



# World Ecology Report

Critical Issues in Health and the Environment

*Knowledge brings new choices. Education brings new knowledge.*

## ***Health and Environment: Global Partners for Global Solutions***



### PART II

This Special Issue of the *World Ecology Report* represents the second of a two part series and contains those abstracts of papers presented at our past *Health and Environment: Global Partners for Global Solutions* Conferences not included in the first part of this series. This volume also contains the edited versions of the keynote addresses presented by the representatives of the co-sponsoring countries. The issues are organized by topic rather than conference theme. Further information on the papers published in these two special issues is available from World Information Transfer headquarters.



L to R: **Dr. Bernard D. Goldstein, Dr. Christine Durbak, Mr. Farouk Mawlawi, Dr. Adib D. Jatene**, Fourth International Conference on Health and Environment, United Nations N.Y., June 9, 1995.

records of health campaigns with an active participation of the medical staff whose aim was to control environmental factors that might aggravate or determine the scope of epidemics. However, we all know that profound inequalities still persist both among countries and among different social classes in the same country. On the eve of the 21st century, over half of the world's population still does not have their right and access to health effectively assured.

The concept of sustainable development, recently integrated into the international agenda, intends to establish a new framework to deal with

health and environmental issues, and this innovation constitutes a significant advance on the debate regarding this subject, both at the domestic and international levels.

In Brazil the notion of health as a universal social right and the need to consider it as an object of all public policies was gradually consolidated. The main proposal was to replace the priority on medical assistance by a new system focused on health promotion and prevention. This idea would reconfirm the prevailing understanding among different social groups that there should be a close relationship between health policies and the gen-

### **Public Health and Environmental Policies in Brazil**

*Keynote Address by H.E. Dr. Adib D. Jatene, Minister of Health of Brazil, at the Fourth International Conference on Health and Environment: Global Partners for Global Solutions, United Nations, New York, June 8 and 9, 1995.*

The relationship between the health status of the population and the environmental conditions of a country is widely recognized. Since the beginning of public health activities, there are

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eral development strategy, including the environment. These goals have developed and were finally incorporated into the new Brazilian Constitution in 1988, which established the principles and guidelines of the public health system. Its essential element is the integration of the several dimensions involved in health care to improve the quality of life of the whole population.

In the 60s, our Government became aware of the problems resulting from industrialization and disorganized occupation of urban sites. Although the damages to the environment and consequently to the population's health caused by industrial pollution were real and serious, the measures to control the amount of waste launched in the air, on the ground and in the water were inadequate. In rural areas, the indiscriminate use of machinery and pesticides in the 70s were also harmful to the environment. The expansion of the agricultural border into the Amazon region resulted in damages to the natural resources of the country. Practices like burning and replacing native forests by growing grounds for cattle, inappropriate use of pesticides and mining have recently been controlled. Public awareness for environmental issues has been steadily increasing and the Brazilian Government has established policies and programs compatible with the principles and guidelines defined in the proposal for sustainable development.

The Brazilian Public Health System is being organized as a regionalized network, decentralized, with a single direction at each level of government, whose services are available to the population for free. The private sector is complementary.

The municipalities have the specific responsibility of providing the health care services, and the Federal and State Governments have the functions of regulating and coordinating the actions as well as providing technical and financial cooperation to the municipalities, so that they can fulfill their tasks.

The scope of the System includes actions on health surveillance, epidemiological surveillance, occupational

health and integral therapeutical care. It also encompasses the formulation of policies and the execution of programs for basic sanitation and the inspection of services, products, and substances of health interest, including those toxic and radioactive.

In order to encourage the adoption of integrated policies and programs related to health interests, the System has Intersectorial Commissions subordinated to the National Health Council (a board integrated by the public sector and entities representing society) in the areas of food and nutrition, sanitation and environment, human resources and science and technology.

It is interesting to note the good results arising from the institution of Commissions for permanent negotiation between the three levels of management (federal, state and municipal). These Commissions coordinate and monitor the execution of programs. The social control is being exercised through the participation in several deliberative bodies integrated by Government and non-government members.

Brazil is moving towards an administrative revolution in the health sector. To be effective it can not be made without the development of proper management models, based on the search of installations adequate to physical, social and economic conditions of each nation; on the rational use of inputs, equipment and human resources; on the development of information systems that enable better management and on the development of more flexible relations among the different players of the health sector. The Ministry of Health intends to improve and diversify the health system reform strategies in Brazil, seeking to make universalization, equity and integrity feasible goals.

The responsibility for the protection and improvement of the environmental quality is assigned to the National Environment System, created in 1981. This system is composed of several bodies: a National Council (CONAMA), which is a collegiate body with consul-

tative and deliberative functions, entitled to establish rules and standards related to the protection of the environment; the Ministry of Environment, Water Resources and the Amazon, which is the central body of the Federal Government in this area; the Brazilian Institute of Environment and Renewable Natural Resources (BAMA), which is in charge of implementing the federal actions and finally, state and municipal entities subordinated to this Institute.

The present Government priorities are aimed at strengthening the coordination between these three levels of government and supporting community initiatives related to environmental matters. In order to achieve these objectives, it is committed to improve the System and extend the representation of society at the National Council; to establish economic areas in the country which stimulate the rational use of the different ecosystems; to promote and support programs and projects to recover degraded areas and to stop pollution, as well as those to control and treat waste, effluents and toxic emissions; and to develop programs and projects to conserve biodiversity, both continental and oceanic.

The Government position is that the country can not expect good results if actions are taken only by the specific sectoral bodies on health and environment. The Government rather expects that other social actors—the organized civil society and economic agents—also organize their action encouraged by the common commitment to promote sustainable development.

The Government also recognizes the essential role of international cooperation to complement its efforts and I want to stress that a comprehensive reflection on this issue is urgently required. Assuming that environmental degradation has a direct bearing on the health of the population and that many of our environmental problems are of a transboundary nature, we should envisage ways to facilitate the transfer of environmentally sound technology and financial resources and the strengthen-

ing of capacity building initiatives to attain a balanced interaction between Health and Environment.

Before finishing my presentation, I would like to stress the differences between actions directed to the environment and actions oriented to people.

The results of actions over persons vary depending on whether they require a change of habits or not. The prevention of poliomyelitis is a good example of this situation, since the key question was how to inoculate every child.

Brazil was fortunate enough to find an adequate way to apply the vaccine and despite all difficulties and inequalities, we were able to have 20 million children vaccinated in only one day in 1980. This was done in June and the same operation was repeated in August of that year and every year since. The Pan American health organization started using the same strategy in 1985 and America was the first continent to eradicate poliomyelitis.

Brazil has a similar experience with measles. In 1992, we vaccinated 48 million children under 14 years of age in one month. The results were extremely positive. The incidence of measles in 1994 was less than 100 cases, while in 1990 we had more than 60,000 cases.

Incidentally, the fast and enormous development of equipment and drugs has created a powerful industry which generates far reaching benefits on one hand but creates many distortions on the other hand.

