of their conflict, transforming cultural attitudes that reinforce avoidance, or inventing new approaches to conflict resolution. By taking a risk, they may learn something important- not only about their conflict, but about their opponent and their own capacity to make a difference.

Nonetheless, asking people to take responsibility for their conflicts is risky. Partly this is because everyone in conflict tells a story in which they are right and the other person is wrong. These accusatory, self-serving stories are designed to disguise and divert attention from the role they play in keeping the conflict going, and reinforce their defenses, justifications, countermeasures, and irreconcilable positions. Yet beneath every accusation lies a confession both of desire and powerlessness, and beneath every confession lies an interest that can be framed as a simple request.

### **Roles in Conflict Resolution**

Feedback, coaching, mentoring and assessment can be used to mitigate unresolved conflicts and moderate conflict-encouraging behaviors. The feedback initiator, coach, mentor, or assessor can also become a mediator and assist in the search for collaborative solutions. The role played by the mediator will vary based on the nature of the conflict, the depth of emotion, the contribution of organizational culture and the needs of the participants. Providers of feedback, coaching, mentoring, and assessment need to make sure before performing these roles that they do not create confusion by contradicting or undermining their original roles. Each role simultaneously expands and limits the attitudes, ideas, and actions of the person who plays it. It is therefore best to play it fully, yet realize that it is only part of a much larger role.

Some of these roles come easier and more naturally than others. By adopting a range of strategies and mixture of roles, including mediation, it is possible for those in conflict to move closer to resolution. As a result, they may reach a deeper understanding of the reasons they became stuck in the first place.

### **Preparing for Resolution**

Offering assistance to people who feel trapped in a conflict or have a pattern of attracting or triggering conflicts may require

meeting with the parties jointly and working with them to find a solution. To prepare for a mediation, or facilitated face-to-face informal problem solving conversation, we often ask each person to complete one or more of the following activities before our meeting:

- List your goals or objectives for resolving the conflict and all the points on which you would like to reach agreement.
- List what you think the other party to the conflict wants and his or her reasons for wanting it. Indicate where you disagree and why.
- Identify three things you would be willing to do to settle the dispute.
- Write the words you would use to describe the relationship you would like to have with the other person.
- List all the words that describe what you like or respect about the other person. If you are unable to do so, say why.
- List all the words that describe what you do not like, or is wrong with the other person. Afterwards, opposite those words, write the name of the person in your family who comes closest to exhibiting those characteristics.
- List your objections to the other person's behavior in the form: "When you \_\_\_\_\_, I feel \_\_\_\_\_ because \_\_\_\_\_."
- List all the words that describe the positive qualities you display when you are in conflict with this person. Next, list the negative qualities.
- Write down what you think will happen, both positive and negative, if you reach an agreement. Next write what will happen if you do not.
- List all the options for resolving the dispute without regard to whether they will work.
- Write down separately what you think each person could have done that would have prevented the dispute from happening.

After both parties have thought about the conflict through one or more of these activities, ask them to exchange what they wrote and respond to the points raised in the other party's lists. You may then be able to identify a number of areas of agreement and

disagreement. The commonalities can then be explored, modified and fine-tuned through a joint, informal problem solving conversation, avoiding relatively useless, semi-rational, emotionally heated serial monologues.

In beginning a conversation to resolve a conflict, it is crucial to understand that the issue of who is right or wrong is, in principle, non-decidable – both by you and by the parties. Workable solutions have to be discovered, modified to make them acceptable to both sides and affirmed through dialogue and consensus. In resolving conflict, it may be useful to reveal:

### **The Importance of Attitude**

The deciding factor in nearly every conflict resolution is the attitude, spirit, intention and determination of at least one of the parties to resolve the conflict. Courageous listening, paradoxical problem solving, supportive confrontation, risky conflict resolution and the entire process of waking up fundamentally depend on attitude. Once there is a positive attitude and commitment to waking up, it becomes possible to shift traditional responses to mistakes, problems and conflicts and develop higher levels of unity, more effective solutions, better communication and improved relationships.

Constructive collaboration flows naturally from an attitude which regards conflicts as opportunities for learning and change. Conflicting employees discover that they can easily let go of their resistance to dialogue and honest feedback and perceive that more can be gained through collaboration than through unresolved conflict. Once people decide they want to resolve their conflicts, the rest is easy. The conflict suddenly seems unimportant, or a minor difficulty to overcome, or a challenge to address collaboratively.

Risky conflict resolution can also have an impact on a wide range of relationships and communications in otherwise hierarchical, bureaucratic and authoritarian organizations. Waking people up and resolving their conflicts invites people to significantly alter their attitudes toward each other.

## Chapter II

### GLOBAL ENVIRONMENT & GLOBAL WARMING

**Global environment** can mean many things for many people – from the state of the globe with respect to commerce, political stances, geographical climate, ideologies, political, economic, social and cultural conditions form part of this meaning. Environment is global in two basic senses. It asserts the priority of a global entity - an ecosystem that operates according to universal laws in a tangled web of planetary interdependencies; and it refers to a worldwide social process— world-level discourse and activity that together have reconstituted nation-states and individuals. It emphasizes a series of global institutional changes: first in the definition of nature, second in the organization of the world polity, and third in the constitutive bases of the nation-state. Environmentalism, we have argued, is fundamentally global, first in its conception of the natural entity and consequently in the social processes it conveys.

The global environmental regime began to appear in the late nineteenth century, and it was spurred by a new social conception of nature and expanded world organization. Changes in the “facts” of nature first became more rapid in the middle to late 1800s. What, until then, had been conceived mainly as the outcome of “Creation,” often separate from and even opposed to human society, became increasingly rationalized as a means to human ends. Nature versus society, with attendant efforts at taming and eradicating nature, increasingly shifted to nature for society. At first this meant that nature could be harvested, used, and sold: whales for blubber, trees for timber, and mountains for copper. Increasingly, however, thanks to the efforts of scientific authorities, nature became rationalized to mean life-sustenance. Outside an Earthly envelope, no human life was conceived to be possible.

This important cognitive shift helped lay the foundations for the “global ecosystem.” The late 1800s also witnessed the increasing organization of the world polity, most strikingly in the expansion of the system of nation-states and colonies. Informal diplomatic

networks gave rise to international conferences and treaties, and to later inter-governmental organizations. The process eventually led to the formation of the United Nations, an all-purpose forum for the discussion of world matters, which in turn sparked an even larger wave of world-level organization.

These two processes together, the social construction of a rationalized global nature and the institutionalization of a world polity, established the motive and capacity necessary for building a global environmental regime facilitated by environmental experts and authorities. International conferences, non-governmental associations, treaties, and intergovernmental organizations multiplied exponentially over the twentieth century, around issues as diverse as locust control, access to fisheries, acid rain, and climate change.

At the centre of all such international activities lay the assumption that nation-states were the primary actors in the global arena (Meyer, Boli, et al. 1997). Thus the rise of the global environmental regime brought with it the notion that nation-states bore the responsibility for protecting nature: The regime reconfigured what the nation-state is in the institutions of world society (Bou and Thomas 1997). Nation-states that participated in world society were expected, encouraged, and sometimes even coerced into assuming responsibility for environmental protection. Countries formed parks, established hunting seasons, set water and air quality standards, founded ministries, passed impact assessment legislation, and so on. The catalysts for involvement emanated from the world social system, as did the rewards for proper implementation (e.g., Barrett and Tsui 1999).

### **Environmental Quality**

A first question that follows from our perspective regards outcomes: Do the many changes in world and national policy actually improve environmental quality (B, p. 118)? Some studies suggest they do (Dietz and Kalof 1992; Roberts 1996). Populations of various endangered species (elephant, wolf, tiger) are strong, and even resurgent. Chlorofluorocarbon emissions, the culprits behind ozone depletion, have declined precipitously. Polluted rivers and

bays throughout the industrialized world are returning to near pristine condition. Clearly some regulations, international and national, are working.

Holes in the system, however, are legend. One needs only to visit a few national parks in a few countries to witness surprising levels of resource extraction, poaching, or agriculture; or read the text of just a handful of international treaties (e.g., the Climate Change Convention) to find instances of flagrant violation; or scrutinize the conduct of only a few environmental impact assessments to see the obvious incursion of political and economic interests. The rules, it seems, are routinely flouted, and incur little in the way of consequences.

Degradation is rampant and spreading. But are policies effective at all? Even a pockmarked system is better than no system at all. Thus at the world level, we expect the proliferation of environmental policies to decrease rates of global environmental degradation, even while problems continue to accumulate. The nation-state-level effects should be much more variable than world-level effects, contingent mainly on a country's relationship to the wider system.

Among nation-states more open to world society and thus the fountainhead of environmental protection, we expect policies to be implemented relatively effectively, with attendant benefits for observed environmental quality. Among countries less open to world society, we expect more decoupling between policy and practice.

These ideas about environmental quality differ sharply from conventional emphases on nation-state-level outcomes and domestic capacities and commitments. In future work, we hope to test our views; the present evidence, however supportive, is merely anecdotal,

### **Social Movements**

A second question our perspective raises concerns the role of domestic social movements. Many theorists place environmental movements front and centre in discussions of environmental policy change (e.g., Szasz 1994), and the secondary

role social movements play in our analysis comes as a surprise to them. As a practical matter, domestic environmental movements do not appear in our quantitative analysis for one reason only: No source to our knowledge provides information on the extent of environmental movement activity for many countries over the whole century. Even if the data were available, however, we would not expect social movements to play a strong independent role in global environmentalism.

This is because those domestic environmental movements are generated from outside and they are outcomes of the same global processes that produced policy changes. The redefinitions that rendered nature as a global ecosystem and the reorganizations that rendered the world as a global interstate system catalyze environmental social movements just as they catalyze environmental ministries, national parks, and so on.

Thus we expect social movements to have effects on national environmental policies that are mostly redundant with our measures of ties to world society and scientific receptor sites. Strong support for the notion that environmental movements emanate from world society would require data over time, but some queries are possible using cross-sectional data. In particular, if environmental social movements are seeded by world society, then nation-states with strong ties to world society should have the most domestic environmental movement organizations.

### **International Conflict**

The “global” label given to many environmental issues and reason for international conflict and may be seen to obscure regional differences in responsibility for environmental problems and in the costs and benefits of their solution (Buttel and Taylor 1992; Yearley 1996). International conflicts may, and often do, follow, and examples are numerous. In the United States, for instance, the Amazonian rainforest is typically depicted in global-ecosystem terms — as a world “oxygen pump,” as a planetary hub of species diversity, and so on. In Brazil, however, the same Amazon is seen as a local natural resource: in particular, as a store of timber for commodity markets.

To some extent, such differences follow from disparities in national interests. The United States clearly benefits if the Amazon is treated as a global ecosystem more than if it is treated as a national resource, and the reverse is true for Brazil (at least in the short term). Our perspective leads us to add, and emphasize, that even “national interests” are constructed in the world social system (Meyer, Bou, et al. 1997). The extent to which a nation-state views the Amazon or any other natural process or entity in global ecosystem terms versus natural resource terms is partly a function of that country’s location in world society. Central nation- states are closer to the wellsprings of meaning in the world system, and thus are more likely to embody newer (in this case global ecosystem) definitions of nature and nation-state responsibility.

All this implies

- (1) That conflicts over environmental issues will involve countries with different locations in the world social system (i. e central versus peripheral);
- (2) That conflicts in substance will hinge on different definitions of the focal entity “nature,” usually ecosystem versus natural resource; and
- (3) That conflicts will decline some over time, as nation-state responsibility for the global ecosystem becomes institutionalized more evenly throughout the system.

Some support for these views appears in the finding that nation-states densely tied to world society are more likely to adopt environmental policies than are others: The global ecosystem view is more deeply institutionalized at the centre. Narrower and more direct tests of these ideas, of course, would be preferable. Given the gap between our emphases on relations “external” to the nation-state and standard emphases on “internal” interests, further investigations are warranted.

The environment created by humankind has caused a wide variety of threats to the geographic environment, forming a globalization problem. Transport also damages the global environment. Changes in international trade patterns, markets, technologies, and communication patterns affect both the economy



and the environment. However, if economic growth is all people think about, what will happen to the environment around us? The global market place in which managers participate is very complex and competitive. As trade barriers, geographic boundaries and political borders come down the opportunities for many organisations are increasing.

Organisations can choose to enter the global market place in a number of different ways. Regardless of how they choose to do this, if an organisation goes into the global market with the view that 'our way is the best and only way', then their chances of success are not good. This view is termed 'parochialism'. All managers must seek to recognise, understand and respect foreign customs and market differences.

**Managers adopt one of the three views in international business:**

**(a) Ethnocentric perspective** is the parochial belief that the best work practices and approaches are those of the home nation. The advantages of this view are that organisations will have simple structures and managers can exercise closer control. Disadvantages of this view are that decision-making may be less effective. There is no flexibility for employees working in foreign locations and there will be difficulties in building good business relationships in the host nation.

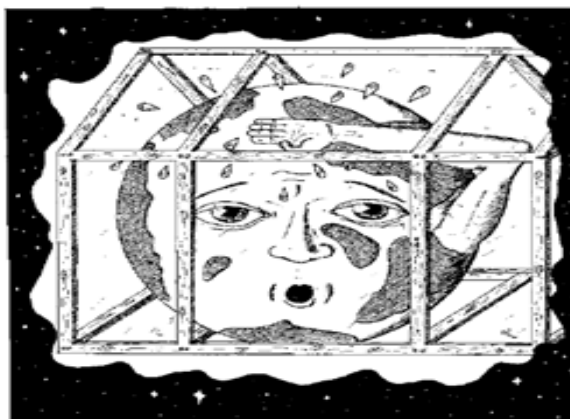
**(b) Polycentric perspective** is the view that managers in the overseas, host nation know the best work practices for running operations in that nation. The advantages of this view are that the managers working in the overseas operation will have extensive knowledge of how best to run the workplace and meet market demand. Local managers are likely to be more committed and have higher morale than managers imported from the home country. Also the host government is more likely to provide support. The disadvantages of this view are that duplication of work efforts and facilities in both the home nation and foreign host nation leads to inefficiencies and inadequacies.

Before moving on climate change, the commerce, trade and economy that takes place every day gives information about jam-packed landfills, polluted water, and reduced air quality, leading to

different temperatures and bipolar climate changes known as global warming. One way global warming is increasing is by greenhouse gases. This statement shows how oil pollution effects the environment, increase global warming, and can be harmful to life. This is polluting the surrounding environment and needs to come to a stop. All this forms the global environment.

### **What is Global Climate Change?**

#### **The Greenhouse Effect:**



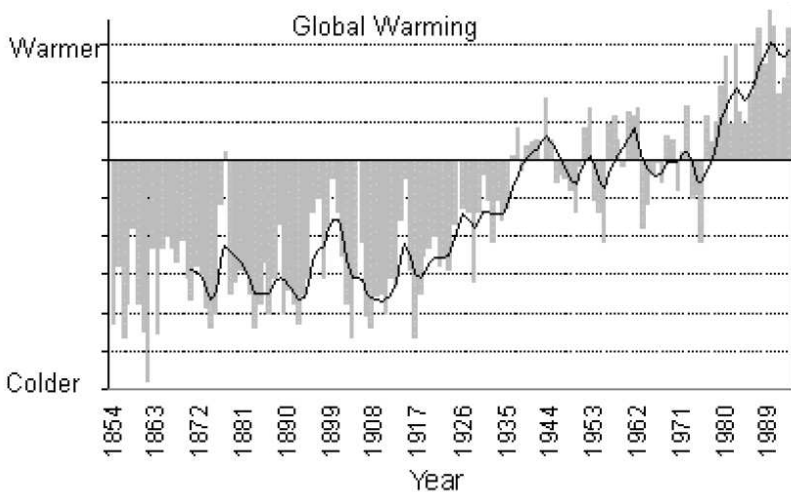
Greenhouse gases keep our planet warm. They exist naturally in the **atmosphere**, heating it by trapping energy that has originally come from the Sun. This process is called the **greenhouse effect**. Without the greenhouse gases the surface of the Earth would be as cold as the surface of the Moon (about -18 **degrees Celsius** or °C). In fact the typical surface temperature of the Earth is about 15°C.

**Changing Temperatures:** Measurements taken from all over the world, however, have shown that the global climate is changing. In the last 100 years the atmosphere has warmed up by about half a degree Celsius. Also during this time humans have been **emitting** extra greenhouse gases, which are the result of burning **fossil fuels** (like coal, oil and gas). These gases include carbon dioxide, methane and nitrous oxide.

**Greenhouse Gases:** It is thought that the man-made emissions of greenhouse gases, from the increased use of fossil fuels, are responsible for some of the warming of the global climate during

the 20<sup>th</sup> century. The extra greenhouse gases in the atmosphere trap more energy and therefore enhance the greenhouse effect. This may cause more warming. Greenhouse gases are also released by the exhausts of motor vehicles. The cutting down of rain forests also releases carbon dioxide, which is a greenhouse gas and causes global warming.

**Natural Changes:** There are also natural ways in which the climate can be altered. Volcanoes release gases, which mix with water vapour in the air to make **aerosols**, and cool the atmosphere. Changes in the Sun's energy and the **circulation** of the ocean also affect climate.



**The Future:** If the Earth continues to warm as **climate models** have predicted, the **temperature** at the Earth's surface maybe 3°C warmer by 2100 than it is today. This rapid change in temperature would be harmful to many **ecosystems**, and many **species** of plants and animals.

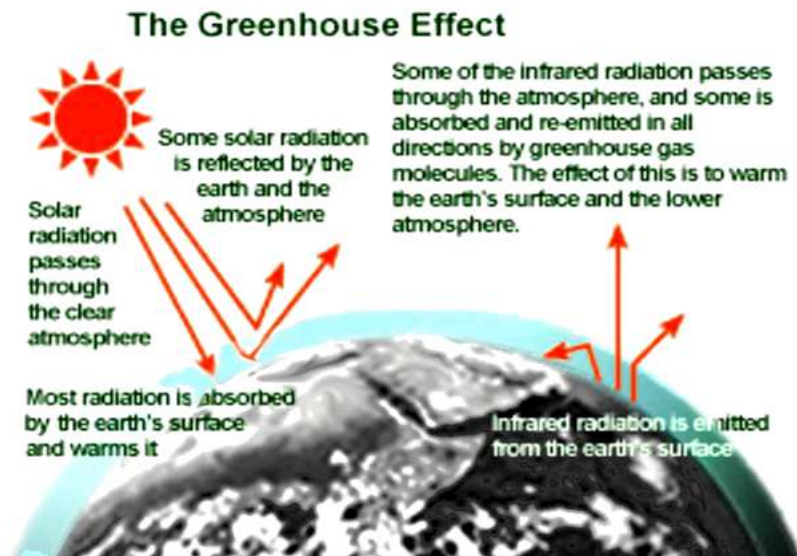
**Impacts:** Climate change will affect rainfall, sea level and storm events, and humans would also be affected by these factors. Food crops would be altered, as well as forests and water supplies. People's health will also be affected.

## 2. What are the Greenhouse Gases?

Since the **Industrial Revolution** 200 years ago, the amount of greenhouse gases in the air has been increasing. This is thought to be due to human activities. During the last fifty years mankind has also introduced CFCs, which not only damage the **ozone layer** but also act as greenhouse gases. Greenhouse gases also include carbon dioxide, methane, and nitrous oxide.

**Carbon Dioxide:** Carbon dioxide (CO<sub>2</sub>) is produced naturally through breathing or **respiration**, decay of plant and animal matter, and from natural forest fires. Man-made sources of carbon dioxide include the burning (or combustion) of fossil fuels, changes in land-use (especially **deforestation**), **biomass burning** and the manufacture of cement. Carbon dioxide is taken out of the atmosphere by the oceans, and by plants, especially forests, through **photo synthesis**.

### Greenhouse effect



**Methane:** Methane (CH<sub>4</sub>) is a major greenhouse gas. It is formed naturally in **wetlands** when organic material decays, and also by **termites**. Man-made sources of methane include the growing of

rice, cattle farming, fossil fuel burning and the disposal of household waste in **landfill sites**.

**Nitrous Oxide:** Nitrous oxide (N<sub>2</sub>O) is a greenhouse gas naturally produced by oceans and by lightning strikes, but humans have increased its abundance by the production of **nylon, nitric acid**, and through agricultural practices and biomass burning.

**Chlorofluorocarbons or (CFCs):** These are a group of man-made substances containing **chlorine, fluorine** and **carbon**. They were invented in the 1930s for use in fridges, but have other uses, including aerosols.

The main human contribution to enhancing the greenhouse effect and global warming has been made by carbon dioxide, but more recently the CFCs have also had a large impact. CFC production has now been limited to protect the ozone layer, and so it is thought that their effect on global warming will become less in the future.

### **3. What are Atmospheric Aerosols?**

Atmospheric **aerosols** are made up of particles suspended in air which is around one millionth of a meter across. They are formed by the mixing of gases in the atmosphere, or by the upward movement of fine material from the ground. Even though these particles are so small, they have the ability to stop some of the Sun's energy from reaching the Earth's surface.

#### **Where do atmospheric aerosols come from?**

Atmospheric aerosol particles may be **emitted** from primary sources as particles, or they may be formed in the atmosphere from gases (secondary sources). Natural sources of aerosols are usually greater than man-made ones, except in certain areas of the world, such as in industrial regions. Primary sources of aerosols include the burning of plants, especially through forest fires. Fires may be natural or man-made.

Other natural sources include wind-blown dust from rocks, soils, and volcanic eruptions. Volcanoes also produce **sulphur dioxide** when they erupt. When this mixes with water vapour in the air, **sulphuric acid** aerosols are produced.

### **Where do atmospheric aerosols go?**

Most aerosols are removed from the atmosphere by rainfall. This is called wet deposition. Aerosol particles may also be removed from the atmosphere directly by falling to the ground. This is known as dry deposition.

When a volcano emits gases high into the upper atmosphere (**stratosphere**) above the level at which rain is usually produced, the aerosols that form from them may remain there for several years, gradually spreading around the world. If the eruption is only into the lower atmosphere (**troposphere**), the pollution will be removed within days by rain.

### **What do atmospheric aerosols do?**

Atmospheric aerosols influence the global climate in two ways, both resulting in cooling. Firstly they can **scatter** the sunlight, so less of it reaches the Earth's surface. This effect is particularly important and long-lasting when the aerosols are high up in the atmosphere as a result of a volcanic eruption.

Secondly, aerosol particles help to form clouds, which reflect sun light back out to space, so making the atmosphere cooler.

## **4. How Do We Measure Climate Changes?**

Climate change has been taking place throughout the history of the Earth. It is only recently that mankind has begun to exert its own influence. Natural factors that have caused these changes have been due to changes in the Sun, volcanic eruptions and ocean circulation. We have been able to work out what the climate was like in the past by using a number of scientific methods.

**Historical Records:** Historical records of climate are useful in determining just what past climates were like. Such records include ancient inscriptions, government records, commercial records and diaries. Firstly, we can use records of weather events such as heavy snowfall or severe frosts. Secondly, we may use records of environmental events that are caused by weather, such as floods and droughts. Lastly, there are records of events that affect plants and animals, and depend on the weather, such as the flowering of trees or the migration of birds.

**Ice Cores:** As snow and ice builds up, it lays down a record of the conditions in the environment at the time of its formation. This information can be taken from the snow and ice and used to work out what the climate was like at that time.

**Dendroclimatology:** Dendroclimatology is the study of tree rings, and how they are linked to the climate. When the growth of a tree is stunted, the width of the tree ring for that year is narrower than the ones before and after. This lack of growth may be due to a climatic factor such as temperature or rainfall, and so we can tell what the weather was like in that year.

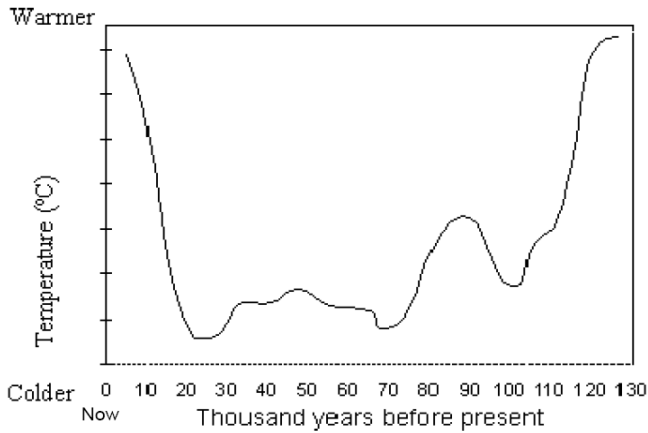
**The Ice Ages:** Records of past climates have been used to show what the climate was like during the last several hundred thousand years. These records have demonstrated that the global climate has changed from being fairly warm, as it is now, to being very cold. These cold periods are known as the Ice Ages, and the last one affected the Earth only 18,000 years ago. It is thought that the change in global climate between Ice Ages and warm periods is linked to the Earth's changing orbit around the Sun.

## 5. How Do We Predict Future Climate Change?

In order to predict future climate changes it is necessary to look at past patterns and trends. The graph below shows how the global temperature has changed over the last 130 thousand years. Between 20,000 years ago and the present, the Earth warmed by as much as 6°C. Predictions of climate change over the next 100 to 150 years are based only on climate models.

**Climate Models:** These are special computer programmes. Climate models have attempted to show man-made influences on climate change. Firstly, climate models are used to gain a clearer picture of past climates. Then they compare their results with real data from observations of climate changes. If a good match is found between the model results and the real observations, the model is believed to be working well, and it can then be used to predict future changes in climate. All climate models, however, are subject to a lot of uncertainty, and their predictions should not be considered to be

fool proof, but as intelligent estimations based on existing knowledge.



## 6. The Effects of Global Warming on: Sea Level

As the Earth warms up a number of changes in the weather will occur, including hotter summers. This may seem like a good idea, but a rise of a few degrees Celsius in temperature could change the conditions on Earth, which are currently just right for existing plants and animals.



 = East Anglia and the Thames Estuary



**Flooding:** Higher sea levels will threaten the low-lying coastal areas of the world such as the Netherlands and Bangladesh. Many important fisheries would become threatened and coastal **ecosystems** damaged. In Britain, East Anglia and the Thames Estuary will be particularly at risk from flooding as sea levels increase.

**Warmer Seas and Melting Ice:** When the Earth warms, the oceans will warm and expand causing an increase in the level of the sea. This process is thought to be responsible for about a quarter of the sea level rise recorded during the 20th century. The melting of ice sheets in Greenland and Antarctica could be another major cause, although it is not known what contribution this makes. According to many studies, sea levels have been rising by 1-2 millimeters (mm) each year for the past 100 years. Current predictions suggest that the sea level may rise by half a meter in the next 100 years.

## **7. The Effects of Global Warming on: Agriculture**

Climate plays a large part in determining plant growth and the production of crops. Crop growth is often limited by temperature and rainfall. An increase in temperature may suit some crops, but the accompanying increase in the **evaporation** of water will leave less moisture available for plant growth.

The changes in the weather will affect the type of crops grown. Some crops such as wheat and rice grow better in higher temperatures, but other plants such as maize and sugarcane do not. Changes in the amount of rainfall will also affect how many plants grow.

**Food & Water Shortages:** The effect of a change in weather on plant growth may lead to food and water shortages in some countries of the world. **Droughts** in countries that currently experience them may become more severe. Brazil, South East Asia, China and parts of Africa are likely to be affected most, and many people could suffer from hunger.

**Low-Lying Land:** Low-lying agricultural land is at risk from rising sea levels. South East Asia would be badly affected as most farming takes place on low-lying **deltas**. If salt water entered the land it would need treating. This would increase costs for farmers and mean higher food prices for the public.

**Carbon Dioxide:** Plants grow as a result of **photo synthesis**.

This involves plants taking in carbon dioxide and giving off oxygen. Climate change is associated with an increase in the levels of carbon dioxide in the atmosphere and hence plant growth rates could increase.

**Uncertainty:** It is not certain what the effects of climate change on agriculture will be, but it is thought that crop production will be reduced in some parts of the world, whilst it will increase in others.

## **8. The Effects of Global Warming**

**Wildlife:** As the climate changes, the composition and distribution of ecosystems will alter and individual species will respond to the changes. Some species in ecosystems may become extinct.

**Climate Zones:** Groups of organisms will tend to move towards the **poles** as warming occurs. It is predicted that a warming of 2°C over the next 100 years would shift current climatic zones towards the poles by about 300 km. The ecosystems most at risk from global warming will include those that are presently subject to harsh climates. These include:

- Tropical forest
- Coral reefs
- Deserts
- Polar (ice) regions
- Coastal marshes
- Mountains
- Low lying land

The occurrence of extreme events, such as flooding and drought in these environments, may become more likely.

**Forests:** Forests cover around a quarter to a third of the total land surface of the Earth. They are essential for the maintenance of a stable global climate. Global warming will increase the risk of forest fires as soils and plants will become drier.

Changes in pest populations may also place stress on forests. Forests are known to strongly moderate local climates and use up carbon dioxide during photo synthesis, helping to remove

some of the carbon dioxide released by mankind. As forests are cut down, this potential is removed. Furthermore, forest clearance through burning releases a lot of carbon dioxide into the atmosphere.

## **9. The Effects of Global Warming on: Health**

The health of human populations depends on the continued use of the Earth's natural systems. Climate change is likely to have a negative effect on health, with significant loss of life through a variety of illnesses.

**Effects of Warmer Temperatures:** Warm temperatures can increase local air pollution, which in turn can lead to an increase in breathing problems and respiratory diseases.

**Effects of Extreme Events:** Extreme events may lead to a large number of deaths at a set time. For example, a land slide or flood could wipe out a large number of people. Events like this are set to increase as global warming takes place.

**Infectious Diseases:** Many infectious diseases only appear in warm areas. Warmer trends would enable insects and other disease carriers to expand their range. Mosquitoes and other insects will spread further across the globe. Currently, 45% of the world's population lives in the climate zone suitable for the spread of malaria. Models estimate that by 2070 this figure could be 60%.

**Positive Effects:** Although global warming may have a number of negative effects on health, warmer temperatures may decrease the number of deaths from cold weather. Poorer countries will be the most vulnerable to global warming, as they will find it difficult to adapt to change.

## **10. The Effects of Global Warming on: Water Resources**

Scientists agree that global warming will generally result in milder winters and hotter summers, although there will be differences between countries. In winter it may rain more, but in the summer, it may become dryer. Water resources would generally benefit from wetter winters but warmer summers with longer growing seasons and increased water **evaporation** would put greater pressure on them.

**Changing Evaporation and Rainfall:** Water is essential for human life and development. Much of the world's agricultural, **hydroelectric power** and water supplies depend upon the water cycle. Global warming will affect the water cycle, placing stress on water resources. In some areas of the world water evaporation may increase by a greater amount than rainfall. This would lead to lower water levels in rivers and lakes. Global warming may mean that rainfall becomes concentrated into large storms that could cause problems with flooding.

**Hydroelectric Power:** Water is used for a number of different purposes that will be affected by global warming. Rivers may become prone to flooding or drought. Hydroelectric power generation depends upon a high water flow to make electricity. If flows decrease, less hydroelectric power will be generated. The supply and demand for water to homes and work places may also be affected if the levels of reservoirs and **aquifers** decrease. Looking after future water resources with care will become increasingly important as global warming takes place.

## **11. The Effects of Global Warming on: Storms, Floods & Droughts**

**Natural Events:** The Earth's climate changes naturally and often produces climatic extremes and disasters. On a time scale of days, months and years, changes in weather and climate can produce:

- heat waves
- river and ocean flooding
- droughts
- landslides
- storms and hurricanes
- Tornadoes.

