Main Identity

From: "ramdas rao" <ramdas_rao@hotmail.com>
To: <bangaloresolidarity@yahoogroups.com>; <dhanaraju42@yahoo.co.in>; <jeeves@vsnl.com>; <kamaan@rediffmail.com>; <meera_c@vsnl.net>; <puclblr@yahoogroups.com>; <radhar4@yahoo.com>; <alazon@rediffmail.com>; <rajsundarak@vsnl.net>; <das@iiap.ernet.in>; <manasapathrike@yahoo.co.in>; <manohar@sangamaonline.org>; <mansur_humanrights@yahoo.com>; <nagarageremamesh@yahoo.com>; <nbabaiah@yahoo.co.in>; <nilanjanabiswas@yahoo.com>; <pinakic@physics.iisc.ernet.in>; <ramdas_rao@hotmail.com>; <shivasundar35@rediffmail.com>; <sreedhara@vsnl.net>; <vasuhv@rediffmail.com>
Sent: Sunday, January 04, 2004 7:45 AM
Subject: [bangaloresolidarity] FW: [PUCL] Digest Number 284

>
> Date: Wed, 31 Dec 2003 18:45:08 -0000 (GMT)
> From: "C. R. Bijoy"
>Subject: Appeal from Kashipur - Struggle against mining/MNCs
>
>PRAKRUTIK SAMPAD SURAKSHYA PARISHAD (P. S. S. P.)
>KUCHEIPADAR, KASHIPUR, RAYAGADA- 765015 (ORISSA, INDIA)
>
>
>
>

>Dear Friend , Date: 30/12/03

>
>We the people of Kashipur, Orissa have been struggling against the bauxite
>mining companies and the state for last 8-9 years and today we want to
>bring certain facts of gross violation of human rights in our land.
>
>Our land is full of bauxite. Bauxite is useful for aluminium. Now a days
>aluminium is used for making missiles, bombs, war weapons. This would help
>to cause so many Iraq, Afghanistan in future. Besides this, aluminium is
>useful for aero planes, food packages and cokes. Companies want profit.
>They want to make profit out of our land. They want to throw us from our
>land.
>Our government has joined its hand with these murderer companies. Once
>firing took place on 16th December, 2000 at Maikancha and three people
>died in the firing. But we have not yet left our land. We know that if we
>leave our land we will die. Why should we be the victims of an unrighteous
>development?
>
>Just after the firing because of a lot of pressure from our sympathizers
>the Orissa government
>constitutes a judiciary Commission appointing justice P.K. Mishra. The
>Mishra Commission has given it report. It is the matter shocking that
>though the Commission has said "it was not necessary for the police force
>to go inside the village. Having gone they should have maintained almost
>restraint in dealing with the situation". The Commission has concluded
>"the action of police in assaulting two tribal women had the effect of
>magnifying the tension". The allegation that there was a firing from the
>side of villagers, which had damaged a police jeep, was not accepted by

>the Commission. The Commission has included that grossly excessive force
>had been used. The Magistrate had merely given the order for firing which
>"was not necessary". Even after
>that the Commission has not recommended any action against the person held
>responsible for their acts of commission and omission in the firing which
>is against the natural justice. (For more, you see the attachment)
>
>Not only that the Commission has felt "the extraction of bauxite need not
>have any significant adverse impact on the environment, particularly
>relating to protection of water" and gave green signal for establishment
>of the Utkal Aluminium Plant (joint venture of Hindalco of India and Alcan
>of Canada) which is again our wishes. We have not yet accepted such step
>of the government and several times we have communicated it to the
>government making rally, dharna, and road blockade and also through
>Gramsabha several times.
>
>We feel that the recommendations of Judiciary commission has come from the
>Company's quarter and in stead of giving justice according to the law of
>this country the Commission has not only acquitted the persons who are
>responsible for firing but also welcomed the establishment of plant in our
>land. The state cabinet has accepted all these recommendations. We
>apprehend that more firing could take place in our areas to force us to
>accept the company.
>
>We request that all our friends who have stood with us in our difficult
>time to exert pressure on the state government (writing to: Naveen
>Pattnaik, Chief Minister, Sachivalaya Marg, Bhubaneswar, Orissa E-mail :
>cmo(@)ori.nic.in) for cancellation of recommendations of the Commission and
>cancellation of the MOU with the bauxite mining companies and punish its
>officers and political leaders who are responsible in the firing .
>
>You should also write to the Chief Justice of Supreme Court, (Justice V.N.
>Khare, Chief Justice, Supreme Court of India, New Delhi-1) against the
>Mishra Commission ?How a Justice could give such type of conclusions?
>This is also not healthy sign for all people who are struggling like us
>and also in justice system of this land specifically in the era of
>liberalization and privatization.
>
>Hope you will do this and forward a copy of your action to us.
>
>Yours,
>
>Bhagaban Majhi
>Convenor, Prakrutik Sampad Surakshya Parishad (PSSP)
>Kuchcipadar, Kashipur, Rayagada, Orissa.
>Phone : 06856-224012 (PP)
>
>
>Attachments:
>A letter to the Chief Minister, Orissa/ Chief Justice,
>Supreme Court, India
>Synopsis of the findings and recommendations of Mishra Commission Report
>Fact sheet of the Kashipur Struggle
>
>

1/5/04

>P.S.: write to US if you feel more people should be requested for this
>signature campaign
>
>
>**********
>
>To ,
>The Chief Minister, Bhubaneswar Orissa / Chief Justice, Supreme Court,
>India, New Delhi
>
>Subject: Cancellation of recommendations of Justice Mishra Commission and
>punishment of guilty officers in the firing
>
>Dear Sir,
>
>We have been associated with the ongoing Kashipur struggle for a long time
>and we were shocked when we heard the police firing in 2000 at Maikancha.
>How a struggle for livelihood could be targeted as a law and order
>problem?
>
>In the mean time the Justice Mishra Commission's recommendations on the
>firing has been accepted by your government. It is a matter of shocking
>that when entire world knows the police and administration are
>responsible for the firing how the Commission has acquitted all
>responsible officers. Also the Commission has recommended for
>establishment of the
>plant. Here we all concerned citizens of this country condemn the firing
>and recommendations of the Commission. It is not a good sign in the
>justice system of this country.
>
>Forceful entry of Mining companies including MNCs will not solve the
>problem of this country rather will enhance the problem.
>
>So we demand that all responsible officers should be punished and the
>memorandum signed with the company should be cancelled.
>
>Yours
>
>
>
>Name and Address/ E-Mail Signature
>
>
>
>
>
>SYNOPSIS
>Government of Orissa
>Home Department
>CABINET MEMORANDUM
>1. Three persons had died in police firing on 16.12.2000 in village
>Maikanch of Kashipur Police
>Station in the district of Rayagada. All the persons who died were members
>of Scheduled Tribe. Several others were injured by the firing.
>2. Considering its seriousness, the Government of Orissa had ordered an

>Notification No. 496/C, dated 20.01.2000. Under Section 3 read with
>Section 5 (1) of the Commissions of Inquiry Act, 1952 was issued,
>appointing a Commission of Inquiry consisting of Justice P.K.Mishra, then
>a Sitting Judge of High Court, Orissa. The terms of reference of inquiry
>are produced as below:
> 1. Analysis of the sequence of events leading to the police firing
>on the 16th December, 2000;
>2. Whether measures taken, and quantum of force used, in anticipating
>preventing and
>handling situations were adequate, inadequate or in excess of the
>requirement and the responsibility for such acts of commission or
>omission;
>3. The role, conduct and responsibility of organizations, groups of
>individuals or persons, if
>any, in influencing, precipitating or escalating the incident and
>4. Any other matter connected with or incidental there to as the inquiring
>authority may
> consider appropriate, including any suggestions, in relation to such
>matter."
>
>3. Commission took cognizance of the matter on 01.03.2001. It visited the
>spot on 08.03.2001 in the presence of Collector, Superintendent of Police,
>Rayagada Chief Judicial Magistrate (Joint Secretary of Commission),
>Rayagada and local inhabitants. Notices were published in newspapers
>inviting filing of affidavits and other papers / documents on or before
>20th April, 2001. In all 108 affidavits were fields on different dates.
>The examination of affidavits had
>revealed allegations against many persons. Consequently, the Commission
>had issued notices under Section 8 (B) of the Act to several persons
>likely to be affected prejudicially by the inquiry. 32 witnesses were
>examined several documents, field as annexure to the affidavits and as
>exhibits, were also examined by the Commission.
>4. The first sitting of the Commission had taken place at Kashipur on
>02.05.2001 subsequently, number of sittings had taken place at Rayagada
>Cuttack.
>5. After all the evidences were recorded, the Commission had on
>29.07.2002 visited the village of Maikanch, Baphilimali (mining area),
>Nuagaon and Kuchcipadar. Similarly, after hearing oral submissions and
>filing of written submissions the Commission had visited Bauxite mines of
>NALCO at Damonjodi and had held discussions with the company officials to
>have an idea of Bauxite mining operations and its effect on the
>environment and the neighborhood. The Commission had submitted his report
>structured along the lines of terms of references on 17th January, 2003.
>6. The report of the Commission and its conclusions are briefly
>described as below.
>6.1. Sequence of Events leading to the police firing on 16th December, 2000:
>'A' private sector company in the name and style of Utkal Alumina
>Industries Limited (UAIL) was formed in 1993 for establishing an alumina
>refinery plant new Domba-korala in Kashipur. It was granted a lease for
>extracting bauxite from Baphilimali hills in Kashipur Police Station area
>of Rayagada district. Muth—of protests were raised to this grant of lease
>by some local organizations. Subsequently when the process of acquisition
>of land commenced, the protest against establishment of the industry
>gathered momentum with the encouragement and support of some social

1/5/04

Main Identity

From: <prayasct@sancharnet.in>
To: "Sundararaman" <cerd@satyam.net.in>; "pha-ncc" <pha-ncc@yahoogroups.com>; "PHM - Secretariat" <secretariat@phmovement.org>; "Abhay Shukla" <abhayseema@vsnl.com>
Sent: Sunday, January 04, 2004 7:20 PM
Subject: [pha-ncc] attachment incomplete

dear Dr. T.Sundararaman

new year greetings to you.
many thanks for your mail. the attachment that you've sent about the latest IHF schedule (as on 31st dec)is incomplete. initial few pages are blank. so please send us the latest schedule once again. another request is that unfortunately we have lost the mails in our inbox. thus we request you to please also send us the IHF registration form once again.

thanking you
warm regards
pallavi gupta
co-ordinator
prayas

--------Original Message -------
Sub: International Health Forum(for Defense of Peoples Health)- conference on 14th - 15th --- pre -WSF conference organised by Jan Swasthya Abhiyan and Peoples Health Movement International

Registration fee Rs 100. Accomodation at Dharmshala- Rs 200 per day.Venue YMCA international hall, (see address and details of how to reach below).

Dear Friends,

Please find attached the programme for the IHF conference. Participants from 42 countries have confirmed - testifying to the continued emergence of the international peoples health movement . We hope to follow up this conference with concrete action plans both programmatically and organisationally both at national and international level. Please make sure that your state is fully represented with all the partners having due representation . Do not miss the opportunity.If for some reason you are unable to send 15 from the state do let us know at once so that we can pass the quota to some other state which needs it. We have been cutting down on some states requests as we are having to limit the conference to 600 participants. So please please let us know if less than 15 are coming.

As has been circulated earlier, the norm is 15 persons per state, so if more than this number are coming, it is especially important that you inform immediately, to ensure that accommodation can be arranged and there is space . Similarly, National networks (e.g. CHAI, CMAI) should also please inform about total number of participants coming from their network (who are not included in state contingents), and whether they require accommodation. Individuals are also permitted to register directly but please do it as soon as possible.

1. All State coordinators / state nodal persons should definitely inform about the total number of persons coming from their state, and how many will require accommodation, LATEST BY 8TH JANUARY. Please send in the number of participants from your state, to Sarojini samasaro@vsnl.com with copies of the mail to Sundararaman sundar2@123india.com and both the PHM secretariat

Please also ensure that filled IHF registration forms are sent to Sarojini by e-mail or by post, to help planning.

2.. For Indian participants in IHF, two large Dharamshalas have been arranged at a short distance from the venue (YMCA). These will be available from 13th Jan. onwards. Arrangements have also been made for local transport, from Dharamshala to IHF venue and back. The partly subsidised cost of arrangements is as follows:

- From 13th to 15th Jan., for IHF participants, accommodation, breakfast and dinner and local transport to and from venue will be available at a rate of Rs. 200 per person per day. This includes lunch at the IHF venue on 14th and 15th.

- From 16th Jan. morning onwards, the same Dharamshalas will remain available to individuals who would be continuing for WSF. The cost of accommodation will be Rs. 125 per day, while persons can avail of reasonably priced food near the Dharamshalas or at the WSF venue.

Please note that the WSF venue at Goregaon is at a significant distance from the Dharamshalas (about one and half hour travel by taxis and local train). We will try to make bus travel arrangements for WSF but this depends on number of persons who will be staying on in the Dharamshalas.

3.. How to reach the Dharamshalas:
The place to reach is -

Nemani Wadi Dharamshala. Thakurdwar road

close to C.P. Tank naka

off Charni Road (East), Mumbai

Contact person: Mr Ramavatar Sharma

Ph. 22067630

To reach this place, if you are coming by Western Railway (from Gujarat / Rajasthan / Delhi), get off from the train at Mumbai Central station and take a taxi to C.P. Tank naka.

If you are coming by Central Railway (that is trains from most other states, which culminate at Mumbai CST or Kurla stations) then you have two options.

a. The cheaper option is to get off at Dadar, and walk to the Western side of Dadar station and take a LOCAL TRAIN on Western line, to Charni Road. Then get off at Charni road station, get out on the EAST side and take a short taxi ride to C.P. Tank naka.

b. Somewhat more expensive is to get off at Mumbai CST station (last stop) and take a straight taxi to C.P. Tank naka.

4.. The venue for IHF is:
YMCA International House,

18, YMCA road, near Maratha Mandir cinema,

Mumbai Central (East)

Ph. 23070601 / 23091262

5. The registration fee for IHF is Rs. 100. It can be paid at the IHF venue.

E-3.

Main identity

From: "Ruchita Khurana" <ruchita@toxicslink.org>
To: "Jayakumar" <thanal@md4.vsnl.net.in>; <tarumitra@vsnl.com>; <econet@axess.com>; <janvikas@axess.com>; "PSS" <pss@narmada.net.in>; <ics@bnpl.com>; <okaanet@yaho.co.uk>; <sarangi_rk@rediffmail.com>
Cc: <kanhere@hotmail.com>; <sochara@vsnl.com>; "dudani" <atd@mantraonline.com>; <pravin@ndt.vsnl.net.in>; <waste@operamail.com>; <sctripathi@rediffmail.com>; <callshiv@hotmail.com>; <ceesouth@vsnl.com>
Sent: Tuesday, November 18, 2003 5:40 PM
Subject: Do we have right to safe food? - Invitation to the Panel Discussion onNovember 19, 2003

Toxics Link
Environment and Health Public Lecture Series

Safe food is a basic need that is fundamental to our health. However, in India these fundamental necessities have been taken for granted for too long, even as the threats to them have multiplied. Do we know how safe our food is?

As citizens and taxpayers we have a right to expect our government to make protecting the health and well being of residents its top priority. Yet for years the government has neglected environmental protection, in terms of investment in infrastructure, better enforcement of regulations or promotion of environmental education, to the detriment of everyone's health.

The direct economic and health losses suffered by farmers and the general public following a pollution-related health scare highlights the failure to address environmental problems at its source is a false economy. Corporations in India pay scant regard to our health and quality of food we consume.

These problems are easily preventable through investment in environmental infrastructure, improved technical measures, better enforcement of existing regulations and better education.

The present life and health-threatening situation cannot be tolerated for long. The policy decisions on sectors such as industry & agriculture, should ensure that the effects of those decisions work for, rather than against, environmental and health policies.

In the recent times, we have come to know as to how our food safety has been compromised. These problems stem from poor environmental quality and hygiene standards. Indiscriminate use of pesticides has contaminated our food chain. The spread of pathogens is also an issue which deserves attention.

Citizens have a right to safe environmental and public health. But government and corporations seem to have forgotten that human health is non-negotiable. We have invited an eminent panel to discuss:

Do we have right to safe food?

Panelists:
Mr. S. Nigam, Economic Adviser, Ministry of Commerce and Industry
Mr. Sudhir Rahi, Joint Director, Bureau of Indian Standards
Dr. T. K. Joshi, Director, Centre for Occupational and Environmental Health, LNJP Hospital.

Moderated by Mr. Ravi Agarwal, Director, Toxics Link.

Venue: Conference Room 1, India International Center, Lodhi Road, New Delhi
Date: Wednesday, 19th November 2003, Time: 6:30 p.m.
(In collaboration with India International Center)

Toxics Link

11/19/03

H-2 Jungpura Extn.
Ground Floor, New Delhi - 110 014
Ph: +91 11 2432 0711, 2432 8006
Fax: +91 11 2432 1747
Email - ruchita@toxicslink.org

11/19/03

C-3.

Main identity

From: "Judith Richter" <judith.richter@attglobal.net>
To: "Ravi Narayan" <sochara@vsnl.com>; "Lida Lhotska" <lida.lhotska@gifa.org>; "Maria Hamlin Zuniga" <iphc@cablenet.com.ni>; "Beryl Leach" <balafrica@africaonline.co.ke>; "Alison Linnecar" <alison.linnecar@gifa.org>
Cc: "Balasubramaniam, HAI" <bala@halap.org>; "Margaret Ewen" <marg@hanweb.org>
Sent: Wednesday, December 17, 2003 2:17 PM
Subject: FW: December E-News: Activism on trial

Dear friends,

I just wanted to draw you attention to the item which I cut out of the Earthrights Newsletter. Not necessarily to make you read it - we did exchange mails on the issue before. But to remind ourselves that UN discussion on UN-NGO and/or civil society discussions are taking place in a very serious context.

