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AIDS WHAT YOU SHOULD KNOW

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AIDS is the final stage that results from an infection of HI virus. It is a condition which develops when the body's natural defensive mechanisms or the immune processes are not working properly. As a result infected people are more likely to get-illnesses, infections and some forms of cancers which the body would normally be able to fight off easily. These illnesses can be serious or fatal.*

AIDS stand for Acquired Immune Deficiency Syndrome.

Acquired - means that it's caught from someone or something as opposed to inherited.

Immune Deficiency - state where your body cannot defend itself against certain illnesses.

Syndrome - describes the varied signs and symptoms of illnesses that result from the infection.

AIDS patients develop serious infections in the digestive system, lungs, central nervous system, and skin. They also develop particular forms of cancer.

AIDS AND H.I. Virus

Aids is caused by a virus called Human Immunedeficiency Virus or HIV. Luc Montegniev of the Pasteur Institute of France isolated this Aids causing virus.

How is the HIV Passed on

Transmission of HI virus involves exposure to body fluids of an infected person. The virus has been isolated from various body fluids. The higher concentration has been found in blood, semen, vaginal secretions and cerebro - spinal fluid. HIV is found in lesser concentrations in body fluids such as saliva, tears, breast milk, urine and amniotic fluid.

AIDS is spread when blood, semen or vaginal secretions of an infected person comes into contact with the blood of a healthy person.

There are three main ways by which the virus can be transmitted to another.

1. **By intimate sexual contact**

The most common way that the HI virus is spread is when a person has sexual intercourse with a person who is already carrying the virus in the body fluids. The virus can be passed on either in sexual intercourse between homosexuals, (from an infected man to a man through anal intercourse) or intercourse between a man and woman from an infected man to a woman and from an infected woman to a man.

2. **By transfusion of infected blood and blood products**

if the blood or blood products containing the H.I. virus is given to an uninfected person, then the blood or blood product receiver becomes infected with the H.I. virus. Transfusion

of unscreened blood is dangerous. Syringe, needles, knives, razor blades and piercing tools or any of the instrument used to cut, pierce or inject the body can contain blood of a person infected with the H.I. virus.

If such instruments are used with out proper sterilization, then the H.I. virus can be passed onto an uninfected person through these instruments.

Needles or syringes are a common mode of transmission of the HIV among intravenous drug users.

How is the AIDS Developed

Normally when you catch an infection, the body's immune mechanism is activated and it attacks the invader. Due to some reason or other when an H.I. virus enters the body this mechanism does not happen properly. There are a group of white blood cells called lymphocytes which recognize the intruder and orchestrate the body's defence mechanism.

The H.I. virus attacks the very lymphocytes, the T-helper cells or T-4 cells, that normally would recognize it an alert the body's defences. When large number of the cells are attacked by H.I. virus the immune system breaks down and it leaves the body vulnerable to attacks from other infections, with fatal results. Though antibodies to the HI virus appear in the blood after 6-12 weeks (sometimes may take as long as 6-8 months) after infection. It may take 2-12 years to develop full blown AIDS the end stage of HIV infection.

During that period HIV infected person could undergo five phases described below.

i. Acute phase

The acute phase may occur 2-12 weeks after infection. Clinical manifestations of this phase are fever, sore throat, headache, night sweating, cough and sometimes enlargement of lymph nodes. Often these features subsides after about two weeks.

ii. The Latency phase

The characteristic of this phase is the absence of any illness. The infected individual shows no external signs of a disease.



Called upon to care for family members and friends with AIDS, women face physical, emotional and social stress.

3. By an infected pregnant women

To her unborn child during pregnancy or childbirth. Approximately 15-25% of infants born to infected mothers will be infected with the virus. There is a very slight risk of contacting Aids to a new-born through breast milk. But experts maintain benefits of breast-feeding ou-weigh this very minute risk.

iii. Persistent generalized lymadenopathy phase

Lymph nodes longer than one cm in diameter are found in two or more sites other than groin for period of at least 3 months duration.

iv. AIDS related complex phase

Patients at this stage may have weight loss, malaise, fatigue, anorexia, watery diarrhoea, abdominal discomfort, fever, night sweating, headache, itching, lymphadenopathy and sometimes leisions of the skin and mucous membrane.

v. AIDS or the final phase

The most severe stage of the HIV infection. Full blown Aids shows severe and fatal opportunistic infections, rare forms of cancer, and neurological diseases.

Symptoms of AIDS

Symptoms of AIDS can be divided into two main categories as major signs and minor signs.

Major signs

*Weight loss of more than 10% of body weight with in 1-2 months.

*Chronic diarrhoea for more than one month.

*Intermittent or constant fever for more than one month.

Minor signs

*Profound fatigue.

*Persistent cough or sortness of breath for more than one mouth.

*Generalised enlarged lymph nodes.

*Thrush in the mouth.

*Generalised pruritic dermatitis.

*Loss of appetite.

Most common such opportunistic infections are:

- Pnemocystis Carinii Pneumonia - A serious lung infection.
- Kaposi's Sarcoma - A cancerous tumour.
- B.Cell Lymphoma - A form of cancer.
- Tuberculosis - Can affect many organs of the body.
- Herpes Simplex - Viruses cause skin leisions around mouth or in genital or rectal area.
- Canidiasis or Thrush - Fungal infection commonly seen in mouth.
- Cryptos poridiosis - A protozoan disease causing severe diarrhoea.
- Cryptococal Meningitis - Fungal infection of the menningial layers of the brain.
- Encephalitis - Inflammation of the brain.



Needles and other skin-piercing instruments should be sterilised after each use. They should never be shared.

*Excessive sweating.

*Recurrent herpes zoster (shingles)

*Chronic progressive and disseminated herpes simplex infection.

Diagnosis of AIDS is considered if at least two of the major and one of the minor signs are present.

The manifestation of the disease varies widely from patient to patient and country to country. Some signs and symptoms are more common in certain parts of the world than in others.

At the sametime these signs and symptoms could appear due to various other diseases. Eg: Swollen glands

could be a sign of glandular fever. Tiredness, fever, weight loss and cough may be more likely tuberculosis.

HIV is not transmitted through

*Touching, shaking hands, or hugging of a AIDS patient or a person infected with HI virus.

*Living, eating, studying, playing or swimming together with an Aids patient or a person infected with HI virus.

*Using toilets used by an Aids patient or a person infected with HI virus.

*Sneezing or coughing by Aids patient or a person infected with HI virus.

*Bites of mosquitoes, ants etc., who have hitten an Aids patient or a person infected with HI virus.

*By donating blood.

Ways to Reduce the Risk of Getting AIDS

You are now aware the unsafe sexual practices are the main cause for HIV infection/AIDS.

*Have sexual intercourse only with one faithful, uninfected, permanent partner.

*Reduce the number of sexual partners. The fewer sexual partners you have the less risk you have of coming into contact with someone already infected.

*The HI virus could enter your body through vaginal - anal or oral intercourse. But the way you have sex might increase the risk. As an example Anal Intercourse is particularly risky. The walls of the back passage are delicate and likely to tear making it easier for the virus to pass from are person to another.

Therefore it is better to avoid sex with suspected persons.

*Avoid sex with person who have many partners such as prostitutes.

*If you suspect - use a condom from start to finish. It reduces the risk of getting virus.

*Sharing sex toys such as vibrators could be risky.

*There is no risk involved in masturbation or in partners caressing each other.

*Avoid sex with others or pregnancy if infected with HI virus.

*Avoid donating cornea or others body organs if you suspect your self.

*Use only sterilized or disposable devices that punctures the skin. This includes hyperdermic needles, syringes, ear piercing equipments or accupuncture needles.

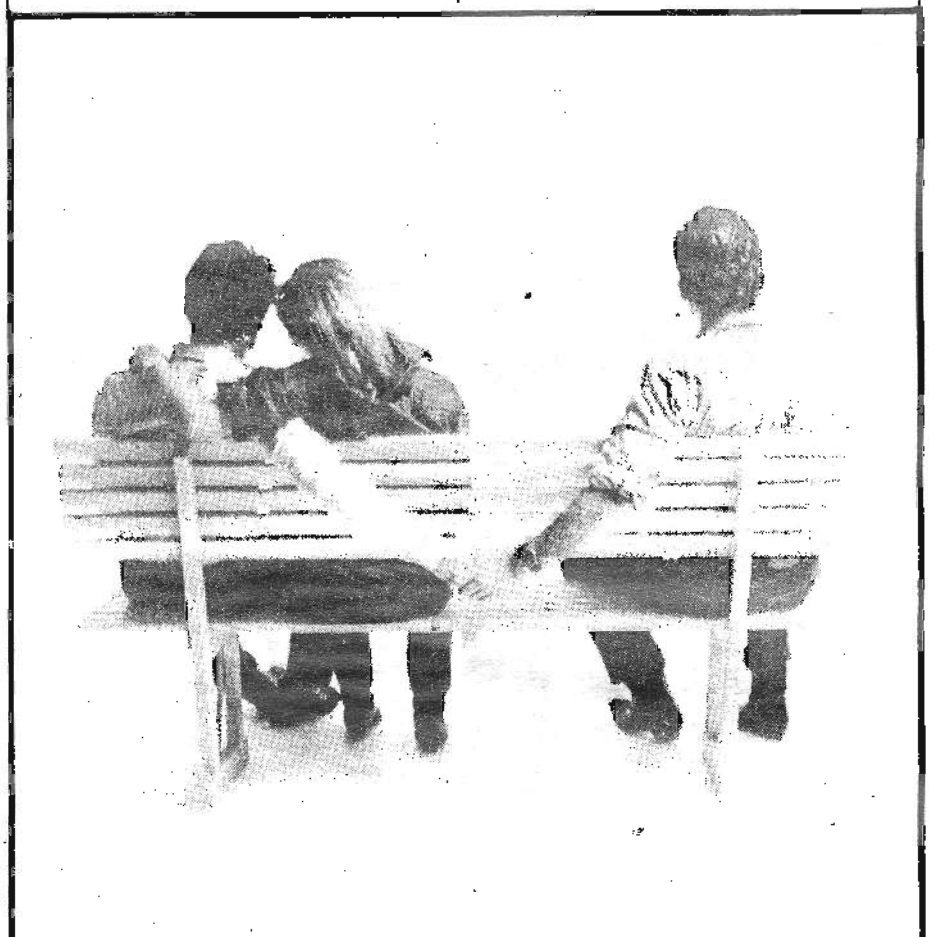
*The drug abuses, should avoid injection of drugs. But if you do continue to inject use your own set and never share.