**Effects of Global Warming:** As global warming raises the temperature of the Earth's surface these events may become more frequent. This may have a negative effect on society as the events damage homes and villages and can lead to loss of life. As the global temperature increases, we would expect the amount of moisture in the atmosphere to increase, due to an increase in evaporation of water from the sea's surface. It is predicted that for every 1°C rise in

temperature, water vapour in the air over the oceans will increase by 6-8%. This will lead to an increase in rainfall rates in some parts of the world, causing more frequent floods and landslides. In other parts of the world a decrease in rainfall may be experienced, causing an increase in very dry periods.

In order to tackle future increases in extreme events we must learn how to predict and cope with them. It is certain that the poorest and most vulnerable societies in the developing world will be the least able to cope.

## **12. How Can Renewable Energy Reduce Global Warming?**

Renewable energy is energy created by sources that are not used up or depleted. Most forms of renewable energy do not produce carbon dioxide and other harmful gases. Using more renewable energy sources would reduce carbon dioxide emissions and minimize global warming.

**Hydroelectric Power:** Hydroelectric power (HEP) uses the force of moving water to create electricity. However, HEP stations often require large **dams**, which disrupt ecosystems and displace people. HEP is the most widely used renewable source, providing 20% of the world's energy.

**Solar Power:** The Sun provides the main source of energy for all living things. Solar energy is free and will never run out. We can use solar panels to turn the Sun's energy into useful energy.

**Wind Power:** Wind turbines harness the movement of air to produce energy. They are often found grouped together in wind farms.

**Biomass:** This is the term used to describe plant materials and animal waste, which can be burnt for energy.

**Geothermal Energy:** Geothermal energy is energy that is generated by using the heat beneath the Earth's surface.

## **13. Impact of Global Warming in Africa**

The African continent is a rich mosaic of ecosystems, ranging from the snow and ice fields of Kilimanjaro to tropical rain forests to the Saharan desert. Although it has the lowest per capita fossil energy use of any major world region, Africa may be the most vulnerable continent to climate change because wide spread poverty

limits countries capabilities to adapt. Signs of a changing climate in Africa have already emerged: spreading disease and melting glaciers in the mountains, warming temperatures in drought-prone areas, and sea-level rise and coral bleaching along the coastlines.

### Finger prints

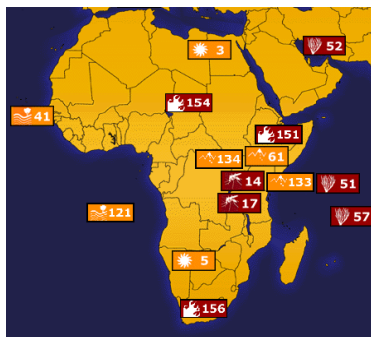
**3. Cairo, Egypt - Warmest August on record, 1998:** Temperatures reached 105.8°F (41°C) on August 6, 1998.

**5. Southern Africa - Warmest and driest decade on record, 1985-1995:** Average temperature increased almost 1°F (0.56°C) over the past century.

**41. Senegal - Sea-level rise:** Sea-level rise is causing the loss of coastal land at Rufisque, on the South Coast of Senegal.

**61. Kenya - Mt. Kenya's largest glacier disappearing:** 92 percent of the Lewis Glacier has melted in the past 100 years.

**121. World Ocean - Warming water:** The world ocean has experienced a net warming of 0.11°F (0.06°C) from the sea surface to a depth of 10,000 feet (3000 m) over the past 35-45 years. More than half of the increase in heat content has occurred in the upper 1000 feet (300 m), which has warmed by 0.56°F (0.31°C). Warming is occurring in all ocean basins and at much deeper depths than previously thought. These findings lend support to the hypothesis that the oceans are taking up excess heat as the atmosphere warms, and would account for the apparent discrepancy in the magnitude of the observed atmospheric warming as compared to climate model predictions.



**133. Mount Kilimanjaro, Tanzania - Ice projected to disappear by 2020:** 82% of Kilimanjaro's ice has disappeared since 1912, with about one-third melting in just the last dozen years. At this rate, all of the ice will be gone in about 15 years. Scientists hypothesize that less snow on the mountain during the rainy season decreases the surface reflectiveness, leading to higher rates of absorption of heat and increased ice melt.

**134. Ruwenzori Mountains, Uganda - Disappearing glaciers:** Since the 1990s, glacier area has decreased by about 75%. The continent of Africa warmed by 0.9° F (0.5°C) during the past century, and the five warmest years in Africa have all occurred since 1988.

### **Harbingers**

**14. Kenya - Deadly malaria outbreak, summer, 1997:** Hundreds of people died from malaria in the Kenyan highlands where the population had previously been unexposed.

**17. Tanzania - Malaria expands in mountains:** Higher annual temperatures in the Usamabara Mountains have been linked to expanding malaria transmission.

**51. Indian Ocean - Coral Reef Bleaching:** (includes Seychelles; Kenya; Reunion; Mauritius; Somalia; Madagascar; Maldives; Indonesia; Sri Lanka; Gulf of Thailand [Siam]; Andaman Islands; Malaysia; Oman; India; and Cambodia).

**52. Persian Gulf: Coral reef bleaching.**

**57. Seychelles Islands: Coral reef bleaching.**

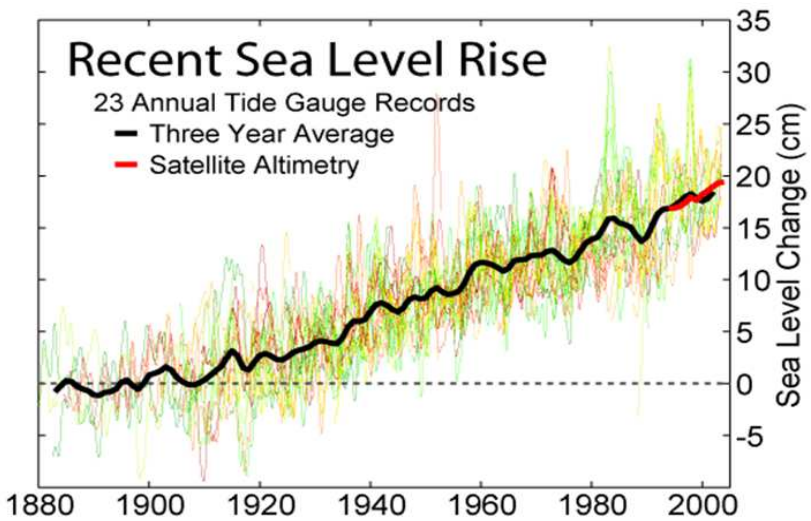
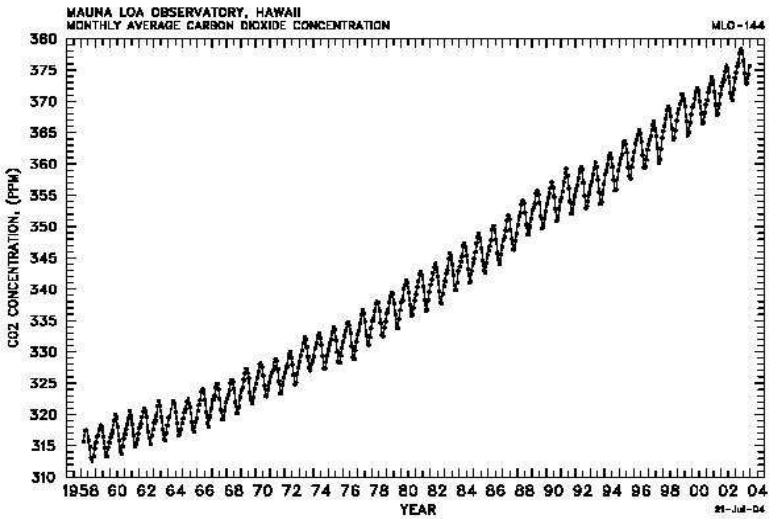
**151. Kenya - Worst drought in 60 years, 2001:** Over four million people were affected by a severely reduced harvest, weakened livestock, and poor sanitary conditions.

**154. Lake Chad - Disappearing Lake:** The surface area of the lake has decreased from 9,650 square miles (25,000 km<sup>2</sup>) in 1963 to 521 (1,350 km<sup>2</sup>) today. Modeling studies indicate the severe reduction results from a combination of reduced rainfall and increased demand for water for agricultural irrigation and other human needs.

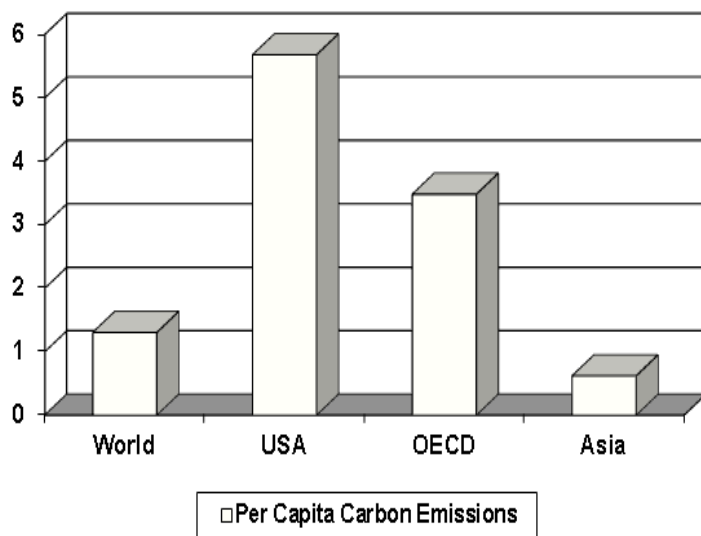
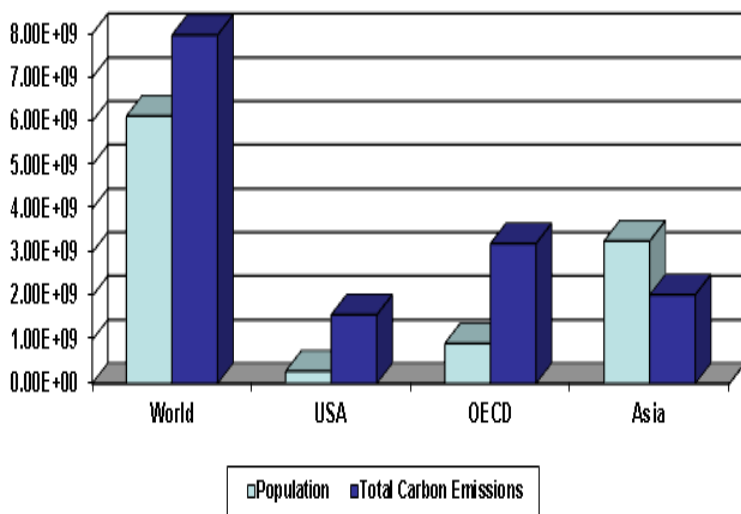
**156. South Africa - Burning shores, January 2000:** One of the driest Decembers on record and temperatures over 104°F (40°C) fueled extensive fires along the coast in the Western Cape Province. The intensity of the fires was exacerbated by the presence of invasive

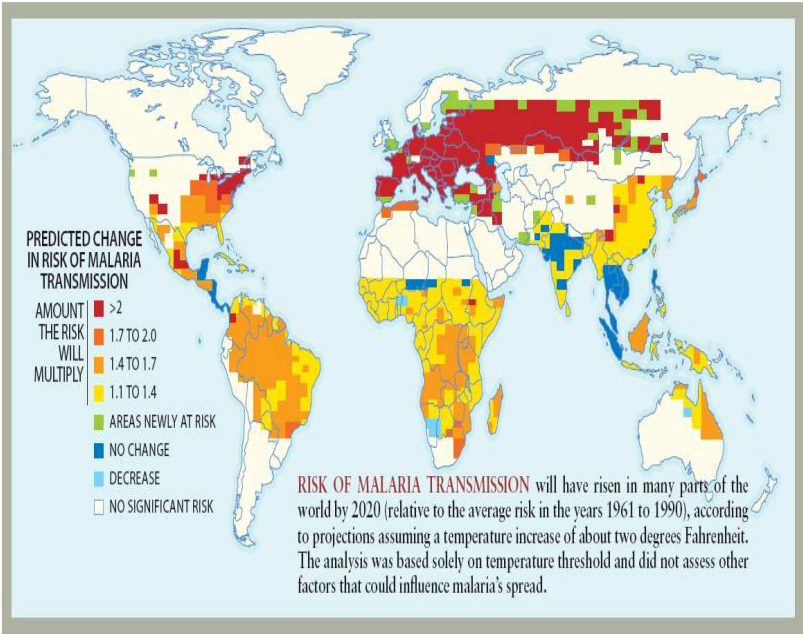
vegetation species, some of which give off 300% more heat when burned compared to natural vegetation.

#### 14. Figures

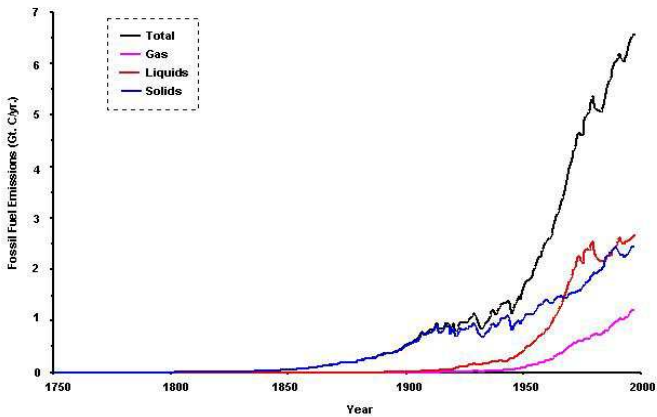








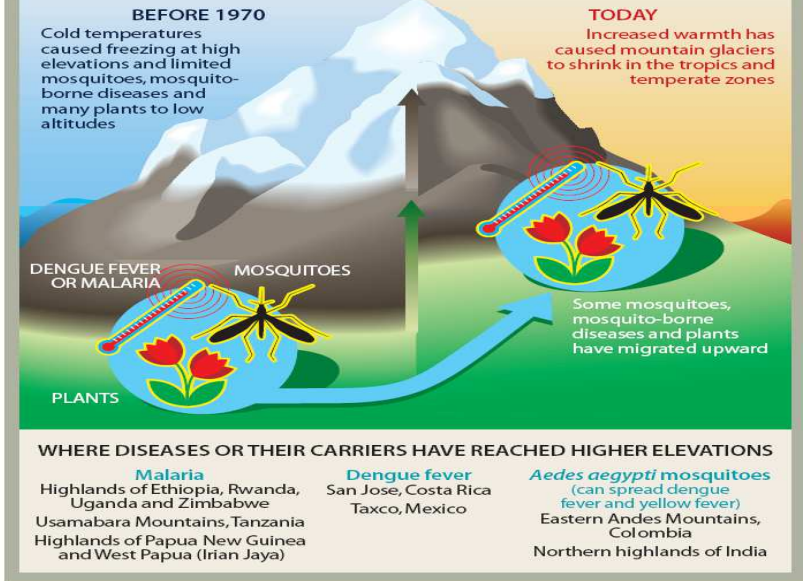
**Principal Global Fossil Fuel CO<sub>2</sub> Emissions**



Source: Marland, et al.

## Changes Are Already Under Way

Computer models have predicted that global warming would produce several changes in the highlands: summit glaciers (like North Polar sea ice) would begin to melt, and plants, mosquitoes and mosquito-borne diseases would migrate upward into regions formerly too cold for them (*diagram*). All these predictions are coming true. This convergence strongly suggests that the upward expansion of mosquitoes and mosquito-borne diseases documented in the past 15 years (*list at bottom*) has stemmed, at least in part, from rising temperatures.



## 15. Facts about Global Warming

- The Earth was formed about **4,540,000,000** years ago.
- In the beginning, the Earth's atmosphere contained very little oxygen (less than **1%** oxygen pressure).
- Early plants started to develop more than 2 billion years ago.
- Through photo synthesis, plants take carbon dioxide into the biosphere as organic matter, and release oxygen as a byproduct.
- Through geologic time, oxygen accumulated gradually in the atmosphere, reaching a value of about **21%** of atmospheric gases at the present time.

- Through geologic time, surplus organic matter has been stored in the lithosphere as fossil organic materials (coal, petroleum, and natural gas).
- Early animals (the first organisms with external shells) started to develop around **600,000,000** years ago.
- Animals operate in the opposite way to plants: they take up oxygen, burn organic matter (food), and release carbon dioxide as a byproduct.
- Early humans (*Australopithecus anamensis*) began to develop about **4,100,000** years ago.
- Cool climatic conditions have prevailed during the past **1,000,000** years. The species *Homo sapiens* evolved under these climatic conditions.
- *Homo sapiens* dates back to more than **400,000** years.
- Estimates for the variety *Homo sapiens*, to which all humans belong, range from **130,000 to 195,000** years old.
- The concentration of carbon dioxide in the atmosphere was as low as 190 ppm during the last Ice Age, about **21,000** years ago.
- The last Ice Age began to recede about **20,000** years ago.
- The agricultural revolution, where humans converted forests and range lands into farms, began to develop about **10,000** years ago.
- The agricultural revolution caused a reduction in standing biomass in the biosphere and reduced the uptake of carbon dioxide in mid latitudinal regions, indirectly contributing, however so slightly, to global warming.
- The concentration of carbon dioxide in the atmosphere increased gradually from a low of 190 ppm 21,000 year ago, to about 290 ppm in the year 1900, i.e., at an average rate of **0.00478 ppm per year**.

- The industrial revolution, where humans developed machines (artificial animals, since they consume fuels, which are mostly organic matter), began in England about **240** years ago (1767).
- In October 1999, the world's population reached **6,000,000,000**, which is double that of the year 1959 (the doubling occurred in 40 years).
- The world's population is currently increasing at the rate of about **80,000,000** per year (about 1.2 %).
- The current world population is **6,632,000,000** (November 2007).
- The global fleet of motor vehicles is estimated at **830,000,000** (2006).
- The global fleet of motor vehicles has been recently growing at the rate of **16,000,000** per year.
- Motor vehicles (cars, trucks, buses, and scooters) account for **80%** of all transport-related energy use.
- The concentration of carbon dioxide in the atmosphere, which was at 290 ppm in the year 1900, rose to 316 ppm in 1959, or at an average **0.44 ppm** per year.
- Measure of the concentration of carbon dioxide since 1959 (316 ppm) have revealed an increase to 378 ppm in 2004, or at an average **1.38 ppm** per year.
- The concentration of carbon dioxide has increased an average of about **1.8 ppm** per year over the past two decades.
- The concentration of carbon dioxide increased **2.87 ppm** in 1997-98, more than in any other year of record.
- The year 1998 was the warmest of record. The year 2002 was the second warmest (to that date). The year 2003 was the third warmest (to that date). The year 2004 was the fourth warmest (to that date). Last year (2005) equaled 1998 as the warmest of record.
- About **75%** of the annual increase in atmospheric carbon dioxide is due to the burning of fossil fuels.

- The remaining **25%** is attributed to anthropogenic changes in land use, which have the effect of reducing the net uptake of carbon dioxide.
- Anthropogenic changes in land use occur when forests are converted to range lands, range lands to agriculture, and agriculture to urban areas.
- Other patterns of land degradation--deforestation, overgrazing, over cultivation, desertification, and salinization--reduce the net uptake of carbon dioxide, indirectly contributing, however slightly, to global warming.

### **16. Data on Climate Change**

Today the Kyoto Protocol takes effect in an effort by 140 countries to reign in emissions of carbon dioxide and other greenhouse gases. The world's biggest emitter, the United States, is not participating, so the result is expected to be limited, reducing by about one-tenth a projected 30 percent rise in worldwide emissions between 1990 and 2010

#### **Key events in the story of climate change:**

**1750:** Before Industrial Revolution, atmosphere holds 280 parts per million of heat-trapping carbon dioxide, later research determines.

**1898:** Swedish scientist Svante Arrhenius warns carbon dioxide from coal and oil burning could warm the planet.

**1955:** U.S. scientist Charles Keeling finds atmospheric carbon dioxide has risen to 315 parts per million.

**1988:** NASA scientist James Hansen tells U.S. Congress global warming "is already happening now."

**1992:** Climate treaty sets voluntary goals to lower carbon dioxide and other greenhouse gas emissions.

**1995:** U.N.-organized scientific panel says evidence suggests man-made emissions are affecting climate.

**1997:** Treaty parties approve Kyoto Protocol mandating emission cuts by industrial nations, an approach rejected in advance by U.S. Senate.

**1998:** Warmest year globally since record-keeping began in mid-19th Century.

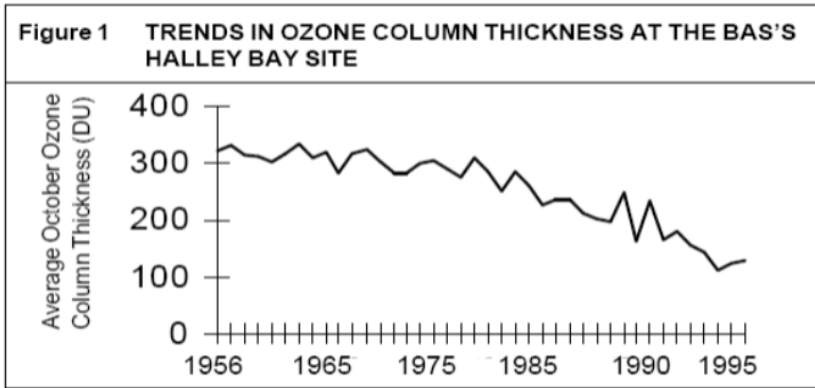
**2001:** U.N. scientific panel concludes most warming likely due to man-made emissions; President Bush renounces Kyoto Protocol.

**2004:** Carbon dioxide reaches record 379 parts per million; Russia gives crucial ratification to Kyoto Protocol.

**Ozone Layer Depletion:** Ozone in the upper atmosphere (stratosphere) plays a vital role in absorbing many of the most harmful components of sunshine through the mechanisms described in **Box 1**, and the so-called 'ozone layer' is one of the essential prerequisites for life to have developed on this planet. Atmospheric scientists have investigated the layer over many years and built up a good historical record of how its thickness varies naturally with latitude, the season, the sunspot cycle and events such as volcanic eruptions (Box 1). Researchers have also looked into the complicated chemistry involved in the layer's formation and, during the 1970's, US scientists postulated that some industrial chemicals starting to reach the stratosphere (particularly chlorofluorocarbons (CFCs)) might interfere with the mechanisms of ozone formation and destruction.

This theory triggered further research, but remained a theory until the discovery in 1985 by the British Antarctic Survey (BAS) that levels of ozone dropped substantially during the Antarctic Spring.

This led to a reexamination of earlier satellite data which revealed that average spring time ozone levels had actually been dropping since the 1970s (**Figure 1**), and that there was now a well-established seasonal 'ozone hole' (actually a region of severe depletion) which appeared over the Antarctic early each spring (between late August and November), disappearing when ozone-rich air from lower latitudes mixed with polar air in the late spring/ early summer. The exact location and size of the 'hole' vary with meteorological conditions, but the area covered has increased over the last 10 years or so (**Figure 2**) and extends over the entire Antarctic continent, occasionally including the tip of South America.



Research also revealed that the Arctic is similarly affected during winter/spring - as in Antarctica, the greatest loss is near the Pole, but depletion is spreading to lower latitudes. In early 1995, the World Meteorological Organization (WMO) reported that ozone levels were 10% to 15% below long-term averages, with 35% depletion over Siberia and below average ozone levels were reported as far south as Spain. Overall, losses over mid-latitudes in the Northern hemisphere are around 8% per decade in the winter and spring, and 2%-4% per decade in the summer.

The appearance of the Antarctic ozone hole gave credence to the theoretical predictions that CFCs and some bromine-containing chemicals (e.g. fire suppressants) would cause a loss of stratospheric ozone (**Box 2**), and led to action within the UN Vienna Convention on the Protection of the Ozone Layer.

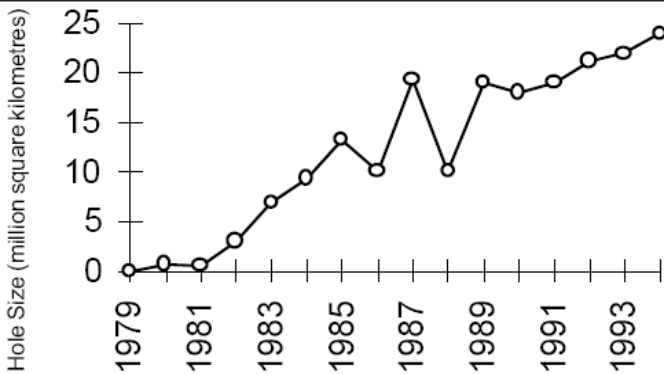


### Box 1 - SUNSHINE AND OZONE

Ozone (a form of oxygen containing three atoms instead of the usual two) is formed and destroyed by a complicated series of chemical reactions between atmospheric oxygen, sunlight and other trace substances in the stratosphere. Absorption of solar ultraviolet radiation (UVR) by the ozone layer has the effect of removing much of the more harmful parts of the UVR spectrum as they pass through the stratosphere (the upper atmosphere 10 to 50 km above ground). By the time UVR has passed through the stratosphere, virtually all of the shortest wavelengths (UVC) and most (70-90%) of the intermediate wavelengths (UVB) have been absorbed, leaving the least damaging UVA.

The amount of ozone depends on its rate of formation and destruction, and varies naturally according to:-

**Figure 2 TRENDS IN THE SIZE OF THE ANTARCTIC OZONE HOLE**



## Box 2 - CHLORINE AND OZONE DEPLETION

Most scientists now agree that the Arctic and Antarctic ozone holes are caused mainly by chlorine and bromine atoms in the stratosphere, and that these originate largely from CFCs and other closely related compounds (e.g. carbon tetrachloride, methyl chloroform, halons) used as refrigerants, propellants, solvents, etc. Such compounds are extremely stable, surviving in the troposphere for 10 to over 100 years without being broken down. However, once they reach the stratosphere they react with UVR breaking into a variety of different products. Some of these are relatively stable and harmless (so-called 'reservoir species' such as hydrogen chloride and chlorine nitrate). But others

Specific controls on the production of ozone-depleting chemicals were first agreed through that Convention's Montreal Protocol in 1987, with an agreement aimed at halving CFC emissions by the year 2000. Subsequent research suggested that these measures would not reverse ozone depletion fast enough, and further agreements (in London in 1990, Copenhagen in 1992 and Vienna in 1995) have speeded up this schedule and extended the range of chemicals covered (**Table 1**).

Chemicals Covered	Phase out date	
	<i>Developed countries</i>	<i>Developing</i>
Halons	1994	2010
CFCs, Methyl chloroform	1996	2010
Carbon tetrachloride	1996	2015
Methyl bromide - freeze	1995	2002
- phaseout	2010	
HCFCs - 90% cut	2016	
- phaseout	2030	2040

### Implications for Human Health

The main human health concerns over a thinning ozone layer are that more UVR will reach the surface and increase peoples' exposure. As summarised in **Box 3**, the most serious potential effect is expected to be on non-melanoma skin cancers (NMSCs) as well as the less common but more serious malignant melanomas (MMs). Both of these have become more common in recent years; over 40,000 NMSCs are now registered in the UK each year, a rise of some 200% in the last 15 years, while the incidence of MM (currently ~4,000 cases a year) has been rising by around 5% per year. Experts consider, however, that this trend reflects changes in lifestyle in previous decades (e.g. a rise in the number of people taking holidays in the sun, an increased willingness to expose them to the sun) rather than any increase in the amount of UVR reaching the Earth.

In addition to the cancers described in Box 3, UVR also causes other short- (e.g. sunburn) and longterm (e.g. photo aging) effects, can damage the eye (acute effects such as inflammation of the cornea and conjunctiva as well as chronic problems such as corneal lesions and cataracts), and can suppress some of the body's normal immune responses. The key question on health effects is how far a thinning ozone layer leads to increased UVR (especially the potentially damaging UVB component) reaching the ground. In the clear unpolluted air of Antarctica, periods of maximum ozone depletion can triple UVB levels at the surface.

In the UK and other Northern Hemisphere locations however, the relationship is less straight forward since the amount of UVR reaching the earth's surface depends not only on the thickness of the ozone layer, but also on weather conditions and local levels of air pollution, since ozone and other pollutants formed nearer the ground (in the troposphere) from the interaction of vehicle and other emissions with sunlight, also absorb UVR.

Information on ground level UVR in the UK is more limited, since continuous monitoring only started in 1988, when the National Radiological Protection Board (NRPB) set up a network of monitoring stations. So far this has shown little or no evidence of any consistent rise in UVB levels. Indeed, monitoring data from other countries (e.g.

USA) suggests that UVB levels may even have fallen in recent years, particularly in urban areas.

### Box 3 - UVR and SKIN CANCER

UVR is a major factor behind the development of both the main types of skin cancer. Non-melanoma skin cancers (NMSC) occur in two main types of skin cells (basal cells and keratinocytes), and while common are seldom fatal (accounting for ~5% of UK cancers but <0.5% of cancer deaths each year). Most (80-90%) NMSCs occur on parts of the body likely to be exposed to the sun, with risk increasing in proportion to the cumulative lifetime dose of UVR.

Malignant melanomas (MM) are less common and more often fatal (~1.5% of UK cancers and 0.8% of cancer deaths), and occur in the cells (melanocytes) that make skin pigment (melanin). The relation between UVR and MMs is more complex, since indoor workers are at highest risk and MMs most commonly occur on relatively unexposed parts of the body. Overall, the risk factors most closely associated with MMs include sunburn in childhood, skin type (those with red hair and fair skin are most at risk), exposure to intermittent high bursts of UVR, genetic factors (MM sometimes runs in families) and certain types of unusual moles. Exactly how UVR contributes to skin cancers has been the subject of much recent research. UVR (particularly UVB) can directly damage DNA leading to mutations in genes responsible for controlling vital processes such as cell division, cell death, repair of DNA errors, etc. Analysis of tumor samples shows that skin cancer is often associated with mutations in specific genes, including the ras oncogene (a gene that can cause cancer if activated by a mutation) and the p53 tumor suppressor gene. As well as these direct mechanisms, it is also thought that UVR

The most likely explanation is that levels of urban air pollution have more than offset the effects of ozone depletion in the stratosphere, since long term increases in UVB at monitoring sites unaffected by urban air pollution (e.g. in the Swiss Alps, and in New Zealand) have been detected.

Nevertheless, short-term increases in UVR can occur with the right combination of circumstances, and in March 1996, weather conditions conspired to allow the Arctic vortex to slip further south than usual, positioning it over the UK for several days. During this time, Meteorological Office monitors (operated on behalf of the DETR) at Lerwick and Camborne reported record low levels of total ozone, and the NRPB monitors at these and other sites registered large increases in UVR levels (**Table 2**). There is some evidence that

short-term episodes like this are becoming an increasingly regular feature - for instance, unusually low ozone and high UVB levels were detected over the UK during a 4-5 day period in April-May 1997.

### **Issues**

Experts are now predicting that stratospheric chlorine will also peak by the turn of the Century, although best estimates are that it will take another 50 years or so for chlorine (and thus ozone) levels in the stratosphere to return to normal. The Antarctic ozone hole is thus expected to persist until at least the middle of the next century, and ozone depletion at mid-latitudes to get slightly worse than present (a further reduction of 1.5% - 2.5% on current levels over the next 10 years or so) before levels start to recover.