In hope for a good ending for Greenpeace,

Judith

-----Original Message-----
From: Kate at EarthRights International
[mailto:newsletter@earthrights.org]
Sent: Tuesday, December 16, 2003 5:31 PM
To: judith.richter@attglobal.net
Subject: December E-News: Sarayaku action alert, Activism on trial, Rivers for life

TH

EarthRights International
December E-Newsletter

17/12

XXXX

HRM - lib. environment & health fyi 17/12.

* Activism on trial

In an unprecedented prosecution, the U.S. Justice Department has indicted Greenpeace - not just a few Greenpeacers, but the entire organization - for the peaceful protest activities of its members. If this prosecution is successful, it will mark a sea change in the history not only of environmental activism but non-violent civil disobedience generally.

http://m1e.net/e?16239985-6JGiejdAx1No0%40381428-Z8VKsmSivvnA

XXX

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ABOUT US
EarthRights International (ERI) is a nonprofit group of activists, organizers, and lawyers with expertise in human rights and the environment, and corporate and government accountability. Learn more

about our work at http://www.earthrights.org

SUPPORT US
Your donation to ERI will help us fight human rights and environmental abuses in Burma and around the world.
https://www.groundspring.org/donate/531/index.cfm?id=2852-0531-0

TELL YOUR FRIENDS
Forward the ERI online newsletter to your friends and co-workers concerned about human rights and the environment. If you got this message from a friend, you may subscribe at:
http://www.mailermailer.com/x?oid=09585e

YOUR PRIVACY
ERI will never share your email address with anyone.

XXX

IN: Environmental Endocrine Disruptors: An Evolutionary & Comparative Perspective. Eds. L.N. Guillette & D. A. Crain, Taylor & Francis Pub. NY 2000

Chapter 12

AN ANTHROPOLOGICAL INTERPRETATION OF ENDOCRINE DISRUPTION IN CHILDREN

Elizabeth A. Guillette

Bureau of Applied Research in Anthropology
University of Arizona
Tucson, AZ 85721

The first words uttered by parents after the birth of a child reflect their concerns about normalcy. "Is my child all right?" The reply is based on the gross anatomy of having five fingers and five toes, or other normal external features. The hidden internal anatomy and physiological function are unknown. As scientists, we recognize that harmony in external features does not guarantee conformity in internal functioning. This fact grows in importance as environmental contamination becomes increasingly widespread. The possibility of covert effects of endocrine-disrupting contaminants (EDCs), which may have an immediate or delayed internal influence on the child's overall health, have only recently emerged, although gross teratogenic defects have been associated with such EDCs as dioxin and certain herbicides (Sherman, 1995). The purpose of this chapter is to present what is suspected and known about EDCs as obstructing normal childhood physiology and functioning, and to place this knowledge within a framework applicable to all types of EDC research.

Introduction

Other sections of this book reflect on the interactions of evolutionary responses to the environment and how EDC contamination has not allowed sufficient time for a protective evolutionary response to develop for most vertebrates. Temporally, evolutionary responses occur very slowly in humans, reflecting a

long reproductive cycle between generations. On the other hand, cultural evolution has occurred at a more rapid pace. Marked technological change has occurred in the western culture over the last hundred years and is increasing rapidly. Developing countries, taking benefit of industrial and agricultural advances, have experienced marked technological change in a matter of decades. The children of today are a product of this cultural evolution as much as they are of biological evolution. As with biological evolution, cultural evolution serves as provocation for continuing action and reaction in future generations. We act and react according to the preceding changes that have occurred, both on an individual level and on a global level.

More ancestral vertebrates are not excluded from this process of "modernization." Specific aspects of both biological evolution and social organization are tied to various aspects of human cultural evolution and social change. Foremost are the pressures from human-induced ecological change and habitat compression. Other diverse factors affecting both animal and human welfare include pressures from population growth, social, economic, and political influences, plus access to the basic necessities of life. Correspondingly, we must remember that an event occurring locally may eventually have a global impact (i.e., the destruction of rain forests). Evolutionary factors are also a two-way street, reflecting the evolutionary interdependence of animal and plant life. Changes in biodiversity are known to lead to previously innocuous insects becoming devastating pests. Zoological and botanical change and/or extinction can easily feed back into the quality and quantity of human life (Epstein et al., 1997). Thus, the assessment of the impact of EDCs must be placed in a holistic, global context, with recognition of the magnitude of events that are capable of shaping the future for both animal offspring and our own children.

Reproductive Rights

The early unsettling hints that EDCs may be disrupting the many loci in the endocrine system are increasingly being accepted as reality. In light of the extensive scope of findings, both in animals and humans, the time has come to place endocrine disruption in a broad-based framework in which to evaluate the future of our children. The foundation of the framework lies in the reformulation of basic rights to reflect the need for sustainable existence, including ongoing reproduction and productivity. Three basic prerogatives, based in terms of reproductive rights to ensure the health and productivity of future children, are necessary: (1) the right to a healthy body for pregnancy and parenting, (2) the right to impregnate or become pregnant when a child is desired, and (3) the right to have the expectation that one's children will be able to express these same reproductive rights without physical or mental liabilities leading to restrictions (Guillette, 1997). Such rights, as stated, decrease the emphasis on the traditional sociobiological paradigm regarding the passage of genes and increase

emphasis on a continuation of normal physiological function and intellectual prowess for all generations. Other chapters present what is known about EDCs in relation to reproductive processes. I will discuss reproductive rights as they apply to the children of today, integrated with thoughts on what is needed to ensure that today's generation can expect that future generations will have the same reproductive rights.

The course of the future will reflect the mental status, as well as the physical status, of today's children beginning with their conception and continuing throughout life. The healthy child is defined as born free of contamination-induced defects and who has no greater risk of exhibiting pathology later in life, either in terms of disease or dysfunction, than if never exposed to EDCs, and who has the same, or greater, ability to reproduce in adulthood as his or her forefathers. Implied in this statement is the concept that the child will be mentally, as well as physically, fit. With pressures to limit family size because of world population growth and limited resources to care for an excessive number of children with preventable pathology, it is of paramount importance that all children fall within this definition of "healthy."

The Right to a Healthy Pregnancy

Worldwide fertility rates, reflecting the number of births per woman, dropped for the first time in 1996 (Popline, 1997). Population control advocates assert that the decrease reflects an increase in the use of contraception, particularly in developing countries. Other factors are not generally considered. Unfortunately, there is no systematized record of global infertility, but a few statistics are available. In parts of sub-Saharan Africa—including Kenya, Uganda, Cameroon, Zaire, and Babon—infertility rates range between 30% and 40% (Leke et al., 1993). The underlying cause of most of the infertility is unknown. Sexually transmitted disease accounts for only one-third of the cases. Pathology, such as low sperm counts and endometriosis, has been identified in another third, conditions that have already been correlated with toxic exposures. The cause of infertility in the remaining third is unknown, which may be reflective of pathology difficult to diagnosis (Leke et al., 1993). Abnormal ovarian morphology, including polyovular follicles and polynuclear oocytes, is associated with alligators and mice exposed to a number of EDC contaminants (Iguchi, 1992; Guillette, 1994; Guillette and Guillette, 1996). An accelerated onset of reproductive senescence following prenatal exposure to EDCs occurs in rodents, although there is no comparable menopausal data for humans (Gray, 1991). The relatively recent increase in infertility for the sub-Saharan African women described above suggests that it is due to environmental change. Exposure levels in most sub-Saharan human populations, resulting from widespread use of pesticides—particularly DDT in coffee, tea, and cocoa plantations common to these areas—has never been fully determined or documented.

Problems with conception need not result from actual disease. Contamination from exposure to microwaves, industrial chemicals, or pesticides are associated with sexual disturbances. The problems range from decreased libido to erectile and ejaculatory problems in males (Bancroft, 1993). The impact of toxins on female sexual behavior is unknown (Bancroft, 1993). Many studies have shown that when mothers are exposed to high levels of EDCs prior to or with pregnancy, incidence of spontaneous abortion, prematurity, reduced birth weights, and smaller head circumference increase, depending on the type of contaminant exposure (Guo et al., 1993; Karmaus and Wolf, 1995; Guillette et al., 1998). Thus, the EDC-related prenatal health status of the child is frequently assumed to be a reflection of only the maternal exposures and cross-placental transfer. This may not be totally accurate. Men exposed to pesticides through farm work in India produced children with a 300% increase in congenital defects and a 4-fold increase in neonatal death when compared to controls (Rupa et al., 1991). However, neither the mother's exposure nor the history of grandparents was considered in this research. Children of dioxin-exposed mothers continue to have significantly elevated dioxin blood levels 25 years after birth (Schecter and Ryan, 1993). These children, now adult women, are in a position to pass the same EDCs on to the third generation.

Other factors, resulting from cultural evolution but completely unrelated to EDC or other toxic waste contamination, serve to further complicate the right to a healthy pregnancy. The obvious ones of poor diet, alcohol, tobacco, and drug use, poverty, and lack of prenatal medical care are generally considered when evaluating the impact of contamination. We must equally consider psychosocial stressors that impact the outcome of pregnancy. Such stressors may be observable. Loud, ambient noise levels at airports and at some industrial facilities have been correlated with lower birth weights and reduced physical growth during early childhood (Schell, 1997). Many of these same confounders complicating human research apply to wildlife and the stresses of noise, poverty in terms of limited habitat and food supplies, and disrupted social patterns of behavior resulting from human intervention (Epstein et al., 1997). These various confounding variables should not be allowed to become faults in research design. Instead, recognition should be given to their absence or presence within the studied and reference populations, along with the possible role of such factors in pregnancy outcomes and health of the newborn. Comprehensive recognition of all factors involved with pregnancy can provide strength to the correlative evidence relating EDCs to poor postnatal outcomes.

The Right to a Healthy Body for Parenting

It is beyond the scope of this chapter to detail the suspected health changes in adults that result from environmental change. An overview of changes in world health patterns provides basic insight. The increase in various chronic diseases

among younger and younger adults during the last 50 years appears to correspond with the introduction and increased presence of EDCs. Cancer is no longer a disease of the elderly in modern nations. Half of the world's cancers are now found in developing nations, all of which have been experiencing modernization and the accompanying increase in EDCs for the last 30 to 50 years (Polednak, 1989; World Cancer Research Fund, 1997). Since the introduction of man-made toxic chemicals, cancers of the reproductive track are now occurring early in life, besides having increased 3-fold in incidence (Benedek and Kiple, 1993).

Research is minimal on the correlation between EDC exposure and adult infectious disease. We are all aware of the recent outbreaks of both old and new infectious disease, yet neither pathogen mutations nor increased incidence of disease in adults has been investigated in terms of contaminant exposure. At the same time, correlation between immune system malfunctioning and EDCs has been documented (National Research Council, 1993; Colborn et al., 1996).

Environmental change appears to be influencing the gender of the child to be parented. Slow, mysterious declines in male births have occurred in various parts of the world. Suspect factors include exposure to dioxin, pesticides, and high voltage (Knave et al., 1979; Dimich-Ward et al., 1996; Mocarelli et al., 1996). Impairments to male-producing fertility are found with both fathers and mothers, leading to a hypothesis that the involved toxic agents impact hormone levels related to sex determination and/or pregnancy outcomes (Toppari et al., 1996; Toppari and Skakkebaek, 1997).

The Right to Expect Our Children to Have Healthy Bodies and Pregnancies

Given the suspected insidious and sometimes minute but important alterations induced by EDCs, the identification of changes in health and factual proof of such change presents a major dilemma. There is a scarcity of baseline data prior to the introduction of toxic chemicals on which to base the actual occurrence of possible EDC-induced aberrations. For example, birth defects are the leading cause of infant death in Florida, although a birth-defect registry, aimed at tracking the problem and looking at the causes, was not approved by the state government until May 1997 (*Gainesville Sun*, 1997). Florida is a state with a history of heavy agricultural and residential pesticide use. The rate of defects prior to the introduction of pesticides will never be accurately known. Although 34 other states have a similar registry, a national registry is still lacking. Such problems should not be viewed as deterrents for documenting changes in health status but used to enlarge the scope of recognizable steps that must be taken to promote better documentation and recognition of the health changes found in association with EDC exposure. One step that must be undertaken rapidly is the procurement of broad-based physical and mental

health baseline data on both adults and children living in the few lesser contaminated areas of the world, for EDC exposure will eventually increase in amount and complexity with modernization processes.

The process of growth and development during fetal life and childhood are reflections of health. While the foundations for body growth are laid down during fetal life, the human infant is compositionally immature at birth. Physical growth is a continuous process. Tissue organization and cellular maturation continues until adulthood. It has been demonstrated that infants exposed to high levels of PCBs or herbicides transplacentally are small for gestational age at birth (Munger et al., 1997). An enigma exists in regards to this question: Does *in utero* EDC exposure continue to disrupt postnatal growth? Children exposed transplacentally to PCBs can be used in this debate. Jacobson and Jacobson (1990, 1996) found that children with *in utero* PCB exposure were small for gestational age and remained small at 4 years of age. The studies on a prenatally PCB-exposed group of Yu Cheng children read that they may or may not continue to have continued growth retardation (Gnu et al., 1994; Lai et al., 1994). Cultural and social factors, some of which were considered as variables in the various studies, can account for some of the differences. In addition, one must consider the usual outcome of small infants for gestational age. In a 1972 study, occurring prior to the large-scale recognition of EDCs, babies who were born small were evaluated at 4 years of age. Of these children, 35% remained below the third percentile for both length and head circumference, and only 8% rose above the 50th percentile markers for their age group (Fitzhardinge and Steven, 1972). These data provide hints that other factors besides EDC-induced growth disruption may be involved with the continuation of the exposed fetus's failure grow to a normative level following birth. At the same time, it does not refute correlation between EDCs and limited growth. One must ask if there are any accompanying inborn genetic and/or physiological alterations due to EDCs that accompany below-average growth. This appears to be so. Disorders of ectodermal and neurological tissue are present in children with *in utero* PCB exposure (Rogan et al., 1998).

One of the most important postnatal maturation processes occurs within the central nervous system. Rapid neurological development, particularly learning capabilities, occurs during the first 5 years of life and ends with complete myelination of the peripheral and spinal cord nerve tracts at adulthood. Research has documented that children with high levels of transplacental exposure to PCBs have hypotonia and hyporeflexia at birth, indicating that the central nervous system (CNS) has been affected prior to birth (Rogan and Gladen, 1992). Other signs of defective CNS function that exhibit themselves later in childhood include slowed motor development, with deficits in gross and fine eye-hand coordination (Chen and Hsu, 1994; Cherr and Hsu, 1994; Guillette et al., 1998). The capacity for intellectual abilities also increases during these early years (National Research Council, 1993). Findings suggest that prenatal exposure to PCBs and pesticides tend to affect high cortical

function rather than the sensory pathway, resulting in a lower IQ (Chen and Hsu, 1994; Jacobson and Jacobson, 1996). Many of these identified deficits, including behavioral problems and increased activity levels, persist over time (Cherr and Hsu, 1994). Both human and animal research are also providing correlative evidence that prenatal exposure to heavy metals induces varied mental and psychomotor disturbances, including learning, behavioral, and memory disorders (Liu and Elsner, 1995). We do not know if the identified learning/behavioral deficits ever occur with postnatal exposure to an additional compound or if the prenatal deficits are exacerbated by postnatal exposure to similar EDCs. These questions are difficult to answer because of the multiplicity of extraneous factors affecting growth and development in any child, including genetics, diet, ethnic practices, and cultural opportunities for mental stimulation and the overt expression of abilities.

Ethnic and regional differences in thought processes do exist and will continue to exist (Polednak, 1989). Such differences must be taken into account with the mental evaluations of children living in various areas of the world. American children are presented with many opportunities to recall a series of numbers (zip codes, social security numbers, and telephone numbers). In underdeveloped areas, the need to recall a number series is usually absent, making any test item involving this task difficult for the child to comprehend. Revision of the method is often necessary, as done with the children of the Yaqui tribe of Sonora, Mexico, under study for pesticide exposure (Guillette et al., 1998). Only when asked to repeat vowel sounds in abstract order, can the child grasp the task, eventually moving into number repetition. Acceptable childhood play behaviors also vary among cultural groups. Most American preschoolers are encouraged to engage in standing on one foot, which represents a sense of balance. When this same task was asked of Yaqui preschoolers, the children either refused to perform the task or managed to stand on one foot momentarily, usually holding onto an object. Only after questioning the parents did cross-cultural differences regarding the activity emerge. Children had been taught that standing on one foot was dangerous and results in injury (Guillette et al., 1998). Therefore, any claim that low scores on this activity reflected disruption of a sense of balance would have been invalid. Cross-cultural research studies are increasing. Interpretation of findings must always account for social and cultural factors and their implications in regards to neurological and mental performance.

Body functioning also includes the response to disease. The incidence of all cancers in children up to 14 years old rose 7.6% from 1973 through 1989 (Miller et al., 1992). The largest increases were for cases of acute lympocytic leukemia (23.7%), cancers of the brain and nervous system (28.6%), and cancers of the kidney and renal pelvis (25.9%). During the same time interval, other childhood cancers decreased (bone and joints, -15%; Hodgkin's disease, -1.5%; non-Hodgkin's lymphomas, -0.9%). Total cancer incidence for the entire U.S. population increased approximately 16.1% during this period (Miller et al., 1992).

