МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ

ЦЕНТРАЛЬНОУКРАЇНСЬКИЙ
НАЦІОНАЛЬНІЙ ТЕХНІЧНИЙ УНІВЕРСИТЕТ

КАФЕДРА ІНОЗЕМНИХ МОВ

Методичні вказівки до читання текстів англійською мовою для магістрів спеціальності «Екологія і охорона навколишнього середовища»

Затверджено на засіданні кафедри іноземних мов
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Методичні вказівки до читання текстів англійською мовою для магістрів спеціальності напряму: «Екологія і охорона навколишнього середовища». /Укл.: к.п.н., доц. С.В. Щербина., – Кропивницький ЦНТУ, 2019. – 41 с. Умовн. друк. арк. 2,5 (80008 др. зн.).

Дані методичні вказівки і завдання до читання текстів англійською мовою призначені для магістрів спеціальності «Екологія і охорона навколишнього середовища» денної і заочної форми навчання. Інформаційний зміст текстів доступний для сприйняття магістрами, доповнені коментарями та вправами.

При укладанні методичних вказівок використовувалися оригінальні матеріали з журналу «International Wildlife» (США) та «Environment Matters» (World Bank Group, США).

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Оцінка виконання завдань за кредитово-модульною системою здійснюється шляхом підрахунку балів, які набрані за кожний розділ методичних вказівок (Unit) окремо.

Набрана кількість балів трансформується в українську 5-ти бальну систему оцінювання знань, а українська оцінка перетворюються в європейську системі балів:

кількість правильних відповідей	90-100%	76-89%	61-74%	60%
українська оцінка	5	4	3	3-
відповідна кількість балів за європейською системою	3	2	1	0.5

UNIT 1 (Total Score – 51 points)

I. Прочитайте наступні слова ти словосполучення. Запам'ятайте ці слова та їх значення. (Score – 22 points)

1. **punctuate** v. – переривати, втручатися; розставляти знаки пунктуації
2. **scorhing spikes**– *mym* абсолютні максимуми температур в графічному зображенні
3. **deluge** ['delju:ᵌ] n. – повінь, потоп, велика кількість чогось deluge of questions
4. **flood**[flöd] n. – повінь, паводок
5. **shift** v. – пересувати, перекладати (з місця на місце) пересуватися, змінюватися, переїзджати в інше місце to shift to another flat; to shift the blame onto smb.
6. shift n. – зміна, переміщення
7. **accustom** v. – звикнути; робити звичним, привчити
8. to accustom oneself to; to get accustomed to hard work
9. **erode** [i 'roud] v. – піддаватися ерозії, роз'їдати, розмивати вивітрювати. soil erosion; glacial erosion
10. **internal combustion engine** – двигун внутрішнього згоряння
11. **trap** v. – зловити в пастку, заманювати
12. trap n. – пастка, капкан, засідка
13. **enhance** [in 'ha:ns] v. – підвищувати, збільшувати (якість, важливість, авторитет); зростати в ціні, дорожчати
    The living expenses are constantly enhancing
14. **estimate** ['estimeit] v. – оцінювати, визначати ціну, приблизно підраховувати
15. estimate n. – оцінка, кошторис, визначення вартості

II. Перевірте, чи засвоїли ви значення слів завдання I. Заповніть в наступних реченнях пропуски словами у відповідній граматичній формі. Перекладіть ці речення на українську мову. (Score – 7 points)

1. The weather was … by rains and fogs.
2. The climate in this region starts ….
3. The ground in this region is … by lasting rains.
4. It was difficult … the damage after the earthquake
5. The importance of the work of ecologists … from year to year.
6. Global warming may cause disastrous …on the Earth.
7. He cannot … himself to get up early.

III. Визначте функцію Participle II, перекладіть речення на українську мову. (Score – 7 points)

1. Winters become milder, punctuated by deluges and blizzards.
2. Trees weakened by drought and disease burn in fire.
3. Over the past century humans have raised our planet's temperature.
4. Species accustomed to cooler temperatures move north.
5. Species you never heard of are declared extinct.
6. People get sick from diseases you thought occured in far-away tropics.
7. 1991 to1995 was the warmest five-year period in recorded history.

IV. Знайдіть еквіваленти до наступних словосполучень. (Score – 5 points)

1. weakened by drought. 1. впіймати сонячні проміні
2. despite winter storms2. послаблений посухою
3. to trap the sun's rays3. не зважаючи на зимові бурі
4. to get sick from diseases4. почали зберігатися
5. started to be kept5. страждати від захворювань

V. Прочитайте текст. Знайдіть відповіді на наступні запитання. (Score – 6 points)

1. Why can we say that ecosystems start to shift?
2. What is the reason for disappearance of beaches?
3. How do humans raise our planet's temperature?
4. What in the result of the industrial revolution?
5. When did global records start to be kept?
6. What will be the level of CO by the end of 21st century?

HOT TIMES

(life with global warming)

Part I. (Score – 6 points)

Slowly, almost imperceptibly, it starts to get hotter. The increase in average temperatures is gradual; what we notice are the scorching spikes, as heat records fall one after another. Winters are milder, but punctuated by deluges and blizzards. Springs start early, but too-rapid snowmelt leads first to floods, and then to summer draught.

Ecosystems start to shift, subtly at first. Familiar trees weakened by draught and disease, burn in the more frequent fires. Grasslands replace what once were forests, and desserts replace grasslands. Species accustomed to cooler temperatures move north. Species you never heard of are declared extinct. Then species you have heard of.

Melting ice caps and glasiers cause sea level to rise; beaches erode and then disappear.

With warmer winters and earlier springs, mosquitoes are everywhere. People get sick from diseases you thought occured only in far-away tropics.

By the end of your life, you realize that everything is different that this is not the world you meant to pass on to your children and grandchildren. And it keeps getting hotter.

Today, global warming is just beginning. It is impossible, of course, to point at natural events and say that this one is caused by global worming and that one not. But we can study the past, look at what is happening around us, and listen to what climatologists say global warming will mean for our future.

Over the past century, humans have raised our planet's temperature. We do this through industrial activity and by using internal combustion engines, generating gases that trap the suns rays in the atmosphere and thus greatly enhancing the natural «greenhouse» effect. These gases include methane and nitrous oxide, but especially carbon dioxide. The inevitable product of the combustion of fossil fuel CO_2 is released whenever we burn oil coal or natural gas. The greater the concentration of CO_2 in the atmosphere, the hotter it gets. Before the Industrial Revolution, the atmosphere contained about 280 parts per million of CO_2. Today, that figure is 360 ppm. The Intergovernmental Panel on Climate Change (IPCC), an assembly of the top climatologists on the planet, estimates that by the end of the 21st century the CO_2 level will be somewhere between 480 and 800 ppm.

Not coincidentally, 1995 was the warmest year since global records started to be kept in 1856. Despite brutal winter storms 1996 was still among the warmest years, and 1991 to 1995 was the warmest five-year period in recorded history. Human activity has increased the earth's average temperature by one degree this century. The IPCC predicts a further increase of 2 to3 degrees over the next century.

C o m m e n t a r y

«Greenhouse effect» – парниковий ефект

I P C C – Міжурядова комісія з проблем змін у кліматі nitrous oxide – закис азоту.

VI. Назвіть номери речень, які відповідають змісту тексту. (Score – 8 points)

1. With warmer winters and earlier springs, mosquitoes are everywhere.
2. Winters are milder, but punctuated by deluges and blizzards.
3. The greater the concentration of CO_2 in the atmosphere, the colder it gets.
4. We do this through industrial activity and by using internal combustion engines.
5. Human activity has increased the earth's average temperature by two degrees this century.
6. Today global warming is just beginning.
7. Ecosystems start to shift, subtly at first.
8. The inevitable product of combustion of fossil fuel is methane and oxygen.