*Sharing or mixing up of razors and tooth brushes should be avoided.

You can find out whether you are already infected or not.

Antibodies to the virus appear in the blood 6-12 weeks after infection.

There are special blood tests (ELISA/WESTERN BLOT) which detects these antibodies. If the test is positive it means that you have been



This Norwegian poster advises: "Men who have sex with men should have regular health checks" Express agree that AIDS prexcution messages aimed at bisexual men should comphasise behaviour and avoid using the sexual labls: homosexual, heterosexual or bisexual.

infected with the Human Immuno Defiancy virus. These blood tests are available free of charge to any suspected person at the Central V.D. clinic (Room 33 General Hospital, Colombo) De Sarum Place, Colombo 10 or at any V.D. clinic of the provincial (general) hospitals. If you are reluctant to divulge your real name and address, you can still get the AIDS test done under a pseudo name or number. Anti STD/AIDS authorities will assure total confidentiality of all details regarding those seeking blood tests and HIV positive or AIDS cases.

Blood tests for HIV antibodies could also be obtained from the Sri Lanka Family Planning Association Butlers Lane, Colombo 7.

To date there is no known cure for AIDS or vaccine to prevent the spread of the infection.



Four-year-old Marian is one of 300 Romanian children in the Municipal hospital suffering from AIDS. Doctors fear that the spread of AIDS in the country's main port-city might turn into a catastrophe. Of 1240 children in Constantia tested positive to the HIV virus, 750 developed AIDS. Some 290 children have died so far, a doctor at the hospital said.

WOMEN

Women's organizations are specially concerned about women in communities both in the rural and urban sector. They can therefore be obvious and ideal activists in the movement to increase awareness of fellow women on the problem of AIDS. They can catalyse community participation of women in this objective.

It is because of the crucial role that women can play in a strategy directed towards women that the Director-General of WHO devoted December 1st 1990 World AIDS Day for a focus on women.

Women are often the innocent victims of sexually transmitted diseases. They are unaware of the sexual behaviour of their partners. Through them, perinatal transmission of their progeny can be 30% affection or less. The majority of such children would die before age five.

The affected women themselves could die leaving behind families of orphans.

Too often women prostitutes (sex workers) are not aware of the hazards they are exposed to. There is a sizeable number of them in this country - perhaps over 20,000 "sex workers" in Colombo, who could not only be vulnerable but also could be the source of infection to their sexual partners.

It is shown that HIV infections leading to a compromised situation called AIDS is now mostly transmitted heterosexually. Of the millions in the world who are now HIV infected, approximately one third are women.

WHO estimates that over 200,000 infants are infected.

WHO also forecasts that 200,000 new infections each year will be women. This is to say that at the beginning less

women were affected. Hence more women will be ill with AIDS in the coming years.

Women are at risk: specially for the following reasons -

1. The frequency with which women are given blood during delivery.

2. Vaginal intercourse accounts for about 60% of total transmission : women are more vulnerable to this type of infection than men. If they have disease of the cervix, they are even more vulnerable.

3. Self injecting drug users - (regardless of gender)

4. Perinatal transmission - half of them will be girls.

5. Female prostitutes in Thailand and India are showing levels of infection 30 - 40% and 15 - 20%.

Children are at risk:

1. a) Through infection from the mother when pregnant viz. about 30% or less. The mothers's health during pregnancy seems to govern the risk of infection - if the mother is already ill with AIDS, baby is more likely to have it than if the mothers were clinically well.

b) The majority die by about 5 years if they become HIV positive.

2. Breast milk transmission is a new risk in a handful of cases if mother receives infected blood immediately after birth. (They could be already infected during mother's pregnancy).

3. Adolescent children and street children.

4. Those children who have regular blood transfusions for various diseases e.g. haemophiliacs, some anaemias and leukaemias.

5. In immunization if there is inadequate sterility of needles. (Disposable syringes are recommended).

The economic and social consequences of AIDS must be highlighted. Because of their poverty and lack of status, women are more vulnerable to this infection. We have the example of the Sri Lankan woman who was discriminated against both in maternity and subjected to social rejection in her village.

All women must learn about AIDS and not just target groups like women in tourism or even sex workers alone. Women must know that any injection of blood or blood products can be hazardous. They are more likely to such transfusions for anaemia or obstetrical procedure.

They have the right to question the safety of such procedures and their need for protection against HIV infection during any hospitalisation or health seeking behaviour, particularly in maternity. This type of awareness of the need for self care must be universally known.

The need to develop a supportive environment must receive attention. The burden of the disease must be shared equally in the family.

In general, there is a need to improve the status of women in the community. Non-governmental organizations (NGOs) have a major role in this way of not ostracising them as bad persons. Of course, there is a cultural aspect towards the discussion of sexuality and AIDS activities. NGOs can bring out the nature of these difficulties in their work and from their experience in the past in family planning activities.

In the future, there could be women who have to bear the economic burden of caring for their partners and in bringing up their families.

Women on the whole must have a firm economic base to assert themselves. The legal rights of different groups of women in this country have been ex-

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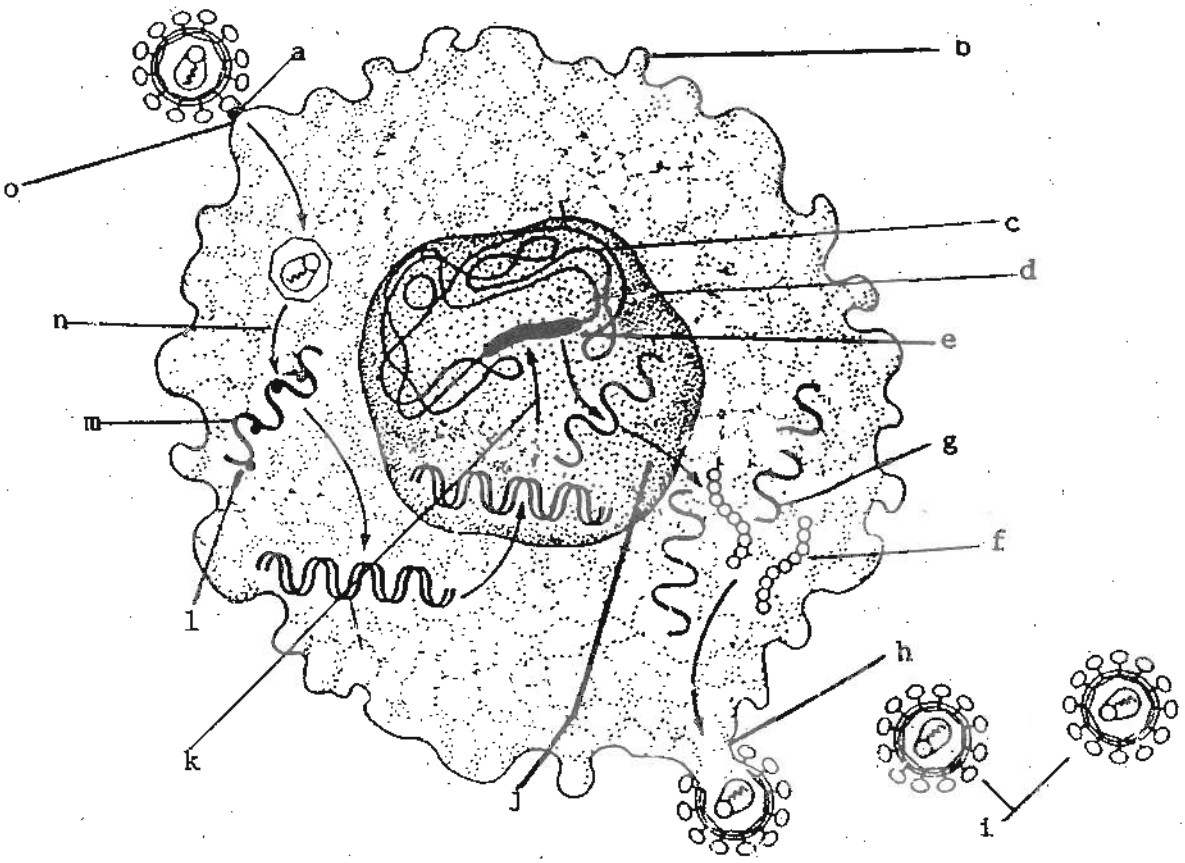
AND AIDS

6. Among drug users in Bangladesh, prevalence rates have gone up from 1% to 50% infected.

It is shown that HIV infections leading to a compromised situation called AIDS is now mostly transmitted heterosexually. Of the millions in the world who are now HIV infected, approximately one third are women.

Production of New Generation of HIV Viruses

HIV Virus



HIV

a. Receptor
b. Human cell
c. DNA of host cell
d. Host cell nucleus
e. Viral DNA inserts itself into chromasome of cell
f. Viral proteins
g. Viral RNA
h. New viruses assemble at membrane of cell
i. New generation of viruses
j. The viral DNA starts to instruct the human cell to produce viral components such as viral proteins and RNA-the two main components of HIV. These migrate to the surface of the infected cell, where they stick out through its outer membrane. Then by a process known as budding, multitudes of new viruses detach themselves from the infected host cell, and are taken away in the blood stream to attach to other cells with CD 4 receptor.
k. .... inserts itself into human cell. Because HIV becomes part of the human cell's genetic material, infection of the cell is irreversible.
l. Viral RNA
m. Reverse transcriptase
n. The single stranded RNA then makes a copy of itself using reverse transcripase. Results in double stranded DNA which ...
o. On contact with receptor, the virus sheds its lipid coat and injects RNA into human cell.

amined but what correctives have been adopted?