EDCs have also been correlated with a depressed immune response (Colborn et al., 1996; see Chap. 7). The number of T-helper cells is known to be decreased in mice when exposed to DES prior to birth, raising questions with regard to humans (Palmlund et al., 1993). One study on the Yu-Cheng children, with *in utero* exposure to polychlorinated biphenyls and dibensofurans, demonstrates altered T-cell function and increased rates of sinopulmonary infection (Luster, 1996). Immune system depression, believed to be induced by PCB-contaminated food, is at the point where Inuit children have chronic ear infections and fail to produce antibodies in response to the usual childhood vaccinations (Colborn et al., 1996). Pesticides appear to create a similar immune system depression. Over half the families residing in the agricultural regions of Sonora, Mexico, experience seven or more bouts with infectious disease per year, in addition to autoimmune ailments of allergies and asthma, compared to incidence of none to two episodes of infectious disease and no autoimmune symptoms in the reference group. Most common are upper and lower respiratory infections, with adults similar to children in disease incidence (Guillette, 1997). The long-term impact of a compromised immune system gains greater importance when viewed in terms of social and environmental change. Already the more common infectious agents show resistance to new and powerful antibiotics. Looking to the future, will these children be more susceptible to certain diseases of adulthood, including the sexually transmitted diseases and such immune disorders as rheumatoid arthritis, for which there is no known cure?

Evaluating Risk

Risk assessment is usually approached in the context of the probability of a particular compound producing undesirable health outcomes, usually cancer. Risk is generally determined from the extrapolation of data derived from highly exposed subpopulation groups and/or data based on the chemical's effect on rodents, and then applied to adult humans (May 1996). Several problems exist with this approach. First is the assumption that only the heavily exposed subpopulation is at the greatest risk. Little consideration is given to the fact that the majority of all children are exposed to unknown doses of contaminants, including heavy metals, carcinogens, and multiple EDCs. For instance, background levels of TCDD up to 20 ng/kg have been found in the general population, with no identifiable specific exposures (Peterson et al., 1993). Adults and children are also unknowingly exposed through the foods we eat and water that we drink, in addition to the dust of our environment (National Research Council, 1993). Opportunities for children to become contaminated are even greater than parents may suspect. Play leads to direct contact with pesticide residues in yards, schools, and homes (Calabrese, 1997; Stanek, 1995). Other sources of contamination include poorly ventilated classrooms and the arts and crafts supplies at

schools (Fields, 1997). In addition to the hidden sources of exposure is the fact that the child can be absorbing more toxic material than an adult in the same area. The child inhales and absorbs lead at a level 2 to 3 times that of an adult due to the child's higher metabolism and higher level of activity (Schell, 1991). One can assume that other airborne EDCs enter at a comparatively similar increased rate.

The universality of contamination places all children at some degree of risk, with the possibility of having cellular disorganization during fetal life and the later development of endocrine-related dysfunctions. The interrelationships between body size, time of exposure, and amount of exposure are not considered. This interrelationship is most important for the developing fetus and the young child (Bern, 1992). "Weak" estrogen, or EDCs that bind to the estrogen receptor, have a far more potent effect on unborn mice than on adult animals (Bern, 1992). There are also critical developmental periods during which exposure can induce modifications in cell function and structure (Bern, 1992; Guillette, 1994). Although these studies involve research on nonprimates, the applicability of findings to human fetal life should not be denied. As described by Bern (1992), the treatment of mice with diethylstilbestrol (DES) during the time period of development of the reproductive tract results in the same vaginal and uterine cell dysplasias as found in women whose mothers received DES during the third month of pregnancy. Such specifics are good to know, but the situation of the world today means that developing embryos are exposed to multiple specifics, many of which remain unknown.

Risk assessment for children needs to be considered both in terms of interurterine exposure and continuing exposure throughout childhood. It is now believed that many EDCs are able to pass the placental barrier and enter the fetus. Fetal blood and breast milk have a high lipophilic content and appear to absorb lipid soluble EDCs. The transfer of the contaminants to the fetus and child is well known (Rogan and Gladen, 1990; Ahlborg et al., 1992). Developing countries, which do not have controls on the use and types of chemicals as strict as those in developed countries, have a fetal blood and breast milk EDC concentration that meets or exceeds levels found in the developed world (Autrup, 1993). In human populations, the average levels of DDT in breast milk range from 70 to 170 mg/l, with highs of 830 (Wolff, 1983). Assorted pesticide residues have been found in such diverse areas as Australia, Uruguay, Spain, Italy, Mexico, and Guatemala (Thomas and Colborn, 1992). Therefore, it seems reasonable to assume that all children born today have experienced *in utero* exposure to some form of EDCs and continued exposure if breast feeding was undertaken. Hopefully, the time will arrive when child risk assessment considers the maternal body load of EDCs prior to pregnancy but not based exclusively on such data. Exclusive use of the toxic equivalency approach may underestimate the risk of deleterious effect, because of the many independent mechanisms involved with these effects and the number of factors involved, including the amount and timing of fetal exposure and possibly the mixture of

transferred compounds. For these same reasons, the evaluation of children must extend beyond the typical disease incidence approach to include the endpoints of growth and development, including varied physical maturation process, cognitive abilities, neuromuscular performance, and behaviors.

Both the role of Darwinian evolution and cultural evolution must be incorporated into any evaluative method of growth and development. Genetic differences among children and among racial groups are increasingly recognized as being meaningful in terms of susceptibility to actual disease. Facemire (Chap. 3) discusses racial differences in the adipose tissue composition. The most rapid deposition of total body fat occurs during infancy and reoccurs later during puberesence, especially for the female (National Research Council, 1993). Questions exist if the rapid deposition of fat serves to protect EDC target organs of the neonate when exposed to lipophilic contaminants. The issue becomes paramount with breast feeding, as the intake of varied contaminants via breast milk can be exceedingly high and involve over 250 chemical contaminants (Thomas and Colborn, 1992). The anticipation that rapid fat deposition protects the infant's organs from high concentration of dioxins and feuans in breast milk is included in the 1990 Canadian Environmental Protection Act (Anonymous, 1990). Others claim that the magnitude of the safety margin cannot be determined, and the available information does not rule out the possibility that there is no safety margin for the weight-gaining infant (Ahlborg et al., 1992).

Cultural evolution has created circumstances in which the safety margin is compromised. Social-economic conditions in particular produce outcomes similar to the mental deficits identified with EDC exposure. Undernutrition is known to affect cognitive functioning, including poor scores on IQ tests, decreased intersensory perception, and increased propensity towards illness (Cravioto, 1966; Kamphaus, 1993). Nutrition is not the only social economic variable related to mental and neuromuscular achievement. It has long been known that poor sanitation, inadequate health care, limited and/or low-quality educational and recreational facilities, all interact to play a major role in childhood development (Krogman, 1972). Social-economic inequality is frequently correlated with environmental inequality, with the poor and minorities residing in the more highly contaminated areas (Johnson, 1997). The presence of environmental EDCs may well be the straw that breaks the camel's back, placing the children of these families at extreme risk.

In summary, actual risk assessment should not be based on single factors. Assessment is complicated. The child, from conception onward, is exposed many times to many compounds. The varied mechanisms of action, in conjunction with the varied times of doses and varied time lines of possible adverse effects, add additional confusion to determining risk, as children are not just little adults. They have different exposure, metabolism, and physiological processes. The total problem is compounded by sociocultural factors that create their own risk factors and possibly multiply those of EDC exposure. In

addition, childhood risk assessment does not take into account the possibility of delayed effects that may not be expressed until early adulthood or later (Bern, 1992; Guillette et al., 1995).

The Future

The course of the future depends on action taken today. Such action includes two important segments: that of limiting our exposure to EDCs released into the environment and that of integrating EDC research to present a valid and realistic picture of what is actually happening. These two segments apply to all living species, as the physiological and endocrine parameters, although species specific, also share a great degree of similarity.

Scientists involved with the study of EDCs tend to use a categorical approach in their research. Investigation centers on such areas as the impact on biochemistry (i.e., binding properties), cell responses (i.e., mutations), specific organs (i.e., ovarian function), or the general population (i.e., risk, disease incidence). Such research is important in that it provides new knowledge. At the same time, the treatment of these factors as separate entities carries overtones of artificiality, in that research addresses issues that are related causally and conceptually but fails to give a total picture. The building blocks that result from compartmentalized research are seldom erected in total to provide a total view of what may be occurring with all children. The findings give the impression that there are pockets of children with intellectual deficits and other separate pockets with children exhibiting hormonal dysfunction or gross birth deformities or growth retardation. While pockets with extremes do exist, one cannot, and should not, come to the erroneous conclusion that EDCs are not affecting all children to some degree. The unification of specific knowledge from each category is necessary to prevent a heightened state of environment-induced vulnerability for parenting and reproducing, especially with our children and our children's children.

Research involving children must be approached holistically, extending beyond one specific area of interest or expertise. The range of possible outcomes and their endpoints are largely unknown, as are appropriate methods to assess possible probabilities (Weiss, 1998). The broad-based assessment of the normal play behaviors of 4- and 5-year-old pesticide-exposed Yaqui children showed that all areas of play behavior, ranging from ball catching to jumping, from drawing a stick figure to remembering a gift of a balloon, were compromised (Guillette et al., 1998). Such broad-based investigations, delving into unknowns, not only point out the scope and multitude of possible environment-induced deficiencies but also point out a need for more in-depth research in areas not previously recognized as being affected. The holistic approach calls for an interdisciplinary approach involving social, medical, and natural scientists working together without the artificial separation of topical components. Secondly, the need for more international investigation must be recognized, particularly in developing countries. Contamination is not just a problem in industrialized and western nations. Many published reports of birth defects, correlated with maternal and paternal EDC exposure, do not receive recognition because they are usually in lesser-read publications, such as Rupa et al.'s (1991) findings of a 300% increase in congenital defects and a 4-fold increase in neonatal death of children born to pesticide-exposed men in India. Such reports—plus verbal reports by nurses, midwives, agronomists, and others—indicate that children worldwide are exhibiting syndromes consistent with EDC exposure. For instance, a South-African midwife asked me for help in explaining "a strange new disease of newborns" in a particular agricultural area. The symptoms she described fit the syndrome of hermaphroditism. Many countries are those that contain sites with maximum and minimal exposure, providing valid reference groups for research.

Lastly, as research identifies an increasing array of pathological and physiological changes hypothesized to be associated with EDC exposure, consideration must be given to the acceptable and nonacceptable trade-offs that accompany technological advances. Evolution of flora and fauna, including *Homo sapiens*, continues to go onward as life continues. Clean air, water, and sufficient food is needed for all life. Providing these basics involves an integrated plant-based, animal-based, and human-based political economy. Short-term advantages that maintain the political economy must be weighed against long-term disadvantages, as should short-term disadvantages against long-term advantages.

Similar choices must be made for proposing and selecting intervention for protecting children. There are no simple answers. Mothers have been advised to cut away fatty portions of contaminated meat and fish where bioaccumlation is greatest. The removal of fat is a stopgap at best, for where is such tissue discarded? I have observed it being fed to other meat-producing livestock, including goats and hogs. At other times it ends up in a garbage heap, where it reenters the earth. Agricultural workers are advised to wash pesticide-contaminated clothing separate from other articles. Yes, this does decrease skin absorption of these pesticides by others. But where does the contaminated water flow? The possibility of its reentering the water system is present, particularly in rural areas served by shallow wells and drainfields.

Other family-based interventions for decreasing exposure pose similar decision-making problems, balancing economics and health. A mother's decision in regards to breast or bottle feeding frequently reflects the social and economic status of the family in society (Frayser, 1985). Only recently have the possible relationships of decreased maternal breast cancer risk and immunological advantages for the infant play a strong influencing role on the lay person's decision-making process for infant feeding. The maternal cumulative EDC load is a new facet to be considered in the decision-making process. With regard to all EDCs, the estimated intakes for neonates could be exceedingly high, and may exceed the permissible daily intake (Colborn et al., 1996). One point of view is

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that breast feeding occurs only for a relatively short period of the life span, with exposure reduced below the guidelines during the remainder of the life span (Anonymous, 1990; Ahlborg et al., 1992). Also, the supposition is that with the rapid deposit of fatty tissue during neonatal life, EDC concentration occurs in the adipose tissue rather than the target organs (Anonymous, 1990). The question whether breast feeding should be advocated or not remains a serious matter for scientists to resolve. There should be concern for the transference of EDCs, but considerations must also be given to the positive benefits for the mother and infant.

In all instances, the choice that must be made by the individual involves choosing between short-term and long-term options that will affect their health and their environment. The question all of us must face is: Should EDC production and use be restricted? If so, what will be the outcome in terms of global quality of life and for public health? There are no easy answers to these questions. Advances in knowledge, technology, and policy must provide avenues that will protect both the environment and the people, now and in the future. Until adequate means are found to substitute for present technology, we are left with the question: "Is my child all right?"

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Examining Childhood Development in Contaminated Urban Settings

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Normal childhood development and growth is affected by such factors as genetics, nutrition, and multiple familial and social factors. In large urban settings, children are constantly exposed to varying amounts of assorted toxic chemicals both inside and outside the home. Many of these contaminants are suspected to be associated with developmental alterations. The heterogeneity of risk factors in urban populations poses a challenging situation for research. Change must be made in the manner in which developmental toxicological research is undertaken. Plans should be made for immediate data collection after a large-scale exposure to prevent the loss of valuable information. Retrospective studies would benefit from applying rapid assessment techniques to identify high- and low-risk children. In all cases, the development of research design and investigative format needs to reflect the strengths of both social factors and scientific facts. Cross-disciplinary approaches, using physicians and physical and social scientists and incorporating community knowledge, are required for the evaluation of children in urban settings, with each discipline contributing to theory and methodology. *Key words:* childhood development, contaminants, rapid assessment, urban children. — *Environ Health Perspect* 108(suppl 3):389–393 (2000).
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The identification of children at risk for the ill effects of contamination at first seems easy. They are the children living in an area heavily contaminated with a toxic chemical. Such an approach places emphasis on situations of environmental injustice, with a tendency to regard routine exposures as a normal part of life. Research has neglected children exposed to varying, and sometimes small, amounts of assorted chemicals. This paper explores approaches for research examining children living with chronic ambient contamination from mixed sources. The multiple risk factors, including and extending beyond contamination, that influence childhood health and development are presented. Thoughts on incorporating cross-disciplinary approaches to research, allowing for the incorporation of multiple risk factors, are also discussed. An understanding of the interplay among all risk factors is necessary to ensure normal growth and development in all children.

Unfortunately, definitive proof that any amount of a toxic chemical increases risk for functional or pathological disorders is difficult to obtain. Intelligence loss correlates with known *in utero* exposure to polychlorinated biphenyls (*1*). Children living in high-pesticide areas, with few other sources of contamination, exhibit neuromuscular and neuromental deficits (*2*). In both cases, the research involves a group of children with known exposure to a particular group of toxicants that is absent in reference groups. Such ideal populations are difficult to find, and even then, we are faced with unknown background levels of other contaminants.

Contamination with man-made chemicals is a global problem from which no child escapes multiple exposures from numerous sources (*3*). We must accept the impossibility of raising children in a sterile environment in which exposure to toxic chemicals is controlled from conception onward. Not only must we admit that all children have multiple, and often unknown, exposures to toxic chemicals, but we must also accept the role of other variables, such as diet and parenting skills, that influence childhood growth, development, and health status. Therefore, research must responsibly identify the multitude of factors that affect a child's well-being and incorporate these variables into research methodology. As scientists, we want not only to know not just the effects of multiple exposures, but also to identify other specific risk factors that, in conjunction with contamination, may potentiate deleterious outcomes.

Heterogeneity in Contamination Exposure Factors for Urban Children

Today, most children live in urban environments facing such urban problems as traffic, smog, industrial plants, and older housing stock. Chemical releases from incinerators, factories, and support services, such as dry cleaning, also contribute to the ambient mixture of toxins to which the child can be exposed daily. Heavy metals, such as lead, plus the breakdown products of various materials used daily, such as plastics, are constantly present, sometimes at levels far beyond acceptable standards (*4*). The vehicular congestion found in a city along with the tall buildings restrict air flow and thereby provide increased opportunities for contamination through respiration. Airborne contaminants fall to the ground, where children sit and play. Moreover, application of pesticides occurs in urban areas for pest control in homes, yards, schools, and golf courses. More recently, large cities, such as Manhattan, New York, and Tampa, Florida, have been sprayed with pesticides to control potential outbreaks of plant and animal disease. The similarities in action among contaminants deserve more attention than is usually given. All are toxic and biologic in action, either directly or by endocrine disruption. The disruptive effects can take different routes according to the chemical and the time of exposure, but the end result is an alteration in body function (*5*). Shared disruptive characteristics include alterations in body system function, mental and behavioral changes, decreases in neuromuscular abilities, and compromised immunological function (*6–8*). The degree to which these disruptive characteristics overlap within a given child remains unknown. This lack of knowledge raises questions. Should research take the approach of investigating a single contaminant and all of its possible outcomes or should we emphasize outcomes due to mechanisms, such as endocrine disruption, or neurological alterations following exposure to a heterogeneous mixture of toxic agents?

Heterogeneity in Human Risk Factors

Urban areas, with mixtures of contaminants, also have heterogeneous human populations. Frequently, population heterogeneity is thought of in terms of race as an indicator of genetic differences among people (*4*). Descriptions of children must extend beyond the breakdown of racial groupings based on skin color, hair texture, and/or facial features. No major racial group remains genetically isolated from others; there is a long historical sharing of genes among groups (*9*). This mixing of genes among all peoples results in more genetic diversity within a racial group than is found between racial groups (*10*). Yet the assumption remains that the separation of individuals by racial groups will provide a valid basis for genetic separation of children's responses to contamination. The assumption becomes additionally complicated with the findings of genetic variants that can either

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increase or decrease an individual's sensitivity to toxins (*11,12*). Race does play a role in the distribution of some diseases (i.e., sickle-cell anemia among those of African descent) but is not limited to a given race (*13*). Racial genetic diversity prevents assigning a propensity for the harmful effects of contamination based only on dominant racial features until more is understood with regard to such genetic variants.