VII. Прочитай те текст ще раз та складіть план тексту. (Score – 6 points)

VIII. Виконайте письмовий переклад перших двох абзаців. (Score – 3 points)

(Total Score – 51 points)

UNIT 2 (Total Score – 92 points)

1 Прочитайте наступні слова. Запам`ятайте їх значення. Перекладіть на українську мову приклади, що ілюструють вживання цих слів. (Score – 36 points)

1. **afflict** v. – уражати хворобою; спричиняти біль
2. affliction n. – хвороба, лихо, нещастя
3. vulnerable – уразливий
4. **restrict** v. – обмежувати (в межах чого-небудь) to restrict to a diet; restricted application; restriction, without restriction, to impose restrictions on
5. **unleash** n. – спускати з прив`язу, розв`язувати
6. to unleash war; to unleash a new arms race on the world
7. **link** v. – з'єднувати, пов'язувати (together)
8. to link two towns with a road; to link events; weak link;
9. strong link; connecting link
10. **outbreak** ['autbreik] n. – вибух, спалах (про епідемію, хворобу), раптовий початок, виверження

11. an outbreak of war; volcanic outbreak, outbreak (*or* to break out) v. – вибухати, спалахувати,
12. раптово починатися
13. **threat** n. – загроза, небезпека
14. under threat of; serious threat; to fulfill a threat; to constitute; a threat to
15. threaten v. – загрожувати
    she threatened to resign; they threatened to impose restrictions on import
16. **resurgence** n. – відродження, відновлення
17. **thrive** n. – процвітати, розростатися
    thriving business;
18. **to turn into** – перетворюватись
19. **occur** v. – мати місце, траплятися, відбуватися, спадати на думку. new ideas occurred to him; occurance
20. **to keep up** – підтримувати; пристосовуватися до чогось (with)
21. to keep up old traditions
22. **devastate** v. – спустошувати, розоряти, виснажувати
    a devastating flood, devastation, complete devastation
23. **expect** [iks 'pekt] v. – очікувати, сподіватися, припускати she expected great results from the meeting; expectation; to meet expectations; to surpass expectation
24. **destroy** v. – знищувати, руйнувати
    a devastating flood destroyed the village; destruction;
    total destruction; destructive; destructive effect.

II. Перевірте чи засвоїли ви значення слів завдання I. В наступних реченнях заповніть пропуски словами у відповідній граматичній формі. Перекладіть ці речення на українську мову. (Score – 8 points)

1. The whole region was … by this disease.
2. The scientists … the … of malaria to global warming.
3. At this temperature water … ice.
4. This event … three years ago.
5. The ecologists must work hard in order not to let the world to be….
6. Climate changes may cause … of unknown diseases.
7. We … that the weather will be nice tomorrow.
8. A rise in temperature may … many animal populations.

III. Знайдіть еквіваленти до наступних словосполучень. (Score – 9 points)

A	B
1. to afflict population	1. спалахи захворювань
2. outbreaks of diseases	2. поступово звикати
3. to turn into traps	3. спустошувати рослинні популяції
4. to be dependent on	4. скоротити розмір
5. to keep up with the change	5. смертельна хвороба
6. to devastate plant populations	6. пристосуватися до змін
7. to reduce the size	7. перетворюватися на пастки
8. fatal illness	8. уражати населення
9. gradually adapt	9. бути залежним від

IV. Визначте час і стан дієслова-присудка. Перекладить ці речення на українську мову. (Score – 5 points)

1. A hotter world means more than higher prices on air conditioners.
2. Vermin will spread to newly suitabe habitats.
3. Climate change is increasing the range of mosquitoes that carry both dengue and yellow fever.
4. A 1991 cholera epidemic in South America killed 5.000 people.
5. In the 10.000 years following the end of the last ice age the globe has warmed by about 2 °C degrees.

V. Прочитайте текст. Знайдіть відповіді на питання. (Score – 7 points)

1. What does a hotter world mean?
2. What does a study of American scientists say about the global warning?
3. What can the weather extreams lead to?
4. What is dependent on particular climatic conditions?
5. Will plant and wildlife species be able to keep up with rapid change of the climate?

6. What will the forest of the next century look like ?
7. What animal species can be endangered by a rise in temperature?

HOT TIMES

Part II (Score – 6 points)

A hotter world means more than higher prices on air conditioners. It means that vermin will spread to newly suitable habitat, bringing diseases to afflict newly vulnerable human populations. Mosquito-borne malaria, for example, is generally restricted to humid regions with average temperatures above 16°C degrees-at present, about 45% of the world. Global warming in the range of 2-3 °C degrees would unleash malaria-carrying mosquitoes on 60% of the globe. At present malaria kills about 2 million people annually. According to a study of american scientists, by the middle of the next century global warming could cause an additional million malaria deaths every year.

Climate change is also increasing the range of mosquitoes that carry both dengue and yellow fever; scientists in New Zealand have already linked outbreaks of dengue in the South Pacific to global warming.

The weather extremes caused by global warming can also lead, indirectly, to outbreaks of deadly hantavirus, the acute, often fatal respiratory illness that broke out in New Mexico in 1993 eventually killing 76 people nationwide.

Another deadly threat is the resurgence of cholera, which thrives in the higher water temperatures of a warmer world. A 1991 cholera epidemic in South America killed 5000 people. How many will die next time? As global warming causes low- lying coastal areas to fload or former cornfields to turn into sand traps, humans can pack up and move. It is not so easy for trees, insects, fish and wildlife, which are dependent on particular climatic conditions.

In the past, climate change has occured gradually enough for whole populations to migrate in the 10000 years following the end of the last ice age, the globe has warmed by about 2 °C, and ecosystems have gradually adopted. We now face a similar temperature size, but this time within the period of only 100 years.

Plant and wildlife species will hardly be able to keep up with the rapid change. Species dependent on colder climatic conditions are in big trouble. A 2°C size in average temperatures may devastate many plant and populations.

The forest of the next century will be dramatically different. The sugar maple, for example, could virtually disappear from the USA. With a doubling atmospheric CO_2, the ranges of birch, hemlock, and beech trees could also shift 300 to 600 miles to the north. Spruce forests are already advancing into what is now tundra; a doubling of CO_2 is expected to reduce the tundra's size by 30%. In the High Arctic, warmth could destroy the snow dens of the seal. The consequent decline in the seal population could mark the end for the king of the north, the polar bear.

COMMENTARY

1. mosquito-borne malaria – малярія, що переноситься москітами
2. dengue – тропічна лихоманка
3. yellow fever – жовта лихоманка

VI. Назвіть номери речень, які відповідають змісту тексту. (Score – 9 points)

1. A hotter world means more than higher prices on air-conditioners.
2. Climate change is also increasing the range of mosquitoes.
3. At present malaria kills about 2 millian people annually.
4. The temperature size is now the same as one hundred years ago.
5. Another deadly threat is the resurgence of cholera which thrives in the higher water temperatures of a warmer world.
6. It is not so easy for trees, insects, fish and wildlife which are dependent on particular climatic conditions.
7. He consequent decline in the seal population could mark the end for the king of the north, the polar bear.
8. In the past, climate change occured very quickly.
9. Plant and wildlife species can easily keep up with the rapid climate change.

VII. Прочитайте текст ще раз та складіть план тексту. (Score – 6points)

VIII. Виконайте письмовий переклад перших двох абзаців. (Score – 6 points)

(Total Score – 92 points)

UNIT 3 (Total Score – 69 points)

I.Прочитайте вголос наступні слова, що означають природні та метеорологічні явища. Перекладіть на українську мову приклади, що ілюструють вживання цих слів. (Score – 23 points)

1. **precipitation** n. – випадіння опадів, опади
2. light precipitation, heavy precipitation, annual precipitation.
3. **hurricane** n. – ураган, тропічний циклон
4. to forecast a hurricane, a devastating hurricane
5. A hurricane is a violent, tropical, cyclonic storm with winds
6. greater than 75 miles per hour.
7. **tornado** n – торнадо, вихор, шквал
8. A tornado is called a destructive storm appearing as a whirling,
9. advancing funnel extending downward from a black cloud .
10. **blizzard** – снігова буря, завірюха
11. a ragging blizzard; a blizzard rages; a blizzard blows itself out
12. A blizzard is called a violent storm of wind with dry snow and
13. intense cold.
14. **flooding** – повінь
15. The flood struck several cities.
16. **inundation** – повінь, потоп; затоплення
17. Heavy rains caused the complete inundation of low-lying areas.
18. **drought** ['draut] – посуха, нестача вологи
19. A drought is called a long period of dry weather that affects
20. crops and causes distress.
21. **surge** [sý³] – велика хвиля
22. storm surges; a surge of anger
23. **evaporation** – випар; випарювання вологи.