The problems of adolescent pregnancies, the numbers of street children who are abused sexually must be sorted out. One cannot ignore the numbers of adolescents who are starting to explore sex at school age. Older children are in need of AIDS education.

Problems relating to different religious view points must be considered and overcome in extending AIDS education to older school children and school leavers.

Older women as grandmothers might be called upon to support families and orphans.

Access to resources in health institutions must be considered. This could have different angles such as the terminal care of individuals affected with

AIDS and also those who are HIV positive. NGOs can be in the fore front of organizing such terminal care.

NGOs must be the advocates for many of these issues, including equality and discrimination.

Information must be available. The role of the media in increasing awareness, but shunning unkind publicity must be mentioned. Women journalists have a positive role to play.

Women's organizations are leaders in training programmes for women: they are sponsors of family life education. They must be aware of traditional, cultural, ethical and spiritual values and yet use this experience to overcome lethargy in extending information to the community they work in and to the public in general.

in spite of efforts to improve women's health, economic and social status, the 1989 world survey on the role of women in development reports that poverty among women has increased even in the richest countries leading to what has become known as the feminisation of poverty.

Women therefore have to take a more positive approach to their own health, improving services for themselves. To this end, it is necessary to arm them with more technical support and training in this area of Maternal an Child Health and Family Planning.

Women's organizations at rural level will have to coordinate with women workers in health and together improve the utilization of health resources.

Through regular workshops women can be sensitised to the problems that AIDS could post for women.

They could design ways of disseminating information on the prevalence and prevention of the disease.

Mass media could disseminate information on AIDS with counselling programmes on maternal and child health and family planning.

The safety and quality of the health services must be promoted in the safe use of needles and blood transfusions.

Women's organizations can support solidarity on women's issues; can promote community action and conduct a situation analysis of AIDS; can promote fund raising activities for public education, specially addressed to women and for counselling activities.

AIDS is a new health problem. However, in some continents it has reached a situation where it is the highest cause of mortality among women.

It is not yet a priority health problem in Sri Lanka. But with the possible spread of HIV infection throughout the world, we in Sri Lanka must take the advantage and precaution of preventing its spread here by information and education.

This information and education is in creating awareness among all women that they should be protected. Women's organizations therefore must start early in developing a sociological approach.

The education is firstly for themselves, then for all women they work with, finally for those at special risk.



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Hot weather may also increase the numbers of those affected by chronic and respiratory problems, reproductive illnesses and allergic reactions. It can also worsen cardiovascular and cerebrovascular problems.

GLOBAL WARMING, PHYSIOLOGY, HEALTH AND FOOD SUPPLIES*

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It has been determined that the Earth's near surface temperatures have increased on average by about 0.6^0C in the last 100 years. Estimates vary as to what the rate of increase may be in the future but it has been suggested that the rate may be as much as 1 to 5^0C per 100 years.

It has been postulated that the fundamental cause behind the rise in average temperature is principally the build-up in the atmosphere of certain gases These gases have been termed "greenhouse gases" since they allow solar radiation to pass through and reach the Earth but absorb and thus "trap" the heat (i.e. energy of a different wavelength) which radiates from the Earth's surface. Thus (as in the "greenhouses" or hothouses" used in temperate countries for growing green plants even in cold weather) the Earth's average temperature is raised to an average + 15^0C from the around - 18^0C it would be at in the absence of any greenhouse effect.

Since the commencement of the industrial age, Man has been quantitatively and qualitatively adding to greenhouse gases in the atmosphere. The percentage contributions of the various greenhouse gases to the additional warming are, at present, as follows: carbon dioxide (50%), methane (19%), chlorofluorocarbons or CFCs (17%), tropospheric ozone (8%), nitrous oxide (4%) and stratospheric watervapour (2%).

The increase in carbon dioxide levels is largely due to the combustion of fossil fuels (coal, oil and gas) and biomass (firewood etc.) and the clearing of forests (which trap and "fib' carbon dioxide during photosynthesis). Important sources of methane include escapes of natural gas, coal mining, oil production,

* *This is an expanded an up-dated version of a paper presented at the seminar entitled "Global Warming - Global Warming" which was organised by the Central Environment Authority of Sri Lanka on the 3rd June 1989.*

paddy cultivation, livestock production, termite activity and waste dumps. Chlorofluorocarbons (CFCs) are generally of anthropogenic origin, while nitrous oxide chiefly arises by microorganisms breaking down mineral nitrogenous fertilizers. Tropospheric ozone arises by complex reactions for which the presence of carbon monoxide, hydrocarbons and nitrogen oxides are necessary.

It is expected that with time a variety of serious consequences may arise as a result of global warming. We will attempt to examine some health and food aspects of global warming, although much of the available information is fragmentary and speculative. The discussion will focus on global warming and not the possible repercussions of the postulated damage to the ozone layer. However, the increased flow of ultraviolet radiation due to the latter phenomenon may lead to greater incidence of skin cancers and cataract of the eyes and weakening of the immune system during global warming, since some gases (such as the CFCs) may contribute to both effects.

It must also be recognized that many aspects relevant to climate change are multi-factorial and cannot be examined in isolation (as is possible in laboratory experiment).

For instance, an important greenhouse gas is water vapour. Generalised global warming would cause more water to evaporate, thus causing the addition of more water vapour to ths atmosphere and leading to an increased "greenhouse effect". Again, a reduction in snow and ice, which reflect solar radiation back to space, may result in further absorption of solar energy. The influence of cloud formation on greenhouse warming is also extremely difficult to assess and depends on a complex of factors including the extent, height. and liquid water content of the cloud cover.

The immensity of the number and variety of factors influencing global warming are exemplified by the above and the number and variety of anthropogenic and natural sources and "sinks" of greenhouse gases as described elsewhere.

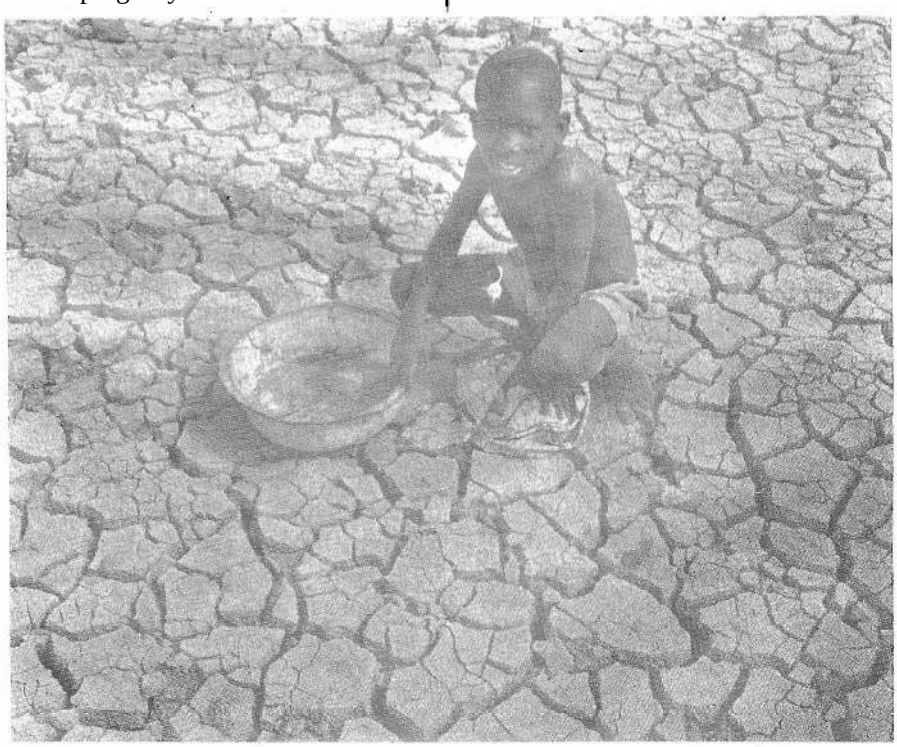
Physiology

The "climate" is composed of a number of elements including temperature, wind, humidity and rainfall and the time components of the above and the extreme ranges and normal deviations of the above factors.

Of the above factors, the temperature is very important and, generally speaking, life processes can continue only when the temperature of the body stays within certain limits. Thus, while populations of certain trees can become acclimatized to survive winter temperatures of -50^{0}C (-58^{0}F) provided the summers are sufficient for growth and reproduction, animals can usually cope with or acclimatize themselves to climate change only if the temperature rise or fall or its rate of change is not excessive.

Animals have developed a variety of mechanisms to reduce heat loss or to acclimatize themselves to conditions in their surroundings., These include developinga layer of subcutaneous fat

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Drought in Mali. Human activity has ondoubtedly contributed to environmental degradation in the Sahel, but some scientists believe the deteriorating conditions may also be attributable to global warming.

and the use of fur or feathers for thermal insulation.

Excessive heat may be more damaging to living organisms and more difficult to guard against than cold. The term "thermal pollution" has usually been associated with waste heat emitted, for example, with cooling water from a thermal power plant. A rise of even a few degrees in the receiving waters can (and does) cause severe mortality in eggs and larvae of fish and invertebrates and other life forms which form parts of marine and freshwater food chains. This could be of importance in the event of generalized global or regional warming.

A better appreciation of the Importance to organisms of guarding against excess heat may be gained by surveying a few of the mechanisms available for thermoregulation. One mechanism of guarding against excessive heat may be behaviourial methods. Honeybees, for instance, maintain a constant colony temperature of around 34^0C and can survive mammal outside temperatures of up to about 49^0C by adjusting the rate at which they circulate air and evaporate water within the hive.

Mammals may lose considerable excess heat from their body surfaces Thus, those animals with a thick coat of fur may experience problems in losing heat in the event of elevated environmental temperatures. The large ears of rabbits assist in getting around this problem by providing an extensive surface for heat loss. Such loss can be reduced during cold weather by constricting the blood vessels which carry heat to the surface.