Expressions of population heterogeneity must go beyond genetics and race. All races include those who are rich and poor. The tendency is to place increased risk factors on the poor, with claims of high exposure due to environmental inequality (*14*). Often, claims of environmental inequality for the poor are true, especially for a single compound in a given geographical area, but we fail to consider that the rich may be equally at risk (*15*). Increased exposure may come not only from an uncontrollable external environment but from the home environment that the affluent have made for themselves and their children. The more affluent are more apt to have household furnishings replaced more frequently. Many new furnishings contain chemical dyes and finishes. According to U.S. Environmental Protection Agency congressional testimony, adhesive-backed carpets emit approximately 120 chemicals, many of which are toxic (*16*). The more affluent are also those who have large lawns to be kept weed and insect free, frequently by the application of pesticides and herbicides. No one knows if the children of families that provide their offspring with the newest and the latest in material goods and services are more, less, or equally exposed to multiple contaminants than the children living in areas designated "environmentally unjust." In essence, contact with individual compounds may differ in levels and type among the richer and poorer children, but the cumulative effect of chemical-induced change in body functioning could be similar, albeit via differing mechanisms.

Within the United States, white mothers in higher income brackets are the most apt to breast-feed, and to do so for longer periods of time (*17*). Possible links between contaminant transfer from breast milk to future infant health have not been well established. The current opinion is that the health benefits of breast-feeding outweigh any possible future deleterious consequences, although mothers do opt out of the practice due to fear of harm to the infant (*18*).

The child's daily play practices add to the variables contributing to the contaminant body burden. Toys are now a major concern, with the discovery of the leaching of phthalates found in teething rings and soft plastic articles that young children put into their mouths (*19*). Household insect sprays leave pesticide residues on toys and on the floor, which are routes for oral and skin absorption (*20*). Outdoor toys and play areas pose similar situations because of actual spraying and pesticide drift. Children playing directly on a recognized toxic site have higher incidences of assorted health problems during adulthood compared to others in the same location who did not play on the toxic site (*21*). The more immediate effects of playing on toxic ground remain to be investigated.

Lifetime exposure, including the levels and times of exposure, is difficult, if not impossible, to calculate in a modern society. Each child possesses an individualized accumulation of varied toxins resulting from maternal contaminant transfer during pregnancy and the child's direct exposure (*22*). Body accumulation for persistent contaminants can be measured, but not all toxins are persistent within the body. We do not understand if, and to what degree, the nonpersistent substances influence childhood growth and development, particularly with prenatal exposure. Decreases in height, weight, and intelligence, along with increases in disease incidence, birth defects, behavioral disorders, and organ malfunctions are associated with known *in utero* exposure to various persistent chemicals (*2,23–27*). The lack of extensive background data regarding exposures, especially of subjects participating in research studies, spearheads debate over the interpretation and meaning of findings regarding toxic chemicals and humans.

Other Factors Influencing Growth and Development

The mental and physical health characteristics associated with toxic exposure can also be duplicated through other known factors. These nonchemical factors capable of generating similar outcomes must be investigated. Many of these assorted factors are closely tied to social–economic class but are not limited to a particular grouping. Nutrition is a prime example. Malnutrition is a powerful factor that can adversely affect physical and intellectual development. Poor nutrition results in stunted growth, decreased organ size, mental retardation, and increased susceptibility to infection and other diseases (*28*). In addition, the overall functional capacity becomes limited (*29*). Although access to food is more restricted and hunger more frequent among the poor, undernutrition is not necessarily restricted to either event (*30*). Undernutrition does occur among the rich, with poor food habits resulting in both nutritional deficiencies and excesses (*31*). The reversibility of the adverse effects of poor and undernutrition is debatable, especially after 3 years of age (*32*).

Sociocultural practices also have a direct influence on the developmental process. Beginning with pregnancy, the assorted practices of smoking, alcohol use, vitamin and other dietary supplements, plus street and medicinal drugs influence fetal development and outcomes after birth (*18*). Social–cultural practices can also effect the overt expression of unaffected inherited genes (*33*). For example, evidence is increasing that heredity provides the major control over intelligence levels, with wide variations occurring among specific individuals of a race but not between human races or populations (*10,32*). At the same time, the assertion that intelligence is fixed and immutable is false. Exposure to stimuli can increase intelligence quotient scores (*32*). Parental educational and stress levels, exposure to chronic noise, and the parent's daily living practices, such as the amount and type of attention given to the child, all contribute to learning and behavior patterns (*34,35*). Therefore, it is necessary for researchers to control for the differences in parental stimulation and social learning and the circumstances that can potentially modify intellect and developmental skills.

Variations in child-rearing practices that influence developmental patterns probably intermingle in assorted ways, with the body burdens of contaminants resulting in unique and varied outcomes. Children living in highly contaminated areas are more apt to reflect toxicity-induced syndromes, including higher rates of infectious disease and immune system disorders, and lower than expected intelligence scores (*18,36*). There is little doubt that various aspects of these toxicity-induced syndromes are environmentally induced, but environmental influences must include aspects of sanitation and housing, opportunities for cognitive development, access to preventive and curative medicine, and even noise levels, all of which are independent of racial, economic, and genetic make-up (*10,13,32*). The interplay between toxicity-induced syndromes and nontoxic deficits in health and development requires careful evaluation, with the placement of appropriate weight on all possible causative factors.

Approaches to Children's Environmental Research

The Need for Cross-Disciplinary Research

Urban children, as a group, present a heterogeneous group with numerous risk factors. This multitude of factors presents a challenge in research intended to examine the associations between environmental contaminants and adverse health and/or developmental outcomes in children. Therefore, a multifaceted approach is required to meet this complex problem of assessment. Most multifaceted

approaches usually involve related disciplines with distinct, but overlapping, areas of expertise. For instance, a chemist and a physiologist can work together to determine blood levels of dioxin and altered biological mechanisms in children living near a toxic dump. A physician and an epidemiologist may diagnose and investigate patterns of disease in a contaminated area. The identified problem area may be well researched within their field of study, but the approach limits an in-depth examination of multiple variables. Token appreciation of social–economic status or race is not enough in urban settings. The integrated use of medical, social, and physical science personnel is applied successfully in court cases demonstrating relationships between toxic waste and health (*37*). Urban research calls for similar cross-disciplinary cooperation, involving physical scientists, social scientists, and physicians working together, with each discipline contributing its own unique areas of thought, theory, and technique.

Cross-disciplinary approaches to research can allow for the investigation of clinical and subclinical outcomes. Unrecognized compromise in areas of normal functioning may give the appearance of the acceptable and the expected. Subclinical deficits in assorted areas of normal functioning (i.e., coordination, stamina, and memory) have been reported after exposure to multiple pesticides in children who share cultural and genetic backgrounds, and who outwardly appear similar (*2*). The danger of not recognizing such subclinical adverse outcomes induced by contamination is that the child's limitation could be classified as normal functioning, yet the individual child is unable to reach his or her inherent level of functioning. In such an instance, the danger lies in a lowering of the normative standards for childhood development and possibly adult functioning. For the individual children with small drops in intelligence quotient, as identified by Jacobson and Jacobson (*1*), the lowered mental abilities did not imply a major loss in ability. At the same time, the far-reaching social and economic consequences for the population as a whole are very real (*38*). The same broad-based consequences are likely to hold true for performance deficits. The connection between subclinical changes and contamination in complex urban areas will always carry uncertainty, but ignoring the possibility of such change carries great scientific and ethical risk. The prevention of small change that may result in major consequences is equally important as preventing overt disease.

The Need for Quick-Response Research Programs

The setting found with urban research and the current approach to examining the health of urban populations make almost impossible to correlate a specific type of exposure with a specific effect. Most scientists do not have unplanned time or financial resources to spontaneously begin research in a site immediately after mass exposure to a contaminant, such as the broad-based malathion spraying that occurred in the Tampa area during 1998 to eradicate the Mediterranean fruit fly (*39*). Hospital reports give clues to the health impact on the populace, but the separation of pesticide versus other causative factors is difficult with acute admissions. With the Tampa incident, many possible spray-related illnesses were attributed to previous medical conditions (*39*). Delayed scientific investigations rely on a person's recall of events and symptomology. As time passes, the error in recall increases, either with forgetting or though an unknowing exaggeration of reality (*40*). Valuable data are lost, especially with the degree of exposure and with the experience of symptoms not requiring medical treatment.

A preplanned quick response to the situation would prevent such a loss of information and would also allow for accurate documentation of medical, physiological, and household responses. These data can then be used for the development of later in-depth investigations. A program for immediate scientific investigation after natural hazards is available, with grant approval before the anticipated disaster and funding available at the time of the event through the Natural Hazards Research and Applications Information Center in Boulder, Colorado. A similar program, designed for acute contamination situations such as the 1999 malathion spraying in Manhattan (*41*) would stimulate research at the time it is most needed. Announcement of spraying occurs before the event, allowing for the actual presence of a cross-disciplinary research team at the time of application. For instance, malathion is suspected of hormonal disruption during pregnancy (*22*). Instead of relying on postevent information, more accurate data regarding exposure, blood levels, and endocrine-disruptive responses in pregnant women could be obtained at the time of the event and later correlated with fetal deaths and newborn status. Demographic, social, and economic variables become important in correlating the degree of exposure and with outcomes.

Quick-response research could be designed for research with children, investigating their immediate response for acute poisoning and following the children through any possible intermediate syndrome. Intermediate syndromes occur 24–96 hr after the resolution of acute cholinergic crisis associated with organophosphates and are characterized by acute respiratory paresis and muscular weakness (*42*). Early evaluations could also be used for a prospective longitudinal study. Knowledge about initial exposure would be invaluable in determining the association of exposure with overt disease incidence and suspected neuropsychiatric sequela, including depression, memory, and behavioral changes (*42*). An early research response would also help eliminate distorted recall of facts, which increases in proportion to the time span involved postevent investigation (*40*). Multiple variables beyond immediate contact also require immediate investigation. Play areas and home activities become paramount, as malathion has been found in house dust and water (*22*). At all times, there must be an awareness that environmentally induced symptoms can be worsened by hidden, or unrecognized, sources of toxicity. In addition, one must contend with the multiple variations in functional and mental abilities, be they adverse or inherent to the child.

Rapid Assessment with Chronic Exposure

Cross-disciplinary research on urban children can be accomplished with ongoing exposure. One approach is to apply the developmental rapid assessment techniques used by Guillette et al. (*2*) to preschool children. Childhood development is usually assessed in terms of mental and physical task-orientated activities, such as the age for walking or skipping or the mental abilities to solve problems, remember information, or draw a person (*32*). The advantage of rapid assessment techniques is that many children can be screened in a relatively short period of time with a minimum of personnel. More than 200 children attending randomly selected preschools throughout the city could be rapidly examined. A child can be tested with the use of representative established age-appropriate activities for neuro-mental and muscular functioning in a 30-min period (*2*). A two-person team, each evaluating 10 children a day, would provide basic information on 200 children within 2 weeks. Assessment findings would be divided into two categories representing neuromuscular function and mental function. Randomly selected children falling into one of the lower categorical percentiles would be compared to randomly selected children in the first or second percentile, investigating environmental, nutritional, medical, social, and genetic reasons for the differences in development using methodology from a variety of disciplines. Environmental scientists would evaluate the schools for pesticide spraying and the use of toxic materials and toys. Physicians would be responsible for health information including growth and physiological norms; environmental chemists would determine body levels of contaminants; and social scientists would

investigate dietary, social, cultural, and environmental histories through interviews of the parents. The disadvantages if such a study were retrospective are many, including a large amount of time and expense for in-depth evaluation in areas that may have no known problem, lack of accurate exposure data for mother and child, and the separation of the multiple variables. At the same time, such a study as described here taking place at the time of exposure could provide clues concerning the results of contact with contaminants. Further, the results from families of the children that performed the best in the testing could provide insight for deleterious effects of contamination on the population of children as a whole.

Collecting Information from Parents

The relative newness of environmental childhood toxicology, and the lack of knowledge regarding contaminant action in children, require unique approaches to parent questioning. Standard interviewing involves asking a predetermined question to which the respondent gives a simple answer. This answer is then recorded, often according to predetermined categories. The topic of asthma serves as a good example, with a mother answering questions about her child. The first question is, "Does your child have asthma?" The response is either yes or no. A positive response is followed with various questions, often investigating known precipitating causes and the frequency of attacks per month. When this scenario is dissected, several problems emerge. Foremost is that the "yes" answer assumes that all children with asthmatic symptoms have had a positive medical diagnosis. In situations where formal medical care is limited because of economic or sociocultural reasons, diagnosis may be lacking and mothers, not associating symptoms with the named disease process, give false negative replies in good faith.

From the time of first parental contact, it is important that parents be made aware of the value of their role in the research without instilling fear or a tendency to tell the researchers "the proper response" (i.e., telling investigators what is believed to be what they want to hear). Other mothers, in the belief that help for the neighborhood would be possible if there were a plethora of disease, will claim the child has the disease even when major symptoms are lacking. Parents tend to forget the frequency of headaches or the appearance of a minor rash. Intentional lying to give the investigators the answers they want to hear occurs with more frequency than scientists want to admit (*40*).

Threatening survey questions, especially with regard to parental habits, tend to yield inaccurate data. The adults of today know that the use of cigarettes, street drugs, and alcohol during pregnancy is not advised. Mothers will answer "no" to routine questions, i.e. "Did you drink alcohol during pregnancy?", for assorted reasons, even if the answer is "yes." One way to avoid false responses is to provide reassurance that admission of use is acceptable (*43*). More honest replies come from saying "Many mothers drink alcohol during pregnancy. How often did you drink?" The nondrinker will reply "never." The alcohol user is more apt to admit to use. When use is admitted, questions about amounts, types, etc., follow as necessary.

Additional errors in survey data collation are due to investigators' beliefs that parents perceive illness in the same manner as the medical profession. For instance, when identifying precipitating causes for asthma, it is assumed that mothers automatically know, and associate, precipitating cause with the medically based classifications (i.e., pet dander and dust). With surveys, this list of "knowns" is usually followed by the answer option of "no identified cause" or "unknown." To the best of the mother's knowledge, the only reason known to her may be that the symptoms are worse when the child plays in the park or has art in school. The interviewer is left with the choice of marking "no known cause" or guessing at possible reasons. This scenario is based on the assumption that asthma may be related to contaminant exposure in some manner.

We really do not know the scope of possible problems with health and development resulting from environmental contamination. Asking direct predetermined disease-centered questions poses problems of omission of important health findings. Ethnographic interviewing, as used by social scientists, provides a broad base of information when faced with unknowns (*44*). Ethnographic interviewing involves only a few basic initial questions, with additional questions formulated according to the parent's response without superimposing assumptions. A sample question could be "What bothers you most about your child's health?" The reply may be breathing problems, to which additional questions regarding causes, timing, and activity during respiratory problems could be asked. Conversely, the reply may be something totally different and unexpected, giving insight to new concepts about the interplay between health and contamination. Parents have knowledge of their children, frequently based on feelings rather than on scientific objectivity. When repetition of similar feelings occurs among various parents, the finding is regarded as a social fact. These social facts provide clues for further research. For example, the mothers of the pesticide-exposed children in Mexico repeatedly mentioned that their children did not engage in as much play as they remembered from their own childhoods. This social fact of subtle change gave rise to the investigation of their children's abilities through the use of directed activities representing normal play, with the scientific finding that the pesticide-exposed children do lack the endurance, coordination, and mental processes found with lesser exposed children (*2*). Without building on the social facts that provided information on exposed children, it is likely that these subtle deficits would eventually be regarded as normal abilities. Other social facts about childhood development and levels of health are apt to emerge in the urban situation facing multiple sources of contamination.

Conclusion

In conclusion, any research involving childhood exposure to toxic material requires investigation of all of the factors influencing growth and development. The multiple unknowns require a cross-disciplinary approach to research, involving multiple fields of science. In this manner, new thought and approaches provide avenues to explore the multifaceted problem in creative ways. The incorporation of social facts, as well as scientific facts, can be used to shed new light on the growth and development of children in contaminated urban situations. Action is rapidly needed, for at no point should the adverse be allowed to become regarded as normal.

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Pesticides: The Hidden Effects on Children

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Much of our knowledge regarding the impacts of chemicals on children is extrapolated from laboratory animal studies. Unfortunately, childhood risk assessment tends to center on obvious birth defects and disease induced by one particular chemical. We should be asking if there are impacts on apparently normal children, as found with some wildlife. This means placing the impact of contamination in a broad based framework, investigating the status of present children as future, functioning members of society. Inherent difficulties with such research include variations in diet, gene pool, and life style, all of which are known to produce variations in growth and intelligence. The absence of these variations are found in communities in a valley in Mexico.

The Indians of the Yaqui Valley of Mexico underwent a philosophical division when modern farming and pesticides were introduced in the early 1950s. Some wanted to embrace the new pesticides and towns formed in the region. Others preferred the traditional ranching and agricultural methods, forming their own towns in the valley foothills.

Today, these towns are similar in the degree of modernization, diet and life style, although the division between the use of pesticides continues to exist. Assorted types of insecticides, herbicides and other agricultural chemicals are used in the agricultural area. Home spraying for insects is a common practice. The foothill population continues to shun the use of pesticides, minimizing home use .

A quick glance at both types of towns presented normal children engaged in the usual childhood activities. The valley parents suspected chemicals were affecting their children but could not identify specifics. A unique approach was required to uncover any possible hidden impacts. When children, ages 4 and 5, were asked to perform a series of play activities representative of developmental levels. The pesticide exposed children, as compared to the foothill children, exhibited a series of neuro-muscular and mental deficits. They were less proficient at catching a ball, reflective of poor eye-hand coordination. Stamina levels, measured by jumping contests, were low. When asked to recall a promised gift and its color, many had no idea what the gift was to be, and very few remembered the color. Foothill children always remembered the gift of a balloon and usually its color. Most striking was differences in ability to draw a person, with the 4 year old exposed children making scribbles and the five year olds frequently making a circle at the bottom of the paper and a line upward to represent the body. Others drew odd, shapes with abstract divisions, where dots represented eyes and enclosed areas were body parts. These children's mental processing abilities contrasted greatly with the foothill children ,who drew people with accurate placement of body part and facial features.