II Прочитайте текст. Дайте відповідь на наступне запитання. (Score – 7 points)

1. What weather extremes can result from global warming?
2. What phenomenon may cause intense hurricanes?
3. Which area in the Indian ocean can be completely flooded as a
4. result of global warming.

5. Which areas in the USA may be subjected to catastrophic
6. flooding?
7. What should be done to prevent the worst?

HOT TIMES

Part III (Score – 6 points)

A warmer atmosphere means the evaporation of more water from the oceans, leading to greater precipitation. It also means the exchange of more energy, leading to greater atmospheric violence.

According to the National Climatic Data Center, weather extremes are becoming more & more frequent: hurricanes, tornadoes, blizzards, flooding, droughts. This century extreme weather events have increased by 20%. Annual precipitation is up 6% since 1900 and total winter precipitation is up 8%. What used to be «100-year» events are now commonplace.

Warmer ocean temperatures in the Atlantic may also cause more frequent and intense hurricanes. Hurricanes in the past two years have been as strong as or stranger than any this century.

Hotter seas may also result in widespread flooding of costal areas, not to mention the complete inundation of low-lying island nations like the Maldives in the Indian ocean. One reason is simply that the warmer the water, the greater it's volume. In addition, large amounts of the world's water currently trapped as ice are melting. The world's glaciers have shrunk 11% in the past century; in the next, one-third to one-half of all mountain glacier mass could disappear.

Scientists predict that sea level will rise by as much as 3 feet by the end of the 21st century. At that rate, most East Coast beaches would vanish within 25 years (they are already disappearing at a rate of 2-3 feet per year). The Atchafalaya swamps will be totally under water. Storm surges and hurricanes would subject continental areas to catastrophic flooding, including much of southern Florida, New Orleans and California. Huge dikes will have to be constructed to protect low-lying metropolitan areas – at a cost, based on Dutch experience, of $1 billion per mile.

Considering current CO_2 levels, some warming is bound to occur, but the worst can still be prevented. Humankind has demonstrated the awesome power to heat the entire globe; now we must demonstrate the wisdom to turn the thermostat down.

COMMENTARY

1. the Atchafalaya swamps – низинна болотяна місцевість у штаті Флорида, США. Природне середовище для рідкісних видів флори і фауни
2. Dutch experience – тут мається на увазі досвід голландців у будівництві захисних дамб.
3. dike – дамба, гребля (будується в низинних місцевостях для захисту від води)

I. В протилежному стовпчику знайдіть українські еквіваленти наступних словосполучень (Score – 10 points)

A	B
1. weather extremes	1. велика кількість води
2. annual precipitation	2. зникати зі швидкістю
3. to prevent the worst	3. повне затоплення
4. low-lying area	4. звичне явище
5. large amount of water	5. низинна місцевість
6. complete inundation	6. кліматичні крайнощі
7. costal area	7. надзвичайна могутність
8. to disappear at a rate of	8. прибережна місцевість
9. awesome power	9. запобігти найгіршому
10. commonplace event	10. річні опади

IV. Назвіть номери речень, які відповідають змісту тексту. (Score – 7 points)

1. This century extreme weather events have increased by10%.
2. Annual precipitation is up 6% since 1900.
4. Scientists predict that sea level will rise by as much as 3 feet by the end of the 21st century.
5. In the next century one-third to one-half of all mountain glacier mass could disappear.
6. Most East Coast beaches would vanish within 50 years.

7. A lot of bridges will have to be constructed to protect low-lying metropolitan areas.

V. Визначіть функцію Participle I в наступних реченнях. Речення перекладіть на українську мову. (Score – 4 points)

1. A warmer atmosphere means the exchange of more energy, leading
2. to greater atmospheric violence.
3. Huge dikes will be constructed to protect low-lying metropolitan areas.
4. Considering current CO_2 levels, some warming is bound to occur.

VII. Прочитайте текст ще раз та складіть план тексту. (Score – 6 points)

VIII. Виконайте письмовий переклад 4-го і 5-го абзаців тексту. (Score – 6 points)

(Total Score – 69 points)

#1

Тексти для позааудиторного читання.

(Total Score – 54 points)

TEXT 1

MEASURES FOR ECOLOGICAL EDUCATION INCREASE (Score – 6 points)

The process of participation of the public in the environment issues decisions making is to be based also on the activities directed on the increase of population ecological education level and its awareness of an ecological danger. Despite the fact Ukraine has adopted a series of nature protection laws, it becomes all more obvious, that the efficiency of ecological legislation usage today is and will remain low in future under conditions of low population activity. Degree of public trust to the power organs and activity of population in ecological issues depends directly on the level of information and ecological consciousness. Therefore the issues of regional habitants information about ecological problems and about strategies of their solutions are to be of high priority directions of ecological activity in Ukraine. The high level of ecological consciousness is the mortgage of interrelation achievement of economic, social and ecological constituents of the country development.

In accordance with the results of the conducted research, the most essential (in creation of the ecological education system in regions) are the measures directed on young people, namely: development and introduction of the children and young people ecological education programs, and also development and introduction in practice the system of summer ecological camps.

Surely, the considerable role in the process of citizens' information in relation to the ecological situation is played by mass media. Taking into account the grave ecological state in Ukraine, the enormous amount of ecological problems, which solution needs considerable funds, it is expedient to extend the ecological problems sphere of mass media materials and multiply their amounts. Experts marked the necessity of such measures introduction as creation of the specialized program about the ecology problems at national and regional television, presentation expansion of ecological problems in local and national mass media.

TEXT 2

THE EAST ASIA CLEAN AIR INITIATIVE (Score – 6 points)

The Clean Air Initiative (CAI) advances innovative ways to improve air quality in cities by sharing knowledge and experiences through partnerships in selected regions of the world. The CAI brings together a range of cross-cutting expertise in urban development, transport, energy reform, environmental management, and environmental health. Since its inception in February 2001, the CAI for Asian Cities has developed and successfully concluded many activities.

A bimonthly newsletter provides regular updates on CAI activities. The CAI website has been revamped. It now includes new features such as online discussion groups and a list serve to facilitate and widen the exchange of information between international and regional partners and specialists on air quality management and related topics. Regional workshops were organized on two-stroke engines, scrappage schemes, inspection and maintenance programs, fuel quality, transport management, and indoor air pollution. The workshop discussions are also available on the CAI web. New activities on regional harmonization of fuel standards and switching to four-stroke engines are currently under preparation.

A regional network of Asian and international training institutes has been established to help coordinate activities and support the delivery of capacity enhancement activities in the region. One of the main activities is a video and web-based urban air quality management distance learning course, which is currently being finalized by the World Bank Institute with contributions from Asian specialists and Bank experts.

There are ongoing discussions to merge the CAI network with the Air Pollution for Megacities in Asia (APMA) Project – organized by UNER in collaboration with the World Health Organization, the Stockholm Environment Institute – to strengthen CAI-Asia's capacity to implement activities based on the strengths of each of its partners and avoid duplication of effort among donor agencies.

TEXT 3

INDOOR AIR POLUTION IS A SIGNIFICANT HEALTH THREAT TO WOMEN AND CHILDREN IN INDIA

(Score – 6 points)

India currently bears the largest burden of indoor air pollution-related health problems in the world, due mainly to the fact that 75 percent of its households use wood, dung, crop residues, or a combination of biomass-based fuels for cooking. When used in simple household stoves, these fuels emit considerable amounts of airborne pollutants, exposing those nearby to much higher concentrations of harmful particulate matter than in the ambient air of most polluted cities. Acute respiratory infections in children are strongly associated with this exposure. Not surprisingly, women who cook on biomass stoves for many years exhibit a higher prevalence of chronic lung disease, pregnancy-related problems, and cataracts. As a result, an estimated 500,000 women and children, mostly from poor rural families, die in India each year, accounting for 25 percent of indoor air pollution-related deaths worldwide.