A different problem confronts the camel which lives in an environment which can become quite warm and where a shortage of water limits the use of mechanisms of losing heat in urine or by sweating. In this case, the animal's thick coat blocks the passage of heat from the surroundings into the body, whose temperature can also vary according to that of the surroundings.

Animals like the dog, on the other hand, lose heat by panting in which the flow of air causes cooling by evaporative loss.

The above examples indicate something of the diversity of the ways in which animals protect themselves against fluctuations of temperature in the world around them. This is, of course, in addition to crawling into burrows in the earth or holes in trees and going into a state of hibernation during the winter season.

ditions have acquired a low skin surface to body ratio by factors such as reducing the length of arms and legs With a reduced surface area to body size ratio, heat loss can be reduced. Conversely, people of tropical regions have been shown to have more sweat glands per square unit of skin surface to help in heat loss by evaporative cooling The darker skin colour of tropical people also facilitates heat loss by radiation, in addition to giving some protection against ultraviolet radiation. (White skin, fur or feather coloration also provides a camouflage effect when viewed against a background of snow and ice).

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Thermal regulation is of prime importance in homoeostasis or the maintenance of the "internal environment", described by the French scientist, Claude Bernard. Over a century ago, Bernard proposed that the "internal environment" must remain approximately constant for the body to function normally and that adequate mechanisms operate to ensure that the necessary balances are maintained.

Several mechanisms may be operative in the human to ensure heat balance and temperature control.

First, one may mention physical attributes which are found in people who have become genetically selected to be better fitted to the temperature conditions in which they live. For instance, people exposed to Arctic con-

Generally, however, thermoregulation in an individual is performed *via* the heat regulatory centre located in the hypothalamus of the brain. This performs much like a thermostat acting on feedback information received from other parts of the body. Heat loss and (or) temperature regulation is effected by a variety of mechanisms of which the activity of the sweat glands is under the control of the nervous system, which is in turn controlled by the temperature-regulating centre. Other methods by which heat is lost include that lost in the urine and by evaporation of water from the lungs. Thermoregulatory mechanisms can also effect changes of the breathing rate, level of blood sugar and the metabolic rate. The regulatory mechanisms may, however, be inadequate to maintain the body tempera-

ture at its normal value of around 98.6^{0}F under factors such as disease, exposure, metabolic rate and hormones.

Further compensatory adjustments are necessary in acclimatization to hot weather above about 30^{0}C (86^{0}F). After a few days, this could result in more sweat glands becoming active, less water being eliminated through the kidneys and less salt being excreted through the kidneys and sweat glands as well. Acclimatization processes may also eventually influence the signals which trigger changes in sweating and peripheral (cutaneous) blood circulation.

Human Health

Insufficient information is available to be able to predict with any assurance the full extent of the effects global warming may have on human health. However, some general observations may be noted.

Firstly, one study on urban populations in the U.S. suggested that an increased temperature of 3.9^{0}C caused an approximately four-fold increase in the number of deaths due to heat stress in a summer under conditions of partial acclimatization, while the figurewas further doubled in the absence of acclimatization. Elderlypeople are particularly afflicted by hot weather.

Hot weather may also increase the numbers of those affected by chronic and respiratory problems, reproductive illnesses and allergic reactions. It can also worsen cardiovascular and cerebrovascular problems.

Some studies in urban areas noted the increase in heart disease and stroke at temperatures over 25^{0}C.

Climate change (e.g. temperature and humidity) could influence the spread and life cycles of organisms such as insects, bacteria and viruses, which may cause or transmit diseases. Mosquito-borne diseases, such as malaria, dengue, (arbovirus-induced) encephalitis, yellow fever and Rift valley fever may cause problems in the United States if climate change takes place. Another risk could be the movement to the U.S. from Central and South America of parasites which cause health problems, such as ascariasis and Chagas disease.

Scenarios have been calculated where global warming may take place at anything from 0.06 to 0.80C per decade. It has been suggested that by the year 2050, semi-arid tropical areas will increase in temperature by 0.3 to 5.0^{0}C accompanied by a decrease in precipitation, while the humid tropics will, also, experience a rise of 0.3 to 5.0^{0}C, but with an increase in rainfall. In high latitude regions, the average winter temperatures may increase by 0.8 to 5^{0}C.

It is feared that elevated temperatures may lead to an increased incidence of premature births and mortalities around the time of delivery.

Among the other effects of warm weather may be those on the psychology of the individual leading to an increasing incidence of crimes of violence.

Other and complex effects will also occurwhich cannot be evaluated as yet in the absence of sufficient reliable data.

Agriculture

Possible effects on crops are more difficult to assess, partly due to inherent differences in heat tolerance. Global warming will not be uniform but will differ in extent and consequences from region to region. Freshwater resources will be affected.

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In addition to the probable geographical shifts of crop growing areas, a host of other factors will need to be considered in relation to global warming. These would include the possibility that increased atmospheric carbon dioxide (CO_2) will result in the more rapid growth of certain crops and that climate change will have effects on not only crops but also livestock, soils, pests and weeds.

Rice is the world's principal food crop as far as direct consumption is con-

cerned. A number of effects of temperature and CO_2 have been described on rice plants and on the rice cultivation ecosystem. These include 1) changes in grain production, 2) changes in photosynthetic rates, 3) altered water use efficiency, 4) altered competitiveness with weeds, 5) changes in nitrogen fixation by symbiotic organisms and 6) changes in problems caused by insects and diseases.

The above are only an indication of the lines of research that have been performed on the possible effects of global warming on rice production.

Fishedes

Global warming could affect manne fisheries in various ways It could affect the plankton, which is the starting point of the food chains on which the higher forms of marine life depend. It could change ocean currants and, thus, fish distribution, by changing nutrient and temperature patterns in the waters. Another way in which global warming could affect fisheries is by disturbing fish breeding grounds (e.g. estuaries, mangroves) following sea level rise or the alteration of freshwater inputs in these coastal regions.

The above discussion only briefly notes some of the ways in which climate change could affect some of out food supplies Among the other factors which have been discussed is, for example, whether we should reduce our consumption of meat since that would permit us to reduce our herds of cattle (a significant contributor, as noted above, to emissions of the greenhouse gas, methane). While this will reduce overgrazing of the world s pasture lands, many other changes or shifts in our traditional food production and consumption

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patterns will be needed to meet the challenges of global warming.

Migrations

Shift will also be necessary for a large proportion of the world's population. About 50 per cent of the world's population lives in coastal regions. The global warming is expected to result in the melting of ice in the polar regions and the expansion of sea water. This may lead to a rise in sea level by 30 cm to 1.5 meters by around 2050 thus leading to the submergence of coastal and low-lying areas, This will lead to severe overcrowding and attendant public health and social problems. Similar problems are also attendant on disasters caused by violent storms (cyclones), whose frequency would increase under conditions of global warming and cause injuries and death in addition to damage to crops and fisheries. Global warming may also affect the availability of fuelwood to cook the available food.

The above account has attempted to sketch in a few of the health and food-related challenges which may be experienced due to the phenomenon of global warming. These challenges are not to be lightly taken. It is possible that entire nations such as the Maldives and some islands in the Caribbean risk being submerged in the event of a marked rise in sea level. We need to recognize that should this happen the people of these countries will need to be accommodated and provided for in other countries, which themselves will be experiencing population pressures. These adjustments will result in fresh political problems arising.

Finally, and in conclusion, it must be noted that many unusual problems are likely to lie ahead. For example, one may refer to the turtles, where the sex of the hatchlings of the clutch is greatly influenced' by the temperature at which the eggs are incubated. While the incubation temperature should lie between 28 and 33^{0}C, hatching at the higher end of the scale results in more males being produced and at the lower end in more females The influence of man's activities on global temperatures may well affect the survival of these and other species of living organisms in fairly bizarre ways.

ENVIRONMENTAL SUSTAINABLE

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The earth is believed to have originated over 4600 million years ago. Although there are numerous hypotheses about the origin of earth, the hypothesis that it was formed from hot gases and cosmic dust can be considered as the most explicable one. Most theories assume that the earth began in a gaseous state, evolved through a liquid state and finally became partly solid. It has been estimated that the life on earth appeared over 3500 million years ago. However, the human species evolved 100000 years ago while the modern man *(Homo sapiens)* has only a 10000 year history. Nevertheless, world's human population has grown to a staggering 5.4 billion in recent years and this figure is expected to reach 6 billion by the beginning of, 21st century. according to statistics, Sri lanka's current population of about 16.5 million is increasing by 200000 a year and is not expected to stabilise in the near future. Some estimates suggest that, at such a rate of growth, the population of Sri Lanka could expand to 35 million within the next five decades.

Despite it's increase in numbers, the human population on earth is continuously facing severe problems such as malnutrition, disease, poverty, unemployment, illiteracy etc. As a result, the sustenance of human population of about 6 billion will be a major problem in years to come. Therefore, many problems including food production, medical facilities, sheltering, clothing, employment etc. have to be overcome to prevent the extinction of human race from the face of the earth.

On the other hand, we have but one small world. It possesses only limited natural resources. In his attempts to

to environmental pollution and other global ecological problems.

1. Destruction of tropical rain forests

According to Lord Buddha, the forest is a peculiar organism of ultimated kindness and benevolence that makes no demand for its sustenance and extends generously the products of its life activity and it affords protection to all beings offering shelter, even to the exeman who destroys it. The tropical rain forests are a major gene pool for future generations as they contain considerable genetic diversity. The plants to be found there include some that have yet to be adequately characterized or their potential use to be determined. With the destruction of the forests, not only the useful flora and fauna but also the undiscovered plant and animal species of potential benefit to man will disappear. Some estimates say that more than 40,000 plant species would disappear forever between now and the middle of the 21st century. Loosely speaking, the word species refers to those groups of individuals sampled from populations closely resembling each other in most characters.