Predicting the additional risk in the UK is complicated by the uncertainty over future trends in tropospheric air pollution. Theory suggests that ozone depletion over Northern Hemisphere mid-latitudes between 1979 and 1989 **should already have resulted in rises in surface UVB levels of between 1.3% and 4.7%**, whereas, as pointed out above, no such trend has been detected. Whether this continues to be the case depends on how far current measures to reduce urban air pollution succeed in reducing ozone levels near the ground.

Taken overall, such estimates suggest that the impact of ozone depletion on NMSC rates will be quite limited, with the worst case scenario projecting a rise of 10% over 50 years - at current rates this would be an additional 4,000 cases, although under-reporting means that the real figure could be higher than this (up to ~8,000 cases). This increase is relatively modest compared to recent trends (NMSCs increased by more than 200% in the last 15 years), which are attributed to changes in people's sun exposure habits. Skin cancer rates over the next 50 years or **so are thus much more likely to reflect changes in people's attitudes and behavior than in ozone depletion/recovery rates.**

The key to reducing skin cancer rates thus remains influencing people's attitude and behavior towards exposure to the sun. In this context, the Health of the Nation initiative in 1992 included a specific target to *"halt the year on year increase in the*

*incidence of skin cancer by 2005*". Initial campaigns were targeted both at the general public (e.g. via the Health Education Authority's (HEA) "Sun Know How" and "Shift to the Shade" campaigns) and at outdoor workers (e.g. through the Health and Safety Executive's (HSE) "Keep Your Top On" initiative).

Overall, the international response to ozone layer depletion is seen by many as one of the first effective responses to a global environmental problem, and looks likely to succeed in reversing the environmental damage involved, albeit over a protracted time scale. There remain, however, a number of continuing challenges if the progress so far is to be sustained

Date	CAMBORNE		LERWICK	
	Daily UVR	Total Ozone <sup>1</sup>	Daily UVR	Total Ozone <sup>1</sup>
1/3/96	240	294	125	269
2/3/96	604	246	154	209
3/3/96	902	206	518	211
4/3/96	450	254	170	225
5/3/96	520	241	342	195
6/3/96	166	302	340	220
<b>Normal</b>	<b>420±200</b>	<b>363±95</b>	<b>280±130</b>	<b>392±115</b>

*Source: Radiological Protection Bulletin 180, August 1996, NRBP*  
 Notes: 1 In Dobson Units for whole atmosphere

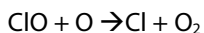
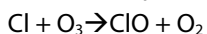
The second issue concerns the rate of technical progress towards 'substitutes for the substitutes' since the main transitional replacements for CFCs (HCFCs) still have some ozone-depleting potential and also contribute to global warming. In addition to the research needs to develop better substitutes, there is also a debate between countries over whether the phase out date for HCFCs should be brought forward (Table 1).

**Causes of Ozone Depletion**

Ozone depletion occurs when the natural balance between the production and destruction of stratospheric ozone is tipped in favor of destruction. Although natural phenomena can cause temporary ozone loss, chlorine and bromine released from man-made compounds such as CFCs are now accepted as the main cause of this depletion.

It was first suggested by Drs. M. Molina and S. Rowland in 1974 that a man-made group of compounds known as the chlorofluorocarbons (CFCs) were likely to be the main source of ozone depletion. However, this idea was not taken seriously until the discovery of the ozone hole over Antarctica in 1985 by the British Antarctic Survey.

Chlorofluorocarbons are not “washed” back to Earth by rain or destroyed in reactions with other chemicals. They simply do not break down in the lower atmosphere and they can remain in the atmosphere from 20 to 120 years or more. As a consequence of their relative stability, CFCs are instead transported into the stratosphere where they are eventually broken down by ultraviolet (UV) rays from the Sun, releasing free chlorine. The chlorine becomes actively involved in the process of destruction of ozone. The net result is that two molecules of ozone are replaced by three of molecular oxygen, leaving the chlorine free to repeat the process:



Ozone is converted to oxygen, leaving the chlorine atom free to repeat the process up to 100,000 times, resulting in a reduced level of ozone. Bromine compounds, or halons, can also destroy stratospheric ozone. Compounds containing chlorine and bromine from man-made compounds are known as industrial halocarbons.

Emissions of CFCs have accounted for roughly 80% of total stratospheric ozone depletion. Thankfully, the developed world has phased out the use of CFCs in response to international agreements to protect the ozone layer. However, because CFCs remain in the atmosphere so long, the ozone layer will not fully repair itself until at least the middle of the 21<sup>st</sup> century. Naturally occurring chlorine has

the same effect on the ozone layer, but has a shorter life span in the atmosphere.

### **Energy Usage: Utilisation of Energy & Irreversible Energy**

**Bio Fuel** also called **agro fuel** can be broadly defined as solid, liquid, or gas fuel consisting of, or derived from biomass. Biomass can also be used directly for heating or power. One type of biomass is wood, which is frequently used in industry, either by itself to create energy or with other combustible matter (such as coal) to burn and create heat. (Wood has been burned for millennia - as solids.)

Biofuel is considered a means of reducing greenhouse gas emissions and increasing energy security by providing an alternative to fossil fuels. However, In October 2007, Nobel Laureate Paul Crutzen published findings that the release of Nitrous Oxide (N<sub>2</sub>O) among the commonly used biofuels, such as biodiesel from rapeseed and bioethanol from corn (maize), can contribute as much or more to global warming than fossil fuel savings due to global cooling. Crops with less N demand, such as grasses and woody coppice species have more favorable climate impacts.

Bio fuels are used globally: biofuel industries are expanding in Europe, Asia and the Americas. The most common use for biofuels is in automotive transport. Biofuel can be produced from any carbon source that can be replenished rapidly e.g. plants. Many different plants and plant-derived materials are used for biofuel manufacture.

**Biomass** is material derived from recently living organisms. This includes plants, animals and their by-products. For example, manure, garden waste and crop residues are all sources of biomass. It is a renewable energy source based on the carbon cycle, unlike other natural resources such as petroleum, coal, and nuclear fuels. Agricultural products specifically grown for biofuel production include corn, switch grass, and soybeans, primarily in the United States; rapeseed, wheat and sugar beet primarily in Europe; sugar cane in Brazil; palm oil and mis can thus in South-East Asia; sorghum and cassava in China; and jatropha in India.

Hemp has also been proven to work as a biofuel. Biodegradable outputs from industry, agriculture, forestry and



households can be used for biofuel production, either using anaerobic digestion to produce biogas, or using second generation biofuel processes; examples include straw, timber, manure, rice husks, sewage, and food waste. The use of biomass fuels can therefore contribute to waste management as well as fuel security and help to prevent climate change, though alone they are not a comprehensive solution to these problems.

### **History**

Humans have used biomass fuels – that is, solid biofuels - for heating and cooking since the discovery of fire. Following the discovery of electricity, it became possible to use biofuels to generate electrical power as well. However, the discovery and use of fossil fuels: coal, gas and oil, have dramatically reduced the amount of biomass fuel used in the developed world for transport, heat and power.

Liquid biofuels have been used since the early days of the car industry. Nikolaus August Otto, the German inventor of the internal combustion engine, conceived his invention to run on ethanol. Rudolf Diesel, the German inventor of the Diesel engine, designed it to run on peanut oil. Henry Ford originally designed the Ford Model T, a car produced from 1903 to 1926, to run completely on ethanol. However, when crude oil became cheaply available (thanks to oil reserves discovered in Pennsylvania and Texas), cars began using fuels derived from mineral oil: petroleum or diesel.

Nevertheless, before World War II, biofuels were seen as providing an alternative to imported oil. Germany powered its vehicles using a blend of gasoline with alcohol fermented from potatoes, called *Reichskraftsprit*. In Britain, grain alcohol was blended with petrol by the Distillers Company Limited under the name *Discol* and marketed through Esso's affiliate Cleveland. After the war, cheap Middle Eastern oil lessened interest in biofuels. But the oil shocks of 1973 and 1979 increased interest from governments and academics. The counter-shock of 1996 again reduced oil prices and interest.

**Carbon Emissions:** Biofuels and other forms of renewable energy aim to be carbon neutral. This means that the carbon released during the use of the fuel, e.g. through burning to power

transport or generate electricity, is reabsorbed and balanced by the carbon absorbed by new plant growth. These plants are then harvested to make the next batch of fuel. Carbon neutral fuels lead to no net increases in atmospheric carbon dioxide levels, which mean that global warming need not get any worse.

In practice, biofuels are not carbon neutral. This is because energy is required to grow crops and process them into fuel. Examples of energy use during the production of biofuels include: fertilizer manufacture, fuel used to power machinery, and fuel used to transport crops and fuels to and from biofuel processing plants. The amount of fuel used during biofuel production has a large impact on the overall greenhouse gas emissions savings achieved by biofuels.

The **well-to-wheel** analysis for biofuels has shown that first generation biofuels can save up to 60% carbon emission and second generation biofuels can save up to 80% as opposed to using fossil fuels. However, a 2007 study by scientists from Britain, U.S., Germany, Switzerland and including Professor Paul Crutzen, who won a Nobel Prize for his work on ozone, have reported that measurements of emissions from the burning of biofuels derived from rapeseed and corn have been found to produce more greenhouse gas emissions than they save.

The claim that biofuels result in emissions savings has also been critiqued on the grounds that it overlooks the 'displacement' effects of large-scale biofuel production, in terms of its direct and indirect role in promoting land use changes and soil carbon losses. In 2006, a UK Government study showed that carbon emissions were reduced between 50% and 60%. This was when biofuels were used in conjunction with other fuels such as petrol and diesel.

**Bioenergy from Waste:** Using waste biomass to produce energy can reduce the use of fossil fuels, reduce greenhouse gas emissions and reduce pollution and waste management problems. A recent publication by the European Union highlighted the potential for waste-derived bioenergy to contribute to the reduction of global warming. The report concluded that 19 million tons of oil equivalents are available from biomass by 2020, 46% from bio-wastes: municipal

solid waste (MSW), agricultural residues, farm waste and other biodegradable waste streams.

Landfill sites generate gases as the waste buried in them undergoes anaerobic digestion. These gases are known collectively as landfill gas: this can be burned and is a source of renewable energy. Landfill gas (LFG) can be burned either directly for heat or to generate electricity for public consumption. Landfill gas contains approximately 50 percent methane, the same gas that is found in natural gas. If landfill gas is not harvested, it escapes into the atmosphere: this is not desirable because methane is a greenhouse gas, with more global warming potential than carbon dioxide. Over a time span of 100 years, methane has a global warming potential of 23 relative to **CO<sub>2</sub>**.

Therefore, during this time, one ton of methane produces the same greenhouse gas (GHG) effect as 23 tons of **CO<sub>2</sub>**. When methane burns the formula is **CH<sub>4</sub> + 2O<sub>2</sub> = CO<sub>2</sub> + 2H<sub>2</sub>O**. So by harvesting and burning landfill gas, its global warming potential is reduced a factor of 23, in addition to providing energy for heat and power. The amount of methane produced by living plants is 10 to 100 times greater than that produced by dead plants but does not increase global warming because of the carbon cycle.

Anaerobic digestion can be used as a distinct waste management strategy to reduce the amount of waste sent to landfill and generate methane, or biogas. Any form of biomass can be used in anaerobic digestion and will break down to produce methane, which can be harvested and burned to generate heat, power or to power certain automotive vehicles.

A 3 MW landfill power plant would power 1,900 homes. It would eliminate 6,000 tons per year of methane from getting into the environment. It would eliminate 18,000 tons per year of **CO<sub>2</sub>** from fossil fuel replacement. This is the same as removing 25,000 cars from the road, or planting 36,000 acres (146 km<sup>2</sup>) of forest, or not using 305,000 barrels of oil per year.

## **First Generation Bio Fuels**

'First-generation fuels' refer to biofuels made from sugar, starch, vegetable oil, or animal fats using conventional technology. The most common first generation biofuels are listed below.

**Vegetable oil:** Vegetable oil can be used for either food or fuel; the quality of the oil may be lower for fuel use. Vegetable oil can be used in many older diesel engines (equipped with indirect injection systems), but only in warm climates. In most cases, vegetable oil is used to manufacture biodiesel, which is compatible with most diesel engines when blended with conventional diesel fuel. MAN B&W Diesel, Wartsila and Deutz AG offer engines that are compatible with straight vegetable oil. Used vegetable oil is increasingly being processed into biodiesel, and at a smaller scale, cleaned of water and particulates and used as a fuel.

**Biodiesel:** Biodiesel is the most common biofuel in Europe. It is produced from oils or fats using trans esterification which is the process of exchanging the organic group R" of an ester with the organic group R' of an alcohol. These reactions are often catalyzed by the addition of an acid or base catalyst. It is a liquid similar in composition to mineral diesel. Its chemical name is fatty acid methyl (or ethyl) ester (FAME). Biodiesel can be used in any diesel engine when mixed with mineral diesel.

In some countries manufacturers cover their diesel engines under warranty for 100% biodiesel use, although Volkswagen Germany, for example, asks drivers to make a telephone check with the VW environmental services department before switching to 100% biodiesel. Many people have run their vehicles on biodiesel without problems. However, the majority of vehicle manufacturers limit their recommendations to 15% biodiesel blended with mineral diesel. In many European countries, a 5% biodiesel blend is widely used and is available at thousands of gas stations.

**Bio-alcohols:** Biologically produced alcohols, most commonly ethanol and less commonly propanol and butanol, are produced by the action of microorganisms and enzymes through fermentation.

**Butanol:** Butanol is often claimed to provide a direct replacement for gasoline, because it can be used directly in a gasoline engine (in a similar way to biodiesel in diesel engines). It is not in widespread production, and engine manufacturers have not made statements about its use. While on paper (and a few lab tests) it appears that butanol has sufficiently similar characteristics with gasoline such that it should work without problem in any gasoline engine, no widespread experience exists.

Butanol is formed by ABE fermentation (acetone, butanol, and ethanol) and experimental modifications of the process show potentially high net energy gains with butanol as the only liquid product. Butanol will produce more energy and allegedly can be burned “straight” in existing gasoline engines (without modification to the engine or car), and is less corrosive and less water soluble than ethanol, and could be distributed via existing infrastructures. DuPont and BP are working together to help develop Butanol.

**Bio-ethanol:** Ethanol is the most common biofuel worldwide. This alcohol fuel is produced by fermentation of sugars derived from wheat, corn, sugar beet and sugar cane. The production methods used are enzymatic digestion (to release sugars from stored starches e.g. from wheat and corn), fermentation of the sugars, distillation and drying. Ethanol can be used in petrol engines as a replacement for gasoline; it can be mixed with gasoline to any percentage, see common ethanol fuel mixtures for information on ethanol. All petrol engines can run on blends of up to 15% bioethanol with petroleum/gasoline. For higher percentage blends, engine modifications are needed. Many car manufacturers are now producing flex-fuel vehicles, which can run on any combination of bioethanol and petrol, up to 100% bioethanol.

**Bio-methanol:** Methanol is currently produced from natural gas, a fossil fuel. It can also be produced from biomass (biomethanol). The methanol economy is an interesting alternative to the hydrogen economy.

**BioGas:** Biogas is produced by the process of anaerobic digestion of organic material by anaerobes. It can be produced either from biodegradable waste materials or by the use of energy crops

fed into anaerobic digesters to supplement gas yields. The solid byproduct, digestate, can be used as a biofuel or a fertilizer.

Biogas contains methane and can be recovered from industrial anaerobic digesters and mechanical biological treatment systems. Landfill gas is a less clean form of biogas which is produced in landfills through naturally occurring anaerobic digestion. If it escapes into the atmosphere it is a potent greenhouse gas.

Oils and gases can be produced from various biological wastes: Thermal de-polymerization of waste can extract methane and other oils similar to petroleum.

GreenFuel Technologies Corporation developed a patented bioreactor system that uses nontoxic photosynthetic algae to take in smokestacks flue gases and produce biofuels such as biodiesel, biogas and a dry fuel comparable to coal.

**Solid Biofuels:** Examples include wood, charcoal, and dried excrement.

**Second Generation Biofuels:** Second generation biofuels use biomass to liquid technology, including cellulosic biofuels from non-food crops. The following second generation biofuels are under development and they are:

**Bio-DME, Fischer-Tropsch, Bio-Hydrogen diesel, Bio-methanol** and **Mixed Alcohols** all use syngas for production. This syngas is produced by gasification of biomass. HTU (High Temperature Upgrading) diesel is produced from particularly wet biomass stocks using high temperature and pressure to produce oil.

**Bio-Hydrogen** is the same as hydrogen except it is produced from a biomass feedstock. This is done using gasification of the biomass and then reforming the methane produced, or alternatively, this can be accomplished with some organisms that produce hydrogen directly under certain conditions. Bio-Hydrogen can be used in fuel cells to produce electricity.

**DMF.** Recent advances in producing DMF from fructose and glucose using catalytic biomass-to-liquid process have increased its attractiveness.

**Bio-DME** is the same as DME but is produced from bio-sources. Bio-DME can be produced from Bio-methanol using catalytic

dehydration or it can be produced from syngas using DME synthesis. DME can be used in the compression ignition engine.

**Bio-methanol** is the same as methanol but it is produced from biomass. Bio-methanol can be blended with petrol up to 10-20% without any infrastructure changes.

**HTU diesel** is produced from wet biomass. It can be mixed with fossil diesel in any percentage without need for infrastructure.

**Fischer-Tropsch diesel** (FT) diesel is produced using gas-to-liquids technology. FT diesel can be mixed with fossil diesel at any percentage without need for infrastructure change.

**Mixed alcohols** are produced from syngas with catalysts similar to those used for methanol. Most R&D in this area is concentrated in producing mostly ethanol. However, some fuels are marketed as mixed alcohols (see Ecalene). Mixed alcohols are superior to pure methanol or ethanol, in that the higher alcohols have higher energy content. Also, when blending, the higher alcohols increase compatibility of gasoline and ethanol, which increases water tolerance and decreases evaporative emissions. In addition, higher alcohols have also lower heat of vaporization than ethanol, which is important for cold starts. (For another method for producing mixed alcohols from biomass see bioconversion of biomass to mixed alcohol fuels)

**Wood diesel** A new biofuel was developed by the University of Georgia from wood chips. The oil is extracted and then added to unmodified diesel engines. Either new plants are used or planted to replace the old plants. The charcoal byproduct is put back into the soil as a fertilizer. According to the director Tom Adams since carbon is put back into the soil, this biofuel can actually be carbon negative not just carbon neutral. Carbon negative decreases carbon dioxide in the air reversing the greenhouse effect not just reducing it.

### **Biofuels in developing countries**

Biofuel industries are becoming established in many developing countries. Many developing countries have extensive biomass resources that are becoming more valuable as demand for biomass and biofuels increases. The approaches to biofuel development in different parts of the world vary. Countries such as

India and China are developing both bioethanol and biodiesel programs. India is extending plantations of jatropha, an oil-producing tree that is used in biodiesel production. The Indian sugar ethanol program sets a target of 5% bioethanol incorporation into transport fuel. China is a major bioethanol producer and aims to incorporate 15% bioethanol into transport fuels by 2010.

Amongst rural populations in developing countries, biomass provides the majority of fuel for heat and cooking. Wood, animal dung and crop residues are commonly burned. Figures from the International Energy Agency show that biomass energy provides around 30% of the total primary energy supply in developing countries; over 2 billion people depend on biomass fuels as their primary energy source.

### **Efforts and promotion**

Recognizing the importance of implementing bioenergy, there are international organizations such as IEA Bioenergy, established in 1978 by the International Energy Agency (IEA), with the aim of improving cooperation and information exchange between countries that have national programs in bioenergy research, development and deployment.

In **Brazil**, the government hopes to build on the success of the Proálcool ethanol program by expanding the production of biodiesel which must contain 2% biodiesel by 2008, increasing to 5% by 2013. **Colombia** mandates the use of 10% ethanol in all gasoline sold in cities with populations exceeding 500,000. In **Venezuela**, the state oil company is supporting the construction of 15 sugar cane distilleries over the next five years, as the government introduces a E10 (10% ethanol) blending mandate. An EU directive has set the goal of replacing 5.75% of transportation fuel by biofuels by 2010 in all member states. In **Canada**, the government aims for 45% of the country's gasoline consumption to contain 10% ethanol by 2010. In Southeast Asia, **Thailand** has mandated an ambitious 10% ethanol mix in gasoline starting in 2007. For similar reasons, the palm oil industry plans to supply an increasing portion of national diesel fuel requirements in **Malaysia** and **Indonesia**. In **India**, a bio-ethanol program calls for E5 blends throughout most of the country



targeting to raise this requirement to E10 and then E20. In **China**, the government is making E10 blends mandatory in five provinces that account for 16% of the nation's passenger cars.

---

### **Current issues in biofuel production and use**

Biofuels can provide benefits including: reduction of greenhouse gas emissions, reduction of fossil fuel use, increased national energy security, increased rural development and a sustainable fuel supply for the future. However, biofuels have limitations. The feedstock for biofuel production must be replaced rapidly and biofuel production processes must be designed and implemented so as to supply the maximum amount of fuel at the cheapest cost, while providing maximum environmental benefits. Broadly speaking, first generation biofuel production processes cannot supply us with more than a few percent of our energy requirements sustainably. The reasons for this are described below. Second generation processes can supply us with more biofuel, with better environmental gains. The major barrier to the development of second generation biofuel processes is their capital cost: establishing second generation biodiesel plants has been estimated at €500million.

### **Rising food prices/the “food vs. fuel” debate**

Due to rising demand for biofuels, farmers worldwide have an increased economic incentive to grow crops for biofuel production instead of food production. Without political intervention, this could lead to reduced food production and increased food prices and inflation. The impacts of this would be greatest on poorer countries or countries that rely on imported food for their subsistence.

The most recent UN report on biofuel also raises issues regarding food security and biofuel production. Jean Ziegler, the UN Special Reporters on food, concluded that while the argument for biofuels in terms of energy efficiency and climate change are legitimate, the effects for the world's hungry of transforming wheat and maize crops into biofuel are “absolutely catastrophic,” and terms such use of arable land a “crime against humanity” Ziegler also calls for a 5-year moratorium on biofuel production.

---

Food surpluses exist in many developed countries. For example, the UK wheat surplus was around 2 million tonnes in 2005. This surplus alone could produce sufficient bioethanol to replace around 2.5% of the UK's petroleum consumption, without requiring any increase in wheat cultivation or reduction in food supply or exports. However, above a few percent (i.e. if the UK wanted to replace more than around 5% of its fuel with biofuel), there would be direct competition between first generation biofuel production and food production. This is one reason why many view second generation biofuel production processes as increasingly important.

**Second generation biofuel production** processes use nonfood crops. These include the stalks of wheat and corn, wood, special energy or biomass crops (e.g. Miscanthus) and waste biomass. These processes could utilize the waste products of current food-based agriculture to manufacture fuel sustainably. Second generation biofuel processes are in development: pilot plants are established for the production of ethanol from wheat straw and of syn-diesel from wood chippings. It is important to note that carbon in waste biomass is used by other organisms, e.g. it is broken down in the soil to produce nutrients, and provides a habitat for wildlife. The large scale use of such "waste" biomass by humans might threaten these habitats and organisms.

**Biofuel prices:** Retail, at the pump prices, including Federal and state motor taxes, B2/B5 prices for low-level Biodiesel (B2-B5) are lower than petroleum diesel by about 12 cents, and B20 blends are the same as petro diesel.

**Poverty reduction:** Researchers at the Overseas Development Institute have argued that biofuels could help to reduce poverty in the developing world, through increased employment, wider economic growth multipliers and energy price effects. However, this potential is described as 'fragile', and is reduced where feedstock production tends to be large scale, or causes pressure on land access. With regards to potential for poverty reduction, biofuels rely on many of the same policy, regulatory or investment shortcomings that impede agriculture as a route to poverty reduction.

As many of these shortcomings require policy improvements at a country level, rather than a global one, they argue for a country-by-country analysis of the potential poverty impacts of biofuels. This would consider, among other things, land administration systems, market coordination and prioritizing investment in biodiesel as this 'generates more labor, has lower transportation costs and uses simpler technology'.

### **Energy efficiency and energy balance of biofuels**

Production of biofuels from raw materials requires energy (for farming, transport and conversion to final product as well as the production of fertilizers, pesticides and herbicides). The level of energy expenditure varies by location: more intensive agricultural regimes such as those found in Western countries are more energy intensive. The more machinery is used for farming, the greater the energy expended in the process; developing countries tend to have less intensive agricultural methods. It is possible to produce biomass without incurring large agricultural energy costs: for example, wild-harvesting excess wood from established forests can be done without much energy input. However the yield of biomass from such resources is not consistent or large enough to support biofuel manufacture on a large scale.

**The energy balance of a biofuel** is determined by the amount of energy put into the manufacture of fuel compared to the amount of energy released when it is burned in a vehicle and some biofuels can produce up to 2-36 times the input rate of fossil fuels. Biofuels tend to require higher energy inputs per unit energy than fossil fuels: oil can be pumped out of the ground and processed more efficiently than biofuels can be grown and processed. However, this is not necessarily a reason to use oil instead of biofuels, nor does it have an impact on the environmental benefits provided by a given biofuel. Other factors connected to energy balance are the following:

#### **a) Cost**

#### **b) Environmental impact**

High energy impacts do not necessarily mean that the resulting fuel will be bad for the environment: energy can be derived from renewable resources to power biofuel manufacture. Energy

balance is not necessarily a measure of a good biofuel. Biofuels should be affordable, sustainable, and abundant and provide good GHG emissions savings when compared with fossil fuels. Energy balance/ efficiency of conversion is relevant when considering how best to use a given amount of biomass resources. For example, given limited resources should biomass be converted into heat and power or liquid transport fuels? Looking at energy balance and the efficiency of energy conversion can help to use biomass resources efficiently and with maximum environmental gain. Studies have been done that calculate energy balances for biofuel production.

Some of these show large differences depending on the biomass feedstock used and location. The energy balance is more favorable for biofuels made from crops grown in subtropical or tropical areas than those made from crops grown in temperate areas. This is largely due to the increased yield of biomass from crops in areas that receive more sunlight. Life cycle assessments of biofuel production show that under certain circumstances, biofuels produce only limited savings in energy and greenhouse gas emissions. Fertilizer inputs and transportation of biomass across large distances can reduce the GHG savings achieved. The location of biofuel processing plants can be planned to minimize the need for transport, and agricultural regimes can be developed to limit the amount of fertilizer used for biomass production.

A European study on the greenhouse gas emissions found that well-to-wheel (WTW) CO<sub>2</sub> emissions of biodiesel from seed crops such as rapeseed could be almost as high as fossil diesel. It showed a similar result for bio-ethanol from starch crops, which could have almost as many WTW CO<sub>2</sub> emissions as fossil petrol. This study showed that second generation biofuels has far lower WTW CO<sub>2</sub> emissions. Other independent LCA studies show that biofuels save around 50% of the CO<sub>2</sub> emissions of the equivalent fossil fuels. This can be increased to 80-90% GHG emissions savings if second generation processes or reduced fertilizer growing regimes are used.

### **Environmental effects**

Some mainstream environmental groups support biofuels as a significant step toward slowing or stopping global climate

change. However, biofuel production can threaten the environment if it is not done sustainably. This finding has been backed by reports of the UN, the IPCC and some other smaller environmental and social groups as the EEB and the Bank Sarasin, which generally remain negative about biofuels.

Biofuels produce greenhouse gas emissions during their manufacture. The source of these emissions is: fertilizers and agricultural processing, transportation of the biomass, processing of the fuels, and transport and delivery of biofuels to the consumer. Some biofuel production processes produce far fewer emissions than others; for example sugar cane cultivation requires fewer fertilizer inputs than corn cultivation, therefore sugar cane bioethanol reduces greenhouse gas emissions more effectively than corn derived bioethanol. However, given the appropriate agricultural techniques and processing strategies, biofuels can provide emissions savings of at least 50% when compared to fossil fuels such as diesel and petroleum.

The increased manufacture of biofuels will require increasing land areas to be used for agriculture. Second generation biofuel processes can ease the pressure on land, because they can use waste biomass and existing (untapped) sources of biomass such as crop residues and potentially even marine algae. In some regions of the world, a combination of increasing demand for food, and increasing demand for biofuel, is causing deforestation and threats to biodiversity. The best reported example of this is the expansion of oil palm plantations in Malaysia and Indonesia, where rainforest is being destroyed to establish new oil palm plantations.

Significant area is likely to be dedicated to sugar cane in future years as demand for ethanol increases worldwide. The expansion of sugar cane plantations will place pressure on environmentally-sensitive native ecosystems including rainforest in South America. In forest ecosystems, these effects themselves will undermine the climate benefits of alternative fuels, in addition to representing a major threat to global biodiversity. Although biofuels are generally considered to improve net carbon output, biodiesel and other fuels do produce local air pollution, including nitrogen

oxides, the principal cause of smog.

**World Energy:** At present, most of the World energy consumption is supplied by the fossil fuels (about 85%). However, the proven fossil fuel reserves are limited, and if continued to be used at the present rates, it is estimated that the coal (as used under current conditions) will be depleted in about 250 years, oil in 60, and natural gas in about 80 years. We have to keep in perspective that 'proven reserves' refers to the customary and economical 'mining' and utilization of fuels, but new reserves and more efficient technologies are being discovered, and make new fuel reserves economical.

At present, a substantial amount of World electricity is obtained from nuclear and hydro energy, about 17% and 18%, respectively, and use of other renewable energy resources is increasing, namely geothermal, wind, biomass and solar, as well as development of alternative synthetic fuels, including development of hydrogen fuel cells, etc. It is worth noting that some countries produce almost all or most of their electricity from hydro energy (like Norway, Brazil, New Zealand, Austria and Switzerland), and France produces most of its electricity from nuclear fuel (76%). The nuclear fuel reserves are orders of magnitude higher than fossil fuels, and it does not contribute to CO<sub>2</sub> and green-house pollution.

**Energy Future Outlook:** The two things are certain in not distant future: (1) the world population and their living-standard expectations will substantially increase, and (2) fossil fuels' economical reserves, particularly oil and natural gas, will substantially decrease. The difficulties that will face every nation and the world in meeting energy needs over the next several decades will be more challenging than what we anticipate now. The traditional solutions and approaches will not solve the global energy problem. New knowledge, new technology, and new living habits and expectations must be developed to address both the quantity of energy needed to increase the standard of living world-wide and to preserve and enhance the quality of our environment.

## **Kyoto Protocol**

In June 1992, Mexico and more than 150 other countries signed the U.N. Framework Convention on Climate Change (FCCC, or Framework Convention) in Rio de Janeiro, Brazil. The Framework Convention called for parties to stabilize greenhouse gas emissions at 1990 levels by the year 2000, to protect carbon sinks, e.g., forests, and to help finance and provide technology to developing countries to help them meet general commitments. These non-binding commitments proved unavailing, however, with only a very few countries demonstrating both an ability and a willingness to meet the voluntary goals set by the treaty. By the time the parties to the convention convened in Kyoto in December 1997, the stage had been set for a contentious negotiation over commitments to enforceable targets and timetables.

At Kyoto the members of the OECD as of 1992 and the countries of the former Soviet Union and eastern Europe listed in Annex I to the Framework Convention pledged to cut anthropogenic emissions of six greenhouse gases during a five-year commitment period, 2008-2012. The covered greenhouse gases are: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride.

The reduction targets, which also give credit for afforestation, reforestation and better forestry projects that remove carbon dioxide from the atmosphere, are 7 percent and 6 percent below 1990 emission levels for the United States and Canada, respectively. In the aggregate, the market-based agreement commits the industrialized nations listed in Annex B to the Kyoto Protocol to national targets that will result in a 5.2 percent reduction in greenhouse gas emissions below 1990 levels by 2008 to 2012.