A recent study – *India: Household Energy, Air Pollution and Health*— found that the transition from traditional biomass fuels to modern fuels, such as kerosene and LPG, would have a significant impact on lowering exposure for all household members. Improved biomass stoves—and cleaner biomass-based fuels—will continue to be an important option for reducing exposure in the short and medium term. Health benefits can be further enhanced with simple housing improvements, such as a separate

kitchen and better ventilation. Last, but not least, improving the status of women and empowering them to make choices about the type of stoves and fuels they use can be a particularly effective intervention.

TEXT 4

IRANIAN INSTITUTIONAL CAPACITY BUILDING
(Score – 6 points)

Iran's rapid growth over the last few years has resulted in worsening environmental problems that are seriously affecting public health and well-being. Major cities such as Tehran, Mashhad, Isfahan, Tabriz, and Ahwas, which contain nearly 60 percent of the population, face ambient air concentrations that exceed World Health Organization (WHO) guidelines and range from 40 percent to 340 percent over maximum allowable limits. Industries in the country emit more than 450,000 tons per year of sulfur dioxide and 100,000 t/year of total suspended particulates (TSP). Air pollution is causing respiratory and allergic ailments in an estimated 20 percent of the population, especially children. Water quality is deteriorating due to the disposal of untreated sewage, industrial effluents, and agricultural runoff. Cities generate about 15 million tons of municipal solid waste annually, but urban areas lack appropriate sanitary landfills. Industries in Iran produce about 100,000 t/year of hazardous waste, but there are no controlled hazardous waste disposal facilities in the country.

The Government of Iran is already addressing the environmental problems facing the country. It has requested World Bank assistance to supplement these efforts by strengthening the capacity of the Department of Environment (DOE), the lead agency responsible for environmental protection in the country. The World Bank-supported Environmental Management Support Project (EMSP) represents the first phase of a long-term effort by the government to improve environmental management in the country, its main objective is to enhance the capacity of the Department of Environment (DOE) and other related agencies to plan, monitor, and enforce environmental regulations and action plans.

TEXT 5

REBUILDING AFGANISTAN (Score – 6 points)

War, political instability, and weakly implemented resource management policies have taken their toll on Afghanistan's natural resource base. Recent

fighting has only accelerated historic trends in environmental degradation, particularly deforestation, overuse of land resources, and the related problems of erosion and desertification. Afghanistan has historically been prone to a variety of natural disasters, including droughts, floods, landslides and earthquakes, and the accelerating environmental degradation has increased their magnitudes and impacts on the people. With the return of peace, millions of refugees are expected to resettle in Afghanistan, particularly in urban areas, thus exacerbating pressures on the environment and the natural resource base. Health problems associated with poor water, lack of sanitation, and poor solid waste management, are expected to worsen.

As donors work to help rebuild Afghanistan, these environmental concerns are starting to be addressed as well—particularly in urban areas. Even while recognizing the urgency of reconstruction efforts, and the uncertain security situation, an Environmental and Social Safeguards Framework has been developed for the initial reconstruction operations. Some operations, such as the Community Empowerment and Public Works, infrastructure and Education Projects, are already under implementation. The Framework is designed to ensure due diligence in managing potential environmental and social risks, by providing general guidelines and specific procedures to be integrated into the implementation of World Bank-financed emergency reconstruction operations.

TEXT 6

THE AFRICA STOCKPILES PROGRAM (Score – 6 points)

The Stockholm Convention on Persistent Organic Pollutants (POPs) provided the basis for a major effort to tackle the long-standing and worsening problem of stockpiles of obsolete pesticides in Africa. With an estimated 50,000 tons of stored chemicals – in some locations up to 30 percent of them containing POPs – plus substantial quantities of contaminated soils, these pesticides constitute the region's most critical chemical management problem. Much of the material is stored in densely populated areas under extremely unsafe conditions, often with deteriorating and leaking packaging. Mostly poor and ill-informed populations are exposed to hazardous ground and surface water pollution, contaminated soils and containers, and airborne exposure. In Mali, where the problem is particularly acute, thousands of tons of obsolete pesticides have been dumped in the open in unprotected areas. In some areas, wells and boreholes have had to be closed, further aggravating water shortages. In

Africa as a whole, thousands of pesticide-related poisonings are recorded each year, many resulting in death.

The Africa Stockpiles Program (ASP) is a multi-partner, multi-phased regional program that aims to eliminate all stocks of obsolete pesticides in Africa over the next 15 years. The ASP is currently under preparation by a group of NGOs—WWF, the Pesticides Action Network (PAN-UK and PAN-Africa), UN Agencies (FAO, UNIDO, UNEP, Basel Secretariat), regional organizations (UN-ECA, OAU), industry (CropLife International), and the World Bank. Financial support is being provided by the GEF—in its role as the interim financial mechanism of the Stockholm Convention—the Canadian Government, and other partners. The estimated cost of the total program, targeted to start in mid-2003, is $250 million.

TEXT 7

TUNISIA DEVELOPMENT PROJECT (Score – 6 points)

The Tunisia NW Mountainous Areas & Forestry Development Project addresses the important problems of rural poverty and natural resource degradation. By using a participatory approach, it will strengthen farmers' planning and implementation capacity, and improve the responsiveness of rural service agencies to farmers'needs. The project will support development of a participatory approach to watershed rehabilitation in about 50 micro-catchments in the Governorates of Beja, El Kef, Siliana, Jendouba, and Bizerte over a six-year period. Treatments—including improved range management, improved fodder production, soil and conservation works—will be selected and implemented with the participation of the local population The project will also provide such basic infrastructure as feeder roads, potable water, health centers, and schools.

TEXT 8

COSTA RICA ECOMARKETS PROJECT –MAINSTREAMING ENVIRONMENT IN THE CONTEXT OF LAND, WATER AND FOREST RESOURCES MANAGEMENT (Score – 6 points)

The Costa Rica Ecomarkets Project is one of the first Bank projects to support client country institutions in putting in place arrangements involving payments for ecological services. The program promotes payments from individuals and firms who benefit from environmental services to the landowners whose natural produces such services – including

environmentally friendly land-use decisions relating to carbon management, biodiversity conservation, and provision of hydrological services.

Since project preparation was initiated in 1998, participation of indigenous groups in the project's forest conservation program has risen from 2 percent to nearly 14 percent of the total area contracted. Participation of women landowners and women's organizations has increased from leas than 5 percent to nearly 9 percent of total land area contracted.

TEXT 9

URUGUAY MONTREAL PROTOCOL PROJECT
(Score – 6 points)

Completed in June 2002, the Uruguay Montreal Protocol Project supported the government's program to reduce ozone-depleting substances (ODS) consumption by about 30 to 40 percent below 1992 consumption levels through the provision of technical assistance and technology conversion. In 1992, Uruguay's consumption of chlorofluorocarbons (CFCs) was 305 tons. By 2001, CFC consumption was reduced to 106 tons, representing a 76 percent reduction and far exceeding its objective. The project achieved its goals using only 21 percent of the anticipated $4 million budget. Other factors also helped speed the phase-out, including a new local regulatory framework, the natural tendency of the market, and a strong dissemination campaign organized by the government.

#2

Рекомендовані тексти для індивідуального читання

ECOLOGY

Ecology is the study of the relationship of plants and animals with their physical and biological environment. The physical environment includes light and heat or solar radiation, moisture, wind, oxygen, carbon dioxide, nutrients in soil, water, and atmosphere. The biological environment includes organisms of the same kindas well as other plants and animals.

Because of the diverse approaches required to study organisms in their environment, ecology draws upon such fields as climatology, hydrology, oceanography, physics, chemistry, geology, and soil analysis. To study the relationships between organisms, ecology also involves such disparate sciences as animal behavior, taxonomy, physiology, and mathematics.

An increased public awareness of environmental problems has made ecology a common but often misused word. It is confused with environmental programs and environmental science. Although the field is a distinct scientific discipline, ecology does indeed contribute to the study and understanding of environmental problems.

The term "ecology" was introduced by the German biologist Ernst Heinrich Haeckel in 1866; it is derived from the Greek "oikos" ("household"), sharing the same root word as "economics". Thus, the term implies the study of the economy of nature. Modern ecology, in part, began with Charles Darwin. In developing his theory of evolution, Darwin stressed the adaptation of organisms to their environment through natural selection. Also making important contributions were plant geographers, such as Alexander von Humboldt, who were deeply interested in the "how" and "why" of vegetation distribution around the world.