It is generally accepted that there are three main goals for the conservation of individual species;

1. The aesthetic value of diverse organisms and associated educational aspects.

2. The environmental importance of species in that each organism interacts with other species and the removal of one can have repercussions on the whole ecosystem and the environment.

3. The potential exploitation of the species as a source for genes of agronomic or other value.

Man *(Homo sapiens)* is just one species among the myriads of organisms that the long course of biological evaluation has brought

Some estimates suggest that, tropical forests which house immense biodiverity are being lost at the rate of 11 million hectares every year. The sad truth is that at least 25,000 plant species are now threatened.

forth. His survival will depend on the conscious understanding of nature's laws that link his socio-economic environment with the biophysical environment. Some estimates suggest that, tropical forests which house immense biodiversity are being lost at the rate of 11 million hectares every year. The sad truth is that at least 25,000 plant species are now threatened.

The other side of this problem is also quite sorrowful. Part of the cut down forest material is usually burnt. This process requires a huge amount of oxygen (O_2) and releases carbon dioxide (CO_2) in a large quantity as well. As unique solar energy converters, plants are the ultimate source of all the food and oxygen that support the entire living world. Plants also synthesize thousands of other molecules important for our lives, and this they do at normal temperatures and pressure without polluting the environment. With the destruction of the forests and subsequent burning of unwanted forest material, we not only loose energy converters but we also add more CO_2 to the atmosphere. Carbon dioxide is also produced by burning fossil fuels. Its molecule can absorb some heat (mainly infra-red radiation) and radiate it back to the earth making atmosphere warmer. This phenimenon is called greenhouse effect. Assuming an annual worldwide growth of 5 percent in fossil fuel consumption it is estimated that by the year 2020, the resulting increase in CO_2 in the atmosphere would raise the earths temperature by about 2^0C from the level of 1860 when mankind began to burn fossil-fuel in appreciable quantities.

The exposed topsoil resulted by destruction of tropical rain forests is eroded by winds or water. Accelerated soil erosion not only lowers soil productivity, but also disturbs the downstream hydrological regimes, adding to the misery of populations concentrated along the river banks. In contrast to its destruction, the existence of rain forests may promote the recycling of nutrients between the soil and the plants. The plants "fix" the nutrients so preventing them from being washed away. The forest canopy can protect the topsoil from erosion, so reducing the formation of water streams by heavy rains. A land under a forest canopy absorbs more water from rains than an exposed one. Tropical rain forests also promote the evapotranspiration which cools the tropical air and contribute to the formation of clouds. These clouds reflect solar radiation and take part in globa air circulation so carrying warm tropical air to higher latitudes.

2. Industrial emissions and effluents, vehicle exhaust emissions, uncontroiled sewage works, badly maintained agricultural units

Many factories as well as industrial units use water from reservoirs or rivers for either cooling of engines and machines or for their washing purposes. Elevated water temperatures reduce dissolved oxygen levels while increasing the rate of chemical and biological activity in rivers or lakes. This water may also contain suspended solids and they can eventually smother rivers or lake beds so midifying the ecosystem. Increased turbidity (the cloudiness of a liquid caused by fine suspended particles) prevents light reaching aquatic plants which ultimately result in their death. Oil and other effluents released from industrial units can prevent oxygen absorption so the dissolved oxygen levels

will decline and it may inhibit the normal growth of aquatic flora and fauna.

High concentrations of nitrate ions in water are caused by fertilizers and by the breakdown of organic nitrogen compounds by oxidation. Excessive phosphate concentration in water can be caused by waste water (detergents) and fertilizers getting into the streams and rivers. In bodies of fresh water containing high concentrations of nutrients including phosphates and nitrates, aquatic plant growth (specially algae) is particularly strong. Eventually the resulting waste products can no longer be broken down by oxidation due to lack of oxygen. This gives rise to anaerobic decomposition of dead plants (putrefaction) resulting in the production of toxic substances such as hydrogen sulphide. The process by which an excess of nutrients stimulates the growth of algae and other plants to such extent that they clog waterways is called eutrophication.

Although it has been suggested that domestic sewage dropped to a river or lake could be useful for aquatic animals, particularly for fish, experience has shown that the beneficial effects are negligible compared to serious illnesses and diseases that can be caused by various pathogenic microorganisms in the sewage. Besides, emissions and effluents can change the acidity of water. Excessive acidity or alkalinity can be harmful for the aquatic flora and fauna. Among heavy metals harmful for human beings in some industrial wastes, paints, pesticides etc., lead, cadmium, mercury and zinc are the most common. They are toxic not only to human beings but also to other animals, plants and microorganisms. For example, lead released from sewage sludge, some industrial effluents or petrol fumes is absorbed into the blood stream and finally accumulates in bones.

is inhaled, it displaces the oxygen in the blood and reduces the amount of oxygen carried to the body tissue. It may dull mental performances and can slow reactions of even an otherwise healthy person. Moreover, nitrous oxide is also present in vehicle exhaust emissions which is another greenhouse gas. Nitrous oxide can also be produced by electric-power plants and intensive agricultural practices. Volcanos and burning fossil - fuels can produce notrogen dioxide, another notrogen - containing gas. This gas is toxic to humans and animals and contributes to acid rains. The major component of acid rain is however sulphur dioxide. this toxic gas along with notrogen dioxide is formed in active volcanos, heavy industry and in the process of burning of fossil fuels. Acid rain may directly damage some plants. For example, it may cause leaf damage in evergreen trees. Acid rain increases the acidity of soil and subsequently mobilizes such heavy metals as aluminum, zinc

According to Lord Buddha, the forest is a peculiar organism of ultimated kindness and benevolence that makes no demand for its sustenance and extends generously the products of its life activity and it affords protection to all beings offering shelter, even to the exeman who destroys it.

Mineral oil products ranging from petroleum and heating oils to lubricating oils pose a considerable threat to the environment if handled improperly. They damage the flora and fauna and render the ground water unfit for consumption. Due to their low surface tension, these oils are able to permeate through very small pores which are impassable for water.

In vehicle exhaust emissions there can be carbon monoxide (CO) which is a colorless, odoless, poisonous and flammable gas. The significant source of carbon monoxide is the combustion process when carbon is partly oxidized to carbon mobnoxide instead of fully to carbon dioxide. The largest single source of CO is the internal - combustion engine. When carbon monoxide



There are several greenhouse gases viz carbon dioxide, methane, CFC, nitrous oxides and low level ozones. Whatever its source, releasing of these gases to the atmosphere may lead to the greenhouse effect causing global warming. Global warming may ultimately cause melting of the polar ice caps and subsequent extensive flooding of low lying countries like Maldives, Egypt and Bangladesh. Depletion of the ozone layer could be a reason for a global catastrophe since ultra violet - B radiation is harmful to humans, animals and plants. Pollution of the environment by various sources can also eventually lead to catastrophic consequences.

and lead in the soil. This may eventually result in levels of those materials in the soil which are toxic to plants. Gases like sulphur dioxide may enter the leaf via the stomata (the small pores normally found on the underside of plant leaves) and individual cells can be killed or their chemical reactions altered. Sulfur oxides including sulfur dioxide can cause temporary and permanent injury to the respiratory system, irritating the upper respiratory tract and the lung tissues. Sunlight promotes notrogen oxides (in presence of ultra-violet rays) to combine with hydrocarbons to form a complex variety of secondary pollutants called photochemical oxidants. These oxidants include "low-level ozone", nitrogen dioxides, aldehydes etc. They together with solid and liquid particles in the air make up what is commonly known as smog (a debse smoky fog). This "Low-level ozone" is a greenhouse gas as well. Ozone also accelerates the cracking of rubber.

3. Landfill sites

Landfilling is a method of disposal of domestic, industrial and agricultural waste by burial in disused quarries and pits. As a result of the break down of organic wastes by microbial activity under suitable conditions "Landfill gases" like methane and carbon dioxide can be produced. Methan is highly explosive when it's concentration in the air is between 5-15%. It can also restrict plant growth. Moreover, methane is a greenhouse gas.

Methane, nitrous oxides and chlorofluorocarbons (CFCs) damage the ozone layer which is located 25 to 50 km above the earth's surface. Ozone layer protects the earth from ultra violet radiation (specially UV - B) absorbing the radiation, but where it is depleted, more harmful UV-B radiation reaches the earth. In recent times, some significant "holes" in the ozone layer have been detected. CFCs are used in the manufacture of aerosol sprays, refrigerators and blown plastics. These gases are considered to be the major agent for damaging of the ozone layer. Because one CFC molecule traps 10000 times more heat than a CO_2 molecule, it is the most potent greenhouse gas.

As mentioned above, there are several greenhouse gases viz carbon dioxide, methane, CFC, nitrous oxides and low level ozones. Whatever its source, releasing of these gases to the atmosphere may lead to the greenhouse effect causing global warming. Global warming may ultimately cause melting of the polar ice caps and subsequent extensive flooding of low lying countries like Maldives, Egypt and Bangladesh. Depletion of the ozone layer could be a reason for a global catastrophe since ultra violet - B radiation is harmful to humans, animals and plants. Pollution of the environment by various sources can also eventually lead to catastrophic consequences.

The earth has supported civilized man for more than 5000 years and agricultural man for twice that period. But now we have reached a stage in Makind's history on the earth where resources are being overexploited to such an extent that our own existance is at stake. At over 5.4 billion population with a predicted doubling in the next century the utilization of natural resources and production of consumer goods will have to be more efficient. This may be done, avoiding the production and release of toxic by-products, minimizing the production of pollutants and finishing with minimal wastes which can be recyled either directly or through nature without pollution. It is to be hoped that zealous attitude of regulatory authorities or their bureaucracy will play the key role in the protection of the environment. Control of the pollution is of vital importance. Well planned agricultural production on a scientific basis, industrial complexes designed for efficient production with minimal pollution of the environment can help to overcome the global environmental problems. Moreover, alternatives for

fossil-fuel have to be sought. Indeed in many less developed countries solar and wind energy, biogas etc. may have the potential to be more available and dependable as sources of energy for agriculture compared to other forms. Utilization of substitutes for chloroflorocarbons could prevent the depletion of ozone layer to a considerable extent.