If we take a look at the pharmaceutical drug market we observe that 97 of 100 have been developed at the research departments of pharmaceutical laboratories and are protected by patents. As a result, their prices are defined according to the interests of the industry and are not related with the purchasing capacity of the population who needs those medicines. Similar concerns exist about diagnostic equipment. Faced with the necessity of recovering the investments made, some hospitals overuse the equipment and this procedure burdens the health care

**Selected Infectious Diseases and Emerging Issues of  
Global and/or Specific Regional Significance,  
Including Those Recognized as Important by International Forums**

Selected Diseases/Conditions by Main Mode of Transmission	Global Priorities	Diseases of Concern to:						Diseases Identified By International Forums
		Africa	Americas	Eastern Mediterranean	Europe	South-East Asia	Western Pacific	
<b>Person to person</b>								
Acute lower respiratory infection (ALRI)	x	x		x	x		x	x
Diphtheria	x	x		x	x	x	x	x
Influenza		x	x	x	x			
Leprosy	x	x	x	x		x	x	
Measles	x	x	x	x	x	x	x	x
Meningococcal meningitis		x	x	x		x	x	
Tuberculosis	x	x	x	x	x	x	x	x
Whooping cough (pertussis)	x	x		x	x	x		x
Poliomyelitis, acute	x	x	x	x	x	x	x	x
Trachoma		x		x				
HIV/AIDS	x	x	x	x	x	x	x	x
Sexually transmitted diseases	x	x	x	x	x	x	x	x
Hepatitis B, viral	x	x	x	x	x	x	x	x
Hepatitis C, viral		x	x	x	x	x	x	
<b>Food-, water- and soilborne</b>								
Cholera		x	x	x	x	x	x	x
Diarrhoea	x	x	x	x	x	x	x	x
Dracunculiasis (guinea-worm infection)	x	x		x		x		x
Giardiasis				x				
Hepatitis E, viral				x		x		
Schistosomiasis		x		x			x	x
Shigellosis				x	x			
Trematode infections				x		x		x
Typhoid and paratyphoid		x	x	x	x			
<i>E. coli</i> 0157: H7 infection						x		
Hepatitis A, viral			x	x	x	x		
Salmonellosis (other than typhoid and paratyphoid)			x	x	x			
Ascariasis		x	x	x		x		
Hookworm diseases		x	x	x		x		
Tetanus, neonatal	x	x	x	x		x	x	x
Tetanus, other	x					x		x
Trichuriasis			x	x				
<b>Insect-borne</b>								
Dengue fever		x	x	x		x	x	
Dengue haemorrhagic fever		x	x			x	x	
Filariasis (lymphatic)		x		x		x		x
Japanese encephalitis						x		
Malaria	x	x	x	x		x	x	x
Yellow fever		x	x					
Chagas disease (American trypanosomiasis)	x		x					
Leishmaniasis, cutaneous and mucocutaneous				x		x		
Leishmaniasis, visceral (kala-azar)			x	x		x		
Onchocerciasis (river blindness)	x	x	x	x				x
Plague		x	x			x		
Sleeping sickness (African trypanosomiasis)		x		x				
<b>Animal-borne</b>								
Brucellosis			x	x		x		
Rabies (dog-mediated)		x	x	x		x		

**SOURCE:** *The World Health Report, 1996*

costs. We need an international leadership to consider such a complex and comprehensive issue.

Actions on the environment are much more difficult because they depend not only on the cooperation of the population but also on scarce financial resources, especially in developing countries. Diseases like malaria, break-bone fever and diarrhea are closely linked with degraded environments and demand vigorous actions and huge investments.

I would like to emphasize that we have the necessary knowledge to make significant impacts on the environment so that it contributes to the improvements of the health sector. The real problem we are facing is where and how to have the necessary funds to finance the actions.

A worldwide joint effort will certainly contribute to reduce the enormous inequalities and to stimulate security and peace. In doing so, we will be nearer to attaining our common commitment of providing "Health for All," if not by the year 2000, at least as close as possible to that target.

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### Schistosomiasis in Egypt: Past–Present–Future

*Keynote Address by H.E. Dr. Abdullah Aburayah, Under-Secretary of State for Endemic Diseases of Egypt, at the Second International Conference on Health and Environment: Global Partners for Global Solutions, United Nations, New York, April 30, 1993.*

The search for schistosomiasis in ancient Egypt has shown evidence of its occurrence in the Nile Basin Valley since remote times. Haematuria with urinary bladder disturbances has been mentioned in Four Papyrus papers dated back to 1950-1900 BC. Canadian scholars discovered schistosoma ova in a cirrhotic liver of a mummy from 1200 BC.

In 1852, the German scientist Theodore Bilharz, discovered in Kasr El-Eini Hospital, Cairo, Egypt the worm which is the causative agent. In 1915, the English scientist Lieper, discovered the snail intermediate host in the water

streams in "marg village" near Cairo.

In 1930, the first bibliography on bilharziasis was published including 3800 research studies of which 480 were conducted in Egypt. In the same year, the Institute for Tropical Medicine and Research was established in Egypt. It was the first institute of its kind in the African Continent and it is functioning in the control and treatment of endemic diseases of which schistosomiasis (bilharziasis) is on top of the list.

In 1939, the Department of Snail Control by molluscicides was established within the Organogram of the MOH-Egypt. Subsequently, departments of tropical medicine were established in the Schools of Medicine in Egyptian Universities. The research inputs in diagnosis, treatment and control efforts had been published in hundreds of papers as a national problem of priority importance. Efforts of MOH, alone or in cooperations with international agencies as WHO-UNICEF-USAID or countries like Germany continued to conduct projects to control the disease, limit its propagation and treat the patients.

The arable land in Egypt is being irrigated through surface water from the River Nile and its branches. This resulted into hundreds of thousands of small water channels crossing all over Egypt in rural areas to allow for close water contact and high chance of infection. The spread of haematuria infection was thus all over rural areas except south of Assuit in upper Egypt, where infection rate was low because of basin irrigation. The slow current of water in the peripheral branches passing through villages and their tributaries crossing fields, helps the growth of vegetation, hence snail traps.

The ecological changes following the construction of the high dam and the lake have changed the pattern of distribution of schistosoma in Egypt. The slowness of water current and the increased salinity of water from increased percolation from underground water resulted in the greater spread of schistosomiasis mansoni south, and foci in Upper Egypt. At the

same time, the prevalence of schistosomiasis hematobium has receded to very low levels in the Delta region, probably due to changed ecology and water beds for *Bulinus* snails. Also, hematuria infection increased in Upper Egypt, south to Assiut, because of the change from basin to perennial irrigation.

The introduction of pure water supply to rural Egypt has been the strategy for the past 30 years. This is achieved by deep underground water supply at points in the villages all over Egypt except Northern Delta, Suez canal zone and Fayoum province. In these areas, underground water is unsuitable for human consumption. The supply of water there is through a wide network of piped water from huge water purification plants to each village at certain collection points.

From this, we have a problem with safe water supply in rural Egypt. However, because of the absence of waste water disposal systems, water is mostly used in houses for drinking and cooking purposes. Washing of clothes and house utensils is still carried at canals with constant chances of exposure to infection. Currently, many villagers are building brick-houses with piped water supply and piped drainage systems. This is expected to lower canal contact.

The application of molluscicides could be done at the main water channels to be carried to the peripheral branches. However, the dose application at the mouth of the channel will kill fish and vegetation as well as the snails. As it proceeded peripherally, the concentration gets too low to be effective. Successful trials had been done in Fayoum since its water supply is from one main branch, but the drainage to Fayoum lake has seriously affected its fish output.

Because of the High Dam and water control output into the Nile and its branches, the current of water has slowed down especially in peripheral branches which encourages more snail breeding and high vegetation growth.

Since the early forties, rural health

centers have been constructed and put into service to provide basic primary health care including endemic disease control. A basic function of the centers is to examine and treat every outpatient attendant for parasitic infestation, especially bilharziasis, by urine and stool examination. Currently, we have almost 3000 rural health facilities, each serving a population between five to ten thousand within the context of a village and a maximum reach of 5 kilometers. These health centers are responsible for yearly screening of the population including school children.

The control of schistosomiasis to an effective level can be achieved through four main activities:

1. Environmental sanitation improvements by providing pure water supply and proper collection and disposal of excreta.

2. Diagnosis of cases and their proper treatment with a follow-up system to discover re-infection.

3. Snail control mainly depending on molluscicide application in water channels.

4. Health education addressing methods of infection, symptoms, sequelae of disease, proper treatment value and how to prevent re-infection.

Currently the government is focusing on the following strategy:

1. Screening of the population in masses and treatment of the infected subjects—the introduction of the highly effective one dose of praziquantel has made treatment easy and could be repeated. The results show the infection rates are coming down, intensity as estimated by egg count is less and late sequelae of the disease are not observed as frequently as before.

2. Health education through mass media—presently radios and tv's are practically in every rural home. Very successful messages have been introduced and have changed many of the attitudes and practices of canal water contact. At the same time, rural population is increasingly using the health services for examination and treatment.

3. Ministry of agriculture through multisectoral cooperation is changing

the method of irrigation of many of the new reclaimed areas to drip methods. This lowers chances of direct canal contact.