The thin mantle of life that covers the earth is called the biosphere. Several approaches are used to classify its regions.

BIOMES

The broad units of vegetation are called "plant formations" by European ecologists and "biomes" by North American ecologists. The major difference between the two terms is that "biomes" include associated animal life. Major biomes, however, go by the name of the dominant forms of plant life.

Influenced by latitude, elevation, and associated moisture and temperature regimes, terrestrial biomes vary geographically from the tropics through the arctic and include various types of forest, grassland, shrub land, and desert. These biomes also include their associated freshwater communities: streams, lakes, ponds, and wetlands. Marine environments, also considered biomes by some ecologists, comprise the open ocean, littoral (shallow water) regions, benthic (bottom) regions, rocky shores, sandy shores, estuaries, and associated tidal marshes.

ECOSYSTEMS

A more useful way of looking at the terrestrial and aquatic landscapes is to view them as ecosystems, a word coined in 1935 by the British plant ecologist Sir Arthur George Tansley to stress the concept of each locale or habitat as an integrated whole. A system is a collection of interdependent parts that function as a unit and involve inputs and outputs. The major parts of an ecosystem are the producers (green plants), the consumers (herbivores and carnivores), the decomposers (fungi and bacteria), and the nonliving, or abiotic, components, consisting of dead organic matter and nutrients in the soil and water. Inputs into the ecosystem are solar energy, water, oxygen, carbon dioxide, nitrogen, and other elements and compounds. Outputs from the ecosystem include water, oxygen, carbon dioxide, nutrient losses, and the heat released in cellular respiration, or heat of respiration. The major driving force is solar energy.

ENERGY AND NUTRIENTS

Ecosystems function with energy flowing in one direction from the sun, and through nutrients, which are continuously recycled. Light energy is used by plants, which, by the process of photosynthesis,

convert it to chemical energy in the form of carbohydrates and other carbon compounds. This energy is then transferred through the ecosystem by a series of steps that involve eating and being eaten, or what is called a food web.

Each step in the transfer of energy involves several trophic, or feeding, levels: plants, herbivores (plant eaters), two or three levels of carnivores (meat eaters), and decomposers. Only a fraction of the energy fixed by plants follows this pathway, known as the grazing food web. Plant and animal matter not used in the grazing food chain, such as fallen leaves, twigs, roots, tree trunks, and the dead bodies of animals, support the decomposer food web. Bacteria, fungi, and animals that feed on dead material become the energy source for higher trophic levels that tie into the grazing food web. In this way, nature makes maximum use of energy originally fixed by plants.

The number of trophic levels is limited in both types of food webs, because at each transfer a great deal of energy is lost (such as heat of respiration) and is no longer usable or transferable to the next trophic level. Thus, each trophic level contains less energy than the trophic level supporting it. For this reason, as an example, deer or caribou (herbivores) are more abundant than wolves (carnivores).

Energy flow fuels the biogeochemical, or nutrient, cycles. The cycling of nutrients begins with their release from organic matter by weathering and decomposition in a form that can be picked up by plants. Plants incorporate nutrients available in soil and water and store them in their tissues. The nutrients are transferred from one trophic level to another through the food web. Because most plants and animals go uneaten, nutrients contained in their tissues, after passing through the decomposer food web, are ultimately released by bacterial and fungal decomposition, a process that reduces complex organic compounds into simple inorganic compounds available for reuse by plants.

IMBALANCES

Within an ecosystem, nutrients are cycled internally. But there are leakages or outputs, and these must be balanced by inputs, or the ecosystem will fail to function. Nutrient inputs to the system come from weathering of rocks, from windblown dust, and from precipitation, which can carry material great distances. Varying quantities of nutrients

are carried from terrestrial ecosystems by the movement of water and deposited in aquatic ecosystems and associated lowlands. Erosion and the harvesting of timber and crops remove considerable quantities of nutrients that must be replaced. The failure to do so results in an impoverishment of the ecosystem.

This is why agricultural lands must be fertilized.

If inputs of any nutrient greatly exceed outputs, the nutrient cycle in the ecosystem becomes stressed or overloaded, resulting in pollution. Pollution can be considered an input of nutrients exceeding the capability of the ecosystem to process them. Nutrients eroded and leached from agricultural lands, along with sewage and industrial wastes accumulated from urban areas, all drain into streams, rivers, lakes, and estuaries. These pollutants destroy plants and animals that cannot tolerate their presence or the changed environmental conditions caused by them; at the same time, they favor a few organisms more tolerant to changed conditions. Thus, precipitation filled with sulfur dioxide and oxides of nitrogen from industrial areas converts to weak sulfuric and nitric acids, known as acid rain, and falls on large areas of terrestrial and aquatic ecosystems. This upsets acidbase relations in some ecosystems, killing fish and aquatic invertebrates, and increasing soil acidity, which reduces forest growth in northern and other ecosystems that lack limestone to neutralize the acid.

POPULATIONS AND COMMUNITIES

The functional units of an ecosystem are the populations of organisms through which energy and nutrients move. A population is a group of interbreeding organisms of the same kind living in the same place at the same time. Groups of populations within an ecosystem interact in various ways. These interdependent populations of plants and animals make up the community, which encompasses the biotic portion of the ecosystem.

DIVERSITY

The community has certain attributes, among them dominance and species diversity. Dominance results when one or several species control the environmental conditions that influence associated species.

In a forest, for example, the dominant species may be one or more species of trees, such as oak or spruce; in a marine community, the dominant organisms frequently are animals such as mussels or oysters. Dominance can influence diversity of species in a community because diversity involves not only the number of species in a community, but also how numbers of individual species are apportioned.

The physical nature of a community is evidenced by layering, or stratification. In terrestrial communities, stratification is influenced by the growth form of the plants. Simple communities such as grasslands, with little vertical stratification, usually consist of two layers, the ground layer and the herbaceous layer. A forest has up to six layers: ground, herbaceous, low shrub, low tree and high shrub, lower canopy, and upper canopy. These strata influence the physical environment and diversity of habitats for wildlife. Vertical stratification of life in aquatic communities, by contrast, is influenced mostly by physical conditions: depth, light, temperature, pressure, salinity, oxygen, and carbon dioxide.

HABITAT AND NICHE

The community provides the habitat – the place where particular plants or animals live. Within the habitat, organisms occupy different niches.

A niche is the functional role of a species in a community – that is, its occupation, or how it earns its living. For example, the scarlet tanager lives in a deciduous forest habitat. Its niche, in part, is gleaning insects from the canopy foliage. The more a community is stratified, the more finely the habitat is divided into additional niches.

ENVIRONMENT

Environment comprises all of the external factors affecting an organism. These factors may be other living organisms (biotic factors) or nonliving variables (abiotic factors), such as temperature, rainfall, day length, wind, and ocean currents. The interactions of organisms with biotic and abiotic factors form an ecosystem.

Even minute changes in any one factor in an ecosystem can influence whether or not a particular plant or animal species will be successful in its environment.

Organisms and their environment constantly interact, and both are changed by this interaction. Like all other living creatures, humans have clearly changed their environment, but they have done so generally on a grander scale than have all other species. Some of these human-induced changes – such as the destruction of the world's tropical rain forests to create farms or grazing land for cattle – have led to altered climate patterns. In turn, altered climate patterns have changed the way animals and plants are distributed in different ecosystems.

Scientists study the long-term consequences of human actions on the environment, while environmentalists-professionals in various fields, as well as concerned citizens-advocate ways to lessen the impact of human activity on the natural world.

UNDERSTANDING THE ENVIRONMENT

The science of ecology attempts to explain why plants and animals live where they do and why their populations are the sizes they are. Understanding the distribution and population size of organisms helps scientists evaluate the health of the environment.

In 1840 German chemist, Justus von Liebig first proposed that populations could not grow indefinitely, a basic principle now known as the Law of the Minimum. Biotic and abiotic factors, singly or in combination, ultimately limit the size that any population may attain. This size limit, known as a population's carrying capacity, occurs when needed resources, such as food, breeding sites, and water, are in short supply. For example, the amount of nutrients in soil influences the amount of wheat that grows on a farm. If just one soil nutrient, such as nitrogen, is missing or below optimal levels, fewer healthy wheat plants will grow.