Cultural, social, religious and non-government organizations as well as the government may play an important role in solving environmental problems. Likewise, each member of the society should know his obligations in the protection of the environment. We must consciously be protectors of the environment by all means. Only then can we achieve further succeses in human civilization.

NARESA SILVER JUBILEE

Young Writers' Competition

NARESA will be conducting a competition among school children on "Popular Science Writing". The best article in each of the language media (Sinhala, Tamil and English) will receive a prize of Rs. 750/-.

School-goers under the age of 20 years (on 31/12/93) will be eligible to compete. The article, written on any theme pertaining to "Popular Science" not exceeding 750 words, should be typewritten on A4 size paper, double spacing one side only, leaving margins of 2.5 cm. A certifying statement from the Principal to the effect that the written material is original, and belongs to the competing student, is necessary,

Entries close on : 30/09/1993

Science & Technology Exhibition

Young Innovators Competition

Three cash prizes and three other merit certificates will be awarded for the best exhibits submitted for the above exhibition.

The Competitors should be school-goers under 20 years of age on 31/12/93. The exhibit must be an original innovation conceptualised by the competitor, certified as such by the principal of the school.

For Working models service facilities will be available.

Closing date for written application, detailing the planned innovation, preferably with appropriate drawings, will be 30/09/1993.

Details From : **Secretary**
Science Education Committee
NARESA

NIDU 15-1-20

AIDS - THE CHALLENGE IN FRONT OF US

DR. GAMINI JAYAKURU
Director - Anti AIDS/STD Programme
Ministry of Health & Women's Affairs

AIDS - Acquired Immune Deficiency Syndrome is the greatest threat mankind has faced in modern times. The number of reported cases of AIDS is increasing world-wide. As at December 31st 1992, over 611,000 cases of AIDS had been reported to WHO. But considering the failures of reporting, it is estimated that the actual number of AIDS could be around 2.5 million.

These figures represents only the number of persons who have developed the final stage of the HIV (Human Immune Deficiency virus) infection - the full blown disease - AIDS, the actual number of persons infected with virus is estimated to be between 12 - 15 million. Out of this infected persons, vast majority would be from third world countries.

The number of HIV infected persons in Africa alone is estimated to be more than 7 million. South East Asia is estimated to have more than 1 million persons infected with HIV, with India and Thailand having the largest numbers. Myanmar has recently being reporting an increasing number of HIV infections. Nepal, Indonesia and Shri Lanka had reported almost equal numbers of HIV/AIDS cases.

Even today these countries are classified as countries with low prevalence of HIV/AIDS. The picture is changing rapidly. And that by the end of this year (1993) the situation in these countries would be quite different.

The first case of HIV/AIDS in Shri Lanka was reported in September 1986. For a number of years thereafter only few scattered cases were reported. At the end of December 1991, a total of 36 Shri Lankans had been detected with HIV. This picture changed dramatically in 1992. At the end of last year there were 63 cases of HIV infection in this country.

This sudden increase is a critical point in the evolution of the epidemic and has been the epidemiological pattern seen in other countries as well. The year 1992, could be regarded as the year in which Shri Lanka recorded exponential increase of HIV infections.

Analysis of the available data shows that the indigenous transmission (transmission from one Shri Lankan to another Shri Lankan or among Shri Lankans) accounts for 35% of all transmission, even though Shri Lanka

is still in its early stage of the epidemic. Going through the case histories of persons detected with HIV/AIDs, it appears that indigenous transmission has started as early as 1986, even though the first such documented case was in December 89.

The predominant mode of transmission has been through heterosexual intercourse (sex between man and woman). Homosexual (Sex between man with other man) transmission and Bisexual (men having sex with men as well as women) transmission contributed substantially in the initial stages. But now it is clearly established that as for as this country is concerned sex between men and women will be the predominant mode of transmission.

The total number of HIV positives (identified HIV infective cases) detected in Shri Lanka as at March 31st 1993 is 89 comprising 17 foreigners and 72 Shri Lankans. 24 of the infected Shri Lankans developed AIDs and 23 of them have died by 31st March. It is estimated that there are about 2500 persons who are infected in the country. Neither the health authorities know who the infected are. not the persons infected are aware that they are carrying this deadly disease.

This situation constitutes a real dangerous situation as unknowingly and silently this could be spreading the infection and could be the foci of future epidemic.

Once infected with the virus, there is no cure and it is a matter of time before clinical illnesses of varying severity affect the infected individual. Death occurs 8 - 10 years after infection. The period of survival after confirming the diagnosis of AIDS is about 3 years and is increasing in the developed countries but in developing countries such as ours is only one year or even less.

The detection of AIDS cases at present does not reflect the true and present burden of HIV infection in the country. It is only a reflection of what happened in 8 - 10 years earlier. When one categorises Shri Lanka is yet a low prevalence country it means that 8 years ago only few persons were infected with HIV. What ever presumptions we made today depends on the picture of HIV/AIDS as it is applicable today and that does not leave any room for complacency.

Present epidemiological trends indicate that Shri Lanka could have about thousand cases by the year 1996/1997 and about 12,000 HIV. infected persons. Since the data available is not sufficient to make accurate estimates and, this country is dangerous to make such predictions.

Nevertheless the need to develop strategies, plans and interventions for future, estimates has to be calculated and assumptions has to be made basing on the available data. Otherwise we would be caught completely unprepared when the epidemic does come. If we are to deal with thousand cases of AIDS by 1996/97 it will throw a great burden on our society and the country.

The first case of HIV/AIDS in Shri Lanka was reported in September 1986. For a number of years thereafter only few scattered cases were reported. At the end of December 1991, a total of 36 Shri Lankans had been detected with HIV. This picture changed dramatically in 1992. At the end of last year there were 63 cases of HIV infection in this country.

The focus has so far been on the medical issues of AIDS. It is true that looking after 1000 patients with AIDS will not be an easy task. It will certainly be a strain on the health services. But at the same time sufficient focus has not be given to the social, cultural, ethical, legal, economic and political issues resulting from the increasing number of AIDs patients and HIV infected persons. Also at present there are two lots of children who will become AIDS orphans in the next 7-8 years. This is just the beginning. There will be several AIDS orphans when we face the full impact of the epidemic in the near future. Shri Lankans are world famous for it s compassionate people who gives priority in looking after their aged, children, orphans etc. But with the present economic squeeze, and various other pressures would, Shri Lankan will continues to do so or would more sections becomes the responsibility of state?

Events that unfolded recently have brought into focus issues like the rights of persons infected with HIV to their privacy, confidentiality etc. These will become major issues in the next few years. Recently the national AIDs committee submitting a report to the National Health Council pleaded that AIDs to be considered above politics. No political party should seek political advantages by using AIDS problem.

AIDS is a national calamity and it will not discriminate between political parties or ideologies. The economic issues related to AIDS are likely to surface in the next few years. The health sector will have to bear the added expenditure of caring for AIDS patients. The social service sector will need to deal with the loss of chief occupant or breadwinner with families becoming destitute with the death of one or both parents. At the turn of the century Shri Lanka may have to face a situation similar to what Africa's is facing today. Our industrial and agricultural projects would be seriously hampered by the loss of skilled manpower due to AIDS. Zambia's copper mines are a sad example of this. Though at present, it is creating awareness seems to be the most important, in years to come communities will need to get involved in dealing with AIDS issues to a greater extent.

As the AIDs epidemic extends its horizon the communities will have to learn to care for their sick. But what deters them from doing so is people's fear of acquiring the infection. The disease as it is known today has been around for about 14 years now and the methods by which it is spread are well known Similarly how the virus does not spread is equally well documented.

Community would lose their fear once they realise the ways it could be spread and the ways it could not. But it may take several years for the people of Shri Lanka to reach that stage, and accept the reality behind AIDS/HIV infection. By the year 1995 most of us would known some one very close - a relation, a colleague, an associated, a friend who is HIV infected or having the disease AIDS. Till this happens the figures quoted by the authorities will be mere statistics.

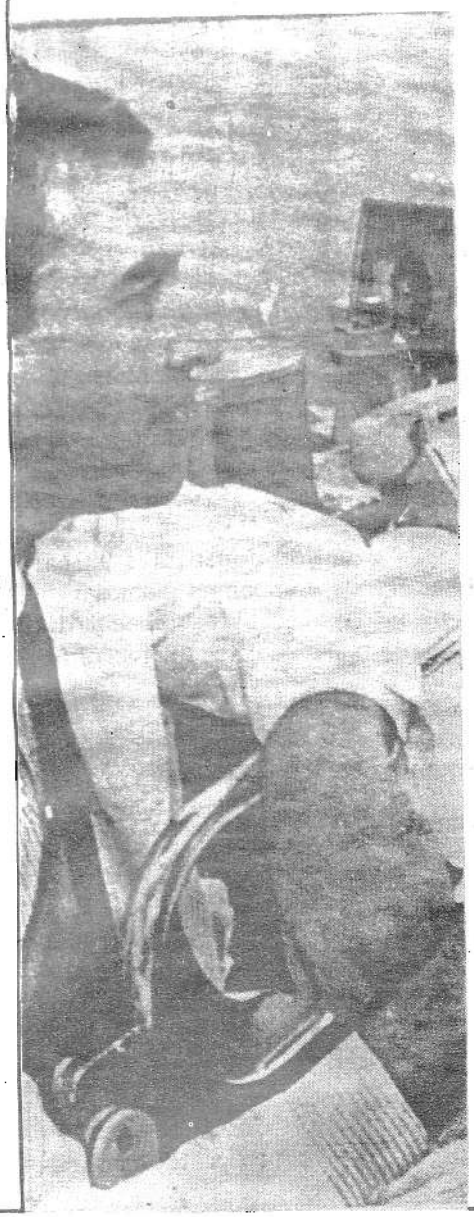
The year 1993 could be a critical year for Shri Lanka as far as AIDS is concerned. The full impact of the disease could begin to feel. Shri Lanka would have decide on certain policy issues dealing with this situation. Shri Lanka could either admit that we have a problem and face up to it by mobilising resources or we could make the mistake of denying that we have a problem and by the year 1996 we could be caught flat-footed with several thousands of infected persons with HIV/AIDS and unaware of what actions we should take to combat the issue.