Obsolete generating plants can be replaced with more efficient or less carbon-dependent ones, but demand for such plants in the OECD will be modest over the next 20 years. Replacing power plants faster than obsolescence requires is dauntingly expensive.<sup>7</sup> The situation poses particular difficulty for the United States, whose emissions are otherwise expected to grow by over 30 percent between 1990 and 2010.<sup>fn5</sup> The treaty will enter into force upon

ratification of at least 55 nations, including enough developed countries to account for 55 percent of the global carbon dioxide emissions in 1990. Eighty-four countries have signed the Kyoto Protocol thus far, including Mexico, which did so on June 9, 1998.

Merely keeping carbon dioxide emissions roughly at today's levels would result in a doubling of the concentration in the atmosphere from its pre-industrial level by the end of the 21<sup>st</sup> century, with the carbon dioxide concentration continuing to rise for another century after that before stabilizing. Though projections vary substantially with assumptions about rates of economic growth, it appears that sometime between 2010 and 2020 China will overtake the United States as the world's largest greenhouse gas emitter, and that sometime thereafter emissions in the developing world will exceed those of the developed world. The World Resources Institute summed up the situation in its Guide to the Global Environment:

"The developing nations' share of commercial energy consumption is expected to grow to nearly 40 per cent by 2010. CO<sub>2</sub> emissions would rise even faster to about 45 per cent of global emissions. The factors driving this increased energy demand in the developing world include rapid industrial expansion and infrastructure improvement; high population growth and urbanization; and rising incomes that enable families to purchase energy-consuming appliances and cars they could not afford before."

---

### **Chemical Wastes and Pollutants**

**Chemical waste** is a waste that is made from harmful chemicals (mostly produced by large factories). Chemical waste may fall under regulations such as COSHH. Chemical waste may or may not be classed as hazardous waste. In the laboratory, chemical wastes are usually segregated on-site into appropriate waste carboys, and disposed by a specialist contractor in order to meet safety, health, and legislative requirements.

Waste organic solvents are separated into chlorinated and non-chlorinated solvent waste. Chlorinated solvent waste is usually incinerated at high temperature to minimize the formation of dioxins. Non-chlorinated solvent waste can be burned for energy recovery. Innocuous aqueous waste (such as solutions of sodium



chloride) may be poured down the sink; aqueous waste containing toxic compounds are collected separately.

Broken glassware are usually collected in plastic-lined cardboard boxes for land filling. Due to contamination, they are usually not suitable for recycling. Similarly, used hypodermic needles are collected as sharps and are incinerated as medical waste. Procedures for the handling of chemical waste are undergoing significant and continuous changes commensurate with society's heightened awareness and concern for the environment. These changes are resulting in ever increasing regulations and a corresponding escalation of incurred costs for disposal.

**In general, current regulations and laws hold the University responsible for any adverse effects from these chemicals forever, regardless of the manner in which they were disposed of or where they are.** Current regulations prohibit the disposal of hazardous waste chemicals in landfills, so all such materials are shipped for incineration or treatment. Solid chemicals which are not considered hazardous and are therefore suitable for disposal with regular trash. However, neither custodians nor trash collectors can readily distinguish between hazardous and nonhazardous wastes. Therefore, the packaging of such waste for disposal must be secure, and its transfer to the dumpster carried out by laboratory personnel. The following are the list of chemical wastes.

<b>Organic Chemicals</b>	<b>Inorganic Chemicals</b>	<b>Laboratory materials not contaminated by hazardous chemicals</b>
Enzymes	Silica	Chromatographic adsorbent
Starch	Phosphates: Na, K, Mg, Ca, Sr, NH <sub>4</sub>	Filter papers
Citric acid and its Na, K, Mg, Ca, NH <sub>4</sub> salts	Oxides: B, Mg, Ca, Sr, Al, Si, Ti, Mn, Fe, Co, Cu	Rubber and plastic protective clothing

Enzymes	Borates: Na, K, Mg, Ca	Chromatographic adsorbent
Starch	Silica	Filter papers
Citric acid and its Na, K, Mg, Ca, NH <sub>4</sub> salts	Phosphates: Na, K, Mg, Ca, Sr, NH <sub>4</sub>	

Other examples of nonhazardous bio-chemicals include polysaccharides, nucleic acids and naturally occurring precursors, and dry biological media. Toxic chemical stockpiles and wastes, including, Persistent Organic Pollutants (POPs) and obsolete pesticides stocks, present an imminent threat to human health and ecosystems even in very small amounts. Thus the objective of eliminating such threats particularly in developing countries which often lack the resources or infrastructure to safely store or manage such chemicals is a laudable goal. However, real danger exists that if very careful attention is not paid to *how* such chemical wastes are to be disposed or eliminated, any policy or initiative which accelerates their disposal could very easily cause in the long run, more environmental damage than it prevents.

For example, if we hastily allow POPs to be dumped in landfills which will eventually leak (as all landfills will), or if we burn them in incinerators which are known to produce more POPs byproducts (as all incinerators do), then we may be guilty of not really solving a global toxic crisis but simply would have *moved* it from commercial cycles to natural ones.

In the present context of Africa, the regional Bamako Convention must also be followed closely, particularly where it is found to be more rigorous than the Basel Convention. In our view, as these instruments were achieved by consensus, provisions of these Conventions and their amendments as well as some other internationally recognized principles and norms must be considered to hold validity regardless of whether or not they have yet entered into strict legal force in general or for the relevant countries concerned.

## **International Law and Principles**

### **Application of the Basel Convention and Basel Ban Amendment**

It is vital to note at the outset, that the Basel Convention's primary responsibility with respect to issues of destruction of chemical wastes stockpiles involves that which the treaty was designed to regulate – the transboundary movement of hazardous wastes. While the Basel Convention is very suitable for issues involving principles and obligations of waste movements, it is duly noted that the Basel Convention is most often ill-equipped to deal with issues of disposal per se. There are three reasons for this.

**First**, the Basel Convention's provisions are almost entirely written in the context of trans-boundary movements which need not apply in cases where there is none.

**Second**, all but the most general objectives regarding disposal of wastes are not legally binding on the Parties.

**Third**, even the technical guidelines, are not adequately prescriptive for the best methods for POPs and chemical waste stockpiles, they do not emphasize destruction and moreover they are out of date with little ability to keep them current.

Despite the Basel Convention's shortcomings with respect to waste disposal, the Convention and its amendments are strong on issues of the *trans-boundary movements* of hazardous wastes. Most importantly, the Convention has the following primary objectives which will impact waste management in Africa. The Convention requires its Parties:

- 1) To minimize the generation of hazardous and other wastes.
- 2) To minimize the transboundary movements of hazardous wastes.
- 3) To ensure that each country, to the extent possible, becomes self-sufficient in hazardous waste management and therefore minimizes transboundary movements of such wastes. This is recognized as being important for minimizing risk of transport, minimizing adverse effects of wastes in the recipient country and also as an incentive to ensure that wastes are reduced at source. In addition to the above obligations, transboundary movements should only be allowed if there is a need for waste as a raw

material in the destination country, or if the country of export lacks adequate technical capacity to manage the wastes.

- 4) To ensure that wastes must be managed in a way that prevents pollution from such wastes and to minimize any consequences of any pollution that is produced.
- 5) The Convention forbids trade between Parties and non-Parties, absent a special bilateral or multilateral agreement. As only 31 African States out of 53 eligible countries are Parties to the Basel Convention, this may impact any plans to create a regional chemical waste management facility which might foresee intra-African waste trade. Additionally, in 1995 the Basel Convention adopted the Basel Ban Amendment which bans the export of hazardous wastes from OECD countries, EU member states and Liechtenstein to all other countries. This is most relevant in noting with respect to forbidding any schemes to establish technologies for waste disposal in Africa which are dependent on waste imports from developed countries.

### **Application of the Bamako Convention**

The Bamako Convention echoes some of the language of the Basel Convention. However in addition the following special provisions should be noted:

- 1) The import of hazardous wastes into the continent of Africa from outside the Continent is prohibited. This will thus forbid *any* non-African imports of hazardous waste.
- 2) The Bamako Convention includes as part of its definition of hazardous wastes, "hazardous substances which have been banned, cancelled or refused registration by government regulatory action, or voluntarily withdrawn from registration in the country of manufacture, for human health or environmental reasons." This provision is very important with respect to preventing future pesticide and chemical stockpiles and could also lead to legal actions against importers of such materials.
- 3) The Bamako Convention requires its parties to impose strict, unlimited liability as well as joint and several liabilities of its hazardous waste generators. This will go a long way toward

ensuring true environmentally sound management of wastes with respect to waste management in Bamako member states.

- 4) The Bamako Convention prohibits, (absent a special bilateral or multilateral agreement) imports of hazardous wastes from a non-Party, and there are only currently 17 Bamako Parties out of 51 African States. This could mean that efforts to establish a regional chemical waste facility in Africa will face difficulty.
- 5) Parties are to promote clean production methods. *Incineration is specifically excluded from the definitions of clean production methods.* This means that the introduction of incineration technology into Bamako Parties will be very difficult to justify.

### **Application of the Stockholm Treaty**

The new draft treaty on persistent organic pollutants (POPs) has been finalized and is not expected to change at its adoption conference in Stockholm later in 2001. It breaks new ground in that it agrees for the first time to phase out and eliminate certain chemical compounds and moreover provides strong criteria as to what should be done with existing stocks. The treaty has made a clear push for *destruction* of the wastes as opposed to simply disposal. Moreover, the treaty has defined destruction rather rigidly. While currently the treaty is only designed to deal with 12 specific POPs, the provisions of the treaty from a policy perspective can be applied to obsolete pesticides and many other toxic wastes that have been designated for destruction as well.

### **Recommendations for disposing the Chemical Wastes for Construction Projects**

- Sediment from areas disturbed by construction shall be retained on site using structural drainage controls to the maximum extent practicable.
- Stockpiles of soil shall be properly contained to minimize sediment transport from the site to streets, drainage facilities or adjacent properties via runoff, vehicle tracking, or wind.
- Construction-related materials, wastes, spills, or residues shall be retained on site to minimize transport from the site to streets, drainage facilities, or adjoining property by wind or runoff.

- Runoff from equipment and vehicle washing shall be contained at construction site unless treated to remove sediment and other pollutants.
- All construction contractor and subcontractor personnel are to be made aware of the required best management practices and good housekeeping measures for the project site and any associated construction staging areas.
- At the end of each day of construction activity all construction debris and waste materials shall be collected and properly disposed in trash or recycle bins.
- Construction sites shall be maintained in such a condition that an anticipated storm does not carry wastes or pollutants off the site. Discharges of material other than storm-water are allowed only when necessary for performance and completion of construction practices and where they do not cause or contribute to violation of any water quality standards; cause or threaten to cause pollution, contamination or nuisance; or contain a hazardous substance in a quantity reportable under Federal Regulations 40 CFR Parts 117 and 302.
- Potential pollutants include but are not limited to: sediments, cement products, solid or liquid chemical spills; wastes from paints, stains, sealants, glues, lime, pesticides, herbicides, wood preservatives, and solvents, asbestos fibers, paint flakes or stucco fragments, fuels, oils, lubricants, and hydraulic, radiator or battery fluids, concrete, detergent or floatable wastes; wastes from any engine equipment steam cleaning or chemical degreasing; and super-chlorinated potable water line flushing.
- During construction, disposal of materials and potential pollutants should occur in a specified and controlled temporary area on-site physically separated from potential storm-water runoff, with ultimate disposal in accordance with local, state and federal requirements.
- Dewatering of contaminated groundwater or discharging contaminated soils via surface erosion is prohibited. True dewatering of non-contaminated groundwater requires a

National Pollutant Discharge Elimination System (NPDES) permit from the respective State Regional Water Quality Control Board.

**Pollution** is the introduction of contaminants into an environment that cause harm to human health, other living organisms, and the environment. Pollution can be in the form of chemical substances, or energy such as noise, heat, or light. Pollutants can be naturally occurring substances or energies, but are considered contaminants when in excess of natural levels. Pollution is often categorized into point source nonpoint source pollution.

**Pollution control** is a term used in environmental management. It means the control of emissions and effluents into air, water or soil. Without pollution controls the undesirable waste products from human consumption, industrial production, agricultural activities, mining, transportation and other sources will accumulate or disperse and degrade the natural environment. In the hierarchy of controls, pollution prevention and waste minimisation are more desirable than pollution control.

**Major forms of pollution and major polluted areas:** The major forms of pollution are listed below along with the particular pollutants relevant to each of them:

- 
- Air pollution, the release of chemicals and particulates into the atmosphere. Common examples include carbon monoxide, sulfur dioxide, chlorofluorocarbons (CFCs), and nitrogen oxides produced by industry and motor vehicles. Photochemical ozone and smog are created as nitrogen oxides and hydrocarbons react to sunlight.
  - Water pollution via runoff, leaching to groundwater, liquid spills, wastewater discharges, eutrophication and littering.
  - Soil contamination occurs when chemicals are released by spill or underground storage tank leakage. Among the most significant soil contaminants are hydrocarbons, heavy metals, MTBE, herbicides, pesticides and chlorinated hydrocarbons.
  - Radioactive contamination, added in the wake of 20th century discoveries in atomic physics.

- Noise pollution, which encompasses roadway noise, aircraft noise, industrial noise as well as high-intensity sonar.
- Light pollution, includes light trespass, over-illumination and astronomical interference.
- Visual pollution, which can refer to the presence of overhead power lines, motorway billboards, scarred landforms, open storage of trash or municipal solid waste.
- Thermal pollution is a temperature change in natural water bodies caused by human influence, such as use of water as coolant in a power plant.
- The Blacksmith Institute issues annually a list of the world's worst polluted places. In the 2007 issues the ten top nominees are located in Azerbaijan, China, India, Peru, Russia, Ukraine and Zambia.

### **Sources and causes**

---

- Motor vehicle emissions are one of the leading causes of air pollution. China, United States, Russia, Mexico, and Japan are the world leaders in air pollution emissions; however, Canada is the number two country, ranked per capita. Principal stationary pollution sources include chemical plants, coal-fired power plants, oil refineries, petrochemical plants, nuclear waste disposal activity, incinerators, large livestock farms (dairy cows, pigs, poultry, etc.), PVC factories, metals production factories, plastics factories, and other heavy industry.
- Some of the more common soil contaminants are chlorinated hydrocarbons (CHC), heavy metals (such as chromium, cadmium--found in rechargeable batteries, and lead--found in lead paint, aviation fuel and still in some countries, gasoline), MTBE, zinc, arsenic and benzene. Ordinary municipal landfills are the source of many chemical substances entering the soil environment (and often groundwater), emanating from the wide variety of refuse accepted, especially substances illegally discarded there, or



from pre-1970 landfills that may have been subject to little control in the U.S. or EU. There have also been some unusual releases of polychlorinated dibenzodioxins, commonly called *dioxins* for simplicity, such as TCDD.

- Pollution can also be the consequence of a natural disaster. For example, hurricanes often involve water contamination from sewage, and petrochemical spills from ruptured boats or automobiles. Larger scale and environmental damage is not uncommon when coastal oil rigs or refineries are involved. Some sources of pollution, such as nuclear power plants or oil tankers, can produce widespread and potentially hazardous releases when accidents occur.
- In the case of noise pollution the dominant source class is the motor vehicle, producing about ninety percent of all unwanted noise worldwide.

A number of air pollutants can cause damage to health. Six major air pollutants (Carbon Monoxide, Lead, Nitrogen Dioxide, Ozone, Particulate Matter, and Sulfur Dioxide) have been identified as causing health effects at concentrations in the ambient air (the outside air we breathe) above thresholds established at levels known to be safe. These pollutants are referred to as "criteria pollutants" and a National Ambient Air Quality Standard (NAAQS) has been established for each based on health related criteria and data. The following pages have information on the criteria pollutants, other air pollutants and emission sources:

#### **Emission sources**

- **Acid rain**, which may damage lakes and streams, occurs when emissions of certain air pollutants react in the atmosphere to form acidic compounds that are then deposited on the earth's surface. The Clean Air Act limits the emissions of acid-forming pollutants from electric power plants by assigning each plant an emissions "allowance" that must be met through emissions reduction or purchase of emission "credits" from plants that have reduced emissions below their allowances.
- **Air Toxics** are those air pollutants that are known or suspected to cause cancer or other serious health effects. Air toxics can

come from natural sources (e.g., radon gas coming up from the ground) or man-made sources such as motor vehicles and industrial processes. Examples include benzene (from gasoline), perchloroethylene, (from dry cleaners), and methylene chloride (used as a solvent and paint stripper).

- **Asbestos** is an incombustible chemical-resistant, fibrous material used for fireproofing materials as well as insulation, building materials, brake linings, etc. Asbestos fibers in the ambient air pose a risk to human health in the form of cancer and other diseases. As such, asbestos is heavily regulated at the state and federal levels.
- **Carbon Monoxide** A Criteria Pollutant - Carbon Monoxide is produced primarily by motor vehicles. It can reduce a person's ability to think clearly, and causes visual impairment and headaches if high enough concentrations are experienced for a long period of time.
- **Chlorofluorocarbons** - CFCs Chlorofluorocarbons are various compounds used as aerosol propellants, solvents, and refrigerants. Such compounds when released into the atmosphere contribute to the breakdown of the stratospheric ozone layer which shields the earth's surface from dangerous solar ultraviolet radiation.
- **Greenhouse Effect/Global Warming** The greenhouse effect is a natural phenomenon that occurs when certain gases in the atmosphere, especially water vapor, carbon dioxide and methane, cause the Earth's surface to heat up more than it otherwise would, thereby maintaining a global average temperature warm enough to support a rich variety of life. Global warming occurs when the amounts of carbon dioxide and other such gases in the atmosphere increase beyond natural levels, thereby intensifying the greenhouse effect.
- **Lead** A Criteria Pollutant - Lead can affect the central nervous system and lead to anemia. The young and the elderly are most susceptible to the harmful effects of lead.
- **Mercury Reactive**, inorganic mercury is emitted to the atmosphere from various sources and then deposited on the

earth's surface. Some of the deposited mercury ends up in wetlands, lakes, and streams where bacteria convert it into methylmercury, a toxic form that builds up (bio-accumulates) in the tissues of animals at each link in the food chain. In some cases, mercury accumulates in sport fish to levels that would be toxic if eaten by humans over a prolonged period of time or by the wildlife that prey upon those fish.

- **Mobile Source Emissions** Mobile source emissions account for almost a third of the air pollution in the United States. These emissions contribute to the formation of ozone, an air pollutant considered to be a major air quality problem. Accordingly, new federal standards for vehicles and fuels have been enacted to address this problem.
- **Nitrogen Dioxide** A Criteria Pollutant - Nitrogen Dioxide, which is a primary component of  $\text{NO}_x$ , is produced when fuel is burned in motor vehicles, power plants, industrial boilers, and other sources.
- **Ozone** A Criteria Pollutant - Ozone is noteworthy in two aspects. High in the atmosphere (in the stratosphere), a natural layer of ozone surrounds the earth and protects the surface from harmful ultraviolet radiation from the sun ("good" ozone). It has been found that man-made gases, especially chlorofluorocarbons (CFCs), have depleted the stratospheric ozone layer, leaving the earth and its population more vulnerable to the adverse health effects of excess ultraviolet radiation (e.g., increased skin cancer, cataracts, and weakened immune systems).
- At the surface, high levels of ozone are associated with urban smog ("bad" ozone). Breathing this ozone can result in damage or irritation to the lungs. Ozone builds up near the ground through a series of chemical reactions involving man-made emissions of volatile organic compounds and nitrogen oxides. Nitrogen oxides are produced by motor vehicles, off-road engines and fuel-burning facilities such as power plants. Volatile organics are produced by natural sources, such as trees, as well as by solvents and fuels that readily evaporate.

- **Particle Pollution**A Criteria Pollutant - Particle Pollution is the general term used for a mixture of solid particles and liquid droplets found in the air. This pollution, also known as particulate matter, is made up of a number of components, including acids (such as sulfates and nitrates), organic chemicals, metals, soil or dust particles and allergens (such as fragments of pollen or mold spores).
- **Smoking Vehicles**, gasoline and diesel powered, which emit smoke from the exhaust pipe contribute to the degradation of ambient air quality. Florida Statutes prohibit the operation of such vehicles and provide penalties for violations.
- **Stationary and Area Source Emissions** Air pollutants are emitted into the atmosphere from stationary, area, and mobile sources. Stationary sources include utility, industrial, institutional and commercial facilities. Examples are electric power plants, phosphate processing plants, pulp and paper mills, and municipal waste combustors. Area sources include many individually small activities such as gasoline service stations, small paint shops, consumer solvent use, and open burning associated with agriculture and forest management activities.
- **Sulfur Dioxide**A Criteria Pollutant – Sulfur Dioxide (SO<sub>2</sub>) is produced by power plants and industries that burn fossil fuels that contain sulfur, such as coal and oil, and by the phosphate industry through its production of sulfuric acid.

## Effects

---

**Human health:** Adverse air quality can kill many organisms including humans. Ozone pollution can cause respiratory disease, cardiovascular disease, throat inflammation, chest pain, and congestion. Water pollution causes approximately 14,000 deaths per day, mostly due to contamination of drinking water by untreated sewage in developing countries. Oil spills can cause skin irritations and rashes. Noise pollution induces hearing loss, high blood pressure, stress, and sleep disturbance.

**Ecosystems:** Sulfur dioxide and oxides of nitrogen can cause acid rain which reduces the pH value of soil. Soil can become infertile and unsuitable for plants. This will affect other organisms in

the food web. Smog and haze can reduce the amount of sunlight received by plants to carry out photosynthesis.

Invasive species can out compete with native species and reduce biodiversity. Invasive plants can contribute debris and biomolecules (allelopathy) that can alter soil and chemical compositions of an environment, often reducing native species competitiveness. Bio-magnification describes a situation where toxins may be pass through tropic levels, becoming exponentially more concentrated in the process.

**Modernization:** It is a concept in the sphere of social sciences that refers to process in which society goes through industrialization, urbanization and other social changes that completely transforms the lives of individuals. In the social sciences, modernisation or modernisation refers to a model of an evolutionary transition from a 'pre-modern' or 'traditional' to a 'modern' society.

**Ecological modernization** is an optimistic, reform-oriented environmental discourse and school of environmental social science that has gained increasing attention among scholars and policymakers in the last several decades in Europe, North America, Japan.

#### **Effects of Modernisation on Environment**

- Warrants industrialization which results in environmental pollution;
- Necessitates urbanization through which the total life at village or rural areas has become commuters' life.
- A man has to take the full-day effects of pollution, as a way of life;

**Industrialisation:** It is the process of social and economic change that transforms a human group from an agrarian society into an industrial one. It is a part of a wider modernisation process, where social change and economic development are closely related with technological innovation, particularly with the development of large-scale energy and metallurgy production. It is the extensive organisation of an economy for the purpose of manufacturing.

#### **Effects of Industrialisation on Environment**

Industrialisation has spawned its own health problems. Modern stressors include noise, air, water pollution, poor nutrition, dangerous machinery, impersonal work, isolation, poverty, homelessness, and substance abuse. Health problems in industrial nations are as much caused by economic, social, political, and cultural factors as by pathogens. It excretes chemical waste, fumes and gases. Ozone depletion, climate change as well as the direct effects of chemicals from industrial emissions, fuel combustion are a great threat to our planet. Carbon monoxide, when inhaled, binds to the blood's hemoglobin and prevents the necessary oxygen from reaching tissues. When inhaled, carbon monoxide can also dull mental acuity.

A deadly chemical cloud at ground level called smog also endangers the health of living things. Volatile organic compounds (VOCs) and nitrogen oxides (NOx) from vehicle exhaust and industrial emissions combine to form ozone at ground level. When the sun reacts with this ozone layer at ground level, it produces smog. For humans, the sperm count in men has decreased fifty percent in the last fifty years, breast cancer has become an epidemic, males experience genital disorders and children have problems in learning. Thus, Industrialization has become a major medical issue worldwide.

**Automation:** It is the use of control systems and information technologies to reduce the need for human work in the production of goods and services. In the scope of industrialization, automation is a step beyond mechanization. Whereas mechanization provided human operators with machinery to assist them with the muscular requirements of work, automation greatly decreases the need for human sensory and mental requirements as well.

#### **Effects of Automation on Health and Environment**

- Replacing humans in tasks done in dangerous environments (i.e. fire, space, volcanoes, nuclear facilities, underwater, etc.).
- The costs of automation to the environment are different depending on the technology, product or engine automated.

- There are automated engines that consume more energy resources from the Earth in comparison with previous engines and those that do the opposite too.
- Hazardous operations, such as oil refining, the manufacturing of industrial chemicals, and all forms of metal working, were always early contenders for automation.

**Globalization:** This is the buzzword of today. The economies of the world are being increasingly integrated. Mobile phones and Internet have brought people closer. The world is becoming a smaller place. Goods, which were once confined to western countries, are available across the globe. Work can be outsourced to any part of the world that has an Internet connection. Because of improvements in traffic infrastructure one is able to reach one's destination in a relatively short span of time.

#### **Effects of Globalisation on Environment**

- Companies have set up industries causing pollution in countries with poor regulation of pollution.
- Fast food chains like McDonalds and KFC are spreading in the developing world. People are consuming more junk food from these joints which has an adverse impact on their health. It results in overall ill-health and environmental demolition
- Deadly diseases like HIV/AIDS are being spread by travelers to the remotest corners of the globe.
- There is increase in human trafficking.
- Multinational Companies and Corporations which were previously restricted to commercial activities are increasingly influencing political decisions.
- Ecological - the advent of global environmental challenges that might be solved with international cooperation, such as climate change, cross-boundary water and air pollution, over-fishing of the ocean, and the spread of invasive species. Since many factories are built in developing countries with less environmental regulation, globalism and free trade may increase pollution and impact on precious fresh water resources (Hoekstra and Chapagain 2008).

- On the other hand, economic development historically required a "dirty" industrial stage, and it is argued that developing countries should not, via regulation, be prohibited from increasing their standard of living.
- Only 1 percent of the country's 560 million city inhabitants (2007) breathe air deemed safe.
- Modern modes of transportation allow more people and products to travel around the world at a faster pace, but they also open the airways to the transcontinental movement of infectious disease vectors.

**Westernisation:** It is also called occidentalisation (from the Occident, meaning the Western World; is a process whereby societies come under or adopt Western culture in such matters as industry, technology, law, politics, economics, lifestyle, diet, language, alphabet, religion, philosophy, and/or values. Westernisation can also be related to the process of acculturation and/or enculturation. Acculturation refers to the changes that occur within a society or culture when two different groups come into direct continuous contact. After the contact, changes in cultural patterns within either or both cultures are evident. In popular speech, Westernization can also refer to the effects of Western expansion and colonialism on native societies.

**Secularization:** This is the transformation of a society from close identification with religious values and institutions toward non-religious or "irreligious" values and secular institutions. Secularization thesis refers to the belief that as societies "progress", particularly through modernization and rationalization, religion loses its authority in all aspects of social life and governance. The term secularization is also used in the context of the lifting of the monastic restrictions from a member of the clergy.

The roots of the modern environmental movement can be traced to attempts in nineteenth-century Europe and North America to expose the costs of environmental negligence, notably disease, as well as widespread air and water pollution, but only after the Second World War did a wider awareness begin to emerge. During the 1950s, 1960s, and 1970s, several events illustrated the magnitude of



environmental damage caused by man. In 1954, the 23 man crew of the Japanese fishing vessel Lucky Dragon was exposed to radioactive fallout from a hydrogen bomb test at Bikini Atoll.

Since the 1970s, public awareness, environmental sciences, ecology, and technology have advanced to include modern focus points like ozone depletion, global climate change, acid rain, and the harmful potential of genetically modified organisms (GMOs).

---

## **Chapter III**

### **HEALTH CARE**

Hygiene refers to practices associated with ensuring good health and cleanliness. The scientific term “hygiene” refers to the maintenance of health and healthy living. The term appears in phrases such as personal hygiene, domestic hygiene, dental hygiene, and occupational hygiene and is frequently used in connection with public health.

The term “hygiene” is derived from Hygieia, the Greek goddess of health, cleanliness and sanitation. Hygiene is also a science that deals with the promotion and preservation of health. It is also called **hygienic**. The following are the examples for some kinds of hygienes to be observed.

#### **I. Personal hygiene**

Examples of practiced personal hygiene:

##### **1. General**

- Washing the body and hair frequently.
- Bathing
- Showering
- Cleaning of the clothes and living area.
- Changing bed sheets when a new person sleeps on the bed.
- Cutting of nails.

##### **2. Hands**

- Frequent washing of hands and face.
- Washing hands after using the toilet.
- Holding a tissue over the mouth or using the upper arm/elbow region when coughing or sneezing, rather than a bare hand. Alternatively washing hands afterwards.
- Not touching animals before eating, or washing hands thoroughly between animal touching and eating.
- Suppression of objectionable habits, such as nose picking, touching pimples, biting fingernails etc.
- Not licking fingers before picking up sheets of paper or turning pages in a book.

(Rubber fingertip covers and Glycerin-based products are available for this purpose, which are available from stationery stores.)

- ❖ Not sharing towels, combs, hair brushes, and other personal things.

### **3. Other - Oral hygiene**

- ❖ taking care of the teeth and gums, and treating or preventing bad breath
- ❖ Daily brushing (with toothpaste) and flossing the teeth, to prevent tooth decay and gum disease. This also helps treat and prevent bad breath.
- ❖ Chewing gum or rinsing mouth with antibacterial mouthwashes (such as Listerine) can also dispel bad breath
- ❖ Avoiding contact with bodily fluids, such as blood, feces, urine, and vomit.
- ❖ Wearing clean underwear or pantyhose or tights and clothing daily. Washing working/social-uniform/clothing at a regular time-interval.
- ❖ For uncircumcised men, cleaning daily under the foreskin with soap and water.
- ❖ Frequent washing of face.

### **4. Grooming**

The related term personal grooming/grooming means to enhance one's physical appearance or appeal for others, by removing obvious imperfections in one's appearance or improving one's hygiene. Grooming in humans typically includes bathroom activities such as priming: washing and cleansing the hair, combing it to extract tangles and snarls, and styling. It can also include cosmetic care of the body, such as shaving and other forms of depilation.

## **II. Food and cooking hygiene**

The purposes of food and cooking hygiene are to prevent food contamination, the transmission of disease, and to prevent food poisoning. Food and cooking hygiene protocols specify safe ways to handle and prepare food, and safe methods of serving and eating it. Such protocol includes

---

- Cleaning of food-preparation areas and equipment (for example using designated cutting boards for preparing raw meats and vegetables). (Cleaning may involve use of chlorine bleach for sterilization.)
- Careful avoidance of meats contaminated by trichina worms, salmonella, and other pathogens; or thorough cooking of questionable meats.
- Extreme care in preparing raw foods.
- Institutional dish sanitizing by washing with soap and clean water.
- Washing of hands after touching uncooked food when preparing meals.
- Not using the same utensils to prepare different foods.
- Not sharing cutlery when eating.
- Not licking fingers or hands while or after eating.
- Not reusing serving utensils that have been licked.
- Proper storage of food so as to prevent contamination by vermin.
- Refrigeration of foods (and avoidance of specific foods in environments where refrigeration is or was not feasible).
- Labeling food to indicate when it was produced (or, as food manufacturers prefer, to indicate its **“best before”** date).
- Proper disposal of uneaten food and packaging.

### III. Medical hygiene

---

- ❖ Proper bandaging and dressing of injuries.
- ❖ Use of protective clothing, such as masks, gowns, caps, eyewear and gloves.
- ❖ Sterilization of instruments used in surgical procedures.
- ❖ Safe disposal of medical waste.