Either population size or distribution may also be affected, directly or indirectly, by the way species in an ecosystem interact with one another. In an experiment performed in the late 1960s in the rocky tidal zone along the Pacific Coast of the United States, American ecologist Robert Paine studied an area that contained 15 species of invertebrates, including starfish, mussels, limpets, barnacles, and chitons. Paine found that in this ecosystem one species of starfish preyed heavily on a species

of mussel, preventing that mussel population from multiplying and monopolizing space in the tidal zone. When Paine removed the starfish from the area, he found that the mussel population quickly increased in size, crowding out most other organisms from rock surfaces.

The number of invertebrate species in the ecosystem soon dropped to eight species. Paine concluded that the loss of just one species, the starfish, indirectly led to the loss of an additional six species and a transformation of the ecosystem.

Typically, the species that coexist in ecosystems have evolved together for many generations. These populations have established balanced interactions with each other that enable all populations in the area to remain relatively stable. Occasionally, however, natural or human-made disruptions occur that have unforeseen consequences to populations in an ecosystem. For example, 17th-century sailors routinely introduced goats to isolated oceanic islands, intending for the goats to roam freely and serve as a source of meat when the sailors returned to the islands during future voyages. As non-native species free from all natural predators, the goats thrived and, in the process, overgrazed many of the islands. With a change in plant composition, many of the native animal species on the islands were driven to extinction. A simple action, the introduction of goats to an island, yielded many changes in the island ecosystem, demonstrating that all members of a community are closely interconnected.

To better understand the impact of natural and human disruptions on the Earth, in 1991, the National Aeronautics and Space Administration (NASA) began to use artificial satellites to study global change. NASA's undertaking, called Earth Science Enterprise, and is a part of an international effort linking numerous satellites into a single Earth Observing System (EOS). EOS collects information about the interactions occurring in the atmosphere, on land, and in the oceans, and these data help scientists and lawmakers make sound environmental policy decisions.

FACTORS THREATENING THE ENVIRONMENT

The problems facing the environment are vast and diverse. Global warming, the depletion of the ozone layer in the atmosphere, and destruction of the world's rain forests are just some of the problems

that many scientists believe will reach critical proportions in the coming decades. All of these problems will be directly affected by the size of the human population.

POPULATION GROWTH

Human population growth is at the root of virtually all of the world's environmental problems. Although the growth rate of the world's population has slowed slightly since the 1990s, the world's population increases by about 77 million human beings each year. As the number of people increases, crowding generates pollution, destroys more habitats, and uses up additional natural resources.

The Population Division of the United Nations (UN) predicts that the world's population will increase from 6.23 billion people in 2000 to 9.3 billion people in 2050. The UN estimates that the population will stabilize at more than 11 billion in 2200. Other experts predict that numbers will continue to rise into the foreseeable future, to as many as 19 billion people by the year 2200.

Although rates of population increase are now much slower in the developed world than in the developing world, it would be a mistake to assume that population growth is primarily a problem of developing countries.

In fact, because larger amounts of resources per person are used in developed nations, each individual from the developed world has a much greater environmental impact than does a person from a developing country. Conservation strategies that would not significantly alter lifestyles but that would greatly lessen environmental impact are essential in the developed world.

In the developing world, meanwhile, the most important factors necessary to lower population growth rates are democracy and social justice. Studies show that population growth rates have fallen in developing areas where several social conditions exist. In these areas, literacy rates have increased and women receive economic status equal to that of men, enabling women to hold jobs and own property. In addition, birth control information in these areas is more widely available, and women are free to make their own reproductive decisions.

GLOBAL WARMING

Like the glass panes in a greenhouse, certain gases in the Earth's atmosphere permit the Sun's radiation to heat Earth. At the same time, these gases retard the escape into space of the infrared energy radiated back out by Earth. This process is referred to as the greenhouse effect. These gases, primarily carbon dioxide, methane, nitrous oxide, and water vapor, insulate Earth's surface, helping to maintain warm temperatures. Without these gases, Earth would be a frozen planet with an average temperature of about –18 °C (about 0 °F) instead of a comfortable 15 °C (59 °F). If the concentration of these gases rises, they trap more heat within the atmosphere, causing worldwide temperatures to rise.

Within the last century, the amount of carbon dioxide in the atmosphere has increased dramatically, largely because people burn vast amounts of fossil fuels – coal and petroleum and its derivatives. Average global temperature also has increased – by about 0.6 Celsius degrees (1 Fahrenheit degree) within the past century. Atmospheric scientists have found that at least half of that temperature increase can be attributed to human activity. They predict that unless dramatic action is taken, global temperature will continue to rise by 1.4 to 5.8 Celsius degrees (2.5 to 10.4 Fahrenheit degrees) over the next century. Although such an increase may not seem like a great difference, during the last ice age the global temperature was only 2.2 Celsius degrees (4 Fahrenheit degrees) cooler than it is presently.

The consequences of such a modest increase in temperature may be devastating. Already scientists have detected a 40 percent reduction in the average thickness of Arctic ice. Other problems that may develop include a rise in sea levels that will completely inundate a number of low-lying island nations and flood many coastal cities, such as New York and Miami. Many plant and animal species will probably be driven into extinction, agriculture will be severely disrupted in many regions, and the frequency of severe hurricanes and droughts will likely increase.

DEPLETION OF THE OZONE LAYER

The ozone layer, a thin band in the stratosphere (layer of the upper atmosphere), serves to shield Earth from the Sun's harmful ultraviolet

rays. In the 1970s, scientists discovered that chlorofluorocarbons (CFCs)-chemicals used in refrigeration, air-conditioning systems, cleaning solvents, and aerosol sprays-destroy the ozone layer. CFCs release chlorine into the atmosphere; chlorine, in turn, breaks down ozone molecules. Because chlorine is not affected by its interaction with ozone, each chlorine molecule has the ability to destroy a large amount of ozone for an extended period of time.

The consequences of continued depletion of the ozone layer would be dramatic. Increased ultraviolet radiation would lead to a growing number of skin cancers and cataracts and also reduce the ability of immune systems to respond to infection. Additionally, growth of the world's oceanic plankton, the base of most marine food chains, would decline. Plankton contains photosynthetic organisms that break down carbon dioxide. If plankton populations decline, it may lead to increased carbon dioxide levels in the atmosphere and thus to global warming. Recent studies suggest that global warming, in turn, may increase the amount of ozone destroyed. Even if the manufacture of CFCs is immediately banned, the chlorine already released into the atmosphere will continue to destroy the ozone layer for many decades.

In 1987, an international pact called the Montreal Protocol on Substances that Deplete the Ozone Layer set specific targets for all nations to achieve in order to reduce emissions of chemicals responsible for the destruction of the ozone layer. Many people had hoped that this treaty would cause ozone loss to peak and begin to decline by the year 2000. In fact, in the fall of 2000, the hole in the ozone layer over Antarctica was the largest ever recorded. The hole the following year was slightly smaller, leading some to believe that the depletion of ozone had stabilized. Even if the most stringent prohibitions against CFCs are implemented, however, scientists expect that it will take at least 50 more years for the hole over Antarctica to close completely.

HABITAT DESTRUCTION AND SPECIES EXTINCTION

Plant and animal species are dying out at an unprecedented rate. Estimates range that from 4,000 to as many as 50,000 species per year become extinct. The leading cause of extinction is habitat destruction, particularly of the world's richest ecosystems-tropical rain forests and coral reefs. If the world's rain forests continue to be cut down at the

current rate, they may completely disappear by the year 2030. In addition, if the world's population continues to grow at its present rate and puts even more pressure on these habitats, they might well be destroyed sooner.

AIR POLLUTION

A significant portion of industry and transportation burns fossil fuels, such as gasoline. When these fuels burn, chemicals and particulate matter are released into the atmosphere. Although a vast number of substances contribute to air pollution, the most common air pollutants contain carbon, sulfur, and nitrogen. These chemicals interact with one another and with ultraviolet radiation in sunlight in dangerous ways. Smog, usually found in urban areas with large numbers of automobiles, forms when nitrogen oxides react with hydrocarbons in the air to produce aldehydes and ketones. Smog can cause serious health problems.