The resources needed to face this challenge is not limited to financial resources. Financial resources no doubt are vital but that alone is insufficient. We need to mobilise the entire community on an unprecedented scale to the epidemic. The commitment for the prevention and control of AIDs should be more tan lip service or should bot limit only to words. Unless there is a demonstratable political commitment, it will be very difficult to mobilise the non-health sector for dealing with all the problems associated with AIDS.

Dealing with AIDS is expensive. Even the governments of developed countries find it difficult to support the AIDS There has to be greater responsibility on the part of non government, private and other sectors and organizations, to support the government in its AIDS prevention and control activities. In Shri Lanka there are large number or non government organizations working in the health and health related fields. These NGOO . could help the programme in prominent way, specially when it comes to providing community care.

If during this year we can effectively deal with problems like discrimination of people with HIV/AIDS and their uninfected family members and close associates and marginalisation of persons who's behaviour do not confirm to accepted social norms and practices would be taking a step in the right direction.

The year 1993, will be a critical for the prevention and control of AIDS in Shri Lanka. Irrespective of actions taken today by programme, new cases will be reported. These are the result of infections acquired 8 to 10 years ago. We should not be deterred by these but should forge ahead with strategies already developed.



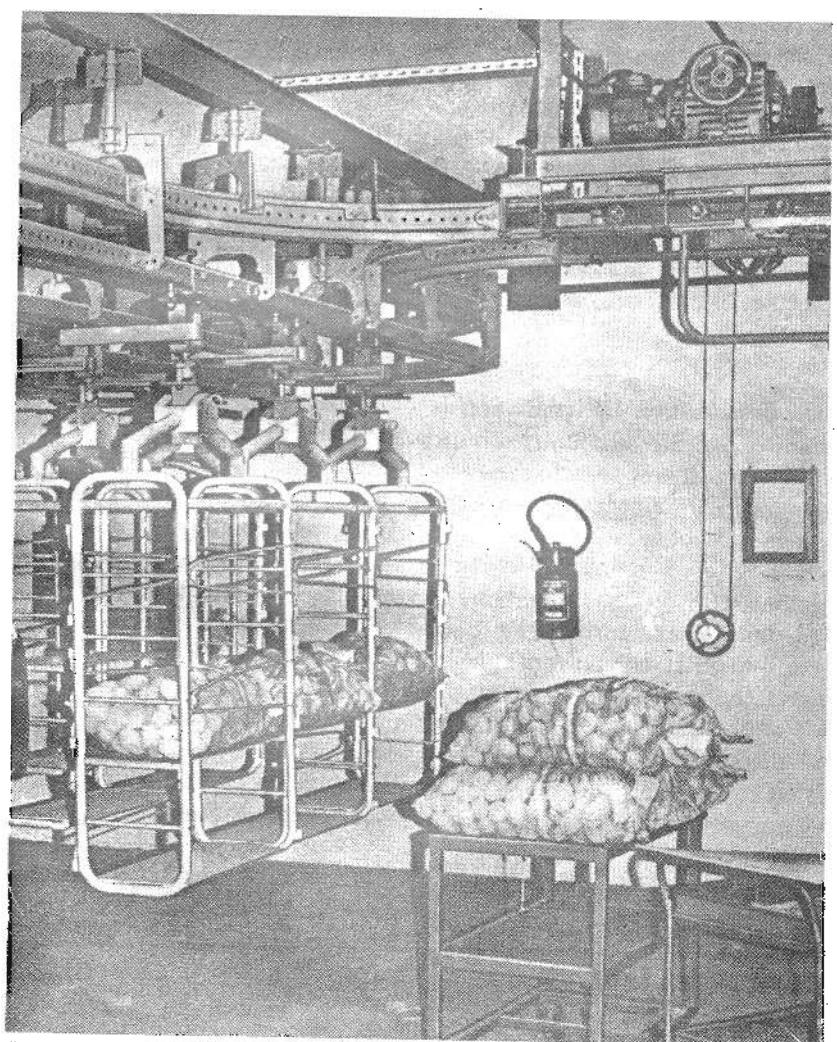
VIDU 15 - 1 - 23

FOOD PRESERVATION BY IRRADIATION

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Food is preserved using a variety of methods including cold storage, drying, salting, smoking, adding sugar or other chemicals or heating. All these methods affect the activity of naturally occurring enzymes in the foods or that of microorganisms spoiling the foods thereby killing them. Thus further changes in the food are inhibited by these treatments.

The enzymic activity in the foods also could be prevented by exposure to x-rays or energy from electron beams. Gamma radiation is a more suitable type of radiation for food preservation which could be obtained from the cobalt 60 or cesium 137 isotopes. The energy is emitted due to nuclear activity in the isotopes.



Potatoes are loaded on the conveyor system. The irradiation is then carried out automatically.

The use of nuclear energy during the second world war for destructive purposes and the disasters resulted from leakages of nuclear energy from the nuclear reactors in the western countries have created a fear among mankind on the application of nuclear energy. These incidence highlight the disturbing aspects of nuclear power at extremely high dosages. We should also recognize that we are continuously exposed very low levels of natural radiation emitted by the elements in our surroundings. The nuclear energy under controlled conditions could be used in a variety of ways for betterment of mankind.

Food irradiation for preservation using irradiation brings about minor chemical changes in the foods in the same way as heat treatments. The radiation degrades some of the constituents in foods. However, research carried out during the last 40 years have not shown the presence of any new compounds in foods than what is preduced by heat treatments. Food preservation by irradiation is referred to as "cold sterilization" since no heat is generated during treatment. The radiation energy ionizes the water molecules in the foods, which in turn inactivate the enzymes.

Food preservation by irradiation is permitted in nearly 40 countries in the world today. It is applied in commercial scale in 20 countries. Some of the applications of irradiation in food technology are presented in Table 1, together with dosages of energy is used. In presenting irradiated foods to consumers it is compulsory by legislation to indicate in the label that the food is preserved by irradiation and also display the internationally accepted logo of radura to indicate that the food is irradiated.

The goal of food irradiation is to make the food safe. Exposure to radiation retains the hygienic and nutritional quality of foods. Radiation does not affect the taste appreciably. The fresh appearance of the food is not altered by the treatments. The treatment also could be used to extend the shelf life of meat contaminated with pathogenic organisms such as Salmonella. The application of chemicals such as nitrates to preserve meat and fumigants to preserve grains and spices could be avoided by application of irradiation. Irradiation does not produce new toxic compounds in foods. The energy does not alter the digestibility of proteins and carbohydrates. However, irradiation destroys some of the fats and oils readily. The destruction is minimized by using low temperatures and eliminating contact with air (oxygen) during irradiation.

Many of us fear to consume foods preserved by irradiation assuming that the foods themselves carry radiation. This is a false fear. There is also doubts in the minds of many regarding possible leakages of nuclear energy in

Table 1
Applications in food irradiation

Effect	Dosage (kGy)
Protecting from insects,	
- spices, grains, cocoa, dates	0.5 - 1.0
- fruits	0.25 - 0.5
Reducing microbial populations in,	
- spices	5 - 10
- fruits (in combination with heat)	0.5 - 1.0
- fish products, cocoa beans	2 - 3
Eliminating pathogenic microorganisms in,	
- spices	5
- fish products	3 - 5
- meat products	2 - 4
Prevent sprouting in,	
- potato, onions	0.05 - 0.05
Control ripening of	
- fruits and vegetables	1
Reduce risk of trichinosis,	
- in pork	1

Radiation does not affect the taste appreciably. The fresh appearance of the food is not altered by the treatments. The treatment also could be used to extend the shelf life of meat contaminated with pathogenic organisms such as Salmonella. The application of chemicals such as nitrates to preserve meat and fumigants to preserve grains and spices could be avoided by application of irradiation.

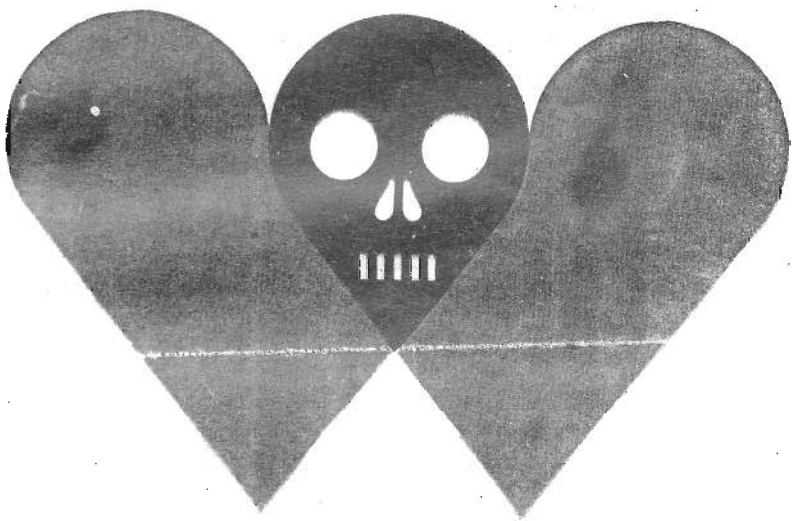
the equipment used for food irradiation in the same scale as from nuclear power stations generating electricity. The equipment used in food irradiation are similar to what is used to sterilize medical equipments. The low energy generated in these equipments are incapable of causing nuclear explosions. A concern also arise from the possible exposure of workers in processing plants to unlimited radiation energy as well as possible hazards associated with disposal of ratioactive isotpes. There are internationally accepted protective techniques and procedures adopted in use of irradiation ecuipment. They need to be carefully applied in food irradiation too.