Most of these practices were developed in the 19th century and were well established by the mid-20th century. Some procedures (such as disposal of medical waste) were tightened up as a result of late-20<sup>th</sup> century disease outbreaks, notably **AIDS** and **Ebola**.

### IV. Personal service / served hygiene

---

- ❖ Sterilization of instruments used by hairdressers.

- ❖ Sterilization by autoclave of instruments used in body piercing and tattoo marking
- ❖ Cleaning hands before eating in food outlets, such as using soap to wash or wet wipe to mop up

## **V. Excessive hygiene**

Excessive hygiene practices may cause allergic diseases. Some parts of the body, e.g. the **ear canal**, are mostly better left alone for the body's own cleaning systems.

### **Hygiene hypothesis**

In medicine, the hygiene hypothesis states that a lack of early childhood exposure to infectious agents, and later a lack of exposure to helminthes as adults, increases susceptibility to allergic diseases.

### **External ear canals**

The ear canals have a perfectly functioning cleaning system on its own, and don't normally need assistance. In fact, attempts to clean the ear canals may only do the opposite, since earwax, carrying debris and other material towards to opening, is pushed back inwards.

### **Dryness**

The skin has a natural layer of fat, which protects the skin from e.g. drought. When washing, unless using aqueous creamsetc with compensatory mechanisms, this layer is removed, leaving the skin unprotected. By this mechanism, excessive washing may eventually trigger eczema.

### **Communal Hygiene**

Public health is the study and practice of addressing threats to the health of a community. The field pays special attention to the *social context* of disease and misery, and focuses on improving health through society-wide measures like vaccinations or the fluoridation of drinking water.

Public hygiene includes public behaviors individuals can take to improve their personal health and wellness. Topics include public transportation, food preparation and public washroom use. These are steps individuals can take themselves. Examples would include avoiding crowded subways during the flu season, using

gloves when touching the handrails and opening doors in public malls as well as going to clean restaurants.

The goal of public health is to improve lives through the prevention or treatment of disease. The **World Health Organization** defines health as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.” In 1920, C.E.A. Winslow defined public health as “the science and art of preventing disease, prolonging life and promoting health through the organized efforts and informed choices of society, organizations, public and private, communities and individuals.”

The public-health approach can be applied to a population of just a handful of people or to the whole human population. Public health is typically divided into **epidemiology**, **biostatistics** and **health services**. **Environmental**, social, **behavioral**, and **occupational health** is also important subfields.

The focus of a public health intervention is to prevent rather than treat a disease through surveillance of cases and the promotion of healthy behaviors. In addition to these activities, in many cases treating a disease can be vital to preventing it in others, such as during an outbreak of an **infectious disease**. **Vaccination** programs and distribution of **condoms** are examples of public health measures.

Most countries have their own government public health agencies, sometimes known as ministries of health, to respond to domestic health issues. In the United States, the frontline of public health initiatives is state and local health departments. The **United States Public Health Service** (PHS), led by the Surgeon General of the United States, and the Centers for Disease Control and Prevention, headquartered in Atlanta and a part of the PHS, are involved with several international health activities, in addition to their national duties.

There is a vast discrepancy in access to healthcare and public health initiatives between developed nations and developing nations. In the developing world, public health infrastructures are still forming. There may not be enough trained health workers or monetary resources to provide even a basic level of medical care and

disease prevention. As a result, a large majority of disease and mortality in the developing world results from and contributes to extreme poverty. For example, many African governments spend less than USD\$10 per person per year on healthcare, while, in the United States, the federal government spent approximately USD\$4,500 per capita in 2000.

Many diseases are preventable through simple, non-medical methods. Public health plays a very important role in prevention efforts in both the developing world and in developed countries, either through local health systems or through international non-governmental organizations.

The application of **economics** to the realm of public health has been rising in importance since the **1980s**. Economic studies can show, for example, where limited public resources might best be spent to save lives or cause the greatest increase in quality of life.

Public health investigates sources of disease and descriptors of health through scientific methodology. This can lead to a public health solution to an epidemic, or a community based intervention for chronic diseases. Either way, research can provide the link between cause and effect for public health issues.

The two major postgraduate professional degrees related to this field are the **Master of Public Health** (MPH) or the (much rarer) **Doctor of Public Health** (DrPH). Many public health researchers hold **PhDs** in their fields of speciality, while some public health programs confer the equivalent **Doctor of Science** degree instead. The United States medical residency specialty is General Preventive Medicine and Public Health.

### **History of Public Health**

---

In some ways, public health is a modern concept, although it has roots in antiquity. From the beginnings of human civilization, it was recognized that polluted **water** and lack of proper **waste disposal** spread **vector**-borne diseases. Early **religions** attempted to regulate behavior that specifically related to health, from types of **food** eaten, to regulating certain indulgent behaviors, such as drinking **alcohol** or **sexual relations**. The establishment of **governments** placed responsibility on **leaders** to develop public

health policies and programs in order to gain some understanding of the causes of **disease** and thus ensure social stability **prosperity**, and maintain order.

### **Early public health interventions**

By Roman times, it was well understood that proper diversion of human waste was a necessary tenet of public health in urban areas. The Chinese developed the practice of violation which is inoculation was the method first used to immunize an individual against smallpox (Variola) with material taken from a patient or a recently **variolated** individual in the hope that a mild, but protective infection would result following a smallpox epidemic around 1000 BC.

An individual without the disease could gain some measure of immunity against it by inhaling the dried crusts that formed around lesions of infected individuals. Also, children were protected by inoculating a scratch on their forearms with the pus from a lesion. This practice was not documented in the West until the early-1700s, and was used on a very limited basis. The practice of vaccination did not become prevalent until the 1820s, following the work of Edward Jenner to treat smallpox.

During the 14<sup>th</sup> century Black Death in Europe, it was believed that removing bodies of the dead would further prevent the spread of the bacterial infection. This did little to stem the plague, however, which was most likely spread by rodent-borne fleas. Burning parts of cities resulted in much greater benefit, since it destroyed the rodent infestations. The development of quarantine in the medieval period helped mitigate the effects of other infectious diseases.

The science of epidemiology was founded by John Snow's identification of a polluted public water well as the source of an 1854 cholera outbreak in London. Dr. Snow believed in the germ theory of disease as opposed to the prevailing miasma theory. Although miasma theory correctly teaches that disease is a result of poor sanitation, it was based upon the prevailing theory of spontaneous generation. Germ theory developed slowly: despite Anton van Leeuwenhoek's observations of Microorganisms, (which are now



known to cause many of the most common infectious diseases) in the year 1680, the modern era of public health did not begin until the 1880s, with Robert Koch's germ theory and Louis Pasteur's production of artificial vaccines.

### **Modern public health**

As the prevalence of infectious diseases in the developed world decreased through the 20<sup>th</sup> century, public health began to put more focus on chronic diseases such as cancer and heart disease.

In America, public health worker Dr. Sara Josephine Baker lowered the infant mortality rate using preventative methods. She established many programs to help the poor in New York City keep their infants healthy. Dr. Baker led teams of nurses into the crowded neighbourhoods of Hell's Kitchen and taught mothers how to dress, feed, and bathe their babies. After WWI many states and countries followed her example in order to lower infant mortality rates.

During the 20<sup>th</sup> century, the dramatic increase in average life span is widely credited to public health achievements, such as vaccination programs and control of infectious diseases, effective safety policies such as motor-vehicle and occupational safety, improved family planning, fluoridation of drinking water, anti-smoking measures, and programs designed to decrease chronic disease.

Meanwhile, the developing world remained plagued by largely preventable infectious diseases, exacerbated by malnutrition and poverty. Front-page headlines continue to present society with public health issues on a daily basis: emerging infectious diseases such as SARS, making its way from China to Canada and the United States; prescription drug benefits under public programs such as Medicare; the increase of HIV-AIDS among young heterosexual women and its spread in South Africa; the increase of childhood obesity and the concomitant increase in type II diabetes among children; the impact of adolescent pregnancy; and the ongoing social, economic and health disasters related to the 2005 Tsunami and Hurricane Katrina in 2006. These are all ongoing public health challenges.

Since the 1980s, the growing field of population health has broadened the focus of public health from individual behaviors and risk factors to population-level issues such as inequality, poverty, and education. Modern public health is often concerned with addressing determinants of health across a population, rather than advocating for individual behaviour change. There is recognition that our health is affected by many factors including where we live, genetics, our income, our educational status and our social relationships – these are known as “social determinants of health.”

A social gradient in health runs through society, with those that are poorest generally suffering the worst health. However even those in the *middle classes* will generally have worse health outcomes than those of a higher social stratum (WHO, 2003). The *new* public health seeks to address these health inequalities by advocating for population-based policies that improve the health of the whole population in an equitable fashion.

**Public health programmes:** Today, most governments recognize the importance of public health programs in reducing the incidence of disease, disability, and the effects of aging, although public health generally receives significantly less government funding compared with medicine. In recent years, public health programs providing vaccinations have made incredible strides in promoting health, including the eradication of smallpox, a disease that plagued humanity for thousands of years.

- One of the most important public health issues facing the world currently is HIV/AIDS. Tuberculosis, which claimed the lives of authors Franz Kafka and Charlotte Bronte, and composer Franz Schubert, among others, is also reemerging as a major concern due to the rise of HIV/AIDS-related infections and the development of tuberculin strains that are resistant to standard antibiotics.
- Another major public health concern is diabetes. In 2006, according to the World Health Organization, at least 171 million people worldwide suffered from diabetes. Its incidence is increasing rapidly, and it is estimated that by the year 2030, this number will double.

- A controversial aspect of public health is the control of smoking. Many nations have implemented major initiatives to cut smoking, such as increased taxation and bans on smoking in some or all public places. Proponents argue by presenting evidence that smoking is one of the major killers in all developed countries, and that therefore governments have a duty to reduce the death rate, both through limiting passive (second-hand) smoking and by providing fewer opportunities for smokers to smoke. Opponents say that this undermines individual freedom and personal responsibility (often using the phrase nanny state in the UK), and worry that the state may be emboldened to remove more and more choice in the name of better population health overall. However, proponents counter that inflicting disease on other people via passive smoking is not a human right, and in fact smokers are still free to smoke in their own homes.

**Racial hygiene:** It is often labeled a form of “scientific racism” is the selection, by a government, of the putatively most physical, intellectual and moral persons to raise the next generation (selective breeding) and a close alignment of public health with eugenics. In the past, this has been done by using deportation, segregation, compulsory sterilization, and even genocide of persons or groups with various mental disabilities, ethnicities, handicaps, criminal backgrounds, religious affiliations, etc.

Racial hygiene was historically tied to traditional notions of public health, but usually with an enhanced emphasis on heredity. The use of social measures to attempt to preserve or enhance biological characteristics was first proposed by Francis Galton in his early work, starting in 1869, on what would later be called eugenics. In the early twentieth century, the idea that human heredity required active vigilance, and perhaps coercive measures (such as compulsory sterilization) had many mainstream scientific and political supporters; Winston Churchill was an advocate, as was Alexander Graham Bell, Marie Stopes, George Bernard Shaw, John Maynard Keynes, Theodore Roosevelt and Calvin Coolidge.

It was the German eugenicist Alfred Ploetz who introduced the term *Rassenhygiene* in his “Racial hygiene basics” (*Grundlinien einer Rassenhygiene*) in 1895. In its earliest incarnation it was concerned more with the declining birthrate of the German state and the increasing number of mentally ill and disabled in state institutions (and their costs to the state) than with the “Jewish question” and “de-nordification” (*Entnordung*) which would come to dominate its philosophy in Germany from the 1920s through the second World War.

One of the confusing aspects of “racial hygiene” is that “race” was often interchangeably used to mean “human race” as well as “German race” as well as “Aryan race” — three quite different concepts with three quite different implications. In the 1930s, under the expertise of eugenicist Ernst Rudin, it was this latter use of “racial hygiene” which was embraced by the followers of Nazi ideology, who demanded “Aryan” racial purity and condemned miscegenation. This belief in importance of German racial purity often served as the theoretical backbone of Nazi policies of racial superiority and later genocide.

These policies began in 1935, when the Nazis enacted the Nuremberg Laws, which legislated “racial purity” by forbidding marriage between non-Jewish and Jewish Germans. A key part of Nazism was the concept of racial hygiene and during their rule the field was elevated to the primary philosophy of the German medical community, first by activist physicians within the medical profession. This was later codified and institutionalized after the Nazis came to power in 1933, during the process of *Gleichschaltung* (literally, “coordination” or “unification”) which streamlined the medical profession into a rigid hierarchy with Nazi-sanctioned leadership at the top.

Racial hygienists played key roles in the Holocaust, the Nazi effort to cleanse Europe of Jews, Communists, Gypsies, homosexuals, political dissidents, the mentally retarded and insane. After World War II, such attempts have been widely reviled as cruel and brutal, and the racialist ideology behind them as un-scientific and pseudoscience. Still, some racial hygiene policies persevered. For

instance, the state-led forced sterilization of Roma in Norway, which started in 1934, wasn't stopped until 1977.

In Australia, a policy of removing biracial, so-called "half-caste" children from Aboriginal mothers, overseen by A. O. Neville, was justified under the principle of "biological absorption" through selective breeding. The policy of removing children from Aboriginal communities and subjecting them to forced cultural assimilation, which ended in 1969, had the aim of ensuring the gradual disappearance of a distinctive Aboriginal population through destroying Aboriginal culture and promoting interracial marriage with white Australians. The Aboriginals who were subjected to these traumatizing state policies are today known as the Stolen Generation.

### **Child Health**

Children seldom stay clean for long. Healthy young children will explore their environment and play with sand, mud, water and paints. Their clothes and bodies often get very dirty during the day at school or child care. This is different from "poor hygiene," which generally means that children are not bathed, always look messy, and have behaviors that spread disease. When the children who attend a child care programme arrive for the day clean, it helps keep everyone healthier.

Young children may ignore or tease children who smell bad or look dirty, which can affect their self-esteem. When children start the day with clean hair, body and clothes, playmates and caregivers respond more positively. It's important to spend time with young children practicing and teaching good hygiene both in child care and at home. The best way children learn to assume positive health habits is by including them in their daily routine.

Until children can do this, adults who care for them must take on this task. Here are some things to do for children to help them develop good personal hygiene habits and feel good about themselves.

**Hand washing:** Good hand washing, practiced frequently, can reduce illness and remove dirt which may contain toxins such as lead. Unwashed or improperly washed hands are the primary carriers

of infections. Young children need your guidance and reminders to wash their hands before they eat and after they toilet, play outdoors or handle animals. Set up your hand washing sink with a step stool so children can start washing their hands themselves. Use liquid soap and paper towels.

**Nose blowing, coughing and sneezing:** Nose blowing, cough and sneezing spread germs. Children can be taught to blow their noses (always with their mouth open), dispose of the tissue and then wash their hands. They can also be taught to sneeze or cough into tissue or into their elbow. Keep plenty of tissues on hand, and discourage nose picking.

**Hair:** Hair which is cleaned (washed at least once or twice a week) and brushed makes it easier to detect head lice and scalp rashes. Early detection allows for early treatment and reduces the chance of disease or parasites spreading to other children.

**Nails:** Dirt and germs often hide under fingernails. Children scratch their genitals, put their hands in their diapers, pick their noses, scratch rashes, and put their hands in their mouths. Keeping children's nails clipped and clean reduces the spread of germs to others.

**Toys:** If a child has a favorite toy or blanket that gets carried around constantly, it may be full of germs from many sources. Cloth toys and blankets should be laundered regularly; plastic toys should be run through the dishwasher or dipped in a bleach solution (one tbsp. of bleach in one quart of water) daily, then allowed to air dry.

**Clothes:** Clothes should be clean, comfortable and appropriate for the weather.

**Oral Hygiene:** Tooth brushing at least once per day with fluoride toothpaste and flossing prevent gum diseases and tooth decay by reducing the build-up of decay-causing plaque. Proper tooth brushing and flossing is a learned skill, improved by practice, and in the meantime children need help from their parents and child care providers. Regular tooth brushing times during child care will help not only help protect children's teeth but help them learn to brush and floss.

**Bathing:** Although it does not usually take place at child care, regular bathing is important and allows a child's entire body to be examined for signs of injury, rash or sores.

### **Tips for teaching personal hygiene in young children**

**Make it fun:** You can help your child to see personal hygiene as less of a chore by making it more appealing to them. For example, brightly colored toothpaste with sparkles, a toothbrush in your child's favorite color or decorated with their favorite cartoon character can add to the fun of bathroom routines. Scents, vivid colors and fun shapes add excitement to soaps. Bubble bath, fizzy bath balls or perhaps a drop or two of essential oil can make bath time just that bit more special.

**Set a good example:** Actions speak louder than words. Your children look up to you and will follow your example. Help reinforce the message by describing what you are doing while doing it e.g. 'Daddy has gone to the toilet, so now daddy is washing his hands to get rid of the germs'.

**Time matters:** How often have you seen your child briefly run their hands under the water or spend just a few seconds brushing their teeth? It is important to teach your child the appropriate length of time for each hygiene activity. Try teaching your child to sing a song like 'Twinkle Twinkle Little Star' twice before they stop washing their hands. When it's time for brushing teeth, play a song that lasts about two minutes or use a kitchen timer so your child knows when time is up.

**Keep it in mind:** Remind your child how important it is to practice good personal hygiene habits. Explain to them that although they may not see germs, they are present and can make them sick. Connect hygiene to illness by reminding them of the last time they were ill. The memory may help convince them of the benefits of good hygiene.

**Learning a new activity:** Each of us has a preferred learning style. Some children prefer to learn by listening, others by seeing or doing. Some may benefit from pictures of 'washing hands' above the

sink, others may find a song or a rhyme more helpful. For best results when teaching your child new skills, consider tailoring your methods to their learning style.

**Readiness:** Start teaching a new activity when your child seems ready. This means they can:

- **Understand what they are to do:** e.g. when brushing teeth, your child understands that the goal of the activity is to clean their teeth by brushing them.
- **Be aware of steps involved:** get toothpaste and toothbrush.
- **Be physically capable of doing the task:** able to hold the items and squeeze the paste onto the brush.
- **Use hand-eye coordination:** hold the paste above the brush and see that the brush is correctly aligned. Direct hand movements to adjust the position of the brush or paste as needed.

**Step-by-step:** Sometimes breaking a task into small steps and teaching one step at a time can make it easier for your child to learn the whole activity. For example:

- get the toothbrush and paste
- stand at the sink in front of the mirror
- squeeze paste on brush
- brush in circles all around your teeth until the song finishes
- Fill your mouth with water, swish it around and spit it out.

**Backward chaining:** 'Backward chaining' is a technique you can use to help your child learn a new skill. It means the child is taught the task in reverse order. Take your child through the first steps of the task and begin teaching at the point where the last step begins (e.g. when teaching brushing teeth, the first step for the child to learn would be: 'Fill your mouth with water, swish it around and spit it out'). The child then completes this final step. The process continues over time as you complete one less step and your child does one more until they can do the whole task on their own. Backward chaining means the child receives instant success, which increases their motivation and confidence.



## **Personal hygiene in children with intellectual disability**

**Patience and praise:** Patience is very important. Your child may make mistakes and take a while to do the activity. You may find it difficult to watch your child struggle with a task that would take you only a minute, but it is necessary and well worth the time. The moment will come when your child can handle most or all of their personal hygiene on their own.

The most important thing is that your child feels they have your support. The more you can take the pressure off the quicker success is likely to come. When children feel tension or anger in their parents/carers, it makes them tense and less able to learn new skills. Give praise for small steps—don't keep your praise for the time when your child is able to complete the whole activity. Teach at your child's pace, and be sure to praise their efforts. Your child needs to know that their efforts are seen, appreciated and recognised, and that you are proud of their successes. If there are significant setbacks give up for a few weeks and then start again.

**Routine:** Personal hygiene activities such as showering are part of a daily routine and should become 'second nature' to your child. Getting into the habit of doing things at the same time each day can make personal hygiene habits much easier to learn. Establishing these routines does take time and effort but it is worth it in the long run.

**Schedules:** Schedules are designed to bring routine and predictability to your child's day. A written schedule may help your child understand and remember the planned activities.

Using pictures of activities in the order in which they occur during the day is a great way to promote independence and help your child learn routines. Your regional office could help you develop a schedule if you wish.

**Choosing equipment and items:** While many children will find standard hygiene items and equipment easy to use, others may need the equipment or environment to be modified (e.g. some children may need a step stool to help them reach the washbasin and some may find that a toothbrush with a wider handle is easier to hold and use than a standard toothbrush). A physiotherapist or

occupational therapist can give you professional and personalized advice on the best equipment for your child.

**Keeping sane and getting support:** Parents and carers don't always find it easy to teach their children good personal hygiene habits: it requires lots of effort and persistence! Sometimes parents and carers need to take some 'time out'. This may not seem achievable when times are tough, but parents/carers need time to take care of themselves in order to cope with the physical and emotional demands of raising children. Here are some ideas on ways to support you:

- ring a friend
- talk to a relative
- go to a community health centre or parent group
- attend counseling
- spend time doing something that you find enjoyable.

All parents/carers need support. You might survive without it but you (and your child) may struggle needlessly.

#### **Mother-to-mother support**

- Many traditional societies have recognized that a new mother is often vulnerable and sensitive and needs encouragement and support.
- The informal, traditional support system that positively reinforced breastfeeding in the past may no longer be in place where modernization and bottle-feeding have become the norm.
- Mother-to-mother support helps fill this gap, as usually it is easier for mothers to share their concerns with other mothers.
- Mother-to-mother support is available in the mother's own community and provides an essential complement to the health care system, even where health care providers are well trained in the science of lactation and the clinical management of breastfeeding.

Mother-to-mother support counters the dissemination of incorrect or misleading information, thus enabling the mother to make informed choices about the feeding of her baby.

### **Mother-to-mother support for breastfeeding.**

- Mother-to-mother supports breastfeeding. This means women helping women breastfeed their babies.
- Experienced breastfeeding mothers model optimal breastfeeding practices, share information and experiences, and offer support to other women in an atmosphere of trust and respect.

In this setting, pregnant women and mothers who are breastfeeding explore options that result in a satisfying breastfeeding experience.

### **Child to Child Health**

The children are not only getting the hygiene principles and instructions from their parents and teachers. They get a good idea about the hygiene from other children whether they are good or bad. For example, a child must follow the hygienic principle which his brother or sister used to follow.

And the children get the habits easily from the schoolmates through others habits. If the teachers teach the good hygiene principle for the students while dancing, playing, eating...etc., definitely it will be memorable one for the child. If some parents teach the good hygiene principles to their children means, they will show their habit in their school mates or other children. So there is a chance for the other student (child) to know about the hygiene very easily.

**Infectious disease:** An infectious disease is a clinically evident disease resulting from the presence of pathogenic microbial agents, including viruses, bacteria, fungi, protozoa, multicellular parasites, and aberrant proteins known as prions. These pathogens are able to cause disease in animals and/or plants.

Infectious pathologies are usually qualified as contagious diseases (also called communicable diseases) due to their potentiality of transmission from one person or species to another. Transmission of an infectious disease may occur through one or more of diverse pathways including physical contact with infected individuals. These infecting agents may also be transmitted through liquids, food, body fluids, contaminated objects, airborne inhalation, or through vector-borne spread. An infection however, is not

synonymous with an infectious disease, as an infection may not cause important clinical symptoms or impair host function.

**Classification:** Among the almost infinite varieties of microorganisms, relatively few cause disease in otherwise healthy individuals. Infectious disease results from the interplay between those few pathogens and the defenses of the hosts they infect. The appearance and severity of disease resulting from any pathogen depends upon the ability of that pathogen to damage the host as well as the ability of the host to resist the pathogen.

Primary pathogens cause disease as a result of their presence or activity within the normal, healthy host, and their intrinsic virulence (the severity of the disease they cause) is, in part, a necessary consequence of their need to reproduce and spread. Many of the most common primary pathogens of humans only infect humans; however many serious diseases are caused by organisms acquired from the environment or which infect non-human hosts.

An opportunistic disease requires impairment of host defenses, which may occur as a result of genetic defects (such as Chronic granulomatous disease), exposure to antimicrobial drugs or immunosuppressive chemicals (as might occur following poisoning or cancer chemotherapy), exposure to ionizing radiation, or as a result of an infectious disease with immunosuppressive activity (such as with measles, malaria or HIV disease). Primary pathogens may also cause more severe disease in a host with depressed resistance than would normally occur in an immune-sufficient host.

One way of proving that a given disease is “infectious”, is to satisfy Koch’s postulates (first proposed by Robert Koch), which demands that the infectious agent be identified only in patients and not in healthy controls, and that patients who contract the agent also develop the disease. These postulates were first used in the discovery that *Mycobacterium* species cause tuberculosis. Koch’s postulates cannot be met ethically for many human diseases because they require experimental infection of a healthy individual with a pathogen produced as a pure culture.

Epidemiology is another important tool used to study disease in a population. For infectious diseases it helps to determine

if a disease outbreak is sporadic (occasional occurrence), endemic (regular cases often occurring in a region), epidemic (an unusually high number of cases in a region), or pandemic (a global epidemic).

**Transmission:** An infectious disease is transmitted from some source. Defining the means of transmission plays an important part in understanding the biology of an infectious agent, and in addressing the disease it causes. Transmission may occur through several different mechanisms. Respiratory diseases and meningitis are commonly acquired by contact with aerosolized droplets, spread by sneezing, coughing, talking or even singing. Gastrointestinal diseases are often acquired by ingesting contaminated food and water. Sexually transmitted diseases are acquired through contact with bodily fluids, generally as a result of sexual activity. Some infectious agents may be spread as a result of contact with a contaminated, inanimate object (known as a fomite), such as a coin passed from one person to another, while other diseases penetrate the skin directly.

Transmission of infectious diseases may also involve a “vector”. Vectors may be mechanical or biological. A mechanical vector picks up an infectious agent on the outside of its body and transmits it in a passive manner. An example of a mechanical vector is a housefly, which lands on cow dung, contaminating its appendages with bacteria from the feces, and then lands on food prior to consumption. The pathogen never enters the body of the fly. *Culex* mosquitoes are biological vectors that transmit West Nile Virus.

In contrast, biological vectors harbor pathogens within their bodies and deliver pathogens to new hosts in an active manner, usually a bite. Biological vectors are often responsible for serious blood-borne diseases, such as malaria, viral encephalitis, Chagas disease and African sleeping sickness. Biological vectors are usually, though not exclusively, arthropods, such as mosquitoes, ticks, fleas and lice. Vectors are often required in the life cycle of a pathogen. A common strategy, used to control vector borne infectious diseases, is to interrupt the life cycle of a pathogen, by killing the vector.

The relationship between virulence and transmission is complex, and has important consequences for the long term evolution of a

pathogen. Since it takes many generations for a microbe and a new host species to co-evolve, an emerging pathogen may hit its earliest victims especially hard. It is usually in the first wave of a new disease that death rates are highest. If a disease is rapidly fatal, the host may die before the microbe can get passed along to another host. However, this cost may be overwhelmed by the short term benefit of higher infectiousness if transmission is linked to virulence, as it is for instance in the case of cholera (the explosive diarrhea aids the bacterium in finding new hosts) or many respiratory infections (sneezing and coughing create infectious aerosols).

**Diagnosis and therapy:** Diagnosis of infectious disease sometimes involves identifying an infectious agent either directly or indirectly. In practice most minor infectious diseases such as warts, cutaneous abscesses, respiratory system infections and diarrheal diseases are diagnosed by their clinical presentation. Conclusions about the cause of the disease are based upon the likelihood that a patient came in contact with a particular agent, the presence of a microbe in a community, and other epidemiological considerations. Given sufficient effort, all known infectious agents can be specifically identified. The benefits of identification, however, are often greatly outweighed by the cost, as often there is no specific treatment, the cause is obvious, or the outcome of an infection is benign.

Specific identification of an infectious agent is usually only determined when such identification can aid in the treatment or prevention of the disease, or to advance knowledge of the course of an illness prior to the development of effective therapeutic or preventative measures.

**Methods of diagnoses:** Diagnosis of infectious disease is nearly always initiated by medical history and physical examination. More detailed identification techniques involve the culture of infectious agents isolated from a patient. Culture allows identification of infectious organisms by examining their microscopic features, by detecting the presence of substances produced by pathogens, and by directly identifying an organism by its genotype. Other techniques (such as X-rays, CAT scans, PET scans or NMR) are used to produce images of internal abnormalities resulting from the growth

of an infectious agent. The images are useful in detection of, for example, a bone abscess or a spongiform encephalopathy produced by a prion.

**Microbial culture:** Microbiological culture is a principal tool used to diagnose infectious disease. In a microbial culture, a growth medium is provided for a specific agent. A sample taken from potentially diseased tissue or fluid is then tested for the presence of an infectious agent able to grow within that medium. Most pathogenic bacteria are easily grown on nutrient agar, a form of solid medium that supplies carbohydrates and proteins necessary for growth of a bacterium, along with copious amounts of water. A single bacterium will grow into a visible mound on the surface of the plate called a colony, which may be separated from other colonies or melded together into a "lawn."

The size, colour, shape and form of a colony is characteristic of the bacterial species, its specific genetic makeup (its strain), and the environment which supports its growth. Other ingredients are often added to the plate to aid in identification. Plates may contain substances that permit the growth of some bacteria and not others, or that change color in response to certain bacteria and not others. Bacteriological plates such as these are commonly used in the clinical identification of infectious bacteria. Microbial culture may also be used in the identification of viruses: the medium in this case being cells grown in culture that the virus can infect, and then alter or kill. In the case of viral identification, a region of dead cells results from viral growth, and is called a "plaque". Eukaryotic parasites may also be grown in culture as a means of identifying a particular agent.

**Microscopy:** Another principal tool in the diagnosis of infectious disease is microscopy. Microscopy may be carried out with simple instruments, such as the compound light microscope, or with instruments as complex as an electron microscope. Samples obtained from patients may be viewed directly under the light microscope, and can often rapidly lead to identification.

Microscopy is often also used in conjunction with biochemical staining techniques, and can be made exquisitely specific when used in combination with antibody based techniques. For example, the

use of antibodies made artificially fluorescent (fluorescently labeled antibodies) can be directed to bind to and identify a specific antigens present on a pathogen. A fluorescence microscope is then used to detect fluorescently labeled antibodies bound to internalized antigens within clinical samples or cultured cells. This technique is especially useful in the diagnosis of viral diseases, where the light microscope is incapable of identifying a virus directly.

**Biochemical tests:** Biochemical tests used in the identification of infectious agents include the detection of metabolic or enzymatic products characteristic of a particular infectious agent. Since bacteria ferment carbohydrates in patterns characteristic of their genus and species, the detection of fermentation products is commonly used in bacterial identification. Acids, alcohols and gases are usually detected in these tests when bacteria are grown in selective liquid or solid media.

Serological methods are highly sensitive, specific and often extremely rapid tests used to identify microorganisms. These tests are based upon the ability of an antibody to bind specifically to an antigen. The antigen, usually a protein or carbohydrate made by an infectious agent, is bound by the antibody. This binding then sets off a chain of events that can be visibly obvious in various ways, dependent upon the test. Serological tests, if available, are usually the preferred route of identification, however the tests are costly to develop and the reagents used in the test often require refrigeration. Some serological methods are extremely costly, although when commonly used, such as with the "strep test", they can be inexpensive.

**Molecular diagnostics:** Technologies based upon the polymerase chain reaction (PCR) will become nearly ubiquitous gold standards of diagnostics of the near future, for several reasons.

**First**, the catalogue of infectious agents has grown to the point that virtually all of the significant infectious agents of the human population have been identified.