With the current results and applied strategy, together with expected future economic, cultural, and educational changes, the future looks more promising in controlling schistosomiasis.

We expect by 2000 to have piped water supply in many rural homes, changes to mechanical water irrigation of fields and better sewage system. This, together with more intense efforts on national level for case detection, effective treatment and more health education should enable the control of this historic disease.

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## Health and Environment From War to Recovery: The Case of Lebanon

*Keynote Address by H.E. Mr. Marwan Hamadeh,  
Minister of Health of Lebanon, at the Fifth  
Conference on Health and Environment: Global  
Partners for Global Solutions, United Nations, New  
York, April 25 and 26, 1996.*

The biggest preventable environmental disaster of all is the disaster of war, for healthy people and a healthy environment cannot prevail except in peace. In the mid-1970s, Lebanon was a prosperous, upper middle-income country with a market economy expanding by about 6 percent a year. Later Lebanon was imperiled with an environmental disaster that extended for more than 15 years, claimed more than 150,000 lives and maimed an even greater number.

When a country is at war, development and health are the first victims. During the war, more than a million individuals were forced to relocate or were displaced at least once. Of these, more than half returned to their homes or settled somewhere else and the other half is expected to return to their villages and towns within a couple of years. The population displacement put a great deal of pressure on the physical infrastructure and environmental and health services that were not upgraded for more than a decade. A shift in the

population distribution occurred with new urban areas developed under no government control and obviously in the absence of any comprehensive development plan.

By the end of the war in 1990, the following was the situation in Lebanon.

**Environment:** 1) a large proportion of our forests were lost to fires and bombing; 2) agricultural lands and terraces were abandoned for safety or job opportunities; 3) many manufacturing industries were either destroyed or forced to shut down; 4) the water distribution system or network was either destroyed or debilitated; 5) main power plants in the country were non-operational or operating at minimal capacity; 6) a number of small and medium sized industrial firms emerged in residential areas or were surrounded by emerging human settlements; 7) the two main refineries in Lebanon became non-operational and oil was imported under no license or control by several interest groups in the different areas of the country.

**Health:** 1) life expectancy declined from 65 to 60 years; 2) infant mortality rates jumped to 44 per thousand; 3) urban population increased to almost 87% as city suburbs were flooded with refugees; 4) health services declined with less preventive care and less vaccination and more focus on the war emergency needs; 5) the poor lost almost all access to basic hospital care; 6) the Public Health Sector was completely depleted, looted or destroyed by the various war factions.

Lebanon today represents a typical case of war and near-recovery in the health and environment sectors. The state of recovery is indicated by the current environmental and health conditions. Lebanon generates close to 3,000 tons of solid waste daily. About one-fourth (800 tons) of the total waste is generated by Beirut alone. Before the war, the waste was composted, burnt in the open, or dumped in land fills. During the war and for difficulties in transportation, different regions in Beirut and in the country reverted to easier ways out. In West Beirut, for

example, solid waste was dumped in a bay which continued to receive solid wastes and construction rubble until 1993. In other areas of the country, wastes were dumped in open landfills, public lands, river streams, or the sea. Now, 6 years into internal peace, the Ministry of Environment is launching a comprehensive solid waste management plan for the country. The three approaches of sanitary landfills, composting, and incineration will be adopted all over the country based on proper environmental impact assessment. The Government, Ministry of Environment, and the Parliament are reviewing this US \$150 million plan with the intention to pay more attention to the management in terms of waste reduction, reuse, and final disposition.

As for wastewater, the few wastewater treatment plants that were established before the war in selected coastal and mountainous towns were destroyed during the war. The Ministry of Environment and the Ministry of Energy and Water Resources are preparing to build wastewater management plants close to each of the main coastal cities. Work is active in constructing sewerage systems in the towns and villages that lack it. The almost total absence of maintenance of the water pipelines during the war and its potential exposure to unkept sewer systems led to the contamination of the potable water supply. In Beirut and other coastal cities, the interruption of water services and the increased demand during the war forced people to dig hundreds of unlicensed artesian wells which led to salination as a result of sea water intrusion.

The Ministry of Public Health is working on upgrading its Central Laboratory which monitors communicable diseases, the quality of the water, food and other consumer products. The Ministry of Energy and Water Resources is collaborating with UNICEF and private universities to upgrade their quality monitoring laboratory units all over the country. This is running in parallel to the rehabilitation of the physical infrastructure of the water sector. The cost is

estimated at US \$45 million.

Lebanon lacks an air quality control program or even an air pollution monitoring station. It is believed that vehicular exhaust emissions are the main source of air pollution in the country. More than a million vehicles are currently operating in Lebanon. Most of them are old makes. The Ministry of Interior has banned the import of cars that are more than 10 years old. The newer cars tend to use unleaded gasoline which became more available and whose consumption is steadily increasing. Lebanon is reintroducing a public transportation system which should reduce the dependency on private cars.

<b>Diseases Targeted for Eradication or Elimination</b>		
	<b>Estimated Prevalence (000) 1995</b>	<b>Target for 2000</b>
Dracunculiasis	122	Eradication
Poliomyelitis	82	Eradication
Leprosy	1,833	Elimination
Neonatal tetanus	10,000 <sup>a</sup>	Elimination
Chagas disease	18,000	Elimination
Iodine deficiency disorders	655,000 <sup>b</sup>	Elimination

*SOURCE: The World Health Report, 1996.*

Industrial air pollution is limited to a few medium and large sized industries. These include a power plant, 5-6 cement industries, and a fertilizer plant. The Ministry of Environment and the Ministry of Public Health have imposed several restrictions over the past years, but enforcement has been partially successful.

The sale and use of pesticides is just beginning to be controlled. Reports of banned pesticides illegally imported into the country were numerous. Some were sold under new trade names. During the war, farmers lost all the public support system which provided advise as to the type and quantity of pesticides to be used for their crops. Currently, farmers use pesticides intensively and apply them improperly. They also harvest their crops without any consideration for the waiting period following pesticide spraying. A national committee has been established to con-

trol the sale and use of pesticides in the country.

During the years of war, the Ministry of Public Health was consumed in emergency care and provision of clinical care for the needy through subsidizing their medical management at private hospitals. The Ministry was minimally involved in preventive measures except for a few immunization and health awareness campaigns. Quality control of medical care, reporting of diseases and illnesses and surveillance systems were totally absent.

Lebanon is currently experiencing an epidemiological transition in which fertility and infant mortality rates are declining. Life expectancy rates are rising with an overall life expectancy of 69 years compared with 65 years before the war. Infectious diseases are becoming less prevalent. Malnutrition is rare and parasitic disease has been brought under control. More than 95% of our children are now vaccinated against diphtheria, tetanus, pertusis and poliomyelitis. The coverage against measles is approaching 80%. With electricity restored and as a result of better and safer water quality, alimentary intoxications and summer diarrheal diseases are remarkably less. Subsequently, mortality rates for children less than 5 years old has dropped from 44 per thousand to less than 30 per thousand. However, improvements in the health of the Lebanese people and nation's environment are uneven. Effects of the extended period of civil war can be seen in high incidence of tuberculosis, which is more prevalent now than in 1975. The Government of Lebanon is committed to developing a health care system that will provide equitable access to essential health care for all Lebanese. It has embarked on US \$510 million project to rehabilitate the health sector and upgrade health services. In addition, a US \$48 million World Bank project was started in February 1996 to be executed in multiple phases over a 6 year period.

During the war, Lebanon joined the list of victims to the silent trade of hazardous waste. In September 1987, more

than 2000 tons of toxic industrial material from Italy in about 16,000 barrels stored in 20 containers were discharged in one of the several illegal ports of Lebanon. Months passed before the Government of Lebanon was alerted to the incident and the possibility that the illegally imported material was dumped in different sites. The Italian government agreed on July 13, 1988, to handle the issue and the barrels were subsequently reported deported by the Italian commission. The world community has to act urgently to prevent the recurrence of incidents such as the 1987 illegal import of hazardous waste into Lebanon. Public participation is the best safety gauge against the potential greed of unethical and corrupt business people, industrialists, and public officials.