When these same children and others were evaluation two years later, at ages 6 and 7, the exposed children continued to lag behind in abilities. Drawings were at the foothill 4 year old level, stamina remained low, coordination remained poor. Simple problem solving, easy for the foothill group, was difficult. While still equal to the lesser exposed in body size, the exposed children exhibited symptoms of illness at a rate three to four times that of the others. Of special concern was the high rate of upper respiratory infection, indicative of a suppressed immune system, and other symptoms such as allergy and rash, which may be indicative of various autoimmune diseases.

The apparent permanency of these hidden deficits have far reaching implications in terms of these children's ability to reach full potential as functioning members of society. We should also remember that contamination is global, with every child exposed to various pesticides in some

manner and degree. Even the degree that the tested but lesser exposed children are affected will never be known. Thus, risk assessment must begin to ask questions beyond the visible tip of the iceberg and delve into the hidden segments that lay beyond our view. Human research does build on laboratory and wildlife findings, but do such finding provide for the range and depth of possible outcomes involving humans? We are exposed to multiple individual compounds from multiple classifications of chemicals. Until we recognize which chemicals are safe and unsafe, the Precautionary Principle advocated for chemical approval must be applied on an individual level. We must take precautions for ourselves and families from unnecessary exposures. Small deficits can add up to large losses for our children and society.

Page 1: Front Cover:

A Call to Action:

Using Indicators to Improve Children's Environmental Health

Page 2: Inside Front Cover:

Photo of a child

"Children's environmental health issues have been recognized in many international agreements and declarations over the past decade. The challenge before us now is to translate the words of declarations into actions and emerge ten years from now having addressed the linkages between children's health and the environment in a meaningful and measurable way. In ten years the children on this planet should be healthier and happier as a result of the decisions and actions we all take today."

--Children in the New Millennium: Environmental Impact on Health.

Foreward by: Klaus Töpfer, Executive Director, UNEP

Gro Harlem Brundtland, Director General, WHO, and

Carol Bellamy, Executive Director, UNICEF

A Call to Action!

In recent years, we have come to understand the inherent link between environmental degradation and ill health. We have come to realize that the health of an economy and society as a whole depends on a healthy generation of children, and a healthy future for our children depends in large part on our efforts to safeguard the environment.

Every year, over 3 million children under the age of five die due to environment-related illnesses. Compared to adults, children bear a disproportionate burden of disease caused by environmental problems. World leaders have identified the need to improve children's environmental health as a primary goal of governments around the globe.

What World Leaders Can Do Now

This brochure is aimed at increasing support for a coordinated effort to improve and protect children's environmental health and at highlighting a practical step governments can take – the development, application and monitoring of children's environmental health indicators.

Governments, international agencies, and non-governmental organizations need to work together collaboratively to facilitate the development of children's environmental health indicators. This constructive step will make a difference in the lives of children. Children's environmental health indicators will not only guide policies and action, and help governments to assess the success of their programs, but also will speak more forcefully for children than words alone.

Box: Indicators

Children's environmental health indicators are information tools that provide a snapshot of the relationship between the environment and child health, and clarify the policy interventions that will improve conditions for children.

Children's Environmental Health and Sustainability

Focusing on children's environmental health as explicit public policy is a cost-effective strategy for the overall improvement of human health and the environment.

If there is one thing that defines the notion of "sustainability," it is the capacity of children to sustain, build and improve the societies they inherit. Healthy children learn better and are able to lead more productive lives, especially in the workforce, which creates a strong economic base on which an economy can grow.

In 2000, world leaders adopted the Millennium Declaration, which included eight Millennium Development goals. Children's environmental health is intrinsically linked to a number of the broad Millennium Development goals. For example, the goal to *reduce the under 5 mortality rate by two thirds between 1990 and 2015* depends largely on drastic reductions in the top two causes of child mortality -- diarrhea and acute respiratory infections, both of which are closely linked to environmental conditions.

Developing and monitoring indicators that link exposures to specific environmental threats and to health outcomes in children will allow governments to prioritize problems, identify urgently needed actions, and monitor the effectiveness of interventions over time.

Children's environmental health indicators alone will not solve the urgent problems facing children around the globe. But they will serve as an important tool that will help policy makers better protect children's environmental health.

Quote "*We recognize that a growing number of diseases in children have been linked to environmental exposures... That environmental exposures are increasing in many countries in the region; that new emerging risks are being identified; and that more and more children are being exposed to unsafe environments where they are conceived and born, where they live, learn, play, work and grow.*" – Outcome document of the International Conference on Environmental Threats to the Health

of Children: Hazards and Vulnerability, Bangkok. March 2002

Why Focus on Children?

Children are more vulnerable than adults to environmental risks in a number of ways:

- Children are constantly growing, and breathe more air, consume more food, and drink more water than adults do, in proportion to weight. (CNM)

- Children have different patterns of exposure from adults, and their central nervous, immune, reproductive, and digestive systems are still developing. At certain stages of development, children's exposure to environmental toxins can lead to irreversible damage, which may not occur with adults.

- Children behave differently from adults – their lives take place close to the ground where they can be exposed to dust and chemicals that accumulate on floors and soil. Young children explore their surroundings through hand-to-mouth behavior, and are too young to understand warnings or recognize risks. (WHO Europe 207)

Children need to be a targeted focus of government action and protection. Children have little control over their environment. They live in environments that are not of their own choosing. Unlike adults, they may not be able to move to avoid dangers and exposures, nor can they act to improve the quality of the water or air in their vicinity. By and large, children are powerless and "voiceless" in the political arena. They do not vote or lobby, or have the resources to make their interests known. And they are often not consulted when policies are considered and made concerning their well-being.

[Place holder for the Diagram from *Children in the Next Millennium*, page 82.

The Cycle of Environmental Disease]

With Caption: The environmental burden of disease can weigh heavily on children who survive to age five, and its effects may persist throughout childhood and adolescence, into adult years, and through the next generation. Decreasing children's exposure to harmful environmental conditions and pollutants not only improves children's health but also fosters a healthier adult population in the future. By contrast, recuring illnesses, weakened immune systems, prolonged absences from school, and learning impairments

place a continuing burden on families and other caregivers, and limit the potential of children to grow into productive adults.

Source: (CNM)

Pages 5:

How Can Children's Environmental Health Indicators Help?

World leaders know that there already are a significant number of indicators for health, and plenty of indicators are available for determining environmental quality. What is needed is a set of indicators that *link* the quality of the *environment* with the *health of children* so that actions can be identified that will improve children's environmental health.

Box:

Children's environmental health indicators reveal, in easily understandable terms, relationships between the environment, health, and the need for action.

The leaders of all nations need:

1. To know the status of children's environmental health in their countries, and,
2. To understand how their interventions are affecting children.

Children's environmental health indicators can measure the status, trend, and response to intervention, and will support leaders in their efforts to improve protections for children.

Lead poisoning is a good example of an environmental health threat to children that has been successfully identified, studied, and understood worldwide over the past several decades. (See box on page __.) Many indicators are used when addressing the problem of lead exposure, for example the amount of lead in the bloodstream of children, the amount of lead in gasoline, and various rates of health problems. Much more still remains to be done to prevent lead exposures in children around the world. However, policy makers today can make immediate improvements in the health of their children by using the indicators already available to change specific policies.

LEAD – A CASE STUDY

Lead exposure is a children's environmental health problem that is better understood than most. Childhood lead poisoning can cause devastating health effects in children. We have the information that tells us that prevention of exposure is the most effective solution to lead poisoning.

Indicators are available to help policy makers understand each part of the lead poisoning problem and take action to solve it.

Health: Even small amounts of lead can interfere with development of the brain of a child; effects can be long-term and irreversible. The health effects of lead have been established in numerous epidemiological studies conducted over several decades in countries all over the world (Needleman). Health effects from lead exposure vary with the amount of exposure and include: anemia; reductions in IQ; learning disabilities; impaired growth, hearing and visual and motor function; damage to liver function, kidneys and bone formation; decrease in muscle strength; negative reproductive effects including infertility; coma; convulsions; and even death.

Blood lead levels as determined by a simple blood test, are a useful indicator of the presence of elevated levels of lead in the body.

Exposure: Lead is a naturally occurring substance but its prevalence in the environment is due to human activities. Lead is found in the air as a result of leaded gasoline and industrial plants; in water from lead pipes; in homes, schools, and other buildings as a result of lead paint; in batteries, cosmetics, and ceramic ware; in food grown near polluted areas; in drinks from cans that contain lead, in certain folk health remedies; and in lead-contaminated soil and dust. In the United States, even years after the use of lead in paint and gasoline has been banned, an estimated one million children still have blood lead levels that exceed the threshold for effects on behavior and cognition.

Over the last 25 years, many countries have made major strides in halting lead poisoning in their child populations. For example, data shows that in 14 different regions, decreasing blood lead levels are associated with a reduction of lead in gasoline. [See figure 1 at end of document].

The United States began to reduce the levels of lead in gasoline in the early 1970s; as a result, US blood lead levels soon began to decrease. [see figure 2]. As of 1995, blood lead levels in children under five had dropped by 78% since the beginning of the phase out

The availability of information on lead exposure has made reducing lead exposure possible. These decreases in childhood lead poisoning are a success story, but the story is not yet finished. Many countries have yet to remove lead from gasoline. Lead reductions in gasoline would positively affect childhood well-being in these countries. Other sources of lead exposure must be controlled as well in order for children to grow up lead-free

How Are Indicators Developed?

For each environmental health problem, three types of measures are required:

-- Exposure indicators that measure how children are exposed to the environmental hazards.)

– Health indicators that express the health effects that may be related to environmental exposure.

– Action indicators that represent preventive efforts to address the environmental condition and remedial actions, such as medical treatment.

This model is shown schematically below and examples of how it could be applied appear on the next two pages.

BRIGGS DIAGRAM GOES HERE!

[Source: Briggs]

QUOTE "Actions to protect children from environmental hazards will be, at the best, arbitrary and unsystematic until a core set of good indicators can be widely adopted. Since indicators receive media attention, they can also play a crucial role in bringing the public's focus to the issue. Most importantly, such indicators will provide a sound basis for children's environmental health policies."

- *Children in the New Millennium: Environmental Impact on Health* (2002), UNEP, UNICEF, and WHO

Linking Health and the Environment

The notion that environmental protection and health promotion requires the collaborative work of the environmental and health communities is relatively new. (WRI, A Guide to the Global Environment. 1998) Making this link can affect how people work in the field and how policies are made. Currently, people who address the effects of environmental degradation may not have the information they need to identify and address the health impacts of these pollutants. Conversely, many health care providers focus primarily on treatment and cures, rather than possible causes, and have inadequate information to identify and implement prevention strategies.

As an example of why the linkages between environment and health are crucial, consider one of the most significant public health success stories of the last two decades: oral rehydration therapy (ORT). ORT counteracts the deadly loss of the body's water during diarrhea with a simple rehydration formula. It is estimated that ORT is now saving more than 1 million children each year from death due to diarrheal dehydration.

Nevertheless, ORT has its limitations. It is a way of controlling the ravages of diarrhea, rather than preventing the illness. No matter how effective ORT is as a treatment, children who return to the same unsafe environments are likely to contract diarrhea again. Without increased access to clean water and sanitation and without improved hygienic behavior, children will continue to get sick and will be progressively weakened by multiple cases of diarrhea each year. Medical treatment alone, without addressing the environmental exposure or causes of the illness, is inadequate as a sustainable public health policy.

Indoor Air Pollution and Respiratory Illness

New introductory text:

Environmental Exposure: Approximately 2.5 billion people worldwide rely on biomass fuels and coal for cooking and heating needs (CNM 69). These fuels lead to

dangerously high levels of indoor air pollution. Women and children, esp[redacted] infants, are often exposed.

Health Effects: As much as 60% of acute respiratory infections (ARIs) worldwide are related to environmental conditions (CNM 70). ARIs - such as pneumonia, bronchitis, asthma - kill approximately 2 million children annually. Indoor air pollution from open fires or inefficient stoves is the single greatest cause of ill health of all forms of air pollution worldwide (CNM 69).

Developing ARI indicators as a policy tool

PDF BOX

Page 9: The Environment and Childhood Diarrhea

New introductory text:

Environmental Exposure:

Childhood diarrhea is closely associated with exposure to contaminated water, insufficient water supply, and inadequate sanitation. Approximately 1.1 billion people do not have access to water that is considered safe (PWSC 6), and about 2.4 Billion people lack sanitation facilities (PWSC 8). Children are especially vulnerable to the resulting exposure to biological contaminants.

Health Effects: Diarrheal disease can result in poor nutrition, anemia, retarded growth, and death. Diarrhea accounts for 17 percent of childhood mortality (CNM 48), and despite improvements in the past decade, diarrhea is still responsible for nearly 2 million child deaths every year. About 80-90% of diarrhea cases are believed to be related to environmental conditions (CNM 48).

PDF BOX

Page 10

Box:

International Support Emerging for Children's Environmental Health Indicators

While some countries, individually or in partnership with other countries in their region and intergovernmental organizations such as the WHO, have moved forward on developing indicators and devising methods for monitoring indicators, a global coordinated movement does not exist. However, a growing number of international agreements and statements recognize the link between children's health and the environment, and point to children's environmental health indicators as an important area for governmental action.

- Final Communique of the 9th Regular Session of the CEC, June 2002. Members of the Council from Canada, Mexico and the United States *"agreed to a cooperative agenda to protect children from environmental risks"* including *"selecting and publishing a core set of children's environmental health indicators for North America."*

- *A World Fit for Children*, United Nations General Assembly Special Session on Children, New York, May 2002: Governments pledged to *"Develop legislation, policies and programmes, as appropriate, at the national level and enhance international cooperation to prevent, inter alia, the exposure of children to harmful environmental contaminants in the air, water, soil and food."*

- G8 Environment Ministers, Banff Ministerial Statement on the World Summit on Sustainable Development, April 2002: *"Recognizing that the task of protecting children's health from environmental threats is ongoing, we agree to collectively advance work on the development of children's environmental health indicators as a means for monitoring progress, in consultation with relevant multilateral organizations."*

- Health and Environment Ministers of the Americas (HEMA), Ministerial Communique, March 2002: *"As a first step, we would work together to develop a set of indicators for children's health and the environment and water quality."*

- European Environment and Health Ministers in the Declaration of the Third Ministerial Conference on Environment and Health, June 1999: Ministers called for the development by the European Environment and Health Committee (EEHC) *"develop an effective mechanism for monitoring and reporting progress annually throughout the Region on the basis of key indicators of the state of children's health and the relevant environmental conditions."*

- Denver Summit of Eight (G8), June 1997: "Protecting the health of our children is a shared fundamental value. Children throughout the world face significant threats to their health from an array of environmental hazards, and we recognize particular vulnerabilities of children to environmental threats."

We call on governments, non-governmental organizations, inter-governmental organizations and UN agencies to work together develop, implement, monitor and report on children's environmental health indicators. This call to action is not intended to supplant efforts already underway among various researchers, governments, and organizations. Indeed, we hope to build on the work already accomplished, linking and consolidating efforts, and promoting international participation.

Different regions in the world have different problems and priorities, depending on their environmental and health conditions. Because of the different environmental conditions and health issues in different regions, it will be important to develop indicators that reflect these differences.

Together, governments, multilateral organizations, and non-governmental organizations can join forces to make *systematic* use of children's environmental health indicators. World leaders are on the record in recognizing the importance of focusing on children, and understanding the link between environment and health. (See box on facing page.) Developing and implementing children's environmental health indicators has also been identified as a necessary step in improving the lives of children.

Environmental policy decisions should be based not just on the health of the average person, but on the health and future of the most vulnerable among us – the world's children. By focusing on the world's children, we invest in our future and the future of all generations to come.

[Endnotes will be inserted in final iteration.]

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Indicators for Child Environmental Health

1. PERCENTILES TO REPLACE MEAN AS A MEASURE OF AVERAGE

Mean : is the most widely used measure of average in health sciences. It does convey a good measure for central tendency, but it would be more helpful to use either use "Quartile" or "Percentiles" especially in environmental health context. Here our concern is to find out a "risk group" it is more a management based approach with a dictum "good care to all, more the need more the care". We could have blood level of particular chemical fond out in children and find out level it begins to cause serious toxic effects, that particular measurement could be our reference point to divide the child population and take the percentage of children falling over and above the reference measurement as the group for priority attention, and then work downwards.

2. SMALL POPULATION MEAN DROP- HUGE DIVIDENDS GAIN

Risk approach is not always the only approach. We have learnt from the conditions like hypertension , that when we target entire population, irrespective of individuals at risk and work on them, even a small drop in over all "population mean" of a health problem can make huge difference in incidence of that particular health events (disease, disability and death) in the population. Eg. if we could reduce mean population Hg blood levels even by few framctions, the resultant reduction in renal failure can be significant in that population.

3. EFFICIENCY

In the realm of management 'efficiency' is the measure of " results achieved and efforts expended in terms of money ,resource and time". So one of the most popular tool for assessing a health intervention programme is "Cost-Benefit Analysis". In this analysis, both the numerator (results achieved eg. Life saved, disability averted) and the denominator (cost of achieving it) are given monetary value. Apart from the correctness of assigning monetary value to a life saved (which often hurts the sentiment of average Asian). There are other very practical difficulties in countries like India where reporting system for any illness is very dismal and actual magnitude of disease burden in the community is anybody's guess. None of the western parameters can be constructive in such situation. So do not employ this parameter for assessing the performance in Third word countries.