Acid rain forms when sulfur dioxide and nitrous oxide transform into sulfuric acid and nitric acid in the atmosphere and come back to Earth in precipitation. Acid rain has made numerous lakes so acidic that they no longer support fish populations. Acid rain is also responsible for the decline of many forest ecosystems world-wide, including Germany's Black Forest and forests throughout the eastern United States.

WATER POLLUTION

Estimates suggest that nearly 1.5 billion people worldwide lack safe drinking water and that at least 5 million deaths per year can be attributed to waterborne diseases. Water pollution may come from point sources or nonpoint sources. Point sources discharge pollutants from specific locations, such as factories, sewage treatment plants, and oil tankers. The technology exists to monitor and regulate point sources of pollution, although in some areas this occurs only sporadically. Pollution from nonpoint sources occurs when rainfall or snowmelt moves over and through the ground. As the runoff moves, it picks up and carries away pollutants, such as pesticides and fertilizers, depositing the pollutants into lakes, rivers, wetlands, coastal waters, and even

underground sources of drinking water. Pollution arising from nonpoint sources accounts for a majority of the contaminants in streams and lakes.

With almost 80 percent of the planet covered by oceans, people have long acted as if those bodies of water could serve as a limitless dumping ground for wastes. However, raw sewage, garbage, and oil spills have begun to overwhelm the diluting capabilities of the oceans, and most coastal waters are now polluted, threatening marine wildlife. Beaches around the world close regularly, often because the surrounding waters contain high levels of bacteria from sewage disposal.

ECOLOGY & ENVIRONMENT

The three elements namely earth, water and space constitute the whole cosmos therefore it re-affirms to work with people towards creating awareness and as a movement for perseverance, sustenance of flora and fauna and cosmic elements and to usher ecology and environment of this earth where integrity of creation will be a cherished value.

AIR

- Air pollution has now become a major killer with three million people dying of it every year.
- Carbon emissions doubled in three decades. Global warming is now a serious threat.
- US Carbon emissions are 16 % above 1990 levels making it a major polluter.

WATER

- Forty percent of world population now faces chronic shortage of fresh water for daily needs.
- Half the world's wetlands have been lost and one-fifth of the 10,000 freshwater species is extinct.
- Contaminated water kills around 2.2 million people every year.

LAND

• Since 1990, 2,4 % of the world's forests have been destroyed. The rate of loss is now 90,000 sq. km. every year.

• Now two-thirds of the world's farmlands suffer from soil degradation.

• Half the world's grasslands are overgrazed. India is 25 % short of its fodder needs.

WILDLIFE

• 800 species have become extinct and 11,000 more are threatened.

• Almost 75 % of the world's marine captures is over fished or fully utilized. In North America, 10 fish species went extinct in the 1990s.

• Of the 9,946 known bird species, 70 % has declined in numbers.

PEOPLE

• The world added 800 million people since 1990. In 2000, global population was 6 billion, up from 2.5 billion in 1950.

• In 10 years, the world will have to feed and house another billion

CARING FOR THE NATURE

"Nature has everything for man's need but not his greed", – said once Mahatma Gandhiji. A large-scale deforestation that is taking place around the globe is causing tremendous ecological and environmental imbalances throughout the world. The resultant fury of the nature is witnessed all around through drastic change in the climate, flash, floods, failure of rain and many more, causing damage to thousands of lives and livestocks throughout the world.

THE ENVIRONMENT IN THE NEW MILLENNIUM: THE WAY OF THE WORLD

"The Economist", the famous magazine of the United Kingdom, has analyzed the trend of the world in the twentieth century. The environment of the past 100 years has not been as bad as the people

have thought. On the contrary, the environment of the world has been good and will be so until the next century. Although the population of the world has been increasing quickly during the last century, it has not caused any serious problems as world production has also been highly increased. The environment of the world has not been a disaster (like the prophecy of many others) because of the changes of many factors. There is the change of resource prices and society. The development of democracy and the planning of environment are to meet the pressure from the people.

It is seen that when there are more people, more consuming, more production, the use of natural is increasing. The price goes up when there is the need. There is then the force of being economical in use, the need to find new resource sites, new kinds of resources, new technology, and new ways for humanity. The mechanism of prices has been quite efficient in solving the problems of natural resource.

However, we need to accept that marketing mechanisms have not been quite satisfactory in solving environmental problems, particularly, where there is something in nature, which does not belong to any one. There-fore, there is the tendency that resources will be used inconsiderately. There is no one to care for conservation.

There is the example that resources in the sea and the ocean will continue being in hazard in the next century.

Moreover, in some cases, the hazard in the environment has not been reflected in the way we can see like "price". There is the case that pollution is setting into air and water. The pollution occurs to the ecology and community. However, the price does not reflect any of these damages. It is because private business wants to decrease the capital amount and want to continue getting the highest profit. They let the disasters happen.

Communities, society and nature meet danger from the environment as we see in the developing countries all over the world "The Economist" points out that in a country with advanced industry, pollution is not a big problem because they have developed democracy, which then has the checking, there is always the pressure from the people. The democratic government has answered the people's needs with the awareness that something needs to be done and some things have already been done. We can see that air pollution in industrial society, which had been increasing for 300 years, is solved satisfactorily.

This will be continued for a long time. In a developing country, this problem may continue to the next century.

THE CRISIS OF ECOLOGY IN THE DEVELOPING WORLD

In the analysis, "The Economist" may be too positive in assessing the environmental problem and regarding only one aspect like pollution in industry. There is the conclusion that the incidence of pollution in the air has been decreasing. Nothing is said about the pollution of toxic waste, which has been left, and keeps piling up in the environment for so long in the world of industry. This tendency will continue until the next century as the government in industrial countries like America, Japan and Germany have not been successful in solving the problems of toxic waste, which has been accumulating for so long. It is because the main environmental policy emphasizes only the problems, which are visible and can be felt. The emphasis is on short-term pollution, which has an immediate effect to on people's health. The accumulating pollution cannot be seen easily, it is then neglected.

Besides, the analysis of the population of the world overlooks one main fact – although the growth rate is not as high as before the population of the world in this turn of the century will increase by approximately 80 million a year. (The amount is equal to the number of people in Germany.) It means that this amount of population among the impoverished and the deterioration of rural environment will heighten the environment crisis, which will have an effect on the production system and the ways of living of the people in developing countries. The very high increase of the population has affected the development in city and the living in urban areas. At present, there are 2.6 billion people living in cities. 1.7 billion of that amount live in the cities of developing countries. There is the prediction that the ratio will accelerate until the year 2015. Three quarters of the world population is in developing countries, which are very crowded, and the health problems are serious.

When we adopt the well-known "environmental formula" of Anne and Paul Ehrlich as the base on considering problems, we get the conclusion that the environment crisis has the tendency to become very critical. This formula says:

"Environment crisis (I) is settled by the amount of the population (P), the economic growth (A) and Production

Technology (T), that is I = P ? A ? T".

Economic growth is also another main variable. The more development, there is the more the increase in production. It heightens the ecology system. Moreover, the production of one unit may cause a large quantity of pollution because of the use of unclean (unhealthy) technology, which endangers the environment. It is worrying that the trading, the production and the consuming will enhance the squandering of resources and the environment will be seriously destroyed.

DEMOCRACY AND ENVIRONMENT

We can give the main conclusions for the future of the developing world as follows.

1. The worst pollution may occur among the poor countries. It reflects some basic problems. These countries hardly have democratic development, their people have no rights, no vote, they do not get information on the environment, and they are unable to force their government to be against the businesses threatening environmental conditions. The lack of democracy is then the main factor causing environmental crisis.

2. The seriousness of pollution has not occurred because of the over development of the economy. It is because the first part of the development by government and private business emphasizes only the economic enlargement (to increase population income and the export). After a certain period, people in various fields started to develop their conscience of "Green" and there is a large cry for the awareness of "Sustainable Development". During this time, the government has to respond to the starting of environmental planning with the aims of economic development along with environmental protection. However, there needs to be "Democracy of the environment" as the main base.

3. Regarding the long 100 years of experience of the West, we may look further ahead that in the 21st century the developing countries may be trying to solve environmental crises by themselves. However, there are many other factors for their success, particularly, the following:

– there needs to be information which is quite complete for the comparison of capital for the controlling of environment and the benefits from which society will gain;

– there are efficient criteria, which is the mixture of the standards of marketing and the price, and the criteria in setting up the environmental standards.