I leave you today with the promise that Lebanon will adhere to its commitment to biodiversity, environmental protection, and peace. Lebanon has launched a vast reconstruction scheme aiming at restoring its infrastructure and improving socio-economic conditions for our people. Thus, we hope to restore Lebanon to its leading cultural, financial and scientific role in the Middle East.

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## Environmental Health Impact Assessment on Development Activities

*Keynote Address by Honorable Dato' Mohd Farid Ariffin, Deputy Minister of Health of Malaysia, at the Third Conference on Health and Environment: Global Partners for Global Solutions, United Nations, New York, April 15, 1994.*

Human beings are entitled to a healthy and productive life and should be able to live in harmony with nature. This calls for proper linkage of health aspects and environmental health protection—an emerging subject of intense debate and discussion at local, national and international forums.

The causes of environmental degradation are numerous. Activities in the name of development, aimed to elevate the quality of life, have resulted in the deterioration of the very resources that

are needed for sustaining life, such as food, water, air and soil. Rapid population growth and increasing poverty, two major factors affecting environment, development, and health in the world are exerting heavy pressures on natural resources and the capacity of natural ecosystems to support human activity. It must be realized that the capacity of the natural environments is limited and this fact cannot be ignored if the goal is to enhance and improve the health and well being of world citizens. It must also be realized that health is closely related to development and the environment. However in many parts of the world, very little attention is paid to health aspects when environment and development are considered.

The warning bells have been sounded from as far back as 1913 when arsenic poisoning was reported in Argentina to as recent as the deaths in South Africa caused by drowning in toxic sludge.

In developing countries, the major environmental health concerns are still those environmental factors contributing to the spread of infectious diseases, all of which require provision of safe water, basic sanitation, adequate shelter, availability of food and handling practices, controlling disease vectors and agricultural hazards.

The actions of the past are irreversible and the release of more than three and a half billion pounds of toxic chemicals into the environment, as estimated by the United States Environmental Protection Agency, has resulted in various adverse health impacts. Two-thirds of cancers for example, have been attributed to environmental problems which could have been prevented. Other adverse health impacts are seen in the damage to the developing nervous system of children from lead contamination, decreased male sterility from debromochloropropane as well as the largest cholera epidemic ever recorded which occurred in Peru in 1991.

Without a comprehensive and coordinated approach to environmental health protection, it will be impossible to

properly balance the risks and the resources needed to address the taking of risks. The most critical environmental problem of today and in the future is and will be how we identify risks, assess these risks, define them, thoroughly understand these risks, prioritize them and communicate these risks to all citizens. In doing so it becomes very critical also on how we handle the gap between scientific and public perception of environmental health risks.

Environmental health impact assessments should specifically report and comment on potential effects on human health rather than just providing data on point source emissions and ambient levels of pollutants. This then calls for the development of indicators of community health which can be derived from public health surveillance activities or pollution incidents and epidemiologic studies of disease clusters, which should all be integrated into a national environmental health database. Public health authorities could play a major role in constantly developing indicators of environmental health and refining these indicators to improve the predictive availability of health impact assessments where such indicators are used.

It is important to maintain as a principle, that environmental health impact assessment is not considered a parallel process but rather an integral part of the environmental impact assessment process. This can be achieved through legislation which requires health impacts to be addressed explicitly in EIAs, development of health impact guidelines, development of avenues for access to health expertise and community input at different stages of the EIA process and the clarification of roles between agencies.

As any other developing country, Malaysia has to balance its development priorities against effective environmental and health management. The impact of environmental measures on national economy will have to be considered along with the implications of affecting foreign investment as against a well regulated environment.

Nevertheless, in achieving this eco-

conomic growth, Malaysia recognizes that the well-being of the people cannot be ignored or compromised since their health is fundamental to a nation's development and progress. Also, recognizing the fact that the health of the people is inextricably linked to a sound environment, Malaysia strives to strike a balance between economic growth and sustainable development.

Malaysia is also taking steps to be a party to the Basel Convention and currently observes and complies with the recommended guidelines on toxic and hazardous waste. Steps are also being taken to plan and design permanent treatment and disposal sites for toxic and hazardous waste derived from electronic industries, metal electroplating industries and other industries related to chemicals, rubber, plastics, printing, packaging, tanneries and pharmaceuticals.

While Malaysia promotes cooperation, involvement and consultation with various groups including NGO's, a legislative framework has been set in place in order to achieve the goals of sustainable development principal among these is the Environmental Quality Act of 1974 amended in 1985, and its 17 subsidiary regulations which collectively aim to prevent, abate and control pollution. The Environmental Impact Assessment Order of 1987 requires EIA studies to be conducted for any proposed development falling under the definition of prescribed activities, and this very move has set in motion awareness in preventing and mitigating environmental problems. This is holistic legislation to ensure that there are adequate and effective environmental consideration during planning of development activities and projects. Nineteen categories of development activities require that EIA reports to be submitted. These include agriculture land reclamation, housing, industry, infrastructure, waste treatment and disposal and water supply. The EIA order is a legislative procedure for approving, or rejecting the report about the project, not the project itself. It acts as a mechanism for improving planning of redevelop-

ment projects, determining when effects are unacceptable and deciding methods for avoiding some effects and mitigating the remainder.

Apart from these, Malaysia has geared itself towards the improvement of environmental health as is evidenced by the incentives announced in the 1994 budget which among other things, provide for tax exemptions for investment in timber plantations, catalytic converters and other pollution control equipment as well as the 2.7 per cent reduction in the price of unleaded fuel. An extensive health care system is in place which not only provides basic health care services and promotion of hygienic practices among the rural population but is able to control, prevent and treat tropical diseases as well as disease of modern living such as cardiovascular diseases and cancer.

Eighty-nine per cent of Malaysians will have access to piped, treated public water by 1996. In 1988, a national action plan was developed for municipal solid waste management which identified the scope for combining recycling, incineration and sanitary landfilling coupled with efficient collection systems as important components for improving cleanliness in the urban areas. Currently the privatization of solid waste management services is being implemented which will then provide extensive and efficient waste management services throughout the country.

In pursuit of implementing Agenda 21, three functions are seen as necessary: capacity building to provide the human resource and the skills, technology transfer to provide the facilities and techniques and the financial resources to support sustainable development and promote environmental health. Since environmental health issues are multi-sectorial and transboundary in nature, international partnerships and commitments in terms of adequate financing, appropriate trade conditions and technology transfer become essential.

In the partnerships that are developed, it must be borne in mind that the poorer developing countries face a

more difficult challenge wherein they have to combat both the traditional health problems of diarrhoeal diseases, vector-borne diseases and parasitic infections as well as the emerging environmental health problems resulting from development. Thus the standard for environmental health must be realistic so as not to preclude resources essential for addressing more pressing problems.

It must also be borne in mind that developing countries need to continually strive for development. The challenge they face is that it cannot be done at the expense of the environment. In addition, a large number for developing countries are not equipped and prepared to integrate health into their development planning or even to deal with the most pressing environmental problems confronting them.

Standards must be set in the spirit of global partnership to solve global problems such as global warming, ozone depletion and acid rain which cannot be solved singularly by anyone nation. There must be recognition of shared, albeit differentiated responsibilities among all nations and a strong commitment towards sustainable development for the benefit of all peoples today and tomorrow.

This sense of responsibility and commitment may perhaps be strengthened by remembering that "the world was not bequeathed to us by our parents but rather entrusted to us by our children."