4. DALYs AND QUALYs

Sent to Dr. S. L Dhatrak

4. DALYs AND QUALYs

Disability Adjusted Life Years and Quality Adjusted Life Years as a tool for assessing health and illness in third word countries, which do not have sophisticated and working system like National Health Service system of the kind UK or USA ,will remain highly controversial until the national health system gains confidence among the health professionals of their respective countries. Please avoid using them as yard sticks in third word counties

5. PROPORTIONAL MORTALITY RATE

A lot of noise is made about the disease burden of environmental health in terms of incidence and prevalence. While they are good indicators as a base line, a relative indicator like proportional mortality rate can be more reliable as far as its Sensivitivity and Specificity is concerned.

6. POLICY DECISION

The Ottawa charter of health promotion in 1996 has underscored the fact that the policy decisions taken in non-health sector have their repercussion on health, directly or indirectly. Some of the examples from India are :

a) Transport sector - compulsory CNG conversion- aid in reduction of air pollution in Delhi
b) Judiciary – ordering relocation of polluting industry- aid in better environment in Agra
c) Irrigation sector – Dam construction—ecological changes
d) Agriculture – support price-farmer suicide rates in Warangal.

7. INTERSECTORAL COORDINATION

Indian experience has shown, Malaria can be by-product of a improper developmental strategy. Urbanization leading to increase in construction activity which leads to increased mosquito breeding at the construction sites. Labour migration from endemic areas for construction, who are largely not screened for malaria parasite, serve as reservoir of infection. Construction of Indira Gandhi Canal in Rajasthan brought with it mosquitoes borne disease, because no proper environment risk assessment was made. Telecom department dig trenches for laying down cable wires, remain unattended for weeks together leading to mosquito breeding which eventually contribute to diseases like malaria,filaria,dengue etc. Vector Borne disease could be another good indicator to assess environmental health of children in third world countries.

8. CONTROL OF STRAY ANIMALS

Cows, buffallow, mules and dogs invade most of the streets in our towns. Apart from being physical risk for children, they cause traffic disorder leading to increased noise pollution, increased exhaust release. As if it were not enough, they leave behind their

"precious droppings" all over, adding to problems of sanitation. Un controlled dog population increase the risk of rabies among children.

9. REGULATION USE OF MEDICAL TECHNOLOGY

a) Unnecessary exposure of pregnant women to X-Ray, when it is not indicated, leads to radiation during pregnancy, resulting in increased risk for foetal malformation and leukaemia.

b) abuse of medical technology for sex determination lead to increased female foeticide. Consequently illegal and clandestine abortions conducted by untrained personnel in a highly un-hygienic environment.

10. WATER SUPPLY

a) To ensure safe drinking water within 15 minutes walk from home

b) While laying underground sewage pipe and drinking water pipe, the drinking water pipe should always be running above the sewage pipe to avoid leakage contamination

c) Replacement of metal pipe with fibre pipes. The metal pipes are the source of many heavy metal contamination of drinking water

11. ACTIVE MUNICIPALITY

a) Municipality should collect refuse promptly and regularly
b) Open refuse transport – should be banned.
c) Service type daily removal of night soil by human (dalits in india) should be banned not only from the hygiene point of view but also it is 'inhuman'
d) Regular sanitary survey of Source and distribution of drinking water supply

12. BIODIVERSITY

a) Promotion of Green cities like Bangalore. Good vegetation dilutes free toxin quantity in the atmosphere.

b) Intense use of agricultural land with rampant use of fertilizers causes increased nitrate contamination of ground water, which produces meth-hemoglobinemia

13. TOWN PLANNING

a) Good town planning is a must, over crowding is a risk factor for many childhood infections like measles, chicken pox, etc

b) As far as possible the main road should be away from the residential area

c) Industrial units should not be permitted in residential areas.

14. PEOPLE'S MOVEMENT AGAINST HAZARDOUS PROJECTS

a) Resisting proposed hazardous projects by community is also an important indicator in Risk management and promoting children's environment health. The world can get inspiration from Indian peoples' movements like

b) *Chipko movement* against deforestation
c) *Narmada Bachao Andolan* against Dams
d) Fisherman movement against trollers and deep sea fishing
e) People's Health Movement- for increasing people's control over health

15. FROM LITERATURE : SOME INTERESTING FINDINGS ON ENVIRONMENT AND HEALTH

- Developed nations with 15 percent of world population , are responsible for 77% of all hazardous industrial waste. More than 80 % of gases in the atmosphere , that contribute to the greenhouse effect, arise from production or consumption the developed world.

- Heat stroke death/ case ratio is 40%

- Reduction of Air pollution can prevent 5% of all infections

- It is assumed that pollutants could contribute to about 2 % of the fatal cancers, mainly of lung and bladder

- More than 30 diseases have been linked to irrigation, the major vector-borne disease being schistosomiasis Rapidly.

- Half the infant deaths all over the world over can be attributed to water –borne disease.

- The disease associated with filthy water kill over 5 million people a year, many of them being children

- It is estimated that about 3 million deaths occur due to air pollution, globally each year

- Air pollution stunt the growth of foetuses

- Worm infestation (10% of total disease burden)

- Indicator for pollution- Total suspended solids biochemical O2 demand at 20 degree Celsius concentration of chlorine, Nitrogen and phosphorus and absence of dissolved O2

- Softness of water increased cardio-vascular diseases

- PH-7 chlorinatination of water effective when increases less effective

- Ammonia in water is indicator of possible bacterial, sewage animal waste pollution
- Iron contain > .3 mg/L iron damages plumbing fixture.

- Exposure and duration important

- It is estimated that the potential health gains from the efforts to tackle environment total to nearly 80 million Daly's a year. The interventions in the work place and pollution of the ambient environment alone could save 36 million and 8 million Daly's a year, respectively.

- Air in the carbon dioxide rich environment has a very high saturation of fungi-spores jus like those that cause allergic reactions in millions of people.

- A study has revealed that children who live close to the river estuaries flanked by heavy industries have usually high level of alpha radioactivity in there tissues . This increases their risk of developing certain forms of cancer, in particular leukaemia.

- Diesels exhaust, which is probably more carcinogenic than no-diesel exhausts, has been proposed as a likely carcinogenic factor.

- All over the world , chlorination is used to kill germs in drinking water. Even if chlorination did present an extremely small cancer risk, which is by no means certain the danger would be more than outweighed b chlorine's capacity to prevent the spread of waterborne disease such as cholera, dysentery and typhoid fever.

- Some industrial chemicals including organochlorin pesticides such as DDT and polychlorinated biphenyl's (PCBs) act as weak oestrogens. . The hormone oestrogen promotes the growth of follicles, leading to the pronounced development of secondary sex traits and increase in sex urge in women. Oestrogen may also be linked to breast cancer.

- Devra Lee Dvais , a toxicologist from the US opines that " Chemicals in the environment act like human hormones could be the cause of an unexplained increase in breast cancer" Mary Wolff of Mount Sinai School of Medicine, New York, analysed frozen blood samples from women who later developed breast cancer, and found that they contained a much higher levels of DDE, a breakdown product of DDT, than the women who did not develop preset cancer. After a thorough study , it was revealed that organochlorins enhance the metabolic pathway that converts oestradiol the body' most potent estrogens, into 16-alpha-hydroxy-estrone, which stimulate breast cells to divided

- The child summit has set goals of closing the gap by 25 per cent of water supply and 10 percent for sanitation.

- It has been reported that about 2 percent of carboxyhemoglobin affects the ability to judge time and space intervals and 5 percent impairs the ability to perform designed psychomotor activities. The effects of carbon monoxide are additive with other conditions cause hypoxia

- Many studies done by WHO have revealed that the concentration of pollutants inside the Indian kitchen is much higher that the prescribed standards. In Gujarat, the average concentration of particulate matter and benzo-z-pyrene (BAP) WAS FOUND TO BE 7000 micrograms and 3850 nano grams per cubic metre respectively. The WHO recommends the safe limit for particulate matter as 150 micrograms per cubic metre and there is no safe limit for BAP in the air. many studies have shown that the concentration of other pollutants inside the Indian kitchen is found to be as much as 60 times higher than the outdoor envirromnet.Since children spend most of the pre school time with the mothers.....

Reference:

1. Ghai O.P, Gupta Piyush. Essentials Preventive Medicine.Vikas Publishing Houses Pvt Ltd, New Delhi 1999.

2) Beaglehole, Basic Epidemiology, WHO, GENEV

3) K.Park's. Text book of PSM, Banarasidas, 1997, New Delhi

4) Internet Web. Search.

E-3.

Main Identity

From: "Asha Kilaru" <ashagautham@vsnl.net>
To: "Asha Kilaru" <ashagautham@vsnl.net>
Sent: Wednesday, November 03, 2004 10:22 PM
Subject: Fw: A Johns Hopkins Hospital Report

Apparently, storing drinking water in plastic bottles is also potentially harmful and contaminates the water

Subject: A Johns Hopkins Hospital Report

> Also, this does not mention the chemical diphenyl that is in some
> plastics that acts as hormone disruptor.
>
> I've switched to stainless steel and glass and really tried to minimize
> my plastic use.
>
>
> ==========
> Vasu Kilaru
> Physical Scientist
> Regional Vulnerability Assessment Program
> US Environmental Protection Agency
> National Exposure Research Laboratory
> TEL: 919.541.5332
> FAX: 919.685.3180
> Email: kilaru.vasu@epa.gov
> ==========
>
>
> Johns Hopkins has recently sent this out in their Newsletters.
> This
> information is being circulated at Walter Reed Army Medical Center.
> Dioxin Carcinogens causes cancer. Especially breast cancer. Don't
> freeze your plastic water bottles with water as this also releases
> dioxin
> in the plastic.
>
> Dr. Edward Fujimoto from Castle hospital was on a TV program
> explaining this health hazard. (He is the manager of the Wellness
> Program
> at the hospital.) that we should not be heating our food in the
> microwave
> using plastic containers.
> This applies to foods that contain fat. He said that the combination of
> fat, high heat and plastics releases dioxin into the food and ultimately
> into the cells of the ZZZbody. Dioxin are carcinogens and highly toxic
> to
> the cells of our bodies.
> Instead, he recommends using glass, Corning Ware, or ceramic

for lib - environ lit file
JN
4/11/04

> containers for heating food. You get the same results.....
> without
> the Dioxin.
>
> So such things as TV dinners, instant ramen and soups, etc.,
> should
> be removed from the container and heated in something else.
> Paper isn't bad but you don't know what is in the paper. Just
> safer
> to use tempered glass, Corning Ware, etc.
> He said we might remember when some of the fast food restaurants
> moved
> away from the foam containers to paper. The dioxin problem is one of the
> reasons.
> To add to this: Saran wrap placed over foods as they are nuked,
> with
> the high heat, actually drips poisonous toxins into the food, use paper
> towels.
> PLEASE! Pass this on to your family & friends & those that are
> important in your life!
>
>
> Julie Smith Community Representative American Cancer Society Mid-South
> Division, Inc.
> 135 Ellington Road Winnsboro, La 71295-6320
> 318.412.0005 (Telephone)
> 318.412.0005 (Fax) julie.smith@cancer.org
>
> For cancer information 24 hours a day. seven days a week, calltoll free
> at
> 1-800-ACS-2345 or visit our Web site at www. cancer. org.
>
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>
>
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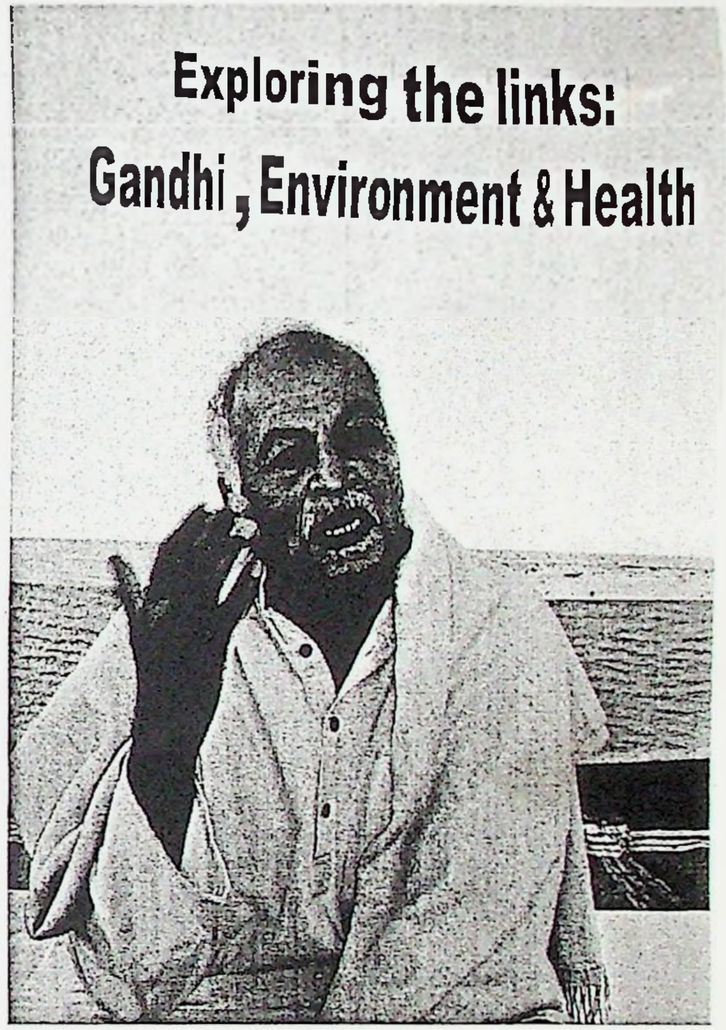
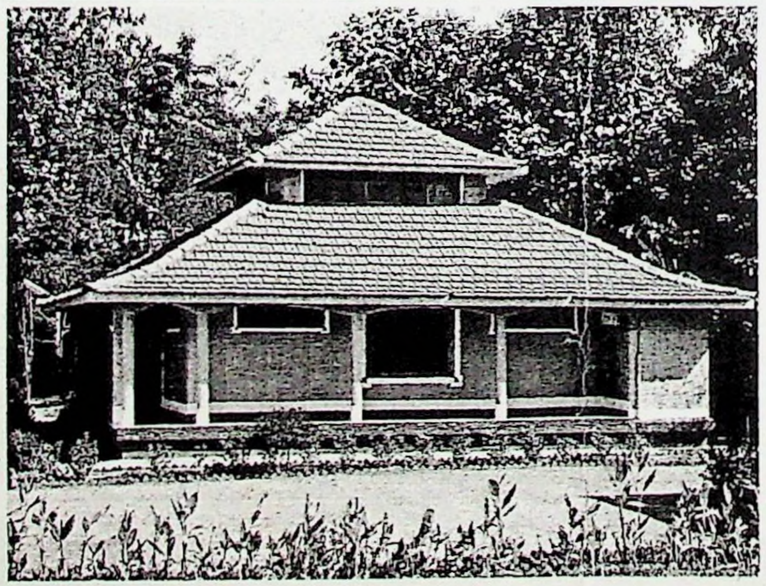
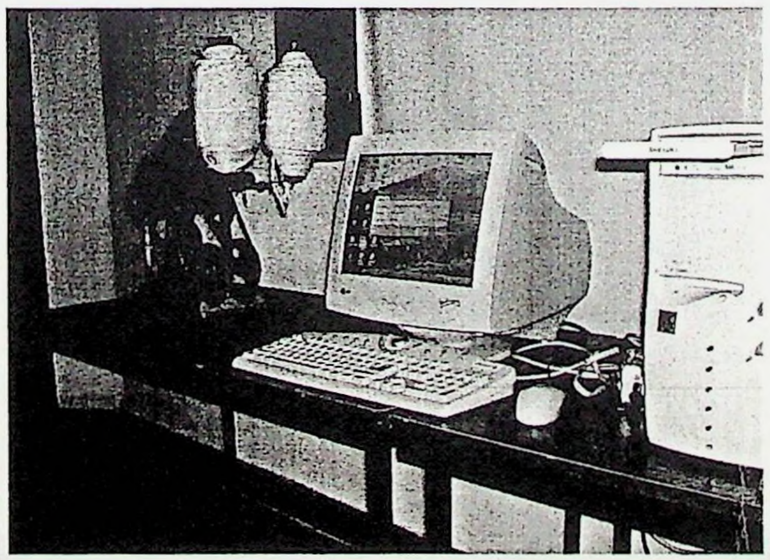
Exploring the links:
Gandhi, Environment & Health


Exploring the links:
Gandhi, Environment & Health





E - 3.

CHC

From: "Ruchita Khurana" <ruchita@toxicslink.org>
To: <Undisclosed-Recipient:;>
Sent: Tuesday, November 16, 2004 4:19 PM
Subject: Is the air killing us? - Invitation to a panel discussion on Nov 17, 2004

Environment and Health Public Lecture Series

Rising asthma rates, respiratory disorders and even cancers are being widely reported especially in cities. According to a report published by CSE, Asthma claims 500 victims every day leading to the death of 180,000 people every year. In Delhi alone one out of 10 children suffer from bronchial asthma. It is further estimated that asthma will strike 32 million people in India by 2010.

What is clean air is becoming an increasingly difficult question to answer. From earlier concerns of particle sizes of 10 microns, recent research shows health impacts even from nano (less than 0.1 micron) sized particles, which can cross the blood-brain barrier. Even as our cities suffer from basic SOx, NOx and SPM levels, questions are being raised as to how well do we monitor these levels and what they mean for our health. Air pollution not only has a direct impact but also aggravates impacts from other types of diseases.

To understand this and to discuss how to move ahead in this complex area, to protect our health, are three eminent panelists on the topic: -

Is the air killing us?

Key speaker:
Dr. B. Sengupta, Member Secretary, Central Pollution Control Board
Panelists:
Dr. S K Chhabra, Deptt. of Cardiorespiratory Phisiology, V. P. Chest Institute
Ms. Anumita Roychowdhury, Associate Director, Policy Research and Advocacy, Centre for Science and Environment

TH

Moderated by Mr. Ravi Agarwal, Director, Toxics Link.