Finally, the solving of the crisis of the environment is not only the economic problems (e.g. the promulgation of Green Tax) but also the political problem. If there are too strict standards, it may not be accepted politically. The people may criticize. The business world may be against it and react (by decreasing the investment in employee's wages or increasing the price so high that it causes people to be in trouble.) In a democracy, the politicians who plan the policy on environment do not usually like strict standards. There is no one being concerned about how much the standard and the policy on environment will be affected.

It is predicted that in the twenty-first century the green power group in developing countries will increase.

The movement will be in a wider scope and there will be the call for solving the problems down to the root.

This is because the environment problem is becoming serious while the reaction from the government is quite slow. It is because the government has the tendency not to have strict standard that they may have to be concerned with private business and the national economy.

ENVIRONMENTAL INNOVATION

Among the rich countries, it is assumed that it is not so hard to solve environmental problems of the 21st century. These countries will compete with each other in improving the quality of their products. There is always the search for innovation, environmental innovation, in particular, is an important instrument in encouraging the progress of the industrial world. At present, the rich countries have already had the high potentiality of developing new technology for the production process with the regard for environmental quality.

The innovative analyst regards that the ability of industry in responding to the environmental problems is the main indicator if that kind of industry can compete at the world level. Those who want to succeed must integrate the main idea with the production system. It means the protection of the environment, solving the problem of pollution, increasing the efficiency in using natural resources and power. The strict standard of the environment will enhance the thinking of production method, which will benefit the environment.

At present, the governments of the industrial world, like Sweden, agree with "Environment Innovation Ways". There is a conclusion in the latest report of the national environment that "The policy on environment of the Swedish government is very important in enhancing the modernity in industrial business sectors. The improvement of the environment has turned out to be the main factor in accelerating the competition in this industry."

This is the entire new western concept, which emphasizes "How to bring about Ecological Modernization."

It is the new concept on new environmental technology and every step is used for the industrial production process. However, there needs to be adaptation of the whole production structure, which needs systematic «en-vironmental planning», and the adapting of world vision and the conscience of the environment of the people in every field. The concept of "Ecological Innovation" does not emphasize only the technology but also regards the importance of "Environmental management" which needs to be done in both the governmental and private sectors. This can be seen in countries like Sweden, Denmark, Holland and Germany, which are regarded as the leaders in "Environmental Innovation".

THE OZONE LAYER

Although ozone (O3) is present in small concentrations throughout the atmosphere, most ozone (about 90 %) exists in the stratosphere, in a layer between 10 and 50 km above the surface of the earth. This ozone layer performs the essential task of filtering out most of the sun's biologically harmful ultraviolet (UV-B) radiation. Concentrations of ozone in the atmosphere vary naturally according to temperature, weather, latitude and altitude. Furthermore, aerosols and other particles ejected by natural events such as volcanic eruptions can have measurable impacts on ozone levels.

THE OZONE HOLE

In 1985, scientists identified a thinning of the ozone layer over the Antarctic during the spring months, which became known as the "ozone hole". The scientific evidence shows that human-made chemicals are

responsible for the creation of the Antarctic ozone hole and are also likely to play a role in global ozone losses.

Ozone Depleting Substances (ODS) have been used in many products which take advantage of their physical properties (e.g. chlorofluorocarbons (CFCs) have been used as aerosol propellants and refrigerants).

CFCs are broken down by sunlight in the stratosphere, producing halogen (e.g. chlorine) atoms, which subsequently destroy ozone through a complex catalytic cycle. Ozone destruction is greatest at the South Pole where very low stratospheric temperatures in winter create polar stratospheric clouds (PSCs). Ice crystals formed in PSCs provide a large surface area for chemical reactions, accelerating catalytic cycles. The destruction of ozone also involves sunlight, so the process intensifies during springtime, when the levels of solar radiation at the pole are highest, and PSCs are continually present.

Although ozone levels vary seasonally, stratospheric ozone levels have been observed to be decreasing annually since the 1970s. Mid-latitudes have experienced greater losses than equatorial regions. In 1997, the Antarctic ozone hole covered 24 million km2 in October, with an average of 40 % ozone depletion and ozone levels in Scandinavia, Greenland and Siberia reached an unprecedented 45 % depletion in 1996.

ENVIRONMENTAL AND HEALTH EFFECTS

The amount of UV reaching the earth's surface has been shown to correlate with the extent of ozone depletion. In 1997, UV-B levels continued to rise at a rate of 2 % per annum. Increased UV levels at the earth's surface are damaging to human health, air quality, biological life, and certain materials such as plastics. Human health effects include increases in the incidence of certain types of skin cancers, cataracts and immune deficiency disorders. Increased penetration of UV results in additional production of ground level ozone, which causes respiratory illnesses. Biologically, UV affects terrestrial and aquatic ecosystems, altering growth, food chains and biochemical cycles. In particular, aquatic life occurring just below the surface of the water, where plant species forming the basis of the food chain are most abundant, are adversely affected by elevated levels of UV radiation. The tensile properties of certain plastics can be affected by exposure to UV radiation. Depletion of stratospheric ozone also alters the temperature

distribution in the atmosphere, resulting in indeterminate environmental and climatic impacts.

FUTURE PERSPECTIVE

Despite existing regulation of ODS, there continues to be severe ozone depletion and maximum stratospheric levels of chlorine and bromine are predicted to occur only during the next decade. Without further measures, the ozone hole will continue to exist beyond 2050. However, the success of the Montreal Protocol has already been observed in terms of changes in the concentrations of man-made chlorine-containing chemicals in the troposphere (i.e. the rates of release of ODS to the atmosphere have been reduced). Additional measures are currently being proposed by the European Commission to accelerate the phase out of various ODS and thereby to provide much-needed additional protection for the ozone layer.

WHAT YOU CAN DO TO PROTECT THE OZONE LAYER

You have already taken the first steps to help protect the ozone layer by informing yourself of the problem and its causes. Try to find out as much as you can about the problem from publications, schools or public libraries. The only way to mend the ozone hole is to stop the release of CFCs and other ozone depleting substances (ODS) into the atmosphere. European legislation aims to achieve this by phasing out ODS as soon as viable alternatives become available, and where no such alternatives are available, restricting the use of these substances as far as possible. However, there are a number of practical initiatives, which can be taken at the individual level to help protect the ozone layer: try to use products, which are labeled "ozone-friendly".

Ensure technicians repairing your refrigerator or air conditioner recover and recycle the old CFCs so they are not released into the atmosphere.

Vehicle air conditioning units should regularly be checked for leaks.

Ask about converting your car to a substitute refrigerant if the a/c system needs major repair.

Remove the refrigerant from refrigerators, air conditioners, and dehumidifiers before disposing of them.

Help start a refrigerant recovery and recycling program in your area if none already exists.

Suggest school activities to increase awareness of the problem and to initiate local action.

PROTECTING YOURSELF FROM UV RADIATION

There is a direct link between increased exposure to UV radiation and elevated risk of contracting certain types of skin cancers. Risk factors include skin type, sunburn during childhood, and exposure to intense sunlight. Recent changes in lifestyle, with more people going on holiday and deliberately increasing their exposure to strong sunlight, are partly responsible for an increase in malignant skin cancers. In order to minimize the risk of contracting skin cancer, cover exposed skin with clothing or with a suitable sunscreen, wear a hat, and wear UV-certified sunglasses to protect the eyes.

PROSPECTS FOR APPLICATION

With the knowledge of how these communication systems operate, they can be manipulated by man to maximize performance of biological control measures in agriculture. If the mechanisms of what attracts and retains a predator or parasitoid to a field are understood, they can be developed and enhanced to optimize control possibilities. The insect carnivore can be retained in the field after mass is released and the efficiency of search and attack is maximized.

Exogenous elicitors may be developed synthetically, applied to a crop and utilized to increase the time of searching by the natural enemies. Plant breeding may produce crops that are able to produce more volatiles making them even more effective in attracting natural enemies. The application possibilities from herbivore induced volatiles research will prove to be as intriguing as the research itself.

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