**Second**, an infectious agent must grow within the human body to cause disease; essentially it must amplify its own nucleic acids in order to cause a disease. This amplification of nucleic acid in infected



tissue offers an opportunity to detect the infectious agent by using PCR.

**Third**, the essential tools for generating PCR (primers) are defined by the genomes of the infectious agents, and with time those genomes will be known, if they are not already.

**Clearance and immunity:** Infection with most pathogens does not result in death of the host and the offending organism is ultimately cleared after the symptoms of the disease have waned. This process requires immune mechanisms to kill or inactivate the inoculums of the pathogen. Specific acquired immunity against infectious diseases may be mediated by antibodies and/or T lymphocytes. Immunity mediated by these two factors may be manifested by:

- 
- a direct effect upon a pathogen, such as antibody-initiated complement-dependent bacteriolysis, opsonization, phagocytosis and killing, as occurs for some bacteria,
  - neutralisation of viruses so that these organisms cannot enter cells,
  - Or by T lymphocytes which will kill a cell parasitized by a microorganism.

---

The immune response to a microorganism often causes symptoms such as a high fever and inflammation, and has the potential to be more devastating than direct damage caused by a microbe. Resistance to infection (immunity) may be acquired following a disease, by asymptomatic carriage of the pathogen, by harboring an organism with a similar structure (cross reacting), or by vaccination. Knowledge of the protective antigens and specific acquired host immune factors is more complete for primary pathogens than for opportunistic pathogens.

Immune resistance to an infectious disease requires a critical level of either antigen-specific antibodies and/or T cells when the host encounters the pathogen. Some individuals develop natural serum antibodies to the surface polysaccharides of some agents although they have had little or no contact with the agent, these natural antibodies confer specific protection to adults and are passively

transmitted to newborns. The following are brief descriptions about some diseases.

---

### **Tuberculosis or TB**

Tuberculosis has been called the Great White Plague to distinguish it from bubonic plague, the Black Death. It is caused by a slowly growing bacterium, *Mycobacterium tuberculosis*, which can remain dormant within infected people for years or decades. Once infected, people do not necessarily become clinically ill. The infection is contained by the body's immune system, becoming active in the presence of factors which reduce immune resistance. In other words, the causative bacterium, in the words of Rene Dubos, is a necessary but not sufficient agent of the disease. Death rates dramatically decreased tenfold in less than a century. Although this trend was interrupted by two world wars and by periods of social upheaval following the wars in Europe, the decline continued when order and economic development returned.

The tuberculosis epidemics in the nineteenth century which prevailed throughout the industrialized world were caused at least in part by long hours working in difficult conditions, poor nutrition, marginal housing, the absence of adequate heating, and the generally poor standard of living among the working class during that period. As the standard of living for workers improved, tuberculosis mortality gradually decreased. Tuberculosis has always disproportionately affected poor people.

WHO declared tuberculosis a global emergency in 1993 because of its high prevalence in Third World countries. Tuberculosis had become largely invisible to Americans because of its persistent patterns of differential susceptibility in the last few generations, largely sparing the well to do. But now, mostly because of the AIDS epidemic, tuberculosis has "reemerged," the term used by Paul Farmer, from the ranks of the poor. The AIDS epidemic has exacerbated longstanding inequalities of risk and the lack of access to resources for poor and marginalized people.

Multi-drug resistant strains of *Mycobacterium tuberculosis*, MDR-TB, have appeared in virtually every country in the world as a

result of frequently inconsistent compliance with tuberculosis treatment regimens. Individuals with this resistant form of tuberculosis then expose others who consequently suffer a primary infection with the resistant strain. Should they become sick, their infection becomes more difficult and more expensive to treat. .

### **Acquired Immunodeficiency Disease (AIDS)**

The disease which eventually became known as AIDS was first reported in the U.S. in June 1981 in an outbreak of a rare form of pneumonia, *Pneumocystis carini*, or PCP, among five young gay men in Los Angeles. Additional reports soon followed from New York City and San Francisco. These outbreaks were quickly recognized as examples of cellular immune dysfunction associated with sexual contact. By early 1983, other risk factors were identified by the Centres for Disease Control, the CDC, all of which were associated with exposure to the blood of previously infected people – sharing needles among IV drug abusers, recipients of blood transfusions and blood products (especially common in hemophiliacs), maternal to infant transmission, and occupational exposures, primarily in health care workers. In March 1983 the CDC issued its first set of prevention recommendations.

AIDS became the most thoroughly and rapidly researched infection in human history. Within three years of its recognition as a new disease entity, the unique retrovirus causing AIDS was discovered; a sensitive and specific diagnostic test for the presence of antibodies produced by infected individuals was developed; and the test was used in the field to survey populations and to screen blood donors. It became clear that HIV infected people could remain asymptomatic for up to 10 years, acting as silent carriers of the disease. So the distinction between HIV infection and AIDS became an important one.

The remarkably rapid development of antiretroviral drugs followed and by the mid-1990s combination therapy with potent antiretroviral medications was well established as very effective treatment for AIDS. This became known as highly active antiretroviral therapy or HAART. It is very expensive, costing between \$10,000 and \$15,000 a year per patient in the U.S. The use of HAART, although not

curative, has led to a dramatic decrease in morbidity and mortality among patients in industrialized countries, making AIDS a manageable chronic disease by effectively suppressing the virus infection. This is unique in the history of fatal virus infections among humans.

### **Aids in Africa**

The region of the world most severely affected by HIV and AIDS today is sub-Saharan Africa. About 25 million people are infected with HIV, with four million new cases in 2000 alone. The average prevalence rate is 10% among people in 16 African countries in the age group 15 – 49; but in Botswana, 36% of the adult population is infected. Life expectancy has decreased by 10 years and infant mortality rates have doubled throughout sub-Saharan Africa. AIDS has become the leading cause of death in Africa, surpassing malaria in many countries. More than 16 million people have died from AIDS in sub-Saharan Africa. Tuberculosis deaths in some sub-Saharan African countries have increased fourfold to more than 400 per 100,000 as a direct result of HIV/AIDS. In some countries, 70% of persons with active tuberculosis are HIV positive.

As staggering as this is, the full impact of AIDS in sub-Saharan Africa has yet to be felt. The disease's impact on families, social systems, and national growth and development is almost incalculable in some countries. Afflicting young people during their most productive years, AIDS has produced severe shortages of teachers, doctors and nurses. Large numbers of orphaned children and widows with no means of support have appeared in many countries. AIDS has shredded the social and economic fabric of large parts of sub-Saharan Africa, destroying all hope of improvement in the standard of living in this part of the world for the foreseeable future. It is truly an agenda-setting disease.

Nevertheless, in some countries like Uganda, intensive prevention programs have slowed AIDS transmission. There, AIDS prevalence dropped from 14% to 8% in the two years following the implementation of an aggressive education and prevention program which included strict regulation of commercial sex, intensive

condom promotion, and the treatment of other sexually transmitted diseases which enhance the transmission of AIDS.

### **Aids in other Geographic Areas**

The incidence and prevalence of AIDS are also increasing in China and India. Given their sizable populations, the consequences of this disease for these countries could be as catastrophic as in Africa. Both countries were slow to respond to the emerging epidemic and both will face the same devastating consequences being experienced in Africa if prevention and treatment interventions are not intensified immediately.

In Eastern Europe and Central Asia, IV drug abuse was responsible for the introduction of AIDS into countries like Ukraine which has 90% of the region's reported cases. Once the disease was introduced, it was propagated in the usual ways: sex, blood transfusions, and occupational exposures.

There were about 1.4 million cases of AIDS in Latin American and Caribbean countries by the end of 2000. The prevalence rate of 2.1% in the Caribbean is second only to the rate of sub-Saharan Africa. As is the case with every other epidemic infectious disease, differences in infection rates are accounted for by differences in economic and political stability, migration, poverty and unemployment, illiteracy, and drug use.

As with MDR-TB, however, the cost of treatment for patients with AIDS is prohibitively high in developing countries. This has led to health policy strategies declaring HAART treatment "cost ineffective." In Paul Farmer's opinion, this represents the conventional establishment view which values human life differently based on measures of poverty and inequality. Inequality is an important co-factor in this pandemic. Stopping AIDS will require a more ambitious agenda than most countries are currently prepared to fund. Developing countries have been spending more money on arms than on making effective treatment for AIDS available to their populations.

Governments in Africa and those of other developing countries face many challenges competing for their scarce resources. They simply cannot mount an adequate response to fight the AIDS

pandemic without outside assistance; but at the moment, HIV is spreading three times faster than is the funding to control it.

UNAIDS created an International Partnership Against AIDS in Africa providing support for indigenous expertise and institutions in implementing prevention programs. It is supporting the development of the public health infrastructure needed to mount effective prevention efforts. But it is tacitly writing off a generation of infected people for whom these efforts will be too late and too little with devastating social and economic consequences.

The AIDS epidemic now constitutes a global threat to the security and welfare of the U.S. and it is in our enlightened self-interest to vigorously assist other countries in controlling it. It can, and most likely will, lead to political instability and ethnic conflicts around the world. AIDS is already undermining decades of efforts to improve the standards of living for people in the Third World. It is, in brief, nothing short of a global catastrophe equivalent to a major global war.

To quote Paul Farmer once again describing the AIDS pandemic, "Their sickness is a result of structural violence: neither culture nor pure individual will is at fault. Rather historically given, and often economically driven, processes and forces conspire to constrain individual agency. Structural violence is visited upon all those whose social status denies them access to the fruits of scientific and social progress....it produces a differential political economy of risk."

### **Malaria**

Malaria is the most prevalent vector-borne disease in the world, endemic in 92 countries containing more than 40% of the world's population. Annually, 300 – 500 million new malaria cases are reported, 90% of them occurring in Africa. Every year 1.5 to 2.7 million people die of malaria, 50% of them children younger than 5 years.

Malaria is caused by four different types of a protozoan parasite, *Plasmodium*, which is transmitted by the bite of an infected female Anopheles mosquito. The involvement of an insect vector makes malaria control challenging in ways that TB and AIDS are not.

Historically, malaria has had a great impact on societies as a result of its insidious and debilitating effects on infected individuals, especially children. Relapsing fevers and the prolonged, chronic illness associated with malaria during infancy and childhood slow development and the ability to learn. Its disappearance in the U.S. and in other countries had little to do with personal medical care. It was largely a result of improved socioeconomic conditions, vector control efforts, including water management to reduce mosquito breeding sites, the use of window screens, and case management to interrupt malaria transmission by identifying and treating individuals with malaria.

Malaria is treatable and preventable with a variety of medications, but as with tuberculosis, treatment has produced strains of the parasite resistant to common medications. And, once again, medications effective against resistant strains of the parasite cannot be afforded by the people in endemic areas who need them the most.

In conclusion, three agenda-setting diseases, tuberculosis, AIDS and malaria, continue to be major public health problems for much of the world. Large numbers of impoverished people continue to disproportionately suffer preventable consequences of these debilitating infections which limit economic development and hinder sustained improvements in the standard of living in many developing countries. Effective treatment for these three diseases, generally available to most of us in the industrialized world, is unavailable to the majority of people in developing countries because of the prohibitive cost of medications. Our challenge is to make these medications available to people who cannot presently afford them, and, by doing so, contribute to the economic progress of countries in which they live.

### **Present Health Status, Awareness of HIV & AIDS and Future plan for Zambia**

HIV and AIDS awareness-raising began early in Zambia. An American journalist in 1988 reported, "Zambia is waging one of the world's most aggressive educational campaigns against AIDS, surpassing anything being done in the United States". Much of the

early campaign involved pamphlets and posters that warned of the dangers of AIDS and promoted abstinence before marriage, for example: "Sex thrills, but AIDS kills". Over the years, a wide range of media has been used to carry messages about AIDS, and children have been taught at least the biological facts in school. These efforts quickly succeeded in raising basic awareness, but many misconceptions have remained. Although almost all adult Zambians know that HIV/AIDS exists, still 11% of men and 19% of women do not know that it can be avoided.

### **Schools**

If behaviour is to be changed then young people must be the highest priority target. It is often said that Zambia's youth offer the nation a "window of hope" – the hope of an AIDS-free future. Nearly half of all Zambians are between 5 and 14 years old; relatively few of these young people have HIV; and they are all eager to learn. Effective education therefore has the power to change attitudes and behaviour for life. Unfortunately, government has not always taken the lead:

*"It must be acknowledged that the Ministry of Education has made a late start on interventions, mainly because HIV/AIDS was generally viewed as a Health issue. The country as a whole has had a rather slow cautious approach but is surely decided on mounting a vigorous campaign to fight the pandemic." – Ministry of Education, September 2000.*

In recent years the Ministry has sought to better integrate HIV/AIDS education into more parts of the school curriculum. It has also recognized the importance of teaching communication and decision-making skills, and of providing a supportive environment for schoolchildren. One challenge to any educational project is that at least 72 languages are spoken in Zambia; therefore the Ministry of Education aims to translate 30% of high priority HIV/AIDS-related materials into Zambian languages, and to produce more information in Braille. Without doubt, a very vigorous government campaign is essential to protect the nation's future, and changes cannot come too soon:



*“The seriousness of the situation in Sub-Saharan Africa calls for the schools to be declared in a state of emergency because of AIDS, requiring emergency-type efforts, emergency-type responses. It calls for the HIV/AIDS crisis to be placed at the centre of each severely affected country's national education agenda.” – M.J. Kelly, University of Zambia.*

Unfortunately, national policies are one thing and implementation on the ground is quite another. Anecdotal reports suggest that some schools still do not teach pupils anything about AIDS because of the belief that sex should only be discussed between parents and their children, and that to do otherwise would increase sexual activity.

### **Strategies**

If education is to succeed in changing attitudes and behaviour, it must reach beyond the classroom, and many different strategies have been developed with this in mind. In the late 1980s, one school in Zambia became perhaps the first in the world to set up an Anti-AIDS club, a concept that has since become very popular. So long as their influence extends beyond their membership and reaches the most vulnerable children, Anti-AIDS clubs can be very effective. Members are encouraged to spread messages about safer behavior and compassion for those living with HIV.

Television, radio and the press have also proved to be influential, even though not all people have direct access to them. Some 71% of urban and 37% of rural youth saw at least some of the HEART television campaigns in 2000, and it seems that their behavior was influenced as a result.

On a smaller scale, and particularly in rural areas, some of the best methods of raising awareness involve interactivities such as music, drama, group discussions or role play exercises. Many of the most effective strategies have been employed by the Copper belt Health Education Project (CHEP). This project, funded mainly by the Norwegian Agency for Development Cooperation (NORAD), started work in the urban Copper belt Province in 1988.

In 2003, through its in-school youth programme, the CHEP educated some 25,000 students using Anti-AIDS clubs, drama, role plays and games. Peer-centred education also reaches sex workers, street children and soldiers, and the CHEP has established youth-friendly health services, in which trained peer educators work alongside clinic staff.

### **Controversy about Condoms and abstinence**

It has been conclusively proven that condoms are highly effective at preventing sexual HIV transmission, when used correctly and consistently. Nevertheless, the role of condoms in curbing the spread of Zambia's epidemic has been a subject of prolonged controversy in this mainly Christian nation.

Increasing the availability of condoms has been a key part of national policy since the mid-1980s, and the Health Department aims to distribute some 25 million condoms each year (in a country of 5 million adults). At the same time, many church leaders and politicians say that condoms cause promiscuity and immorality, and have opposed promotional campaigns. Near the end of his presidency, Frederick Chiluba said, "I don't believe in condoms myself because it is a sign of weak morals on the part of the user". In Chiluba's opinion, "the only answer is abstinence".

In 2001, a series of television advertisements that promoted condom use were taken off the air after generating protest letters, much to the dismay of foreign donors (including USAID, UNAIDS and the World Bank). Many pundits suspected that the president had personally intervened to get the ban. In 2002 the three main churches in Zambia passed a resolution endorsing condom use for preventing HIV transmission between married couples. In all other cases the churches encourage abstinence only, which many AIDS activists consider to be an ineffective approach:

### **Social marketing**

Promotion of condoms has largely been the responsibility of the Zambia Social Marketing Project (ZSMP), which is run by Population Services International and the Pharmaceutical Society of Zambia, and is mostly funded by the USAID. In 1992, the Project

launched a brand of condom, Maximum, which rapidly became a market leader due to its affordability, high-profile advertising and availability in a wide range of outlets – including bars and grocery stores. This was followed by the introduction of Zambia's first female condom, Care, in 1997.

One of the ZSMP's major achievements has been the HEART media campaign, which targets teenagers and encourages condom use as well advocating abstinence and being faithful (the "ABC" of prevention). It has been found that many young people exposed to HEART messages did behave differently to others; condom use at last sex was 1.6 times higher among such people, and they were 1.7 times more likely to report abstinence. Such social marketing and educational campaigns are critical to increasing condom use – free distribution alone will not change attitudes.

### **Trends in behaviour**

The ZSMP reported that total condom sales more than doubled from 4.7 million in 1993 to 10.6 million in 2002. Nevertheless, the use of condoms remains very infrequent, especially in rural areas. One issue is availability and affordability: many villages are miles from the nearest outlet. However, what is more significant is that, while condom adverts adorn shops and bars throughout the nation, the issues of stigma, lack of knowledge and gender inequality present major obstacles to people using them.

Efforts to educate people have had less impact in rural areas than in towns and, as long as men retain their traditional position of authority, women find it very difficult to negotiate safer sex. Less than half of Zambian women believe that a woman can insist on using condoms. Between 1996 and 2003, seven major national surveys investigated sexual behavior, and many people have seen evidence of favorable trends in their findings, especially with regard to increased use of condoms. However, one particular report adjusted the data to compensate for differences in surveillance methods, and arrived at an interesting conclusion. The proportion of men engaging in the highest-risk activity – sex with a non-cohabiting partner in the last year without using a condom last time – fell from 25% in 1996 to 12% in 2003.

Yet it seems that this trend is not due to greater use of condoms: in each survey, about 40% of men having sex with non-cohabiting partners reported using a condom on the last occasion. The change has in fact occurred because fewer men are having sex, and of those who are not abstaining an increased proportion are remaining faithful to one cohabiting partner. There is also evidence of a rise in the average age at which men first have sex. It seems that, in recent years, messages promoting abstinence and fidelity may have had a greater impact on levels of high-risk behaviour than those advocating condom uses.

The evidence of increased abstinence and fidelity is encouraging. However, promoting these two strategies alone is not enough. While the exact statistics may be open to debate, what is clear is that much more needs to be done to encourage the full ABC – including consistent condom use.

### **Preventing mother-to-child transmission**

Zambia's prevention of mother-to-child transmission (PMTCT) initiative was launched in 1999, beginning with a three-year pilot programme in Copper belt Province. By 2004 it had expanded so that 74 health facilities in four provinces offered antiretroviral drugs (primarily nevirapine) to expectant mothers and newborn infants. Such medicine can reduce the chance of an HIV-positive mother infecting her baby by around 50%. Unfortunately, very few pregnant women are even tested for HIV, let alone offered treatment.

In 2003, 95% of women attended an antenatal clinic at least once during the course of their pregnancy, and two-thirds of those women were counseled for HIV/AIDS. Among rural women receiving counseling, only 9% were offered an HIV test, compared to 38% in urban areas; in each location, around half declined the offer. Overall, fewer than 6% of all pregnant women were tested for HIV in 2003.

Preventing mother-to-child transmission is a high priority of the United States' PEPFAR initiative and of the Zambian government. It is to be hoped that uptake of PMTCT services is increasing and will continue to grow.

### **HIV testing: Voluntary testing**

Approximately 8% of Zambian adults have volunteered to be tested for HIV and know their status. Those who do not know they are infected can spread the virus to many others before they become ill, and without early diagnosis may not get the care they require. Many people are reluctant to come forward to be tested because they fear stigma, or because they think that knowing their status is of no advantage – especially if they are unlikely to receive antiretroviral therapy. However, even those who want to be tested may find that accessing services is difficult or costly, and more than a quarter of adults do not even know where they can go for HIV tests. Many more people must come forward for voluntary counseling and testing if the antiretroviral treatment programme is to meet its targets.

Two high profile politicians have hit the headlines by publicly taking HIV tests: former president Kenneth Kaunda (March 2002) and vice president Never Mumba (September 2004), both of whom tested negative. While it is wrong to pressurize people into revealing their status, it is nonetheless true that those who are brave enough to do so – such as the openly-positive campaigner Winston Zulu – can do a lot to inspire others and to challenge stigma.

### **Compulsory and routine testing**

In early 2001, Zambia's largest mining company, Konkola, caused much controversy by forcing hundreds of its employees to undergo anonymous HIV tests. Many groups complained that the miners might suffer discrimination as a result. However, the company insisted that without this action it would be unable to plan its future operations and improve the health of its workers. The survey found that 18% of the 8,532 employees tested were HIV-positive.

In March 2002, the government announced that all military personnel and potential new recruits would be tested for HIV. No more HIV-positive people would be allowed to join, and those already in the army would be moved to less active duties. Within three months the government seemingly changed its mind, and the plans were apparently dropped, at least for a while.

But the issue of non-voluntary testing did not go away. It resurfaced in May 2004 when the National AIDS Council proposed

that everyone attending health institutions should be routinely screened for HIV. This was the most radical plan yet, and it was opposed by some activists and people living with HIV/AIDS as an abuse of human rights. Opponents said that those who feared learning their status might be put off seeking necessary healthcare.

There is still confusion over government plans for routine HIV tests, especially as the National AIDS Policy has not yet been finalized (as of early 2005). Routine screening does exist in Botswana's health service, and perhaps it is true that it has increased efficiency. But the right to choose must be paramount. The government's role should not be to force tests upon people, but to encourage them to want to learn their status. They can achieve this by providing quality testing and counselling services, by combating stigma, and by offering an incentive of treatment and care to those who test positive.

### **Caring for the infected**

HIV weakens the immune system and, in time, makes all those infected highly vulnerable to opportunistic infections. In Zambia, the most widespread of these is tuberculosis (TB). Rates of TB increased five-fold between 1984 and 1996, and in 2002 there were over 50,000 reported cases. Most infections, including TB, can be treated relatively easily. Unfortunately, Zambia's health sector is struggling to cope with the increased demand created by the HIV/AIDS epidemic. Clinics are frequently under-resourced and most patients must pay to access treatment. Usually, people with HIV do not seek clinical help until they are already very ill.

The vast majority of care is provided not by clinics or hospitals but by friends and relatives within the home of the sick person. The government has little involvement in such home-based care; what support exists is mostly provided by community groups and churches. There are many ways to help people living with HIV besides treatment. Some organizations run loan schemes that enable groups of HIV-positive people to set up small businesses, so they can provide for themselves and their families. Other projects distribute food or establish cooperative vegetable plots - good nutrition is essential for everyone living with HIV.

By forming collectives, people living with HIV can share their problems, pool their strength, and campaign for change. The largest of all such groups is the Network of Zambian People Living with AIDS (NZP+).

### **Antiretroviral treatment**

#### **The targets**

The WHO estimates that at the end of 2005, 183,000 people living with HIV in Zambia were in immediate need of antiretroviral (ARV) therapy. By tackling the virus itself, this treatment can revive a person's immune system and give them years more healthy life. However, until recently drugs could only be bought through the private sector and, at prices between \$200 and \$800 per month, very few could afford them.

State provision of ARV therapy began at two hospitals in Lusaka and Ndola in late 2002. Just a year later, President Mwanawasa announced that he planned to have 100,000 people accessing treatment by the end of 2005, as part of the global "3 by 5" initiative. To further boost treatment efforts, the government has declared HIV/AIDS a national emergency, with effect from August 2004 to July 2009.

Zambia's treatment programme has only been made possible by an unprecedented amount of funding from the Global Fund, PEPFAR and other source. The delivery of the programme relies on the involvement of many NGOs, churches and communities.

#### **The cost of treatment**

In Zambia, a year's course of antiretroviral treatment costs \$480-490 per patient, of which the drugs themselves make up 57%, and laboratory tests another 36%. Most of this cost has always been subsidized, but at the start of scale-up the government chose to charge each person receiving therapy around \$8 per month (only a few clinics in Lusaka were exempt). In addition, patients had to pay for tests and transport, which generally raised the cost to \$25-30 per month. Most Zambians live on less than a dollar a day, so could not possibly afford to pay.

Justifications for the user charges included discouraging abuse of the system and encouraging adherence. More significantly,

however, the government was not at all sure that funding was sustainable, so wanted to recover some of the cost. Attitudes changed when Zambia secured \$254 million from the Global Fund in June 2004, and in February 2005 the government announced the start of free treatment.

### **The shortage of health workers**

The treatment programme's greatest handicap is the inadequacy of the healthcare system, which suffers from high patient numbers, lack of physical space and infrastructure, and – most critically – too few staff.

In 2003 it was calculated that to provide treatment to everyone clinically eligible would, after five years, require twice the number of laboratory technicians and half of all the doctors then available in the public health system. Zambia is now trying to recruit as many health workers as it possibly can, and is using nurses and physician assistants to compensate for the shortage of doctors. Success or failure in this area could be the critical factor in determining the future rate of scale-up.

### **Other challenges**

Besides lack of health workers, people trying to access services often encounter other obstacles, including the following:

- gender inequality (men have higher status within households; they control the money and are seen as more deserving of treatment)
- frequent breaches of confidentiality (people who fear stigma do not want to reveal that they are HIV-positive)
- inadequate information about the drugs and how to manage a life on treatment
- language difficulties and illiteracy (infected people sometimes have trouble communicating with staff and completing documents).

### **Future Plan - NHC**

Zambia faces many challenges to meet the vision of health reform established by its government in 1991: "equity of access to cost-effective quality health care as close to the family as possible." The Zambia Integrated Health Programme (ZIHP) is an ambitious



program developed by USAID in partnership with the Government of Zambia to address the main health problems of the people of Zambia and to continue the process of health reform initiated by the government. Part of the process of health reform includes decentralizing health services by strengthening the provision of local services through District Health Management Teams (DHMTs).

Zambia's population of 9.8 million people is linguistically and culturally diverse, with 72 recognized ethno linguistic groups. More than two-thirds of Zambians are under 25. Major factors contributing to high rates of infant and childhood morbidity and mortality nationwide are malaria, diarrheal disease, and malnutrition. High rates of HIV/AIDS transmission and low contraceptive prevalence rates hinder the realisation of productive lives for Zambia's adult population. It is estimated that by 2004, AIDS will account for about 210 deaths per day among 15 to 49 year olds.

Zambia Integrated Health Programme (ZIHP's) goal is to improve primary health care services for all Zambians by providing technical assistance to local counterparts in the areas of:

- Increasing demand for services;
- Increased delivery of services at the community level;
- Increased delivery of services by the private sector;
- Improved quality through improved health worker performance; and
- Improved policies and planning and support systems for the delivery of health care interventions.

Building the capacity of Neighborhood Health Committees (NHCs) to better coordinate population, health, and nutrition (PHN) interventions at the community level is a critical focus area of ZIHPCOMM; it is a participatory process that allows all stake holders at the community level to gain an appreciation of the need to work together. Hence, the more specific goal for community level activities is:

- To improve the skills and capacity of NHC members to be well informed and skilled health promoters in their communities.

## **Activities of NHC**

**Training of Trainers (TOT) and Roll Out of the NHC Strengthening Package** Participants from select districts and health centers were trained in the PLA approach for community mobilisation skills and the Essential Health Care Package (EHCP) to enhance knowledge in disease prevention.

**Distance Education Radio Programme:** The NHC Distance Education Radio Program for service providers was launched in January 2001 after determining the scope, content and details through a design workshop. Looking at the numbers of NHC members across the country that needed to be trained, radio seemed to be the most logical option in terms of cost-effectiveness. The NHC Distance Education Radio Program, seen as the glue for the whole NHC component, supported NHC members as they moved from the training into roles as community mobilizers.

The Distance Education Radio Program for NHC members entitled "Our Neighborhood," is a 6-month, 30-minute per week, repeatable course. The program provided technical updates on both health interventions and community mobilisation techniques, and provided on-going support and encouragement, filling some of the gap in supportive supervision. A follow-up radio program was launched, entitled "Community Health with Sister Evelina". This program was a follow-up to those NHC members who already completed the formal distance learning course. This 15-minute program gave NHC members additional health and technical updates, community mobilisation tips, and information on current health events.

**Health Information Cards and booklets** NHC Health Information Cards were developed as a supplement to those NHC members who registered for the distance education course. The cards are print materials that an NHC member can use for technical updates and for providing ideas on community mobilisation around a specific health topic. Cards have already been developed on 16 health-related topics. Nine more cards are being developed.

**NHC Rapid Assessment** A rapid assessment exercise was conducted to track the achievements of the NHCs in relation to their planned activities. Data is available for 12 districts.

**Operations Research** Operations research activities are conducted to guide and inform the NHC strengthening package. The main objective of the research was to determine which approach is most effective in terms of cost and impact for NHC strengthening and community action for the promotion of health and prevention of diseases.

### **Outputs of NHC**

- NHCs formed in 72 districts
- 5,394 participants trained in community partnerships building and PLA approach
- 1,460 NHC Action Plans developed
- Catchment populations of about 2.9 million people reached (about 30% of Zambia's population)
- 26 Distance Education Radio Program episodes have aired for 4, 6-month cycles. 5<sup>th</sup> round in progress. 5,000 NHC members registered to participate in each round.
- Thirteen episodes of "Community Health with Sister Evelina" (follow-up show to the Distance Education Radio Program) aired per quarter, since June 2001.
- NHC Information cards have been printed and distributed to new NHC listeners on HIV/AIDS, STDs, TB, Birth Preparedness, Family Planning, Danger Signs in Pregnancy, Malaria in Pregnancy, Mother to Child Transmission of HIV/AIDS, Community Drama, and Health Care Financing.
- Rapid assessment data available for 12 districts

### **Future Plan – AMDA-Zambia**

**Background:**AMDA International commenced in Zambia at the request of Japan International Cooperation Agency (JICA) because they wanted AMDA to become an active partner in JICA Primary Health Care (PHC) projects. The AMDA project office in Zambia opened at the George Compound, which is located to the Northwest of Lusaka City. In November 1999, in collaboration with the JICA Study Team (JST), another AMDA project office was opened at the

Bauleni Compound, Southeast of Lusaka City. In February and March of 1998, Dr. Shigeru Suganami visited Zambia in order to facilitate feasibility inspections and information gathering. He soon launched an AMDA Chapter office at Chainama Hills College of Health. In September 1998, AMDA-Zambia was registered and became a legal organization in Zambia.

**Activities and Achievements:** AMDA-Zambia has been implementing the following projects:

**Training on Vocational Skills:** On December 14, 1998, the first group of tailoring students began their lessons. A total of 20 participants, including 2 males and 18 females, took part. Initially, a six-month training course was designed for beginners and another six-month course for advanced classes. The objective of this training was to equip the beneficiaries with appropriate skills in tailoring, cutting and designing. This will enable them to engage in personal income generating activities, thus improving their standard of living.

**Health Education:** AMDA recognizes the importance of health education as a pre-requisite for all AMDA project beneficiaries. All the beneficiaries are required to attend health talks provided by the area Clinic Health Workers, who were trained during the JICA-PHC project. This is a JICA and AMDA collaboration activity, which is supervised by the clinic nurse to ensure that appropriate health topics are discussed so as to improve the general health conditions of the community and the residents.