17/11

Date: 17th November 2004, Wednesday **Time:** 6:30 p.m.
Venue: Conference Room 1, India International Centre, Lodhi Road, New Delhi
(In collaboration with India International Centre)

Ruchita Khurana
Programme Coordinator
Information and Communication
Toxics Link
H-2, Jungpura Extn.
New Delhi - 110 014
Tel: +91 11 2432 8006, 2432 0711
Fax: +91 11 2432 1747
Email: ruchita@toxicslink.org

lib - environment & Health file
JN 17/11

17-Nov-04

E-3.

Main Identity

From: "India Resource Center" <info@IndiaResource.org>
To: "India Resource Center" <info@IndiaResource.org>
Sent: Friday, November 26, 2004 12:55 AM
Subject: Police Attack Coca-Cola Protesters, Over 350 Arrested

November 25, 2004
www.IndiaResource.org

Police Attack Coca-Cola Protest, Over 350 Arrested
http://www.indiaresource.org/press/2004/mehdiganjattack.html

A massive demonstration, with over 1,000 people, was held at the Coca-Cola bottling plant in Mehdiganj, Uttar Pradesh to demand that the bottling facility shut down. Armed police reacted violently, beating and injuring many, including many women. Over 350 people were arrested in an incident that is rapidly becoming part of a pattern in Coca-Cola's response to the growing resistance in India - using violence to suppress opposition.

COCA-COLA FACT SHEET
http://www.indiaresource.org/campaigns/coke/2004/Brochure.pdf

ESPANOL: Coca-Cola: Destruyendo Vidas, Modos de Vida y Comunidades
http://www.indiaresource.org/campaigns/coke/2004/cokefactespanol.html

Coca-Cola is guilty of destroying Lives, Livelihoods and Communities in India. People's movements all across in India have now mobilized to hold Coca-Cola accountable. And the movement is growing everyday. Follow and support the struggles by visiting www.IndiaResource.org

SUPPORT US -- Donate Now!!!
http://www.indiaresource.org/donate/index.html

JOIN our mailing list by sending an email to info@IndiaResource.org with the subject SUBSCRIBE

Lib - Environ + Health file

E - 3.

community health cell

From: "pervin jehangir" <pjehangir@rediffmail.com>
To: <sochara@blr.vsnl.net.in>
Sent: Thursday, December 02, 2004 6:18 PM
Subject: Fw: Bhopal, Oliver Ridley Turtles, Coca- Cola

1) Hello all,
Despite being the worst tragedy in India, victims of Bhopal Gas Tragedy are still waiting for justice, please sign your name in the message forum to show your solidarity and decide on an action.

http://www.bhopal.net/gda2004.php

For more latest info:

http://headlines.sify.com/news/fullstory.php?id=13621611&page=1

-Sidhu

2)

Dear all.

TH & 3/12

Dec 3rd 2004 will mark the 20th anniversary of the Bhopal gas disaster caused by then Union Carbide Ltd. (now DOW Chemicals). All these years, the survivors, second and third generations of the victims have been fighting a prolonged and hard battle against the continuing health and environmental impacts of the disaster.

Now after twenty long years, the tragedy of Bhopal is far from over. The dilapidated factory still has a large quantum of hazardous toxic wastes that continue to percolate into environment through multiple routes and keep killing and maiming lives perpetuating the lethal legacy of the corporate criminals –the Union Carbide (presently the DOW chemicals)-. After killing twenty thousand innocent lives at Bhopal, DOW is still busy finding ways to evaded law and punishment, disowning their responsibility to clean up the lethal mess they have left behind at Bhopal.

Environ & Health

TH 3/12

The International Campaign for Justice in Bhopal (ICJB), a collective of national and international groups, will be observing a **candle light vigil at the Gateway of India, Mumbai on the 3rd of Dec between 7.30 to 9.00 pm to express our solidarity with the survivors of Bhopal in their struggle for justice**.

This is an occasion to express our solidarity with the fight against corporate crimes and human right violations. Your presence at the vigil will not only strengthen the fight of the survivors for due justice, but also would go a long way in preventing Bhopal's in future by sending out a strong warning message to all corporate criminals who put profit before everything else.
Kindly forward this mail to all your friends at Mumbai and ensure maximum participation.

Come, let us join hands for a noble cause. Craving to meet you at Gate Way of India on 3rd night,

Yorurs

Dr. PR Arun, (India Centre for Human Rights and Law (ICHRL), Mumbai (envirorights@yahoo.com)

3)
Dear All,

Please spare a minute or two to participate in our cyber action to save the Olive Ridley Turtles' favourite nesting site. The mass nesting, or arribada, of the Olive Ridley Turtles is a unique natural phenomenon that occurs along the Orissa coastline. Olive Ridley's are, like all other sea turtles, listed as endangered animals.

Turtles are very vulnerable, as only one in every 1000 hatchlings survives to adulthood. Over the last decade close to 100,000 adult turtles have suffered from human activities at the coast of Orissa, with mechanized fishing being the principle cause. The present high mortality rates have been continuing for several years. Each year that passes without improvement will lead to the loss of thousands of breeding turtles and a decline in the population.

Of the many threats to the Olive Ridley Turtle and the unique eco-systems of Orissa coast, the proposed port at Dhamra in the Bhitarkanika sanctuary, is the most immediate threat," says Sanjiv Gopal, oceans campaigner Greenpeace India. "Greenpeace calls on the promoters of the project, Orissa Government and Tatas, to abandon the project, as it will destroy the natural wealth of the region as well as one of the last world's turtle mass nesting sites."

Take Action Now! save the Olive Ridley Turtles'

Click on the link to participate in the Cyberaction.
http://act.greenpeace.org/ams/e?a=1590&s=gen

To read more, visit:
http://www.greenpeace.org/india_en/news/details?item_id=650451

I thank you on behalf of the Turtles!

Kiran
Hejmadi
Supporter Services

---

quoting your supporter reference number as usual.

4)

PROTEST COCA-COLA'S VIOLENCE IN INDIA

Send a Free Fax http://www.indiaresource.org/action/faxcoke.php

Coca-Cola is destroying LIVES, LIVELIHOODS and COMMUNITIES in India, Colombia and internationally.

Send a FREE FAX to Neville Isdell, CEO of the Coca-Cola Company in Atlanta, US demanding that they stop the violence and take immediate action to address the serious problems created by Coca-Cola in India.

For more information, http://www.indiaresource.org/campaigns/coke/2004/mehdiganjgallery.html and http://www.indiaresource.org/campaigns/coke/2004/Brochure.pdf

12/3/2004

E-3.

CHC

From: "Reema Singh" <rsingh@idrc.org.in>
To: <chc@sochara.org>
Sent: Tuesday, November 16, 2004 6:26 PM
Attach: SME Call.doc
Subject: Call for Proposal - Extend of Deadline Date

Dear Sir/Madam,

This is a continuation of the request for applications on Assessing & Mitigating Health Risks from Pollution by Small and Medium Scale Enterprises (SMEs) Initiatives of the International Development Research Centre's (IDRC), Ecosystem Approaches to Human Health Program Initiative (Ecohealth PI). The details can be downloaded from http://network.idrc.ca/en/ev-64943-201-1-DO_TOPIC.html or found in the attached file.

As requested by applicants, the deadline has been extended to the 6th of December, 2004. The applications, in form of a concept note, can be sent electronically to sme-ecohealth@idrc.org.in or mailed to Ms. Reema Singh, Ecosystem Approaches to Human Health Program Initiative, Asia SME Competition, 208 Jor Bagh, New Delhi, India 110 003.

Thank you for forwarding this information to any contacts that may have an interest in this proposal.

TH 17/11

Kindly acknowledge that you have received this e-mail.

Regards,

Reema.

Reema Singh (Ms.)
Program Assistant
Ecohealth
IDRC- South Asia Regional Office,
208, Jor Bagh, New Delhi-110 003.
Ph: + 91 11 2461 9411, Ext -107
Fax: + 91 11 2462 2707
Web: www.idrc.ca/saro

Dear Ms Reema Singh,
Thanks for your mail with attachments.
due to several ongoing commitments we could not be
applying Best wishes
JN

- for Lab Environment & Health file

17-Nov-04

Ecohealth Competition for South, Southeast and East Asia

ASSESSING & MITIGATING HEALTH RISKS FROM POLLUTION BY SMALL AND MEDIUM SCALE ENTERPRISES (SMEs) INITIATIVE

Request for Applications (RFA)

Summary

Research teams from South, Southeast and East Asia are invited to submit applications in the form of a short concept note, to participate in the upcoming Ecohealth training workshop (India, January 2005). The theme of the training will be on assessing and mitigating health risks from pollution by small and medium scale enterprises (SMEs), using risk analysis in an ecosystem approaches to human health research framework. Three members of each selected team would participate in the workshop, representing the breadth of disciplinary expertise necessary for a successful transdisciplinary (i.e. an integrated multidisciplinary approach) applied research project.

Introduction

The development of small and medium scale industries (SMEs) in the Asian region has been promoted as a means for poverty alleviation given the associated opportunities for job creation, production of export goods, and local economic growth. However, environmental emissions, wastes, and production processes from these industrial activities often result in different types and levels of pollution, affecting the health of workers and surrounding communities.

The International Development Research Centre's (IDRC's) Ecosystem Approaches to Human Health Program Initiative (Ecohealth PI) is proposing an initiative on assessing and mitigating health risks from pollution by SMEs in Asia that combines

1. A Training Workshop – 10 research teams will be selected through the current open Request for Applications (RFA) process, with 2-3 members from each team attending the workshop
2. A Proposal Development Small Grants Program – 4 small grants will be selected through a second RFA to be posted soon after the workshop. This RFA will only be open to those teams that had participated in the training workshop. The small grants distributed through the second RFA will fund the completion of a full proposal, to be submitted for funding through IDRC's Ecohealth PI's regular funding mechanisms (for more details please see "How to Approach IDRC for Funding" at http://web.idrc.ca/en/ev-56760-201-1-DO_TOPIC.html)

Background on the Funding Institution

IDRC is a public corporation created by the Parliament of Canada in 1970 to help researchers and communities in the developing world find solutions to their social, economic, and environmental problems through research. It is led by an International Board of Governors. The Centre has a flexible corporate structure that allows multi-disciplinary and multicultural teams to focus on key development problems through connecting people, institutions, and ideas.. To define these challenges and determine how to meet them, IDRC focuses its programming centres

on three areas of inquiry: Social and Economic Equity; Environment and Natural Resource Management; and Information and Communication Technologies for Development. Although the Centre's focus on these broad areas will remain constant, specific research questions may change as new issues emerge. More information about IDRC is available on the Internet at http://www.idrc.ca/

Since 1996, IDRC's Ecosystem Approaches to Human Health Program Initiative (Ecohealth PI) has supported a range of research teams and research topics through its portfolio of over 70 research projects, all related to ecosystem management and human health, in several regions of the world: Latin America and Caribbean, Africa, Middle East and Asia. For more information pleas see http://www.idrc.ca/ecohealth

Goal of the Initiative

The goal of the ***Assessing & Mitigating Health Risks from Pollution by Small and Medium Scale Enterprises (SMEs) Initiative*** is to support applied research studies that will contribute to the formulation and implementation of policies and good industry practices for sustainable development that prioritize human health and well-being.

The Initiative will allow participants to explore the use of risk analyses within *ecosystem approaches to human health* in order to develop a holistic understanding of health determinants and risks associated with industrial pollution, and to plan for local actions to address them. It envisages a research process based on multi-stakeholder participation that engages local communities, the industrial sector, government authorities, and researchers, both in dialogue and through joint actions. This multi-stakeholder dialogue is intended to lead to actions directly related to pollution mitigation, as well as those, which could result in improved overall health. The objective of including risk assessment in ecosystem approaches is to strengthen the potential for multi-stakeholder consensus and participation to influence interventions, by providing information on the relative magnitude of potential health problems. This initiative will:

(i) enable SMEs to proactively plan pollution mitigation and prevention;

(ii) enable the local community to effectively communicate knowledge and improve mobilization activities aimed at SMEs and rule enforcers, which may present a challenge to individuals within the community given the trade-offs between employment and health risks made in developing countries;

(iii) enable financial institutions to be more diligent in the inclusion of environmental and social responsibility as part of their assessment of good management; and

(iv) provide policy makers and stakeholders with the requisite evidence and tools to better understand the complexities associated with the compliance and enforcement of existing rules, and to plan for cost effective interventions that address the economic and knowledge constraints of small enterprises.

Timeframe of the Initiative

This current RFA is the first stage in this multi-step Assessing & Mitigating Health Risks from Pollution by Small and Medium Scale Enterprises (SMEs) Initiative. It solicits transdisciplinary teams to submit short concept notes focusing on environment and health linkages in the context of SMEs in Asia. The successful candidates (10 teams) will participate in a one-week training

workshop in India. The purpose of this workshop is to provide training opportunities in the methodological aspects included in ecosystem approaches to human health and risk analysis.

The training workshop will be followed by a second RFA for Proposal Development Small Grants (4 in total). The Small Grants are intended to facilitate the development of a full proposal over a period of five months, and the competition will be open to the ten teams who participate in the training workshop. The four completed proposals will be presented and discussed at a final workshop and will enter the Ecohealth PI's regular pipeline to be funded when they are ready and the PI's budget allows (within 12-18 months of submission).

The following timeframe is envisioned for the full Initiative:

1. Current RFA period: September – November 14, 2004
2. Deadline to submit concept notes for the training workshop: December 6, 2004
3. Announcement of the ten winning teams to attend the workshop: December 23, 2004
4. Ecohealth training workshop (5 days) in Goa India: 24 - 28 January 2005
5. Second RFA period for four proposal development small grants: January 1 – March 31, 2005
6. Deadline to submit concept notes for Proposal Development Small Grants: April 1, 2005
7. Announcement of the four winning teams for Small Grants: April 29, 2005
8. Proposal development period: May – September 2005
9. Workshop to present the four completed proposals: October 2005
10. Submission of proposals to IDRC/Ecohealth for full grants: October 2005 onwards.

Geographic Scope of the Initiative

Countries to be targeted are: China, Philippines, Indonesia, Vietnam, Sri Lanka, India, Pakistan, Nepal and Bangladesh.

Criteria for Eligibility for the Current RFA

This initiative targets research teams interested in developing action-oriented research studies that use risk analysis within an ecosystem approach. Research teams must include a wide breadth of disciplines. Team members attending the workshop must have different disciplinary backgrounds (social sciences, health and environment related sciences). Applications for the training workshop and competition will be open to research teams from South, Southeast and East Asia. Research teams are required to be transdisciplinary.

Submitting a concept note

Applicants should address the following elements when putting together a concept note to participate in the Ecohealth training workshop

- SMEs belonging to the formal or informal sector, in urban or peri-urban settings.
- Industrial pollution from point sources: solid, liquid and/or atmospheric pollutants
- Occupational and environmental exposures (from air, water, soil, and food)
- Livelihood and employment dimensions of the industries
- Health adverse effects that may range from sub-clinical biological alterations to illness and death
- The vulnerability of affected people and ecosystems

- Ecosystem description including social, economic, cultural and ecological interactions
- Ecosystem approaches to human health methodological pillars: transdisciplinarity, community participation and social and gender analysis
- Risk assessment, communication and prevention/mitigation approaches (i.e. risk analysis framework) that take into account the wide range of uncertainties, mismanagement procedures, and alternatives for the proper management of industrial pollution and environmental resources
- Intellectual and logistical partnerships with like-minded initiatives and institutions, especially in the areas of industrial ecology, industrial estate, risk analysis, ecohealth and respective networking, are encouraged.

In addition to the analysis of exposures from specific industrial pollutants, other environmental health hazards related to the local urban/peri-urban ecosystems might require attention during the course of the research studies for the following reasons:

1. Certain hazards within living environments (e.g. indoor air pollution) or community surroundings (e.g. contaminated drinking water) may produce additive or synergistic health effects with the industrial pollutant(s) being studied and increase the vulnerability of the exposed population.
2. It is critical that the health priorities of the community be understood, acknowledged and addressed to the extent possible, as part of the dialogue and negotiation in a participatory process, and particularly in the context of dialogue with community stakeholders on risk prevention and mitigation.

Concept Note Format

The concept note must have a maximum length of seven pages, single-spaced, covering the following elements:

- purpose and justification;
- objectives;
- methods (explaining how the risk analysis framework combined with the ecosystem approaches to human health will be addressed);
- institutions and personnel (information on expertise and previous work in this area for each researcher participant - short bio-notes, together with an indication of commitment from the leading and collaborating institutions interested in participating, and a description on how the different partners, key stakeholders and institutions intend to collaborate);
- and utilization of research results.

The deadline to submit concept notes will be **November 15th, 2004**. Concept notes should be sent by post to the following address. They can also be sent electronically to the e-mail address given below:

Ms. Reema Singh
Ecosystem Approaches to Human Health Program Initiative
Asia SME Competition

208 Jor Bagh,
New Delhi, India – 110 003
E-mail: sme-ecohealth@idrc.org.in

RFA Selection criteria
The following criteria will be applied to select the ten teams eligible to send three researchers to participate in the Training Workshop

- Scientific merit and aappropriateness of the intended objectives and methods to the proposed activity in the context of the current competition
- Attention to transdisciplinarity, community engagement, and social and gender equity
- Inclusion of the risk analysis framework
- Plans to involve various stakeholders from communities, SMEs and policy makers in several stages of research, including planning, design, data collection, analysis, and dissemination
- Potential for capacity development of research team and institution
- Extent to which the proposed project has potential to influence policy
- Extent to which proposed project is likely to build the coping capacity and resilience of the affected communities
- Existing capacity of participating institution(s) – human resources – to carry out the research
- Team composition suitable to the tasks proposed, with a special attention paid to young researchers in the team
- Attention to ethical considerations

The selection committee will consist of IDRC Ecohealth PI team members and two external reviewers. Results of the selection will be announced by December 06, 2004.