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#### Remarks of H.E. Yuri Shcherbak, Ambassador of Ukraine to the U.S. on the Tenth Anniversary of Chernobyl, April 26th, 1996

*H.E. gave the Keynote Address on the consequences of Chernobyl on April 3, 1992 during our First International Conference on Health and Environment: Global Partners for Global Solutions. The following remarks were given during our Fifth Conference.*

As recently as three days ago, Chernobyl again reminded us on how dangerous and unstable the situation



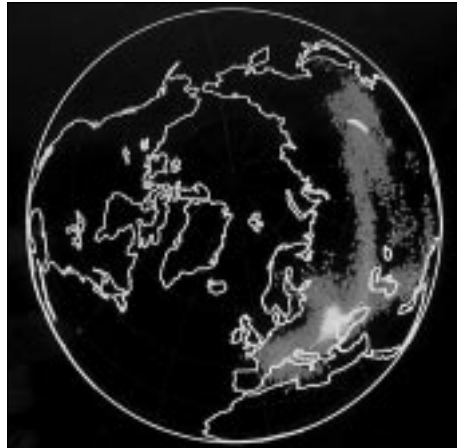
remains in this area. You could see on CNN TV network the pictures of burning houses and damage done to nature within the 18 mile exclusion zone around the Chernobyl plant. This smaller fire reminded us of the fire which threatened the whole of Europe ten years ago on April 26, 1986. At that time millions of curies of radioactivity were released into the atmosphere by the fire and explosion of the fourth unit of Chernobyl NPP. The direction of winds became a major political and economic factor for years, determining the peculiarities of radioactivity distribution not only in Ukraine, Belarus and Russia, but in Poland, Sweden, Turkey and many others.

Judged by the totality of the its consequences, the accident at the Chernobyl nuclear power plant was the largest modern disaster, a national calamity which radically changed the destinies of millions of people living on vast territories. This catastrophe has brought the then Soviet Union and the world community at large to the realization of the necessity of solving new and extremely complex, comprehensive and unprecedented problems dealing practically with all spheres of life—political, social, economic, industrial and the state of science and technology, laws, culture and morals.

Chernobyl was not simply another disaster of the sort that humankind has experienced throughout history. It is a global environmental event of a new kind which is characterized by thousands of environmental refugees; long-term contamination of land, water and air; and possibly irreparable damage to ecosystems. In the chain of the worst technogenic disasters of the 20th century, Chernobyl occupies its special place. This is an absolutely new phenomenon of the modern technical civilization which has a number of unprecedented characteristic features.

First, Chernobyl is an alarm signal sent to mankind from the future, a warning about possible destruction of the humankind and the environment whether it is an ethnic or religious one, civil war or invasion by a foreign coun-

try. It is also necessary to elaborate an effective mechanism for quick reaction by the UN forces or other international organizations in case of starting armed conflicts on the territories where nuclear plants are located. Chernobyl's experience shows us how dangerous is the destruction of a reactor where, at the time of the explosion, there were over 230 metric tons of nuclear fuel (uranium). According to "official" data, as a result of the accident over 20 million curies of radioactivity were released, although the real figures were much bigger. Even now in the ruins of the fourth reactor (Shelter sarcophagus) there still remains 180 tons of nuclear fuel, including over 2.3 tons of uranium 235 and 700 kg of plutonium with general radioactivity of 200 million curies. I want to remind you that the atomic bomb of the Hiroshima type contained 10 kilograms of plutonium.



*Sixth day of Chernobyl. Fallout cloud from the accident taken from satellite by the U.S. Dept. of Energy.*

Let me mention a few data on the post-Chernobyl situation in my country. In Ukraine alone 50.5 thousand square kilometers of territory with the population of 2.6 million (including 700,000 children) in 2218 settlements were contaminated. By the mid-August of 1986 there were over 90,000 people from 81 settlements evacuated. From 1990 to 1995, due to the dangerous radiation conditions as well as social and economic implications, 52,000 citizens of Ukraine were resettled. According to

some data, all in all about 5 million people were exposed to radiation to greater or less extent.

About 600,000 "liquidators", that is cleanup workers, participated in overcoming the disaster's consequences, 300,000 of them live in Ukraine. The people were sent to the Chernobyl area by various ministries and agencies, including Ministry of Defense, Ministry of Atomic Energy, Ministry of Health and so on. Despite the fact that a relatively small number of people died immediately after the accident (31 persons died of the acute forms of radiation sickness), the long-term consequences are grave and cause great tension in the work of state agencies and medical services of Ukraine. For example, 5,000 people have lost their ability to work. The sickness of 30,000 liquidators is officially attributed to the aftermath of the catastrophe. A group of Kiev researchers have conducted a medical survey of a group of liquidators and have found that the majority of these people had the chronic fatigue syndrome accompanied by depression of a certain subclass of lymphocytes (natural killer cells which have the power to kill the cells of tumors or virus infected cells). The defects of the natural immune system are named "Chernobyl AIDS" which in the near future could cause the increased rate of leukemias and malignant tumors, as well as greater susceptibility to "normal infections" like bronchitis, tonsillitis, pneumonia, etc. which last longer and acquire grave clinical forms.

In contaminated regions of Ukraine and Belarus there was a sharp increase (by 10 times) of thyroid cancer morbidity. Chernobyl has given rise to a psychological syndrome comparable to that suffered by veterans at wars in Vietnam and Afghanistan. Among children evacuated from the zone there has been a 10 to 15-fold increase in the incidence of neuropsychiatric disorders.

According to data of the Ukrainian Ministry of Health, Greenpeace-Ukraine organization and other NGO's, 8,000 to over 32,000 people died as a result of the accident. The population mortality

in the most affected regions increased by 15.7% compared to the pre-accident period.

On Saturday, April 20, 1996, the G-7 summit took place in Moscow with the participation of Russian President Boris Yeltsin and Ukrainian President Leonid Kuchma. President Kuchma has confirmed the political decision of Ukraine to shut down the Chernobyl NPP by the year 2000 under condition of adequate and timely financial and technical assistance by G-7 countries. The President has drawn attention of G-7 leaders to the necessity of combined efforts to upgrade the Shelter (Sarcophagus) safety and rehabilitation of contaminated territories. He highly appreciated the Memorandum of Understanding signed last December between Ukraine, G-7 and the European Commission.

According to the USAID report, the United States has contributed over \$100 million worth of humanitarian and medical assistance to Ukraine over the last four years. On the 10th anniversary of the accident, that is tomorrow, USAID expects to distribute some \$20 million in humanitarian assistance to victims of Chernobyl and to donate a mobile radiation-measuring unit. The Department of Energy has earmarked approximately \$13 million for ongoing nuclear safety improvement projects at Chernobyl.

It must be stressed once again that the issue of decommissioning the Chernobyl NPP is directly related to national security of Ukraine and its independence. As you know, Ukraine is experiencing a severe energy crisis. At this time it is capable of covering only 10% to 15% of its needs by its own oil and gas production, whereas nuclear power plants produce up to 40% of energy, with the Chernobyl NPP accounting for 7% of all electricity generated in the country. Therefore, the problem of the plant's shutdown is directly connected with the restructuring of Ukraine's energy sector and introducing new capacities which compensate for energy losses.

Chernobyl is not the issue to be

solved by Ukraine alone. It is a warning to mankind at large and we must learn a dreadful lesson of preparedness if we are to reply on superpowerful and hyperdangerous nuclear technology. Ten years ago we entered a new post-Chernobyl era, and we have yet to comprehend all its consequences.

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## Infectious Diseases and Climate Change

*Robert Shope, M.D., Department of Pathology,  
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Available evidence and the majority opinion of atmospheric scientists suggest that greenhouse gas accumulation is causing the biosphere to get warmer. Global climate models diverge in their forecasts of the extent of warming, the regional variation, and accompanying changes in precipitation. The majority opinion is that temperate zones will get warmer (perhaps 1-4 C) over the next 50-100 years, and wetter. Increase in ambient temperature and changes in rainfall will have direct effect on the vectors of infectious diseases and indirect effect on the interactions among vectors, vertebrate hosts, and the infectious agents that cause diseases. A rise in ambient temperature raises the body temperature of the invertebrate vector, and thus increases the temperature to which the infectious agent is exposed. The wider distribution and abundance of both vectors and pathogens increases the range and severity of certain epidemic and endemic infectious diseases. In most cases, this increase will hasten the rates of replication, evolution, and transmission of the infectious agents. In some cases, the vectors will not tolerate the temperature change and will either move to a more hospitable climate or die.

A related change in stratospheric ozone layer attenuation leading to increased surface level ultraviolet radiation is also predicted. The consequences of this include impaired immune responses both of humans and domesticated animals, enhancing their vulnerability to infectious diseases.

Not all infectious diseases will be affected by global climate changes. Those that depend on vectors and wild vertebrate reservoirs for their survival and maintenance in nature are more likely to change their geographic distribution, to be modified in their virulence and/or to affect new human populations groups.