**Adult Literacy:** During the JICA-PHC training, JICA-PHC experts noticed high illiteracy levels among the majority of the Community Health Workers (CHWs). This was a major stumbling block for them in fully conducting community work as it involved writing and reading. It became paramount, therefore, that literacy should be an essential focus and AMDA was requested by the clinic to introduce a literacy programme for the CHWs. AMDA responded to the request by implementing a three-month project. This was later found to be inadequate and nine months were added to make it a one-year programme. The objective of the programme was to educate the CHWs so that they would be able to conduct work in the community

and ultimately prepare and submit written reports to the Health Centre of George compound.

**Community Farms:** After identifying the need to combat malnutrition within the community at George compound, JICA-PHC members recognized a need for a community farm where nutritious food crops could be grown. The JICA-PHC team, in collaboration with the Lusaka City Council (LCC), managed to secure a 3 ha farm site west of the George compound. AMDA has had a vested involvement in the development of this farm site. This site is expected to be the source of much needed food for malnourished children, especially those under five. It is hoped and expected that a high level of community participation will be involved from the Community Based Organizations (CBOs) and the general residents of George compound. In collaboration with the local CBOs, AMDA has already been carrying out temporary and experimental farming and adequately preparing for long-term farming.

**Distribution of Second-Hand Clothes:** A Japan-based charity organisation, Mikono, sent second-hand clothes to AMDA-Zambia. Since road conditions within the George compound become very poor during rainy season, we recognized the importance of mobilizing the community with voluntary participation in road maintenance. The participants were given second-hand clothes in appreciation for their labour and the exercise brought a positive change, which the community could be proud of. As for the remaining clothes, we donated them to the United Nations High Commissioner for Refugees (UNHCR) for distribution in refugees' camps in Northern Zambia and to a few local NGOs dealing with humanitarian assistance. This was a short-term activity for AMDA-Zambia seeing as the used clothes were collected only once.

**Micro-credit Programme:** The details of this programme are provided in the Income Generation Schemes Section.

**The impact of each of these programmes has proven to be positive and can be summarised as follow:**

- The beneficiaries' economic situation is seemingly improving.
- Sense of unity, belonging and teamwork is rising.

- Sanitation has improved with less diarrhea cases reported. This is as an indirect result of the health education programme.
- The participation impact is high; people are no longer segregating based on religion or sex. Gender understanding has also improved to the extent that we are now having more female leaders.
- Due to various community-based activities, innate capacities are being revealed among the residents of George compound. There are overall improvements in economics, skills, and health, as well as the potential availability to improve even further by involving more and more George compound residents.
- It is still early in the Bauleni project of micro-credit to make claims. So far a lot of enthusiasm towards AMDA projects has been noticed among residents. The evident mobilisation, participation and self-drive is symbolic of successful implementation in the compound.

**Sustainable Activities:**AMDA's activities in Zambia are supplementary to JICA-PHC Project activities, especially in the area of health. Health and other socio-economic aspects cannot be separated for they are inter-related. In this respect, AMDA-Zambia is in the process of preparing for the eventual take-over and continuation of JICA-PHC project activities. Among these, primary health care activities are considered the most important. This includes garbage collection, sanitary and health improvements, training of community health workers, reduction and/or elimination of malnutrition due to poverty, education on the importance of using safe water, etc.

**Youths Sports:** A key factor in improving health conditions is based on projects which focus on youths. Sports can play an important role in the upbringing of healthy children. This is even more important due to high numbers of orphans. In the future, AMDA-Zambia plans to organize various sporting activities with emphasis on football and athletic festivals if funds permit. Footballs, jerseys and other sporting

goods would be given as prizes to the winners. Contests would also be held for essay writing and posters on health related subjects.

**Vocational Training:** Social and vocational training is very important in Zambia. Tailoring and Adult Literacy Education will continue as well as several more socially based initiatives. AMDA-Zambia is planning to build a Vocational Training School within the George compound. This requires huge amounts of financial funding and thus is a long-term project. It is envisaged that once we construct our centre, the current activities taking place at St. Kizito Catholic parish will be relocated to the new centre.

Adult literacy, tailoring, community farm meetings, workshops/seminars, video shows etc., will all be held at the AMDA vocational training school. Once this centre is constructed, it will allow other skills to be developed, including carpentry, metal work, welding, mechanics, as well as nutritional studies. These are our future plans, providing adequate funding is available for this venture. The large population of George orphans will be the initial target group. In later years, orphans from other compounds shall also be invited to come and enroll on expansion basis.

## Chapter IV

### ETHICS

Is a branch of philosophy in which men attempt to evaluate and decide upon particular courses of moral action or general theories of conduct.

#### **Objectivists Ethics**

- ❖ Ought to do – ought not to do
- ❖ What it is - What it ought to be?

**Morality:** A code of values to guide man's choices and actions.

- ❖ It is a set of rules that guide actions of an individual human beings

#### **Stages of Moral Development:**

- Stage 1. Sticking to rules to avoid punishment
- Stage 2. Following rules only when doing so is your immediate interest
- Stage 3. Living up to what is expected by people close to you
- Stage 4. Maintaining the majorities' opinion conventional order by fulfilling obligations to which you have agreed.
- Stage 5. Valuing rights of others and upholding absolute values and rights regardless of the majorities opinion
- Stage 6. Following self-chosen ethical principles even if they violate the law

#### **Business ethics**

Business ethics (also known as corporate ethics) is a form of applied ethics or professional ethics that examines ethical principles and moral or ethical problems that arise in a business environment. It applies to all aspects of business conduct and is relevant to the conduct of individuals and business organizations as a whole. Applied ethics is a field of ethics that deals with ethical questions in many fields such as medical, technical, legal and environmental ethics.

Business ethics can be both a normative and a descriptive discipline. As a corporate practice and a career specialization, the field is primarily normative. In academia descriptive approaches are also taken. The range and quantity of business ethical issues reflects the degree to which business is perceived to be at odds with non-



economic social values. Historically, interest in business ethics accelerated dramatically during the 1980s and 1990s, both within major corporations and within academia. For example, today most major corporate websites lay emphasis on commitment to promoting non-economic social values under a variety of headings such as ethics codes and social responsibility charters. Some corporations have redefined their core values in the light of business ethical considerations, for example, BP's "beyond petroleum" environmental tilt.

### **Why business ethics?**

Discussion on ethics in business is necessary because business can become unethical, and there are plenty of evidences today on unethical corporate practices. Even Adam Smith opined that "People of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices." Firms and corporations operate in the social and natural environment. By virtue of existing in such environments, business is duty bound to be accountable to the natural and social environment in which it survives.

Irrespective of the demands and pressures upon it, business by virtue of its existence is bound to be ethical, for at least two reasons: one, because whatever the business does affects its stakeholders and two, because every juncture of action has trajectories of ethical as well as unethical paths, wherein the existence of the business is justified by ethical alternatives it responsibly chooses. One of the conditions that brought business ethics to the forefront is the demise of small scale, high trust and face-to-face enterprises, and emergence of huge multinational corporate structures capable of drastically affecting everyday lives of the masses.

### **History of ethics in business**

Business ethics, being part of the larger social ethics, has always been affected by the ethics of the epoch. At different epochs of the world, people, especially the elites of the world, were blind to ethics and morality which were obviously unethical to the

succeeding epoch. History of business, thus, is tainted by and through the history of slavery, history of colonialism, and later by the history of the cold war. The current discourse of business ethics is the ethical discourse of the post-colonialism and post-world wars.

The need for business ethics in the current epoch began gaining attention since the 1970s. Historically, firms started highlighting their ethical stature since the late 1980s and early 1990s, as the world witnessed serious economic and natural disasters because of unethical business practices. The fall of Enron is an instance of a major disaster triggered by bad corporate ethics. It should be noted that the idea of business ethics caught the attention of academics, media and business firms by the end of the overt Cold War.

Legitimate criticism against unethical practice of firms was presented as if it were infringement into the “freedom” of the entrepreneurs by activists backed by communist totalitarians. This scuttled the discourse of business ethics both in media and academia. Overt violence by business firms has decreased to a great extent in the democratic and media affluent world of the day, though it has not ceased to exist. The war in Iraq is one recent examples of overt violence by corporations.

### **General business ethics**

This part of business ethics overlaps with the philosophy of business, one of the aims of which is to determine the fundamental purposes of a company. If a company's main purpose is to maximize the returns to its shareholders, then it should be seen as unethical for a company to consider the interests and rights of anyone else. Corporate social responsibility or CSR: an umbrella term under which the ethical rights and duties existing between companies and society is debated.

Issues regarding the moral rights and duties between a company and its shareholders: fiduciary responsibility, stakeholder concept v. shareholder concept. Ethical issues concerning relations between different companies include issues such as hostile take-overs and industrial espionage; leadership issues such as corporate governance; Corporate Social Entrepreneurship; political

contributions made by corporations; law reform, such as the ethical debate over introducing a crime of corporate manslaughter; and the misuse of corporate ethics policies as marketing instruments.

### **Ethics of finance**

Fundamentally, finance is a social science discipline. The discipline shares its border with behavioural science, sociology, economics, accounting and management. It is concerned with technical issues such as the optimal mix of debt and equity financing, dividend policy, and the evaluation of alternative investment projects, and more recently the valuation of options, futures, swaps, and other derivatives securities, portfolio diversification and so on.

It is often mistaken to be a discipline free from ethical burdens. However, frequent economic meltdowns that could not be explained by theories of business cycles alone have brought ethics of finance to the forefront. Finance ethics is overlooked for other reasons—issues in finance are often addressed as matters of law rather than ethics. Looking closer into literature concerning finance ethics, one can be convinced that as the case with other operational areas of business, the ethics in finance too is being called into question.

### **Operational areas of financial ethics**

In the sections devoted to 'Financial Ethics' in 'Business Ethics' text books ethics of financial markets, financial services and financial management are discussed. Fairness in trading practices, trading conditions, financial contracting, sales practices, consultancy services, tax payments, internal audit, external audit are discussed in them.

- Creative accounting, earnings management, misleading financial analysis.
- Insider trading, securities fraud, bucket shops, Forex scams: concerns (criminal) manipulation of the financial markets.
- Executive compensation: concerns excessive payments made to corporate CEO's and top management.
- Bribery, kickbacks, facilitation payments: while these may be in the (short-term) interests of the company and its shareholders, these practices may be anti-competitive or offend against the values of society.

## **Ethics of human resource management**

'Human resource management' occupies the sphere of activity of recruitment selection, orientation, performance appraisal, training and development, industrial relations and health and safety issues where ethics really matters. There are certain inalienable rights of workplace such as a right to work, a right to privacy, a right to be paid in accordance with comparable worth, a right not to be the victim of discrimination; others claim that these rights are negotiable.

**Areas of HRM Ethics:** Ethics in employment management individual practices, issues like policies and practices of human resource management, the roles of human resource (HR) practitioners, the decline of trade unionism, issues of globalizing the labour etc. The moral hazards of HRM would be on increase so much as human relations and the resources embedded within humans are treated merely as commodities.

- Discrimination issues include discrimination on the bases of age (ageism), gender, race, religion, disabilities, weight and attractiveness. See also: affirmative action, sexual harassment.
- Issues arising from the traditional view of relationships between employers and employees, also known as At-will employment.
- Issues surrounding the representation of employees and the democratization of the workplace: union busting, strike breaking.
- Issues affecting the privacy of the employee: workplace surveillance, drug testing. See also: privacy.
- Issues affecting the privacy of the employer: whistle-blowing.
- Issues relating to the fairness of the employment contract and the balance of power between employer and employee: slavery, indentured, employment law.
- Occupational safety and health.

These points are also related to the hiring and firing of employees. In many developed nations, an employee or future employee usually

cannot be hired or fired based on race, age, gender, religion, or any other discriminatory act.

### **Ethics of Sales and Marketing**

Marketing Ethics is a subset of business ethics. Ethics in marketing deals with the principles, values and/or ideals by which marketers (and marketing institutions) ought to act. Two major concerns of marketing ethics are: the concern from political philosophy and the transaction-focused business practice.

**Ethical issues** considered in the marketing:

- The ethical prudence of targeting vulnerable sections for consumption of redundant or dangerous products/services,
- being transparent about the source of labour (child labour, sweatshop labour, fair labour remuneration),
- declaration regarding fair treatment and fair pay to the employees, being fair and transparent about the environmental risks,
- the ethical issues of product or service transparency (being transparent about the ingredients used in the product/service – use of genetically modified organisms, content, 'source code' in the case of software),
- appropriate labeling,
- the ethics of declaration of the risks in using the product/service (health risks, financial risks, security risks, etc.),
- product/service safety and liability,
- respect for stakeholder privacy and autonomy,
- the issues of outsmarting rival business through unethical business tactics etc.,
- advertising truthfulness and honesty,
- fairness in pricing & distribution, and
- forthrightness in selling, etc.

**Marketing ethics** is not restricted to the field of marketing alone, rather its influence spread across all fields of life such as,

- **Pricing:** price fixing, price discrimination, price skimming.

- **Anti-competitive practices:** these include but go beyond pricing tactics to cover issues such as manipulation of loyalty and supply chains. See: anti-competitive practices, antitrust law.
- **Specific marketing strategies:** greenwash, bait and switch, shill, viral marketing, spam (electronic), pyramid scheme, planned obsolescence.
- **Content of advertisements:** attack ads, subliminal messages, sex in advertising, products regarded as immoral or harmful
- **Children and marketing:** marketing in schools.
- **Markets:** Black markets, grey markets.

### **Ethics of production**

This area of business ethics usually deals with the duties of a company to ensure that products and production processes do not cause harm. Some of the more acute dilemmas in this area arise out of the fact that there is usually a degree of danger in any product or production process and it is difficult to define a degree of permissibility, or the degree of permissibility may depend on the changing state of preventative technologies or changing social perceptions of acceptable risk.

- Defective, addictive and inherently dangerous products and services (e.g. tobacco, alcohol, weapons, motor vehicles, chemical manufacturing, bungee jumping).
- Ethical relations between the company and the environment: pollution, environmental ethics, carbon emissions trading
- Ethical problems arising out of new technologies: genetically modified food, mobile phone radiation and health.
- Product testing ethics: animal rights and animal testing, use of economically disadvantaged groups (such as students) as test objects.

## **Ethics of property, property rights and intellectual property rights**

The **ethics of property**, property rights and intellectual property rights are assiduously contested throughout the history of the concept. Discourse on property gained its momentum by the turn of 17<sup>th</sup> century within the theological discussion of that time. The idea of property is intrigued with the notion of self as individual. Property ownership is said to enhance individual liberty by extending the line of non-interference by the state or others around the person. Seen from this perspective, property right is absolute and property has special and distinctive character that precedes its legal protection.

In this era, immersed deep into the cultural construct of autonomous individuals, the idea of property right was conceptualized as “sole and despotic dominion which one man claims and exercises over the external things of the world, in total exclusion of the right of any other individual in the universe”. It is during the same time, as the number of black slaves grew, American legislatures enacted comprehensive slave codes that defined the legal status of slaves as a form of property. Moreover, it is the time in which the natives of America were dispossessed of millions of acres of land. Ironically, the native Indians were dispossessed of their property of about 200,000 square miles (520,000 km<sup>2</sup>) of land under the leadership of Thomas Jefferson, who is a champion of property rights.

**Property right**, referred to as ‘bundle of rights’ implying a group of rights such as occupancy, use and enjoyment, and the right to sell, devise, give, or lease all or part of these rights, often obscure the responsibility associated with such a right: custodians of property have obligations as well as rights. Property claims, it is observed, is fragile and cannot exist without trust of others.

Often, what is claimed as property right later could originally is a forced appropriation rather than negotiation passed on to the heirs of the appropriators. However, the rights paradigm tends to stabilize the current distribution of property holdings by securing

extant property holdings on the assumption that they are lawfully acquired, socially important and politically and morally legitimate.

Property does not exist in isolation and so property rights too. Property rights describe relations among people and not just relations between people and things for the fundamental truth about human condition are its plurality. Some scholars argue that the idea that owners have no legal obligations to others wrongly supposes that property rights hardly ever conflict with other legally protected interests. Further, it is argued, rights impose duties on others and that liberties impose vulnerabilities on those affected by the exercise of those liberties. Ethics of property rights begins with recognizing the vacuous nature of the notion of property.

**Intellectual property right [IPR]** is a special kind of monopoly property right that indicates treating ideas, thoughts, codes and information as monopoly. Michele Bold in and David K. Levine argue that “the government does not ordinarily enforce monopolies for producers of other goods. This is because it is widely recognized that monopoly creates many social costs.

Intellectual monopoly is no different in this respect. The question we address is whether it also creates social benefits commensurate with these social costs.” The standards of Intellectual Property Rights are enforced through Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) globally.

The ethics of monopoly intellectual property rights is questioned from various points of views. A basic contention against IPRs in the context of natural rights and moral rationales is that inventions are mostly a social creation of collective, cumulative, path dependent, and interrelated work to which we all contribute, and, therefore, no one person or firm should be able to claim the property. It is argued that innovations happen in a matrix of historically emergent social arrangement letting individuals in the matrix hitting with the new idea and hence rewarding the lucky individuals with monopoly rights is contested.

The IPR causes concern because intellectual property unlike other forms of material property is unlimited, and unconstrained by limitations of space and time Further, intellect, which was



conventionally considered unalienable from its beholding person, is made legitimately alienable and that which can be owned by others. The others who alienate and own the intellectual property is usually corporate houses with portfolios of intellectual property.

The ethics of a legal system that lets relatively small number of corporate players amassing huge intellectual property portfolios and colonizing the future is contested. Ideas when owned and monopolized it would dispossess the present the generations yet to be born.

- Patent infringement, copyright infringement, trademark infringement.
- Misuse of intellectual property laws to stifle competition (patent misuse or copyright misuse), or to opportunistically extract litigation settlements and awards rather than in furtherance of the public policy aims behind the laws (patent troll, submarine patent, copyright troll, trademark troll)
- The notion of intellectual property itself has been criticised on ethical grounds.
- Employee raiding: the practice of attracting key employees away from a competitor to take unfair advantage of the knowledge or skills they may possess.
- The practice of employing all the most talented people in a specific field, regardless of need, to prevent any competitors employing them.
- Bio-prospecting and bio-piracy.
- Business intelligence and industrial espionage.

### **Ethics and technology**

The computer and the World Wide Web are two of the most significant inventions of the twentieth century. There are many ethical issues that arise from this technology. It is easy to gain access to information. This leads to data mining, workplace monitoring, and privacy invasion. Medical technology has improved as well. Pharmaceutical companies have the technology to produce lifesaving drugs. These drugs are protected by patents and there are no generic drugs available. This raises many ethical questions.

## **International business ethics**

While business ethics emerged as a field in the 1970s, international business ethics did not emerge until the late 1990s, looking back on the international developments of that decade. Many new practical issues arose out of the international context of business. Theoretical issues such as cultural relativity of ethical values receive more emphasis in this field. Other, older issues can be grouped here as well. Issues and subfields include:

- The search for universal values as a basis for international commercial behaviour.
- Comparison of business ethical traditions in different countries. Also on the basis of their respective GDP and [Corruption rankings].
- Comparison of business ethical traditions from various religious perspectives.
- Ethical issues arising out of international business transactions; e.g., bio-prospecting and bio-piracy in the pharmaceutical industry; the fair trade movement; transfer pricing.
- Issues such as globalization and cultural imperialism.
- Varying global standards – e.g., the use of child labor.
- The way in which multinationals take advantage of international differences, such as outsourcing production (e.g. clothes) and services (e.g. call centres) to low-wage countries.
- The permissibility of international commerce with pariah states.

The success of any business depends on its financial performance. Financial accounting helps the management to report and also control the business performance. The information regarding the financial performance of the company plays an important role in enabling people to take right decision about the company. Therefore, it becomes necessary to understand how to record based on accounting conventions and concepts ensure accurate records. Foreign countries often use dumping as a competitive threat, selling products at prices lower than their normal value. This can lead to

problems in domestic markets. It becomes difficult for these markets to compete with the pricing set by foreign markets. In 2009, the International Trade Commission has been researching anti-dumping laws. Dumping is often seen as an ethical issue, as larger companies are taking advantage of other less economically advanced companies.

### **Law and business ethics**

Very often it is held that business is not bound by any ethics other than abiding by the law. Milton Friedman is the pioneer of the view. He held that corporations have the obligation to make a profit within the framework of the legal system, nothing more. Friedman made it explicit that the duty of the business leaders is, "to make as much money as possible while conforming to the basic rules of the society, both those embodied in the law and those embodied in ethical custom". Ethics for Friedman is nothing more than abiding by 'customs' and 'laws'. The reduction of ethics to abide by laws and customs however has drawn serious criticisms.

Law presumes the accused is innocent until proven guilty and that the state must establish the guilt of the accused beyond reasonable doubt. As per liberal laws followed in most of the democracies, until the government prosecutor proves the firm guilty with the limited resources available to her, the accused is considered to be innocent. Though the liberal premises of law are necessary to protect individuals from being persecuted by Government, it is not a sufficient mechanism to make firms morally accountable.

### **Components of Ethical Policy**

To be successful, most ethicists would suggest that an ethics policy should be:

- Given the unequivocal support of top management, by both word and example.
- Explained in writing and orally, with periodic reinforcement.
- Doable....something employees can both understand and perform.
- Monitored by top management, with routine inspections for compliance and improvement.

- Backed up by clearly stated consequences in the case of disobedience.
- Remain neutral and nonsexist.

In the wake of numerous corporate scandals affecting large corporations like Enron, WorldCom and Tyco, even small and medium-sized companies have begun to appoint ethics officers. They often report to the Chief Executive Officer and are responsible for assessing the ethical implications of the company's activities, making recommendations regarding the company's ethical policies, and disseminating information to employees. They are particularly interested in uncovering or preventing unethical and illegal actions.

Ethical business practices result from a corporate culture that consistently places value on ethical behaviour, a culture and climate that usually emanates from the top of the organization. The mere establishment of a position to oversee ethics will most likely be insufficient to inculcate ethical behaviour: a more systemic programme with consistent support from general management will be necessary. The foundation for ethical behaviour goes well beyond corporate culture and the policies of any given company, for it also depends greatly upon an individual's early moral training, the other institutions that affect an individual, the competitive business environment the company is in and, indeed, society as a whole.

### **Business ethics as an academic discipline**

As an academic discipline, business ethics emerged in the 1970s. Since no academic business ethics journals or conferences existed, researchers published their papers in general management outlets, and attended general conferences, such as the Academy of Management. Over time, several peer-reviewed journals appeared, and more researchers entered the field. Especially, higher interest in business topics among academics was observed after several corporate scandals in the earlier 2000s. As of 2009, sixteen academic journals devoted to various business ethics issues existed, with *Journal of Business Ethics* and *Business Ethics Quarterly* being considered the leading A+ outlets.

The International Business Development Institute, a global non-profit organization, is a self-regulated organization that

represents 217 nations and all 50 United States offering a Charter in Business Development (CBD) that focuses on ethical business practices and standards. The Charter is administered and directed by top Harvard, MIT, and Fulbright Scholars, and it includes graduate-level coursework in economics, politics, marketing, management, technology, and legal aspects of business development as it pertains to business ethics. IBDI also oversees the International Business Development Institute of Asia which provides individuals living in 20 Asian nations the opportunity to earn his or her CBD or CIBD Charter.

### **Religious views on business ethics**

The historical and global importance of religious views on business ethics is sometimes underestimated in standard introductions to business ethics according to Dr. Todd Albertson author of *The Gods of Business*. Particularly in Asia and the Middle East, religious and cultural perspectives have a strong influence on the conduct of business and the creation of business values.

Examples include:

- Islamic banking, associated with the avoidance of charging interest on loans.
- Traditional Confucian disapproval of the profit-seeking motive.
- Quaker testimony on fair dealing.

### **Differing opinions regarding business ethics**

Business ethics is a contested terrain. There are economists and business gurus who claim ethics is irrelevant to the field of business. For instance, the neo-liberal Chicago school economist Milton Friedman held that corporations are amoral and CEOs have only one duty: to maximize the profits of a company.

He also said in an interview that business cannot have social responsibilities. Similarly Peter Drucker, a business guru, also observed, "There is neither a separate ethics of business nor is one needed". However, Peter Drucker in another instance observed that ultimate responsibility of the directors of the companies is above all not to harm – *primum non nocere*. The ideological position of excluding firms from ethical obligations is contested.

Business ethics is a contested terrain not just because celebrated persons in the field of economics and business questioned the relevance of ethics in business, observe editors of respected business ethics textbook, but also because what is presented in the name of ethics is either sentimental common sense, or a set of excuses for being unpleasant. What is presented as ethics in many of the Business Ethics manuals and books are just premature responses to questions that look like answers or mere procedural form filling exercises unconcerned about the real ethical dilemmas.

The field of business ethics, it is contested, has insulated itself from the new developments in ethical debate, either ignoring them altogether or misrepresenting. Arguments in Business Ethics often downplay the role of social context, social arrangements, social processes, history, politics and structural aspects constituting individuals and individual actions. Issues taken as ethical dilemma by business ethicists are often narrow in scope, such as behaving politely with customers, following office etiquettes, protecting privacy of employees, avoiding discriminations, bribery, kickbacks etc., while issues like inequality among global labour, ethics of lobbying, intellectual property alienation, bio-piracy etc., are broadly neglected.

The term ethics connotes different thing to people oriented differently. There are arguments from virtue, deontological, utilitarian and pragmatic schools of thought about ethics. The differences are not just a matter of talking about the same thing in different ways. Rather, these different ways of talking about ethics seem to be talking about different things, about different ways of imagining ethics itself. Like discussions of ethics in any other fields, business ethics too should be treated along the percepts of various established, neglected and emergent schools of ethical thought.

Business ethics is assumed to be something that does not really trouble basic assumptions about the normal practices of business. Instead of looking at the politics the corporate firms play in modifying rules of accounting practices, diluting labour laws, weakening regulatory mechanisms etc., and it tends to look at the ethical collapse of firms like Enron and Arthur Andersen as if it were

isolated instances of individuals slipping away from their ethical responsibilities. Further, Business ethicists often foreclose the goal of being ethical. They attempt to convince that being ethical serves a strategy of image management or sustained profit making.

Others hold being ethical and making profit are equally valid goals of firms, some others claim being ethical is just for the sake of being ethical. Further, Ethics, when re-modelled as business ethics it suffers the fate of business expediency thus business ethicists prepare themselves for unambiguous quick and standard answers while ethics is not a matter of stable solutions but one of endless openness and difficulty and beyond the limits of normativity.

### **Ethical dilemma**

Ethical dilemmas, also known as moral dilemmas, have been a problem for ethical theorists as far back as Plato. An ethical dilemma is a situation wherein moral precepts or ethical obligations conflict in such a way that any possible resolution to the dilemma is morally intolerable. In other words, an ethical dilemma is any situation in which guiding moral principles cannot determine which course of action is right or wrong.

Ethical dilemma is a complex situation that will often involve an apparent mental conflict between moral imperatives, in which to obey one would result in transgressing another. This is also called an ethical paradox since in moral philosophy, paradox often plays a central role in ethics debates.

However, human beings have complex social relationships that can't be ignored: If one has an ethical relationship with the neighbour trying to kill you, then, usually, their desire to kill you would likely be the result of mental illness on their part, stories told to them by others, e.g. their daughter claims you raped her. Such conflicts might be settled by some other path that has strong social support. Societies formed criminal justice systems (some argue also ethical traditions and religions) to defuse just such deep conflicts. Such systems always impose trained judges who are presumed to have an ethical relationship and also a clear obligation to all who come before them.

## **Responses to the arguments**

There are many examples of **moral dilemmas**; for instance, a more up to date dilemma is abortion. A woman who has been raped but found out that she is now pregnant from the rapist can choose whether to abort or to keep the fetus. The question is “whether the fetus has rights and, if so, how they are to be balanced against the right of the mother.” A further confounding factor is that pregnancy may threaten the life of the mother, thus implicating the mother’s right to life, rather than her rights of bodily integrity and personal choice.

However, there are few legitimate ethical systems in which stealing are more wrong than letting one’s family die. Ethical systems do in fact allow for, and sometimes outline, tradeoffs or priorities in decisions. Some have suggested that international law requires this kind of mechanism to resolve whether WTO or Kyoto Protocol takes precedence in deciding whether a WTO notification is valid. That is, whether nations may use trade mechanisms to complain about climate change measures.

As there are few economies that can operate smoothly in a chaotic climate, the dilemma would seem to be easy to resolve, but since fallacious justifications for restricting trade are easily imagined – just as, at the family level, fallacious justifications for theft are easily imagined – the seemingly obvious resolution becomes clouded by the suspicion of an illegitimate motive. Resolving ethical dilemmas are rarely simple or clear-cut and very often involve revisiting similar dilemmas that recur within societies:

### **Roles within structures**

Where a structural conflict is involved, dilemmas will very often recur. A trivial example is working with a bad operating system whose error messages do not match the problems the user perceives. Each such error presents the user with a dilemma: reboot the machine and continue working at one’s employment, or, spend time trying to reproduce the problem for the benefit of the developer of the operating system.

So role structure sabotages feedback and results in sub-optimal results since provision has been made to actually reward



people for reporting these errors and problems. See total quality management for more on addressing this kind of failure, and governance on how many ethical and structural conflicts can be resolved with appropriate supervisory mechanisms.

## **Corruption**

In modern English usage the words corruption and corrupt have many meanings:

- Political corruption, the abuse of public power, office, or resources by government officials or employees for personal gain, e.g. by extortion, soliciting or offering bribes
- Police corruption, a specific form of police misconduct designed to obtain financial benefits, other personal gain, and/or career advancement for a police officer or officers in exchange for not pursuing, or selectively pursuing, an investigation or arrest
- Corporate corruption, corporate criminality and the abuse of power by corporation officials, either internally or externally, including the fact that police obstruct justice.
- Corruption (philosophical concept), often refers to spiritual or moral impurity, or deviation from an ideal
- Corruption Perceptions Index, published yearly by Transparency International
- Putrefaction, the natural process of decomposition in the human and animal body following death
- Data corruption, an unintended change to data in storage or in transit
- Linguistic corruption, the change in meaning to a language or a text introduced by cumulative errors in transcription as changes in the language speakers' comprehension
- Bribery in politics, business, or sport
- Rule of law, governmental corruption of judiciary, includes governmental spending on the courts, which is completely financially controlled by the executive in many transitional and developing countries

### **Institutions dealing with political corruption**

- Transparency International, a non-governmental organization that monitors and publicizes corporate and political corruption in international development
- Global Witness, an international NGO established in 1993 that works to break the links between natural resource exploitation, conflict, poverty, corruption, and human rights abuses worldwide
- Trust Law, a service of the Thomson Reuters Foundation is a global hub for free legal assistance and news and information on anti-corruption

### **Bribery**

It is a form of corruption, is an act implying money or gift given that alters the behavior of the recipient. Bribery constitutes a crime and is defined by Black's Law Dictionary as the offering, giving, receiving, or soliciting of any item of value to influence the actions of an official or other person in charge of a public or legal duty.

The bribe is the gift bestowed to influence the recipient's conduct. It may be any money, good, right in action, property, preferment, privilege, emolument, object of value, advantage, or merely a promise or undertaking to induce or influence the action, vote, or influence of a person in an official or public capacity.

### **Forms of bribery**

Bribery around the world is estimated at about \$1 trillion (£494bn). Many types of bribes exist: tip, gift, perk, skim, favour, discount, waived fee/ticket, free food, free ad, free trip, free tickets, sweetheart deal, kickback/payback, funding, happy meal, inflated sale of an object or property, lucrative contract, grease money, donation, campaign contribution, fund raiser, sponsorship/backing, higher paying job, stock options, secret commission, or promotion (rise of position/rank).