The public attitudes towards irradiated foods should be developed based on scientific facts. A survey carried out in Netherlands among the housewives on unsafe foods have shown that the consumers were more concerned about pesticides (55%) and food preservative (45%) than irradiated foods (38%). In one hand there is public protests against food preservation by irradiation in the Western countries. On the other hand the fear is disappearing among many. The scientists engaged in research on food preservation by irradiation feel that the techniques will gain popularity with time.

Food preserved by irradiation are not available in the local markets. The basic facilities needed for food irradiation in laboratory scale were available in Sri Lanka. Identification of conditions necessary for microbial decontamination of spices, and control of fruit spoilage are more important to us today. Application of methods to preserve onions, spices, fruits and dried fish are planned for Sri Lanka after installation of a cobalt 60 irradiator within the next five years. suggestions are also made to market test imported irradiated foods in Sri Lanka.

AIDS

A worldwide effort will stop it.



WORLD HEALTH ORGANIZATION
SPECIAL PROGRAMME ON AIDS

VIDU 15-1-26

A SIMPLE METHOD FOR THE EVALUATION OF WEATHER FORECASTS

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The well known "joke" behind all weather forecasts is universal. Although most of the people don't mean it still we can find some people who really mean it. It is difficult to confine them to a certain group. When a forecast goes wrong then there are lots of people to criticise it but most of the people do not appreciate it when it comes true. This may be due to the fact that those who do not appreciate it either do not have the time to appreciate it or they do not care because the forecast has been correct.

A method was developed to evaluate the weather forecasts issued by the Department of Meteorology and it was applied to evaluate the forecasts issued for the Western province during the month of August 1992.

The results revealed that the average (for 31 days) accuracy of the forecasts issued for the said period is 73.5%.

Introduction

A notable public response to the daily weather forecasts issued by the Department of Meteorology has been observed during the past couple of years. There are two basic reasons for this.

1. **Reliability of forecasts issued**

   If the general public finds that all forecasts go wrong, they will no longer be intersted in the weather forecasts.

2. **Effective dissemination of weather forecasts**

   Thanks to the Media (local Press, Radio and Television) the Weather Forecasts are disseminated to the general public through the media.

   The most powerful medium of communication in Sri Lanka is Television. This has largely contributed to the dissemination of the Weather forecasts to the general Public.

3. **The economic effectiveness of the work of the Meteorological Service.**

The increasing importance placed on assessing meteorological factors in planning and implementation various measures associated with many aspects of human activities.

TECHNIQUE EVALUATION FORECASTS

The well known "joke" behind all weather forecasts is universal. Although most of the people don't mean it still we can find some people who really mean it. It is difficult to confine them to a certain group. When a forecast goes wrong then there are lots of people to criticise it but most of the people do not appreciate it when it comes true. This may be due to the fact that those who do not appreciate it either do not have the time to appreciate it or they do not care because the forecast has been correct. This is natural. The way the forecasts are evaluated is not reasonable and a 'forecast' by definition need not be 100% accurate. Some people do not like the language used in weather forecasting but it has to be pointed out that there are certain special words which have to be used when writing a weather forecast.

Those who had been lucky enough to travel abroad, specially to temperate regions such as United Kingdom, USA and Canada etc. very often comment on the accuracy of the weather forecasts issued in those countries, but they fail to realize, probably through ignorance, the difference in the weather systems in tropical countries such as Sri Lanka and these temperate countries. In the middle latitudes frontal weather systems are well behaved. Not only the direction of motion but also the amount of precipitation due to these frontal weather systems can be estimated well ahead of time. More detailed weather forecasts can be prepared by studying these well behaved frontal weather systems. This is not so in tropical weather systems.

With the advancement of communication technology people in Sri Lanka get the opportunity to watch on TV Wether Forecasts with World News and other international programmes which are telecast by some international agencies via satellites. There is a tendency to believe that these forecasts are superior to the local forecasts. The method of presentation using high technology and the interactive nature of presentation may be the reason for this belief. It must however be pointed out that World Weather Forecasting centres have no capability of forecasting local weather over countries like Sri Lanka.

The local weather situation is determined by analyzing the observations done every 3 hours by the local observatories scattered throughout the Island. A good knowledge of topography and the climatology of the country is very necessary as additional tools for local forecasting purposes. Weather forecasting in Sri Lanka is mostly subjective. Climatology and Persistence Techniques are commonly used in forecasting. No forecasting models and Numerical Analysis packages are currently available. Besides the above constraints the nature of the Tropical Weather is very complex. The weather systems in the tropics are not well behaved and not yet properly understood unlike those in the mid latitudes.

Another important aspect to be stressed is the scarcity of meteorological data in the area surrounding Sri Lanka. This is mainly due to the geographical location of the Island. We are surrounded by the Indian Ocean where only a handful of land stations, (such as Male, Gan,...) exists.

With all these limitations the Department of Meteorology issues the main daily weather forecasts on a provincial

basis. Verification of these forecasts can be done only by the

Meteorologistsworking at the National Meteorological Centre (NMC) where all past and present weather information is available. Also this should be done scientifically, based on Objective techniques. The general public have very limited information available to them to carry out an evaluation of this nature.
In this short article, a simple method of evaluation of forecasts is described and the forecasts issued for the Month of August 1992 for the Western province by the Sri Lanka Department of Meteorology is evaluated using this method.

The common words used in forecasting and their meaning with respect to rainfall are explained with the following tabulations.

Rainfall Forecast

Mainly the spatial temporal distribution of rainfall is included in the daily forecast issued by Sri Lanka Meteorological Department to the general public since the rainfall is the most sensitive weather element in a tropical island such as Sri Lanka.

The format which is used to issue the daily weather forecast for the general public can be classified into three groups.

Format I:

Includes only spatial distribution of rainfall. The words used in this format and their definitions are tabulated in Table 2. Sometimes, the type of rain is also included (see Table 1).

Format II:

Includes both spatial and temporal distribution of rainfall. The definitions of the words used in this format are tabulated in the Table 3.

Symbols used & their Definitions:

A. Rainfall Types

Table 1

Symbol	Word	Definition
A1	Heavy	24 Hour Rainfall > 100 mm
A2	Fairly heavy	100 mm > 24 Hr. Rainfall > 50 mm
A3	Moderate	50 mm > 24 Hr. Rainfall 25 mm
A4	Light to Moderate	25 mm > 24 Hr. Rainfall > 12.5 mm
A5	Light	12.5 mm > 24 Hr. Rainfall > 0
A6	No rain	24 Hr. Rainfall ~ 0

B. Rainfall (Spatial Distribution)

Table 2

Symbol	Word	Definition
B1	Widespread	80% of Stations reports A2-A1 type rain
B2	Fairly Widespread	60% of Stations reports A2-A1 type rain
B3	Scattered	at least 50% of Stations reports any type rain
B4	Isolated	less than 50% of Stations reports any type rain

C. Rainfall (Temporal distribution)

Table 3

Symbol	Word	Definition
C1	Frequent	Continuous rain through out the day
C2	Intermittent	Rain with short intermissions
C3	Occasional	More than 3 Light to Moderate falls

Type of rain is also included occasionally.

Format III:

Includes the cause for the current weather. This is indicated whenever there is a significant weather systems such as a Cyclone, depression etc. in the vicinity of Sri Lanka. This is in addition to the general weather forecast given in the format I or II or both.

This table was constructed by the author

Analysis

Accuracy of the forecasts issued was determined by using the Table 4. The criteria were developed by the author.

B1 to B5 indicate the spatial distribution of rainfall which is self explanatory in the Table 2 while C1 to C3 indicate the temporal distribution of rainfall. It is also explained in the Table 3.

For an instance, when the forecast weather is B5 and the actual weather observed in following day is B4 then the accuracy would be 80% according to the accuracy determination table (Table 4).

The accuracy of the weather forecasts issued for the western province during the month August 1992 was determined using the above tables. Final evaluation was tabulated in Table 5. Analysis was summarized in the Table 6. Figure 1 shows the graphical quantification of the accuracy ranges. All the Tables used to evaluate the accuracy of forecasts for the month of August 1992 are available with the author.

Out of 30 forecasts evaluated only one forecast has been fully out. Fourteen forecasts found to be 100% accurate. Average accuracy of forecasts issued for the month August 1992 (31 forecasts) was 73.45%.

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References

1. Dobryshman, E.M., 1972. Review of Forecast Verification Techniques WMO No. 303, Technical Note No. 120, *World Meteorological Organization.*

Table 4

Accuracy Determination Chart

Forecast / Actual	B1	B2	B3	B4	B5	C1	C2	C3
B1	100%	80%	60%	20%	0%	90%	85%	80%
B2	80%	100%	60%	30%	0%	70%	75%	85%
B3	60%	60%	100%	60%	20%	40%	40%	80%
B4	20%	30%	60%	100%	80%	20%	20%	10%
B5	0%	0%	20%	60%	100%	0%	0%	0%
C1	90%	70%	40%	20%	0%	100%	90%	80%
C2	85%	75%	40%	0%	20%	90%	100%	90%

Table 5

Results for the Month of August 1992 : Western Province

Date	Weather Forecast	Weather Actual	Accuracy	Date	Weather Forecast	Weather Actual	Accuracy
01	C3	B4	10%	16	B4	B4	100%
02	C3	B4	10%	17	B3	B4	60%
03	B3	B3	100%	18	B3	B5	20%
04	B3	B3	100%	19	B4	B3	60%
05	C3	B5	0%	20	B4	B3	60%
06	B3	B2	60%	21	B4	B5	60%
07	B3	B3	100%	22	B4	B4	100%
08	B3	B2	60%	23	B5	B4	60%
09	B3	B3	100%	24	B4	B4	100%
10	B3	B4	60%	25	C3	B3	80%
11	B3	B3	100%	26	C3	B3	80%
12	B3	B4	60%	27	B3	B3	100%
13	B3	B3	100%	28	B4	B3	60%
14	B4	B4	100%	29	B3	B3	100%
15	B4	B4	100%	30	C3	C3	100%
				31	B3	B3	100%
Average Accuracy of Forecasts							73.45