Dengue causes a severe tropical fever and sometimes hemorrhagic disease. The Dengue virus is transmitted by *Aedes aegypti*, a mosquito that thrives in warm climates, lives with people, and spreads readily with the tropics. As the globe warms, this mosquito will spread north and south from the tropics further into the current temperature zones. The potential for severe epidemics will be accentuated if the human population continues to increase and as cities grow in the newly warmed areas.

Other vector-borne agents of disease such as malaria, schistosomiasis, leishmaniasis, and yellow fever can be expected to become more prevalent and to appear in newly-infected geographical areas. Change in rainfall levels will also affect the prevalence of these diseases, and because of the special ecological adaptations of each, their frequency will be changed differently. Some vector-borne diseases have very specific ecological requirements; if the warming is of a degree that does not permit adaptation of a specific vector or a specific vertebrate host, then the disease will become less prevalent or even extinct. We do not always sufficiently understand the ecology to predict consequences.

Agents of disease that do not have an arthropod vector are also affected by ecological change. Cholera and vampire bat rabies are examples. These depend for their transmission on warm temperature, although in case of cholera we do not understand completely why.

Finally, there are undoubtedly diseases as yet undiscovered in sparsely populated regions. These diseases are ecology dependent and will develop into full-fledged human illnesses only when people migrate into their ecos-

**Major Tropical Vector-Borne Diseases  
and the Likelihood of Change of Their Distribution with Climate Change**

Disease	Vector	Population at Risk (million)	No. of People Currently Infected or New Cases Per Year	Present Distribution	Likelihood of Altered Distribution with Climate Change
Malaria	Mosquito	2,400	300-500 million	Tropics/Subtropics	+++
Schistosomiasis	Water Snail	600	200 million	Tropics/Subtropics	++
Lymphatic Filariasis	Mosquito	1,094	117 million	Tropics/Subtropics	+
African Trypanosomiasis (Sleeping Sickness)	Tsetse Fly	55	250,000-300,000 cases/yr	Tropical Africa	+
Dracunculiasis (Guinea Worm)	Crustacean (Copepod)	100	100,000/yr	South Asia/Arabian Peninsula/Central-West Africa	?
Leishmaniasis	Phlebotomine Sand Fly	350	12 million infected, 500,000 new cases/yr	Asia/Southern Europe/Africa/	+
Onchocerciasis (River Blindness)	Black Fly	123	17.5 million	Africa/Latin America	++
American Trypanosomiasis Bug (Chagas' disease)	Triatomine	100	18 million	Central and South America	+
Dengue	Mosquito	1,800	10-30 million/yr	All Tropical Countries	++
Yellow Fever	Mosquito	450	<5,000 cases/yr	Tropical South America and Africa	++

NOTE: + = likely; ++ = very likely; +++ = highly likely; and ? = unknown.

SOURCE: IPCC, 1995.

pheres. Regions such as northern Canada, Alaska, and parts of Siberia deserve careful study to find new agents and to characterize the growth potential of these microbes, especially under warmer conditions. Such studies are important to prevent surprises in the future and lessen the impact of future outbreaks of disease.

## Cancer and the Human Environment

*Harri Vainio, M.D., Chief, Unit of Carcinogen Identification and Evaluation, International Agency for Research on Cancer, Lyon, France.*

Cancer is rising in importance on economic as well as health agendas throughout the world. The second leading cause of death in most of the industrialized world, it is already first in some places. Developing countries appear to be launched on a cancer epidemic curve similar to that of developed countries. More than 6 million new cases of cancer occur worldwide each year, distributed almost evenly between the economically developed and the developing nations. Cancer accounts for a

fifth of all deaths in industrialized countries and for a tenth in developing ones. The major proportion of the increase in cancer will take place in the developing countries as their populations grow and age. The incidence of cancer is strongly dependent on the age distribution of the population because the risk of getting cancer increases greatly with age. In men, cancer is three times more likely to occur at age 80 than at age 60 and 25 times more likely at 60 than at 40.

The risks of some types of cancer have declined substantially in the developed world, yet, incidences of cancer associated with environmental factors are growing. These diseases which include cancer of the lung, breast, prostate, colon and rectum have increased in countries where smoking, unhealthy dietary habits including alcohol consumption, and exposure to carcinogenic chemicals have become more common. The incidences of some cancers differ between developed and developing countries. Cancer of the cervix, the oral and pharyngeal cavity, esophagus, and liver are more common in developing countries, while lung,

female breast, colorectal, and prostate cancer occur more commonly in industrialized societies. As countries make the transition from economically evolving to developed, the incidence pattern of different types of cancer is likely to change.

It is highly likely that the number of cancer cases will increase world wide in the coming decades, and the majority of all cancer deaths will occur in the developing parts of the world. More than two-thirds of all cancers are considered to be of environmental origin increasingly caused by human activity and resulting from exposure to carcinogenic agents. This observation is supported by studies of geographical variation in cancer risk, studies in migrant populations, change in cancer incidence over time, and determination of specific causal factors for human cancer. A major source of the data that point to environmental causes of cancer is the observation of the profound variation in cancer incidence between different human populations, even when differences in the age structure are taken into account. Studies have shown that in some situations, migrant populations tend to develop a cancer pattern resembling that of the population in the area to which they migrate. Data collected by the International Agency for Research on Cancer (IARC) from a large number of cancer registries illustrate the international variation in cancer incidence. For men, the probability of getting cancer in the period from birth to age 75 ranges from 12% in India to more than 30% in the US, France, and Switzerland. In women, the probability ranges from 12% in India to more than 25% (white women) in the US. Thus, regardless, of population, a considerable proportion of people get cancer. In a population with a long life expectancy, about one in four people will develop cancer, and nearly one in five will die of the disease.

A much stronger variability in cancer incidence appears when considering individual types of cancer than when considering cancer overall. Stomach cancer incidence in men varies greatly

### Main Cancer Killers (all countries, 1993)

Trachea, bronchus and lung	1,035,000
Stomach	734,000
Colon and rectum	468,000
Mouth and oropharynx	458,000
Liver	367,000
Female breast	358,000
Oesophagus	328,000
Cervix	235,000
Lymphoma	221,000
Pancreas	214,000
Leukaemia	207,000
Prostate	182,000
Bladder	135,000
Ovary	123,000
Uterus	64,000
Skin	37,000

SOURCE: *The World Health Report 1995*

between Japan and the US. A high incidence of this cancer is also seen in Latin America and Eastern Europe. Liver cancer occurs more commonly in Chinese populations than elsewhere, while cancer of the cervix occurs more often in Colombian women than in other populations. Colorectal cancer and breast cancer are most prevalent in affluent European populations, a tendency also seen for prostate cancer, which is even more common among American blacks.

Worldwide, lung cancer is now the most frequently occurring malignancy. It is a common disease in men in nearly all populations, but primarily in economically developed regions and among the Chinese. In the United Kingdom, about 115 deaths occur per 100,000 annually. Lung cancer rates are lowest where smoking is less common, such as Costa Rica (6 per 100,000) and Israel (25 per 100,000). Although the great majority of lung cancer cases are caused by tobacco smoking, occupational exposure to carcinogenic compounds increases the risk of cancer. The most important occupational carcinogen worldwide is asbestos fibers. Exposure occurs in asbestos mining, ship building and construction work. Other occupational carcinogens include exposure to radon, nickel and chromates. Air pollution has been strongly associated with lung cancer. Several epidemiological studies suggest a link between lung cancer and air pollution from the observation of an urban-rural

gradient in lung cancer risk. In a case-control study from a heavily polluted area of Poland, it was estimated that 4.3% of the lung cancers in men and 10.5% of those in women were attributable to air pollution. A recent study carried out among nonsmokers in California indicated that the risk of cancer increased concurrently with long-term ambient concentrations of total suspended particles.