One must be careful of differing social and cultural norms when examining bribery. Expectations of when a monetary transaction is appropriate can differ from place to place. Political campaign contributions in the form of cash, for example, are considered criminal acts of bribery in some countries, while in the

United States they are legal. Tipping, for example, is considered bribery in some societies, while in others the two concepts may not be interchangeable.

**The offence may be divided into two great classes:**

- a. Where a person invested with power is induced by payment to use it unjustly;
- b. Where power is obtained by purchasing the suffrages of those who can impart it.

Likewise, the briber might hold a powerful role and control the transaction; or in other cases, a bribe may be effectively extracted from the person paying it, although this is better known as extortion.

The forms of bribery are numerous. For example, a motorist might bribe a police officer not to issue a ticket for speeding, a citizen seeking paperwork or utility line connections might bribe a functionary for faster service. Bribery may also take the form of a secret commission, a profit made by an agent, in the course of his employment, without the knowledge of his principal. Euphemisms abound for this (commission, sweetener, back-kick etc.) Bribers and recipients of bribery are likewise numerous although bribers have one common denominator and that is the financial ability to bribe.

From a legal point of view, active bribery can be defined for instance as the promising, offering or giving by any person, directly or indirectly, of any undue advantage [to any public official], for himself or herself or for anyone else, for him or her to act or refrain from acting in the exercise of his or her functions.

The reason for this dissociation is to make the early steps (offering, promising, requesting an advantage) of a corrupt deal already an offence and, thus, to give a clear signal (from a criminal policy point of view) that bribery is not acceptable. Besides, such dissociation makes the prosecution of bribery offences easier since it can be very difficult to prove that two parties (the bribe-giver and the bribe-taker) have formally agreed upon a corrupt deal. Besides, there is often no such formal deal but only a mutual understanding, for instance when it is common knowledge in a municipality that to obtain a building permit one has to pay a "fee" to the decision maker to obtain a favourable decision.

## **Government**

A grey area may exist when payments to smooth transactions are made. United States law is particularly strict in limiting the ability of businesses to pay for the awarding of contracts by foreign governments; however, the Foreign Corrupt Practices Act contains an exception for "grease payments"; very basically, this allows payments to officials in order to obtain the performance of ministerial acts which they are legally required to do, but may delay in the absence of such payment. In some countries, this practice is the norm, often resulting from a developing nation not having the tax structure to pay civil servants an adequate salary. Nevertheless, most economists regard bribery as a bad thing because it encourages rent seeking behaviour. A state where bribery has become a way of life is a kleptocracy.

### **Tax treatment of bribes**

The tax status of bribes is an issue for governments since the bribery of government officials impedes the democratic process and may interfere with good government. In some countries, such bribes are considered tax-deductible payments. However, in 1996, in an effort to discourage bribery, the OECD Council recommended that member countries cease to allow the tax-deductibility of bribes to foreign officials. This was followed by the signing of the Anti-Bribery Convention. Since that time, the majority of the OECD countries which are signatories of the convention have revised their tax policies according to this recommendation and some have extended the measures to bribes paid to any official, sending the message that bribery will no longer be tolerated in the operations of the government.

### **Medicine**

Pharmaceutical corporations may seek to reward doctors for heavy prescription of their drugs through gifts. Doubtful cases include grants for traveling to medical conventions that double as tourist trips. Dentists often receive samples of home dental care products such as toothpaste, which are of negligible value; somewhat ironically, dentists in a television commercial will often

state that they get these samples but pay to use the sponsor's product.

In countries offering state-subsidized or nationally funded healthcare where medical professionals are underpaid, patients may use bribery to solicit the standard expected level of medical care. For example, in many formerly Communist countries from what used to be the Eastern Bloc it may be customary to offer expensive gifts to doctors and nurses for the delivery of service at any level of medical care in the non-private health sector.

### **Politics**

Politicians receive campaign contributions and other payoffs from powerful corporations, organizations or individuals when making choices in the interests of those parties, or in anticipation of favorable policy. However, such a relationship does not meet the legal standards for bribery without evidence of a quid pro quo. See also influence peddling and political corruption.

### **Business**

Employees, managers, or salespeople of a business may offer money or gifts to a potential client in exchange for business. In some cases where the system of law is not well-implemented, bribes may be a way for companies to continue their businesses. In the case, for example, custom officials may harass a certain firm or production plant, officially stating they are checking for irregularities, halting production or stalling other normal activities of a firm. The disruption may cause losses to the firm that exceeds the amount of money to pay off the official. Bribing the officials is a common way to deal with this issue in countries where there exists no firm system of reporting these semi-illegal activities. Specialist consultancies have been set up to help multinational companies and SMEs with a commitment to anti-corruption to trade more ethically and benefit from compliance with the law.

Contracts based on or involving the payment or transfer of bribes can be called different names some euphemistically and some more direct. They are "corruption money", "secret commissions" and "kickbacks

## **Sport corruption**

Referees and scoring judges may be offered money, gifts, or other compensation to guarantee a specific outcome in an athletic or other sports competition. Additionally, bribes may be offered by cities in order to secure athletic franchises, or even competitions, as happened with the 2002 Winter Olympics. It is common practice for cities to “bid” against each other with stadiums, tax benefits, and licensing deals to secure or keep professional sports franchises.

Athletes themselves can be paid to under-perform, generally so that a gambler or gambling syndicate can secure a winning bet. A classic example of this was the 1919 World Series, better known as the Black Sox Scandal.

Finally, in some sports, elements of the game may be tampered with – the classic example being from horse racing, where a groom or other person with access to the horses before the race may be bribed to over-feed an animal, or even administer a sedative or amphetamine known as “horse doping” in order to make a horse faster or slower to respectively increase or reduce their chances of winning. Another type of bribery done for financial gain through gambling is to bet against a clear favorite, and ensure that the favorite has an “off day”, or attempt to “hop up” a long shot in an attempt to collect big winnings by betting on the heavy odds against it.

## **Duplication**

Duplication, duplicate, and duplicator may refer to:

### **Biology and Genetics**

- Gene duplication, a process which can result in free mutation
- Chromosomal duplication, which can cause Bloom and Rett syndrome
- Polyploidy, a phenomenon also known as ancient genome duplication
- Enteric duplication cysts, certain portions of the gastrointestinal tract
- Diprosopus, a form of co-joined twins also known as craniofacial duplication

- Diphallia, a medical condition also known as penile duplication

### **Computing**

- Duplicate code, a source code sequence that occurs more than once in a program
- Duplicate characters in Unicode

### **Mathematics**

- Duplication matrix, a linear transformation dealing with half-vectorisation
- Doubling the cube, a problem in geometry also known as duplication of the cube
- A type of multiplication theorem called the Legendre duplication formula or simply “duplication formula”

### **Technology**

- Duplicating machines, machines and processes designed to reproduce printed material, photocopying being among the best-known today; see also List of duplicating processes
- Loop bin duplicator, a device designed to copy pre-recorded audio tapes
- Double track, a method of railway design also known as track duplication
- In road construction, conversion of a single carriageway into dual carriageway

### **Other**

- Duplicate publication, the publication same intellectual material by the same author twice
- Reduplication, a morphological process in linguistics
- Rebirthing (Breathwork) duplicate, a therapeutic technique in alternative medicine
- “Decouple, duplicate, discriminate,” the “three Ds” articulated by Madeleine Albright as necessary for NATO to avoid

### **Medical ethics**

Medical ethics is a system of moral principles that apply values and judgments to the practice of medicine. As a scholarly

discipline, medical ethics encompasses its practical application in clinical settings as well as work on its history, philosophy, theology, and sociology.

### **History**

Historically, Western medical ethics may be traced to guidelines on the duty of physicians in antiquity, such as the Hippocratic Oath, and early rabbinic and Christian teachings. In the medieval and early modern period, the field is indebted to Muslim medicine such as Ishaq bin Ali Rahawi (who wrote the *Conduct of a Physician*, the first book dedicated to medical ethics) and Muhammad ibn Zakariyaar-Razi (known as Rhazes in the West), Jewish thinkers such as Maimonides, Roman Catholic scholastic thinkers such as Thomas Aquinas, and the case-oriented analysis (casuistry) of Catholic moral theology. These intellectual traditions continue in Catholic, Islamic and Jewish medical ethics.

By the 18<sup>th</sup> and 19<sup>th</sup> centuries, medical ethics emerged as a more self-conscious discourse. While the secularized field borrowed largely from Catholic medical ethics, in the 20<sup>th</sup> century a distinctively liberal Protestant approach was articulated by thinkers such as Joseph Fletcher. In the 1960s and 1970s, building upon liberal theory and procedural justice, much of the discourse of medical ethics went through a dramatic shift and largely reconfigured itself into bioethics. Since the 1970s, the growing influence of ethics in contemporary medicine can be seen in the increasing use of Institutional Review Boards to evaluate experiments on human subjects, the establishment of hospital ethics committees, the expansion of the role of clinician ethicists, and the integration of ethics into many medical school curricula.

### **Values in medical ethics**

Six of the values that commonly apply to medical ethics discussions are:

- Autonomy - the patient has the right to refuse or choose their treatment. (*Voluntas aegrotis suprema lex.*)
- Beneficence - a practitioner should act in the best interest of the patient. (*Salus aegrotis suprema lex.*)
- Non-maleficence – “first, do no harm” (*primum non nocere*).



- Justice - concerns the distribution of scarce health resources, and the decision of who gets what treatment (fairness and equality).
- Dignity - the patient (and the person treating the patient) have the right to dignity.
- Truthfulness and honesty - the concept of informed consent has increased in importance since the historical events of the Doctors' Trial of the Nuremberg trials and Tuskegee Syphilis Study.

Values such as these do not give answers as to how to handle a particular situation, but provide a useful framework for understanding conflicts.

When moral values are in conflict, the result may be an ethical dilemma or crisis. Sometimes, no good solution to a dilemma in medical ethics exists, and occasionally, the values of the medical community (i.e., the hospital and its staff) conflict with the values of the individual patient, family, or larger non-medical community. Conflicts can also arise between health care providers, or among family members. Some argue for example, that the principles of autonomy and beneficence clash when patients refuse blood transfusions, considering them life-saving; and truth-telling was not emphasized to a large extent before the HIV era.

### **Engineering Ethics**

Engineering ethics is the field of applied ethics which examines and sets standards for the obligations of engineers to the public, their clients, employers and the profession. This article addresses the subject for both professional engineers and other engineers. Engineering does not have a single uniform system, or standard, of ethical conduct across the entire profession. Ethical approaches vary somewhat by discipline and jurisdiction, but are most influenced by whether the engineers are independently providing professional services to clients or the public if employed in government service; or if they are employees of an enterprise creating products for sale.

### **General principles**

Codes of engineering ethics identify a specific precedence with respect to the engineer's consideration for the public, clients, employers, and the profession.

### **Fundamental Canons**

1. Engineers shall hold paramount the safety, health and welfare of the public and shall strive to comply with the principles of sustainable development in the performance of their professional duties.
2. Engineers shall perform services only in areas of their competence.
3. Engineers shall issue public statements only in an objective and truthful manner.
4. Engineers shall act in professional matters for each employer or client as faithful agents or trustees, and shall avoid conflicts of interest.
5. Engineers shall build their professional reputation on the merit of their services and shall not compete unfairly with others.
6. Engineers shall act in such a manner as to uphold and enhance the honor, integrity, and dignity of the engineering profession and shall act with zero-tolerance for bribery, fraud, and corruption.
7. Engineers shall continue their professional development throughout their careers, and shall provide opportunities for the professional development of those engineers under their supervision.

### **Other ethical issues**

There are several other ethical issues that engineers may face. Some have to do with technical practice, but many others have to do with broader considerations of business conduct. These include:

- Relationships with clients, consultants, competitors, and contractors

- Ensuring legal compliance by clients, client's contractors, and others
- Conflict of interest
- Bribery and kickbacks, which also may include: gifts, meals, services, travel, tourism and entertainment
- Treatment of confidential or proprietary information
- Consideration of the employer's assets
- Outside employment/activities (Moonlighting)

Some engineering societies are addressing environmental protection as a stand-alone question of ethics. The field of business ethics often overlaps and informs ethical decision making for engineers.

### **Ethics for Teachers**

The professional educator strives to create a learning environment that nurtures to fulfillment the potential of all students. The professional educator acts with conscientious effort to exemplify the highest ethical standards. The professional educator responsibly accepts that every child has a right to an uninterrupted education free from strikes or any other work stoppage tactics.

### **Principle 1: Ethical Conduct toward Students**

The professional educator accepts personal responsibility for teaching students character qualities that will help them evaluate the consequences of and accept the responsibility for their actions and choices. We strongly affirm parents as the primary moral educators of their children. Nevertheless, we believe all educators are obligated to help foster civic virtues such as integrity, diligence, responsibility, cooperation, loyalty, fidelity, and respect-for the law, for human life, for others, and for self. The professional educator, in accepting his or her position of public trust, measures success not only by the progress of each student toward realization of his or her personal potential, but also as a citizen of the greater community of the republic.

1. The professional educator deals considerately and justly with each student, and seeks to resolve problems, including discipline, according to law and school policy.
2. The professional educator does not intentionally expose the student to disparagement.
3. The professional educator does not reveal confidential information concerning students, unless required by law.
4. The professional educator makes a constructive effort to protect the student from conditions detrimental to learning, health, or safety.
5. The professional educator endeavors to present facts without distortion, bias, or personal prejudice.

### **Principle 2: Ethical Conduct toward Practices and Performance**

The professional educator assumes responsibility and accountability for his or her performance and continually strives to demonstrate competence. The professional educator endeavors to maintain the dignity of the profession by respecting and obeying the law, and by demonstrating personal integrity.

1. The professional educator applies for, accepts, or assigns a position or a responsibility on the basis of professional qualifications, and adheres to the terms of a contract or appointment.
2. The professional educator maintains sound mental health, physical stamina, and social prudence necessary to perform the duties of any professional assignment.
3. The professional educator continues professional growth.
4. The professional educator complies with written local school policies and applicable laws and regulations that are not in conflict with this code of ethics.
5. The professional educator does not intentionally misrepresent official policies of the school or educational organizations, and clearly distinguishes those views from his or her own personal opinions
6. The professional educator honestly accounts for all funds committed to his or her charge.
7. The professional educator does not use institutional or professional privileges for personal or partisan advantage.

### **Principle 3: Ethical Conduct toward Professional Colleagues**

By being an example, the professional educator, exemplifies ethical relations with colleagues, and accords just and equitable treatment to all members of the profession.

1. The professional educator does not reveal confidential information concerning colleagues unless required by law.
2. The professional educator does not willfully make false statements about a colleague or the school system.
3. The professional educator does not interfere with a colleague's freedom of choice, and works to eliminate coercion that forces educators to support actions and ideologies that violate individual professional integrity.

### **Principle 4: Ethical Conduct toward Parents and Community**

The professional educator pledges to protect public sovereignty over public education and private control of private education. The professional educator recognizes that quality education is the common goal of the public, boards of education, and educators, and that a cooperative effort is essential among these groups to attain that goal.

1. The professional educator makes concerted efforts to communicate to parents all information that should be revealed in the interest of the student.
2. The professional educator endeavors to understand and respect the values and traditions of the diverse cultures represented in the community and in his or her classroom.
3. The professional educator manifests a positive and active role in school/community relations.

## Chapter V

### INDIVIDUAL AS CIVILIAN AND RESPONSIBILITY TO THE NATION

**National Building:** It is the process of unselfish, altruistic devotion to the all-round growth of one's own nation, contributed by every citizen without any selfish ends and finally converting the nation into a subsystem of the total system namely the Global community.

**Nation** is the largest effective community. It is the largest group which is permeated by a common consciousness of a common kind.

#### **Important factors are:**

- Community of language
- Geographical contiguity
- Common economic ties.
- Common history and traditions
- Political autonomy

Each of the above is not an absolute necessity, but an individual is bound by certain factors. These are as follows:

- As an Individual.
- As a member of the community.
- As a member of the society/Nation.

#### **As an individual**

- Socially Responsible: Awareness, volunteers to help the needy, taking up the roles.
- Culturally Conscious: Cultural identity, torch bearer
- Politically aware and alert: Involvement, law abiding.
- Economically responsible: tax payer, Bread winner, thrift maker.
- Religiously committed/tolerable: sincerely religious, respecting the other religions, not fanatic.

#### **As a Member of the Community/Smaller Group**

- Community awareness: adherence to the code.
- Responsible member: roles clarity/role model, volunteering to assist.
- Taking initiatives: community needs, participating in common functions.

#### **As a Member of the Society/Nation**

- Contribute towards social development.

- Awareness - what happens in Zambia.
- Sharing the responsibilities.
  - As a Guide.
  - As a Model.
  - Patriotism

### **Social Pathology**

Any social disturbance which is detrimental to the overall development and sustainability of the society is known as social pathology. It is pathological as it doesn't allow the healthy and conducive environment to exist in the society. Any social problem in the society is socially pathological and detrimental to the growth of the society

**Street Children:** Any child who starts to live without a shelter without the guidance of parents or caring adults and who resorts to living on the road without being cared for by anybody is known as the street child. These children are the victim of the following:

1. Broken homes
2. Poverty
3. Run away/destitute
4. Lack of parental care and affection
5. Irresponsible parents
6. Orphans

### **Impact**

- They fall a prey into the hands of anti-social elements and become criminals
- Certain crimes are carried out using the street children
- They go for begging to make their living
- Their personal hygiene is at stake

### **Remedy**

- Socialisation of family
- Small family norms
- NGOs/Government can take them to orphanages and educate them
- The community can come forward to maintain such children
- Affordable families/persons can sponsor their education and living.

**Destitute Girls/Women:**The reason for destitution

1. Family disorganization
2. Poverty
3. Lack of any basic resources
4. Trafficking
5. Deserted by the husbands
6. Prothel houses
7. Vagabond

**Effects**

- Beggary
- Prostitution
- AIDS
- Burglary

**Solution**

- Family organization
- SHGs to be formed in all small societies
- Small family norms
- Cultural change through awareness programmes
- NGOs and Government taking care of such persons.

**Old age**

Any person who has grossed the age of sixty is said to be in the old age. This is also known as second childhood stage.

**Problems of the aged:**

- Deterioration in health
- Dependency on the younger members of the family
- Economic instability and dependency
- Lack of attention and affection by younger generation at the family and outside
- Seeking attention, love and affection
- Longing for companions
- Loss of memory
- Considered as a burden in the modern times
- Deterioration in the culture.



**Solution:**

- Love and affection shown by the next generations in the family
- Showing care attention by the younger generation
- Respecting their age and experience and get to know from them
- Old age homes are not the complete solution
- Only by family care and affection this could be solved.

**Responsible Citizenship**

Any person recognized as the citizen or the subject of a sovereign nation will have to have citizenship identity card. As a citizen and a member of the nation should have some functions and roles specifically carried out as the member of the larger society, the nation. A civilian is one who is the citizen of a particular nation and not a member of any military Navy, Air force and Police services.

A responsible citizen is one:

1. Who has knowledge of himself/herself through regular self-analysis
2. Should have the sense of responsibility by clearly understanding his/her roles in the family, social, economic, religious, political environments
3. Make himself resourceful so as to be available to anyone who is in need of information, knowledge
4. Able to take up responsibility at any given situation
5. Able own responsibility rather than shirking the responsibilities
6. A man/woman with eco – friendly attitude and behaviour.
7. Should be human and empathizing with the feelings of the human and living beings.
8. Conserve the resources available to him/her
9. Help the needy to identify his resource or means of living and livelihood.
10. Be a model to other fellow citizens ethically, morally, religiously and socially
11. with ethical principles to follow in life

12. Committed to the cause of one's own living and lead his/her life to be of use to the other. This higher order of living means the pro-existence
13. Become or to be responsible through action and guidance
14. Should love the nature, society, family and self.
15. Must be socially upright rather than being selfish and corrupt
16. Must be ready to face challenges that may come up when behaving socially responsible
17. Must be time conscious and should respect the time of other human beings
18. Must help the individual and communal hygiene.
19. Must liaise between society and government when needs arise
20. Abide by the law of the nation, law of the nature and a guardian.

#### **Different basis of functions**

The individual can influence and guide at various levels. They are as follows.

**As a member of the family:** As parents the responsibility is to guide and supervise, and ensure care for the children in every aspect of their lives until they attain the age of majority. The children should be responsible to maintain the harmony of the home by doing the work entrusted to them.

**As an adult:** Becoming a young adult is exciting, difficult, and scary for both parents and teens. It is a time of increasing independence and change, no matter what the situation. Learning to be independent does not happen overnight. Just like getting a driver's license, it occurs over time and in steps. Learning new skills with supervision and taking on some responsibilities, but with parental support at first before assuming full responsibility is the mark of a person who is adult.

Being adult means being fully responsible for one's own actions Parents need to give up much of the control over many of their young adult's decisions. Open and honest communication is key. Even though some topics may be difficult or even embarrassing

for you, this is the basis of a healthy adult relationship with their children.

**As an educated individual:**

**As a member of the community:** Helping our fellow man has long been seen as an altruistic behavioral model. But it turns out that more selfish motives—pleasing friends, doing what you want—are more successful causes of effective volunteering. Whatever the motive, volunteering improves the health, happiness, and in some cases, the longevity of volunteers. Children who volunteer are more likely to grow up to be adults who volunteer. Unwilling children, who are forced to volunteer, do fare better than kids who do not volunteer. In a virtuous circle, communities with lots of volunteers are more stable and better places to live, which in turn further boost volunteerism.

**As a civilian**

**As an user of natural resources**

**As a man of religion/faith**

**Conserving and Protecting our Earth**

Despite professing to care about the environment and supporting environmental causes, individuals behave in environmentally irresponsible ways like driving when they can take public transportation, littering, or disposing of toxic materials in unsound ways. This is my fourth exploration of how to encourage individuals to stop behaving irresponsibly about the environment they allege to care deeply about. Everyone has some form of impact on their natural environment – in an industrialized world, this is an unavoidable reality. However, the extent to which people negatively impact their environment can absolutely be mitigated through a number of means. Whether it's making large efforts or simple ones, there are many ways that everyone can do their part to help preserve the health of the environment.

The simplest explanation about why the environment matters is that, as humans, the environment – the Earth – is our home. It is where we live, breathe, eat, raise our children, etc. Our

entire life support system is dependent on the well-being of all of the species living on earth. This is commonly referred to as the biosphere; a term created by Vladimir Vernadsky, a Russian scientist in the 1920s. The biosphere refers to one global ecological system in which all living things are interdependent.

### **Food Chain**

The food chain is an example of this. The sun provides light and heat for plants. The plants are consumed by animals who are in turn consumed by other animals who may in turn, be consumed by humans. Or perhaps they are used for material, clothing, etc. Even insects like mosquitoes play a role and of course bees pollinate plants.

### **Ecosystem**

Within the overall biosphere, or ecosystem, there are smaller ecosystems like the rainforests, marine ecosystems, the desert and the tundra. When any of these systems are off kilter, it impacts the entire planet. All of the environmental problems that exist have far-reaching implications for the health of our planet and its inhabitants.

For example, global warming causes a rise in sea levels which effects marine life. The rising sea levels also cause land erosion which harms the habitats of animals living by the coast. Global warming also melts polar caps and leads to arctic shrinking. This endangers the polar bears and other arctic wildlife. Since the icecaps are made of fresh water, they will throw off the saline levels in the ocean which will affect ocean currents. Furthermore, the ice caps reflect light. As they disappear the Earth will get darker and absorb more heat increasing the Earth's temperature.

### **Threat of Environmental Degradation**

The deterioration of the environment, often referred to as environmental degradation, threatens the earth's natural resources such as our clean water supply, fossil fuels for energy and food supply. Many of these resources are non-renewable so when they run out we will be forced to find new alternatives.

Unfortunately the planet is in danger. Many species of animals and plants are nearing distinction. Our clean water supply is

at risk and more and more of our beautiful, open spaces are disappearing as new buildings and factories are built.

### **Why is our environment important?**

It is the only home we have. Many experts believe that we can reverse some of the harm the planet has suffered. The challenge is getting enough people to take drastic enough action so that we can make a difference in our lifetime.

There is not one culprit that people can hold responsible as the singular cause of environmental destruction. While global climate change may be the environmental cause du jour, it is certainly not the only issue facing humankind. Much like there are numerous causes to environmental destruction, there are numerous things that everyone can do at home to help mitigate this damage. Changes do not have to be big, and many incremental changes can add up to a major shift.

- Compact fluorescent bulbs last longer and use less energy than incandescent bulbs, so you will save money by using them.
- Many municipalities already offer good recycling programs. All glass, cans and paper should be recycled, along with as much plastic as possible.
- You may notice that cleaning products can be harsh on the eyes and nose. They can also be hard on the environment. For most household cleaning, you can use baking soda, white vinegar and soap. You will save money and cut down on dangers for small children.
- Invest in a set of canvas bags. You can use these for a lot of shopping. Most people use them for groceries, but bring them along when buying books, toys or even clothes. If they are too bulky, there are many others that fold up and slip into small purses.
- Utilize greywater for things like flushing the toilet and watering the garden. If you use natural soaps without harsh chemicals, the water from your bath or shower can be reused on your garden. Also, this water can be reused to flush your toilet. All you need to do is put a bucket in the

shower with you to collect the water, then dump it down the toilet to flush.

- Use your electronics until they are completely dead and impossible to use. Consumer electronics create an immense amount of waste, and not only when it comes to the components piling up in landfills. Electronics use a number of minerals that are often mined in countries without proper environmental protection protocols. Buying fewer electronics will help you to drastically reduce your imprint on the environment.
- Use heavy curtains on your windows. Heavy curtains play a great dual purpose in your home when it comes to energy savings. Not only will they help keep sunlight and heat out of your home in the summer, but they also help retain heat during the winter. This way, you aren't using up as much energy to heat and cool your home.
- When possible, buy bamboo kitchen tools. Spatulas, spoons, and salad tossers are generally very easy to find in bamboo. Bamboo grows quickly and bamboo fields use very little space to yield a productive crop.
- Buy organic, shade-grown coffee. The coffee industry is one of the most destructive agricultural industries on the planet. Shade-grown coffee is coffee that has been grown in such a way as to create an agricultural ecosystem that promotes animal habitation in harmony with the growth of the coffee. This is much better than the pesticide-laden monocultures that most coffee plantations are.
- Buy second-hand clothing at thrift stores. The cotton industry is another industry that uses an obscene level of pesticides, and there is a lot of energy that goes into creating even a blank t-shirt.

You have heard the phrase “reduce, reuse, recycle” as one of the mantras for simple ways to save the environment. You might be surprised how easy this is to act on.

## **Reductions at Home**

- Take shorter showers. Most people don't really realize how much water is used in every shower they take, and water conservation is quickly becoming one of the most important **environmental issues facing humanity**.
- Repair your clothes when they tear. The clothing industry is simply enormous, and a lot of people will buy a new pair of jeans every time they tear a little hole in the old ones. This is a massively wasteful process, and it can be easily mitigated by simply taking some time to repair your torn clothes.
- Unplug your appliances when you're not using them. Some people don't realize that their appliances pull electricity from the grid even when they're powered down.
- One of the most important things you can do is reduce. You probably send all the junk mail you receive straight into recycling.
- Instead of using foil or plastic wrap to store leftovers, use reusable containers. Glass is your best option and it has the advantage of being microwaveable.
- Old clothes that are unsuitable for charity shops can be cut up into rags, so that you can stop using paper towels. They won't take up much more space in the washing machine.

## **Conservation at the Workplace**

- Try biking or riding the bus to work. Not only will this lessen the amount of greenhouse gasses you put into the atmosphere, but it will also end up saving you money.
- Research local incentives on green development and approach your boss with them. See if there is some sort of interest at your workplace in being more environmentally friendly.
- If you use a computer at your job, try upgrading it to more advanced components. LED screens use a fraction of the energy that the older monitors use, and you could start unplugging your computer when you leave at night.
- Bring a lunch with you to work. This cuts down on the urge to go out to eat at a restaurant for lunch, which can lead to Styrofoam takeout boxes and many other types of waste.

- While there are hundreds of small ways to save the environment at home and at work, you should consider making a slightly bigger impact by doing the following:
- Get involved with a local environmental non-profit. There is always a need for volunteers that are dedicated to the environment, and there are a lot of ways to engage a local non-profit with your unique skills.
- Start replacing your current appliances with Energy Star models. This can be a little pricey, but most states have some sort of incentive program to help citizens pay for these types of upgrades.
- Buy from local vendors and manufacturers. This is one of those things that, on the surface, seems like a very simple thing. However, it takes a lot of work these days to find locally manufactured goods, and they are often more expensive. After all, you can easily find a big box store on almost any corner in every major city, making them a very convenient way to get the things you need. When you buy from local stores, farmers, and manufacturers, you are eliminating the energy used to ship goods from one place to another, resulting in a very positive impact.

### **Conserving energy**

There are two main reasons why conserving energy is important on a global level and each can impact your life dramatically.

#### **1. Fossil Fuel Consumption**

Many types of energy use fossil fuels in some way. Fossil fuels are a nonrenewable resource, meaning that at some point the very last chunk of coal will be dug from the earth and the last drop of oil will be pumped from the Earth. When this happens, fossil fuel won't be available anymore since mankind can't create these resources.

- Most vehicles run on gasoline, which is made from a fossil fuel. Once there are no more fossil fuels then the gas powered vehicles won't work. Commerce would grind to a



stop with no way to deliver produce and manufactured goods.

- The many other types of energy that depend on fossil fuels would no longer work. Homes and businesses would not be heated or in some cases have no electricity. The entire world could come to a standstill, unable to go about normal business.
- Conserving energy gives researchers more time to come up with solutions and alternatives. Although fossil fuels will eventually be depleted, by being careful not to use energy unwisely fossil resources may last long enough for practical solutions to be found.

Fossil fuels are also expensive to mine. This expense doesn't just affect the business paying the bill; it's passed on the consumers as higher prices for goods and services. By being conservative in the use of energy, these costs can be reduced to give consumers more money in their pockets. In turn, this can strengthen the economy since people will have more disposable income when they spend less on energy needs.

## **2. Environmental Protection**

The other reason for conserving energy is the health and well-being of every life form on the entire planet. Using fossil fuels and some other energy forms typically pollute the environment in a number of ways.

- The air is polluted when fossil fuels like coal are burned and released into it.
- Nuclear energy is clean and does not pollute the air but it does create nuclear waste, which is dangerous and must be disposed of. Currently, this waste is buried in nuclear water dumps, both above and below ground. In addition, the water used to cool the reactors is recycled into lakes and rivers usually 25 degrees warmer than when it was taken from the lake or river. The impact on marine life is harmful.
- Solar power is a clean energy source, and a renewable one, but the production of the solar panels usually creates

pollutants and waste products during the manufacturing process.

- When water is polluted during the process of creating energy, it can change the eco-system by killing off many different types of wildlife and plants. For example, marine life can be killed when a nuclear plant intakes water from lakes or rivers.
- The soil is polluted when pollutants in the air mix with rain and form acid rain.
- Every type of pollution can potentially compromise the human body and create health problems. These issues are especially dangerous for people with compromised immune systems, babies and the elderly.
- High energy needs keep a country dependent on foreign governments to supply oil since the majority of the world's countries do not produce enough oil for themselves.

Why is conserving energy important? There are many reasons that conservation is important, ranging from the environment to the economy. The world's dependence on fossil fuels is creating a problem that will affect generations to come. It is important that energy not only be conserved, but also that research continues to find cleaner and better solutions for future generations

### **You can make a difference**

Little things really do mean a lot, and the more eco-conscious you become in your daily life, the more you are doing to preserve the planet for the long haul. While it isn't always convenient or easy to live a more environmentally sustainable lifestyle, it is a way of life that will provide you with greater peace of mind.