Although the cancer-control strategies in North America and Western Europe emphasize high technology treatment, on a global scale, prevention is the preferred strategy. Most potential cases of cancer could be avoided by applying existing knowledge, for example, stopping tobacco use, reducing alcohol consumption, decreasing occupational and environmental exposure to carcinogens, and through hepatitis B vaccination. In Southeast Asian countries such as India, where oral cancer is particularly prevalent, programs to reduce the chewing of tobacco are needed. In sub-Saharan Africa and parts of Asia, liver cancer is one of the most common malignancies, caused mainly by infection with hepatitis B virus and contamination of food with aflatoxins. In Gambia, for example, 80% of the population has been infected with hepatitis B virus by age 15, and 15% to 20% may develop chronic carrier status, which is associated with a highly elevated risk of liver cancer. Hepatitis vaccination is likely to be cost-effective and should form part of cancer-control strategies where hepatitis B virus incidence is high, together with efforts to reduce aflatoxin exposure which results from improper food preservation.

Preventive action to reduce cancer risks based on current knowledge can control the cancers of tomorrow.

### The Relationship Between Diet and Chronic Diseases

*Sushma Palmer, D.Sc., Central European Center for Health and the Environment, Berlin, Germany.*

The agricultural and the industrial revolutions introduced radical changes

in food cultivation, distribution, and availability worldwide. Recent technological advances in food processing and increases in per capita income, especially in industrialized nations, have led to profound changes in dietary preferences. One notable change since the early part of this century is the dramatic and rapid increase in consumption of fats and refined sugars—the affluent diet—coupled with a substantial drop in complex carbohydrate intake. The improved food supply and food security practically eliminated starvation worldwide, guarded against micronutrient deficiencies, and led to improved nutritional status and increased life expectancy. The long-term adverse health effects of the high fat affluent diet, however, have become apparent in the last few decades through the emergence in industrialized countries of chronic diseases such as coronary heart disease, cerebrovascular disease, various cancers, and obesity.

### CORONARY HEART DISEASE (CHD)

There is convincing evidence from scores of epidemiological, clinical, and laboratory studies that dietary factors play a decisive role in the etiology and prevention of coronary heart disease.

Ancel Keys in a 1950s study showed that saturated fat intake varied sevenfold, i.e. between 3% and 22% of total energy in Japan, and Eastern Finland—regions that showed a fivefold difference in coronary heart disease rates. He also suggested that, at a population level, serum cholesterol was strongly related to the incidence of coronary heart disease (CHD) and that there was a strong correlation between the intake of saturated fat and serum cholesterol.

It is now well established that on population basis, the risk of CHD rises progressively with increases in serum cholesterol. Rural China, where the serum cholesterol level averages 125 mg/dl, has one tenth the incidence of CHD observed in the U.S. For many Western countries, in contrast, with serum cholesterol averaging 200 mg/dl or higher, the whole population may be described as high risk, and the concept

of a "normal" serum cholesterol, therefore, may have little meaning.

Epidemiological studies in middle-aged men provide clear evidence that the risk of CHD in individuals is increased by three major factors: high serum cholesterol, high blood pressure, and cigarette smoking. The fundamental importance of diet in the development of coronary heart disease is mediated through its effects on the development of hypercholesterolaemia and hypertension; and the type and amount of fat are the most significant dietary factors.

It is now recognized that most saturated fatty acids elevate serum cholesterol while polyunsaturated fatty acids reduce the level, and monounsaturated fatty acids tend to have little direct effect. Dietary cholesterol independently contributes to CHD risk, and a population average intake of less than 300 mg/day has been recommended by most international committees.

Population subgroups consuming diets rich in plant foods and dietary fiber exhibit lower CHD rates than the general population. For example, Seventh-Day Adventists in the Netherlands and Norway have CHD rates that are one-third to one-half of those in other subgroups in those populations. Serum cholesterol levels among vegetarians are significantly lower than among lacto-ovo-vegetarians and non-vegetarians. Controlled trials in human beings using diet or drugs to reduce serum cholesterol show a reduction in the incidence and progression of CHD.

From the standpoint of public health policy, a low intake of saturated fatty acids is the preferred option for preventing coronary heart disease and is the strategy that is still recommended by most international committees. In most industrialized countries, a high total fat intake coincides with a high saturated fat intake. Diets with 40% of energy from total fat—typical of many European countries and North America—often provide 15-20% of the energy from saturated fat. Reducing total fat intake to 30% of energy will

Diseases/Infections	Important Reservoir/Carrier	Transmission			Multiplification in Food	Examples of some Incriminated Foods
		Person to Person	Water-borne	Food-borne		
Ascariasis	Man	–	+	+	–	Soil-contaminated food
Brucellosis	Cattle, goats, sheep	–	–	+	+	Raw milk, dairy products
Cholera	Man, marine life	+/-	+	+	+	Salad, shellfish
<i>E. coli</i> infections	Man, cattle, poultry, sheep	+ <sup>a</sup>	+	+	+	Salad, raw vegetables, milk, cheese, undercooked meat
Giardiasis	Man, animals	+	+	+/-	–	Vegetables, fruit
Hepatitis A, viral	Man	+	+	+	–	Shellfish, raw fruit and vegetables
Listeriosis	Environment	– <sup>b</sup>	+	+	+	Cheese, raw milk, coleslaw, meat products
Salmonellosis (other than typhoid)	Man, animals	+/-	+/-	+	+	Meat, poultry, eggs, dairy products, chocolate
Shigellosis	Man	+	+	+	+	Potato/egg salads
Trematode infections	Freshwater fish and crabs, cattle, goats	–	– <sup>c</sup>	+	–	Undercooked/raw fish and crabs, watercress
Trichuriasis	Man	–	0	+	–	Soil-contaminated food
Typhoid and paratyphoid	Man	+/-	+	+	+	Dairy products, meat products, shellfish, vegetable salads

+ = Yes; +/- = Rare; – = No; 0 = No information.  
<sup>a</sup>No information for infections due to enteroinvasive *E. coli*. <sup>b</sup>Transmission from pregnant woman to fetus(es) occurs frequently.  
<sup>c</sup>+/- for foodborne trematode infections due to *Fasciola hepatica*.

**SOURCE:** *The World Health Report, 1996.*

therefore have a substantial effect on saturated fatty acid intake to 30% of energy in those populations, while still allowing the different unsaturated fatty acids to contribute up to 20% of energy.

## CANCER

The relationship between specific dietary components and cancer are much less well established than those between diet and cardiovascular diseases. However, the overall impact of diet on cancer rates throughout the world appears to be significant. For population in industrialized countries, where cancer rates are highest and account for approximately one-quarter of all deaths, some epidemiologists estimate that 30-40% of cancers in men and up to 60% of cancers in women are attributable to diet.

The evidence for the influence of diet on cancer risk is derived from several sources. Correlations between national and regional food consumption data and cancer rates, and studies of the changing rates of cancer in populations as they migrate from a region or country of one dietary culture to another, have led to many important hypothe-

ses. Case-control studies of dietary habits, provide stronger evidence for the effects of diet in relation to major cancers. Many of these observations from human populations have been supported by animal experimental data.

Cancers of the oral cavity, pharynx, esophagus, stomach, large bowel, liver, pancreas, lung, and endometrium are among those that have been linked repeatedly to dietary factors in different populations. In general, a high intake of total fat—and in some case-control studies also saturated fat—is associated with an increased risk of cancers of the colon, prostate, and breast. The evidence is strongest for cancer of the colon and weakest for breast cancer. The epidemiological evidence is not totally consistent but is generally supported by laboratory data from studies in animals. The experimental data, however, also point to an adverse effect of very high intakes of polyunsaturated fats, at levels that are considerably above current intakes in human populations.

Diets high in plant foods, especially green and yellow vegetables and citrus fruits, are associated with a lower

occurrence of cancers of the lung, colon, esophagus, and stomach. Although the mechanisms underlying these effects are not fully understood, such diets are usually low in saturated fat and high in starches and fiber and several vitamins and minerals, including beta-carotene and vitamin A. There is no conclusive evidence that these beneficial effects are due to the high fiber content of such foods.

Sustained heavy alcohol consumption appears to be causally linked to cancer of the upper alimentary tract and liver. Excessive body weight is clearly a risk factor for endometrial and postmenopausal breast cancers, but the association of these cancers with excessive energy intake per se is less well established. A reduction in risk is also likely when fat intake is reduced towards 30%, especially if this dietary change is combined with a change in other dietary components.

#### **OBESITY**

Development of obesity in individuals reflects the interaction of dietary and other environmental factors with genetic susceptibility. However, since there is no convincing evidence that genetic susceptibility accounts for differences in obesity among populations, the differences in prevalence of obesity are largely attributable to "environmental" factors (especially diet and physical activity). Within a single population, those who become obese usually come from overweight families and there is evidence of heredity for obesity. Thus, from a public health point of view, the challenge is to modify the population's environmental circumstances so that the susceptible individual members of the population are less liable to become obese.

There is substantial evidence that dietary factors not only predispose people to chronic diseases, but also that modest change in diet can substantially reduce risk of the major causes of death and disability, i.e., CHD, cancer, and others in the population. An upper limit of fat intake for the population was set by WHO at 30% of calories with the

recognition that as additional, more definitive evidence accumulated for cancer, it may be necessary to lower the upper limit for total fat intake to 20-25% of energy. There is also suggestive evidence that obesity may be associated with high total fat intake, but again there is no specific level that marks the lower limit.

The lower limit of total fat intake was set at 15% of calories to take into account the low energy density of diets in developing countries if they are based heavily on cereals and other foods low in energy density. This level of intake would be adequate to provide for essential fatty acid needs.

Epidemiological data suggest that as intake of saturated fatty acids decreases, there is a progressive fall in mortality from cardiovascular disease, but not necessarily below about 10% of SFA energy. Thus 10% was set as the upper limit for the population nutrient goals for saturated fatty acids. The lower and upper population nutrient goals for dietary fiber were set at 16 g and 24 g of nonstarch polysaccharide, respectively. They are consistent with estimates of about 27 g and 40 g of total fiber. The recommendations for total fat and protein account for 25-45% of total calories. Excluding alcohol, the remaining energy intake should be provided by carbohydrate, for which the lower and upper limits for the population were set at 55% and 75%, respectively. As mentioned earlier, there are specific advantages to the intake of complex carbohydrates and thus a lower limit of 50% of calories was set for this class.

#### **CONCLUSIONS**

In summary, dietary factors are now known to influence the development of a wide range of chronic diseases, including coronary heart disease, various cancers, hypertension, cerebrovascular disease, and diabetes. These conditions are the commonest cause of premature death in industrialized countries. On current projections, cardiovascular disease and cancer will emerge, or be established, as substantial health problems in virtually every country in

the world by the year 2000.

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### **Psychological Factors and Environmental Health**

*Vamik Volkan, M.D., Director, Center for the Study of Mind and Human Interaction, University of Virginia, School of Medicine, Charlottesville, VA.*

In 1949, an American Psychiatric Association document referred to war as a plague, a public health problem, and declared that "unusual psychological factors" were contributing to the international tensions that were felt. In spite of this statement, no serious and searching study was carried out to understand these psychological factors. Egyptian President Anwar el-Sadat's visit to Jerusalem in the late 1970s brought about a change, for during his speech at the Israel Knesset, he declared that 70% of the problems between the Arabs and Israelis were psychological. This event initiated a series of unofficial meetings held between 1980 and 1985 among influential Egyptians, Israelis and Palestinians as well as Americans. Psychoanalysts, psychiatrists and psychologists joined individuals from different backgrounds in participating in these meetings. Following these events, the Center for the Study of the Mind and Human Interaction, with an interdisciplinary faculty, was established under the auspices of the University of Virginia's Medical School. Psychoanalysts and psychiatrists have worked closely with diplomats, historians and theologians to actively involve opposing groups from around the world in studying and defining ethnicity and the psychological factors underlying ethnic conflicts. They have also developed techniques aimed at the removal of psychological impediments to the peace process. Since these activities are perceived as "preventative medicine," the Center has remained under the auspices of the Medical School.

Ethnic conflicts are spreading like an "infection." The "germ" is found in the

collective minds of large communities, such as ethnic groups. The more an ethnic conflict becomes chronic, the more it becomes psychologized. Above and beyond real world issues, such as economic, legal, military and environmental issues, psychological factors, as an "unseen" power, play a major role in international relationships.

Think in terms of learning, from childhood on, to wear two layers of clothing. The first garment, which belongs just to the individual who is wearing it, fits snugly. The second set of clothes, the ethnic layer, is a loose covering that protects like a mother of other caregivers. At the same time, because the garment is not form-fitting, it shelters many individuals under it as though it were one big canvas tent. As long as the tent remains stable and strong, the members of the group can go about their lives without paying much attention to it. If the tent is disturbed or shaken, however, this attracts more notice, and all the individuals under the tent collectively become preoccupied with trying to make the tent strong again. At this point, rituals that maintain a balance of relationships between "us" and "them" become more prominent and more observable. This phenomenon contributes to the disintegration of society and its environment.

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*A Non-Profit, Non-Governmental Organization in Consultative Status with the United Nations, Promoting Health and Environment Literacy.*

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## POINT OF VIEW:

The Point of View presented here is the speech given by the Health and Environment Caucus to the Plenary at the United Nations Conference on Human Settlements known as Habitat II, Istanbul, Turkey, June 11, 1996. World Information Transfer was the convener of this caucus.

*Those who cannot remember the past are condemned to repeat it.* These warning words of the American writer George Santayana remind us that when we understand our culture and history, we enhance our capacity to respond creatively to our present problems. Although we are all formed by our culture, our rapidly urbanizing world demands that we are not enslaved by it. Rather we must use our endowed creativity to reach beyond the cultural and traditional control of practices that doom humankind to repeat its past mistakes, learn from those mistakes and move in new directions.

One critical consequence of maintaining traditional practices and viewpoints is the deterioration of human health around the world. We have clear evidence of rising rates of cancers, tuberculosis, lung diseases, lead poisoning, all of which are associated with various forms of environmental degradation. Although the health impacts of overpopulation and over consumption of resources are not directly correlated as yet, habitat destruction in the name of development and the ensuing ecological imbalances have been acknowledged as

a major result of the world's unsustainable economic current practices.

In an ideal world all people would be able to provide shelter for themselves and their families. In a less perfect world, individuals and their dependent children who require housing would find shelter from government, businesses and charities. In our current world, only some people are helped by others to find satisfactory housing while the rest are left to live wherever they might. Housing, like food, is a basic need that must be met before an individual can become a productive citizen. Individuals have always been responsible for their own food and shelter and that of their families, yet there is a worldwide tradition in most cultures of aiding those who cannot meet their basic needs. The modern welfare state has moved that tradition in the direction of human rights. When individuals cannot sufficiently feed or shelter themselves or their families, government takes the responsibility onto itself through laws and programmes that allow needy people to lay claim to the benefits of public assistance. The fundamental idea to provide basic needs to those who cannot do so rests partly on the assumption that a nation's productivity grows when its population is housed and fed. Therefore, it would be in the government's interest to provide basic needs to its people. It certainly is in the interest of the individuals and their families.

Furthermore, it is in the interest of

government to provide basic needs to its citizens as a means of protecting the health of all. In urban areas, diseases spread quickly and know neither class nor neighborhood boundaries. No nation can maintain a healthy economy when significant parts of its population are malnourished or traumatized or suffering the effects of chronic exposure to pollutants. There is little disagreement on this. The question is how to accomplish meeting the basic needs of millions especially in nations with weak economies.

One approach is to recognize the primacy of children's needs in so far as healthy children are a nation's future. We can start by implementing laws that would provide a responsible family for every child that is born. A family that is aware of the *needs of every child, not as a slave to its own existence binding that child to traditions that negate health, but as an individual with rights of its own.* The cooperation of government officials, business leaders, the medical establishment, educators, religious leaders, NGOs, and families in need is required to maintain a full support network to help secure for each child its right to housing and food. In every country meeting housing and food needs is expensive. The cost would be limited if governments recognized that their primary interest lies in the future, that is, in producing children who are physically and mentally healthy and capable of becoming productive citizens.

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***“Never doubt that a small group of thoughtful committed citizens can change the world. Indeed it's the only thing that ever has.”***

Margaret Mead

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