Additional Information on the Proposal Development Small Grants Program
Subsequent to the Training Workshop, a second Request for Applications (RFA) will be launched (January – March 2005) to award up to four Proposal Development Grants of CAD 50,000 each. The grants will be of five months duration (May – September, 2005). The deadline for submission will be April 1, 2005.

Field work with stakeholder involvement will be critical to reach the maturity in proposal development required for full funding by IDRC. In order to accomplish a proper understanding and prediction of the challenges and uncertainties for each proposal, Ecohealth consultants will assist the four teams through a field visit and electronic means throughout the five month grant period. These consultant visits will include research team meetings as well as stakeholder and community meetings with site visits.

At the completion of the Proposal Development Grants, the teams will submit their final report in September 2005, in the form of a full proposal to IDRC. A final workshop will be organized in October 2005 where the four research teams will present their proposal and experiences with the process and will receive comments from their peers and the consultants. These proposals will be

then considered for funding through Ecohealth's regular funding mechanisms. In this context, IDRC will reserve the right to accept or reject the full proposals based on the quality of the submissions and availability of funds. It may also request further refinement of research methodologies when warranted.

These research proposals will be expected to fully integrate an ecosystem approach with risk assessment and mitigation actions to address problems of industrial pollution and human health, and include a substantive characterization of the social-ecological conditions in the ecosystems of study that impact on health and environmental sustainability.

Methodological aspects to be considered in this activity

There are two main methodological aspects that guide this project, which are ecosystem approaches to human health (Ecohealth) and risk analysis (from hazards identification to risk mitigation). Further information is available at http://www.idrc.ca/ecohealth.

The Ecosystem approaches to human health

The ecosystem approach to human health is a holistic approach that places human beings at the center of considerations about development, while seeking to ensure the sustainability of the ecosystem of which people are an integral part. Development actions under this approach take into account both the health and well-being of human beings and the sustainability of the ecosystem. The approach is particularly appropriate for development research, because it is able to accommodate the examination of complex social and ecological interactions that affect the health of disadvantaged populations, and the formulation and testing of local actions.

The ecosystem approaches to human health uses a transdisciplinary framework, and participatory and social/gender sensitive methodologies. Transdisciplinarity refers to the integrated form of carrying out research by teams of scientists from various complementary disciplines in dialogue with local knowledge experts. It characterizes a collaborative working process that goes beyond the limits of individual expertises in order to generate new logical frameworks, new methods, new intuitions and insights born from the synergy that ensues from the collaboration.

Participation of stakeholdersand representatives of various "communities" (geographic, cultural, socio-economic, religious, labour, etc.) is envisaged here as a process through which relevant actors can discuss and explore their different interests, to better understand the dynamics and considerations relevant for all actors. Through this process of mutual learning, they may gain the opportunity to influence and actively participate in making decisions related to the research and ensuing development initiatives, and increase their likelihood of success.

Addressing issues of gender and social equity in the research agenda permits the building of a framework that allows for a better understanding of local knowledge and of various sites of difference that characterize the way in which people behave and are organized. A gender and social equity approach and analysis can create a space to identify the constraints and opportunities that exist due to the assignment of social roles. With respect to gender, for example, the way in which each gender cooperates, divides responsibilities and resources, and controls them, would be one level of analysis. On another level, it is important to consider the

reproductive role of women and levels of toxic exposure in foetuses and young children, as women and children are more vulnerable population groups in the context of environmental pollution and health risks. The incorporation of social equity also demands a consideration of the impact of, for example, differences in age or social grouping.

Risk Analysis (from hazards identification to risk mitigation)

The risk analysis framework includes risk assessment, communication and mitigation measures. "Risk" can be defined as the probability that adverse health effects associated with a given hazard(s), will occur among a certain percentage of the exposed population, with special attention to the most vulnerable people. Risk assessment includes qualitative and quantitative identification of hazards, exposures, and health consequences, according to the dose response knowledge, for the purpose of estimating risks. Uncertainties, due to random reasons and/or lack of knowledge, and/or lack of data, regarding hazards, exposures and health effects must be considered. The specific features of the target population, including vulnerable sub-groups, must also be addressed.

For the toxicity assessment of many pollutants, levels regarded as the lowest observed adverse effect level and the no observed adverse effect level have been established, and a reference dose (RFD) is most often used to be compared with observed exposures, and used to estimate the hazard index. Probabilistic models with different types of variables, according to the hypothesis under work, will provide required results to be used as simple indications of a particular health concern to the policy makers. Based on these results, risk mitigation activities must be identified, planned and conducted by stakeholders, community, and governmental authorities. **For more information on the risk analysis framework, please visit: http://www.idrc.ca/ecohealth.**

Linking Ecohealth and risk mitigation

An ecosystem approach to human health is a broader framework within which risk analysis studies can be placed. All three methodological pillars of the ecohealth approach (transdisciplinarity, community participation and gender/social equity analysis) are relevant to risk analysis. The risk assessment can also be used along with other factors to project a range of future scenarios that could inform decision making processes. In this way risk could be assessed within a context of other health and livelihood variables and used by the multi-stakeholder group to inform decision making. These two different methodological approaches are compatible in their ability to assess the links between human activity, socio-ecological conditions, and human health for the purpose of implementing actions to increase the resilience of communities. Increased resilience through the improvement of human health and well-being conditions, and the negotiation of pollution prevention and mitigation measures with SMEs, constitutes the basis of the proposed initiative.

E-3.

chc

From: "Ruchita Khurana" <ruchita@toxicslink.org>
To: <indiracal@hotmail.com>; <chwwyod@rediffmail.com>; <ritarun@nda.vsnl.net.in>; <bpni@bpni.org>; <prakash@unv.net.in>; <ankureducation@vsnl.net>; <dastkarihaat@yahoo.co.in>; <aidwa@ndb.vsnl.net.in>; <prabhat@jnuniv.ernet.in>; <mobilecreches1@vsnl.net>; <chaukhat@yahoo.com>; <janmadhyam1@indiainfo.com>
Cc: "Jamuna Ramakrishna" <j.ramakrishna@hivos-india.org>; <shantum@ivpas.unv.ernet.in>; <prams_2001@yahoo.com>; <jaba.menon@oneworld.net>; <sujatha.nath@oneworld.net>; <southasia@oneworld.net>; <ics@bnpl.com>; "PSS" <pss@narmada.net.in>; <ia_s@sify.com>; <sarangi_rk@rediffmail.com>; <kanhere@hotmail.com>; <chc@sochara.org>; "dudani" <atd@mantraonline.com>; <pravah@ndt.vsnl.net.in>; <waste@operamail.com>; <sctripathi@rediffmail.com>; <callshiv@hotmail.com>; <ceesouth@vsnl.com>; <jagori@del3.vsnl.net.in>; <actionindia@vsnl.com>; "Almitra Patel" <almitrapatel@rediffmail.com>
Sent: Thursday, September 16, 2004 12:55 PM
Subject: Invitation to panel discussion - Yamuna: The Lost River

Environment and Health Public Lecture Series

Yamuna has long been a victim of civic apathy despite of a number of court directives and action plans. In one of the recent judgments, Supreme Court observed that no improvement is seen in the quality of water despite Rs 400 crores spent on Yamuna Action Plan. The court has also set up a 10-member committee on August 4, 2004 headed by the urban development secretary to draft an action plan within six weeks to revive the dying river.

The 19 major drains linked to Yamuna contribute to 90 percent of the waste-water flow and account for 81 percent of river pollution. Additionally open allotment of land along the riverbed region goes unabated posing a threat to the ecological balance of the river. Recently a PIL filed in the Supreme Court has challenged the multi-crore Temple construction project covering an area of 50 acres of land along the riverbed. This construction would not only prevent the recharge of underground water but also pollute the river further by discharge of huge quantities of waste water.

Class?

To discuss some of the pertinent issues like urban planning, pollution status and ecology of the river Yamuna, we invite you to a panel discussion with an eminent panel on:

TH

Yamuna – The lost river

16/9

Panelists:
Prof K T Ravindran, Professor and Head, Department of Urban Design, School of Planning and Architecture
Dr. R. C. Trivedi, Additional Director, Central Pollution Control Board
Mr. Dunu Roy, Director, Hazards Centre

Moderated by: Mr. Ravi Agarwal, Director, Toxics Link

Date: 20th September 2004, Monday **Time:** 6:30 p.m.
Venue: Conference Room 1, India International Centre, Lodhi Road, New Delhi
(In collaboration with India International Centre)

Toxics Link

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helped to largely correct the relative appreciation of the Rupee in real terms, which will help to offset the competitive disadvantages arising from the extensive depreciation of the East Asian currencies, and is expected to revive our exports and contain import growth.

64. India's stock of external debt at end-September 1998 stood at U.S. $ 95.2 billion as against U.S. $ 93.9 billion at end-March 1998. The debt service payments, as a ratio of current receipts, continued to improve over the years declining from 30.2 per cent in 1991-92 to 19.5 per cent in 1997-98. The share of short-term debt to total debt declined from 7.2 per cent at end-March 1997 to 5.4 per cent at end-March 1998 and further to 3.7 per cent at end-September 1998. The share of concessional debt has declined from 44.7 per cent in 1996 to 39.3 per cent at end-March 1998 and further to 37.7 per cent at the end of September 1998.

Social Sectors

65. The government has relied mainly on three approaches for reduction of poverty and unemployment viz., higher economic growth, anti-poverty and employment programmes and priority to government expenditure on social sectors. The poverty ratio declined from 56.4 per cent in 1973-74 to 37.3 in 1993-94 in rural areas and from 49.0 per.cent in 1973-74 to 32.4 per cent in 1993-94 in urban areas. For the country as a whole, the poverty ratio declined from 54.9 per cent in 1973-74 to 36 per cent in 1993-94.

66. The Planning Commission has estimated that, additional employment opportunities of the order of 29.74 million were generated during January 1,1994 to March 31,1997. This implies an average growth rate of employment of 2.47 per cent per annum compared with 2.31 per cent during July 1,1983 to December 31,1993 and 2.32 per cent during January 1,1978 to June 30,1983.

67. The government has decided to set up the Second National Commission on Labour with a view to provide protection to millions of workers. The main focus of the Commission would be to suggest rationalisation of the existing labour laws in the organised sector and an umbrella legislation for ensuring a minimum level of protection to the workers in the unorganised sector.

68. Increased availability of health care and family welfare services has resulted in reduction of all-India death rate, birth rate and infant mortality rate. The crude death rate declined from 14.9 per thousand in 1971 to 9.8 in 1991 and further to 8.9 in 1997. Similarly, the infant mortality rate per thousand declined from 129 in 1971 to 80 in 1991 and further to 71 in 1997. The birth rate per thousand also declined from 36.9 in 1971 to 29.5 in 1991 and further to 27.2 in 1997.

69. Average real wages for unskilled agricultural labour, which reflect the economic conditions of agricultural labourers, have increased by 0.72 per cent in 1995-96 (Agricultural year July to June), 4.67 per cent in 1996-97 and 4.88 per cent in 1997-98. These trends are consistent with the view that more rapid economic growth has brought about an improvement in living standards of people in general.

70. Several anti-poverty measures have been in operation for decades focussing on the poor as the target group viz. welfare of weaker sections, women and children, and a number of special employment programmes for self and wage employment in rural and urban areas. The Central Plan and non-Plan expenditure on social sectors comprise education, health, water supply, sanitation, housing, slum development, social welfare and nutrition, rural employment and minimum basic services. As a ratio to GDP at market prices these expenditures increased to a record high of 1.91 per cent in 1998-99 (BE) as compared to 1.33 per cent in 1991-92 and 1.75 per cent in 1997-98 (RE). The Central Plan allocation for social sectors and programmes show highest growth of about 36 per cent for family welfare and Women and Child Development in 1998-99(BE) over 1997-98 (BE). The outlay for health has gone up by about 25 per cent in 1998-99(BE) over 1997-98 (BE).

Environment Sector

71. A country's environmental problems vary with its stage of development, structure of its economy, production technologies in use and its environmental policies. While some problems may be associated with the lack of economic development (e.g. inadequate sanitation and access to clean drinking water), others are exacerbated by the growth of economic activity (e.g. air and water pollution). Environmental changes may be driven by many factors including economic growth, population growth, urbanisation, intensification of agriculture, rising energy use and transportation. Poverty remains at the root of several environmental problems.

72. Large scale industrialisation, spread of transport, communication and other modern infrastructure combined with the pressure of population growth have added to the difficulties of preserving clean environment and healthy natural resource base. These have been exerting pressure on environment as witnessed in growing evidence of air and water pollution and land degradation. For instance Delhi is now classified as the fourth most polluted city in the world, with a suspended Particulate Matter (SPM) of 145.3 to 929.8 micrograms/m^3 as against a the National ambient air quality standard of 70 to 360 micrograms/m^3. Organic and bacterial pollution continue to be the predominant source of pollution in our aquatic reserves. The forest cover and globally recognised bio-diversity is also under threat.

73. Such degradation imposes a cost on the society, with the burden of such costs being disproportionately high for the poor who live and depend on such natural ecological systems. Such costs need to be explicitly accounted for in economic policy and planning. The challenge of sustainable development remains formidable and requires integration of country's quest for economic development with its environmental concerns. Choice of policies and investment has to be such which encourage cleaner production/ consumption and practices that minimise the environmental impact.

Issues and Priorities

74. The most intractable and long-standing issue confronting us is that of the fiscal prudence. The various aspects of the fiscal problem, namely the fiscal deficit, the revenue deficit, unproductive expenditures and unsustainable subsidies are now fairly well known. With the exception of the initial success achieved in 1991-92 under the pressure of the balance of payments crisis, subsequent improvements have alternated with set backs and reversal. As a result, the position today is not significantly better than in 1991-92. There is therefore a clear need for building a political consensus on this issue in terms of both constitutional and administrative measures that need to be taken.

75. The fiscal deficit is the key parameter of macroeconomic policy, which has profound implications for inflation, interest rates, investment, growth, the financial system, balance of payments and last, but by no means least, overall credibility of Government's macroeconomic policy. For the Central Government the fiscal deficit simply reflects the net borrowing requirement of the Government. A high fiscal deficits leads to excess borrowing from either the RBI or the market for loanable funds. Excessive borrowing from the RBI leads to high monetary growth, which fuels inflation and puts pressure on the exchange rate. When considering Government borrowing from the market, the fiscal deficits of Centre and State Governments need to be aggregated (in 1997-98 (RE) this was 7.4 per cent of GDP). Such a high level of Government borrowing pre-empts funds which could otherwise have been used productively in industry, agriculture and services. High deficits also keep interest rates high and investment and growth low. Excess Government borrowing also places undue pressure on the domestic financial system and capital markets. There is also the long-term issue of sustainability of fiscal deficit.

76. Long term fiscal sustainability generally requires bringing down the Primary deficit (gross fiscal deficit minus interest payments) to below zero. For the Centre and States together, the primary deficit is estimated at 2.4 per cent of GDP in 1997-98 (RE), with little prospect of improvement in 1998-99. A reduction in the primary deficit to zero would, therefore, require at least a 2.4 per cent of GDP reduction in the fiscal deficit. If the entire adjustment falls on the Central government, this would require a reduction of the Central fiscal deficit to about 3.3 per cent of GDP. This target assumes that the real interest rate in the economy is lower than the growth rate. If this condition does not hold for any reason, a primary surplus and consequently a greater reduction in the fiscal deficit would be required.

77. Quite clearly, fiscal consolidation is absolutely necessary for containing inflation, reducing interest rates, promoting investment and growth, and fostering reasonable stability in the financial system and the foreign exchange market. Experience from the rest of the world underlines the importance of fiscal deficit reduction in regard to reducing interest rates and inflation. It is therefore essential to put the fiscal deficit on an irreversible and unambiguously declining trend.

78. In a broader qualitative sense, sustainability also depends on the quality of the government expenditure and the nature of the tax system underpinning the fiscal system. Concern about the revenue deficit stems from the legitimate concern that a significant part of revenue

expenditures are of low priority. These low priority expenditures and non-targeted subsidies need to be identified and eliminated. This is also essential for freeing up funds for completing the unfinished tasks of universal primary education, effective public health systems and modern water and sewage systems for the entire population. The impact of the Fifth Pay Commission and its aftermath on revenue deficits of Centre, States and local bodies lends urgency to the need to downsize government. The time has perhaps come to reconsider the issue of constitutional limits on the deficit as well as to take up the challenge of reengineering government.

79. The task of reforming the tax system must also be carried forward and completed. But such reforms must be accompanied by determined efforts to augument revenue mobilization through base broadening, improved administration and other means. The decline in the tax to GDP ratio of recent years must be reversed.

80. The commendable but gargantuan task of decontrol and de-bureaucratisation which every government in the nineties has set for itself remains unfinished. The extent and depth of the economic distortions such controls have created are perhaps still not fully appreciated by all, even though the negative effect on the public is known to all who interact with the government. The remaining price and distribution controls must be eliminated. At the State level this must be preceded by a major effort to identify such controls. Investment controls are the second most pernicious legacy of the control era and remain in several infrastructure service sectors. SSI reservation is another form of investment control. The need to replace all quantitative restrictions by fiscal measures was recognised even in the eighties, yet import and export controls remain widespread in certain sectors like agriculture. Though reform of the foreign exchange system has been one of the prominent areas of reform, the operation of exchange controls still requires improvement, particularly for exporters and knowledge-based industries. Similarly, though some of the well-known financial sector controls have been removed, many controls remain embedded in the laws, rules, regulations, norms and procedures.

81. The very uncertain global environment during 1998 has brought external issues back into focus during 1998-99. As downside risk remains prominent in all the forecasts of the world economy for 1999, the prominence of external issues in our own policy making is likely to continue in the coming year. The deceleration in the growth of exports over the last three years has mirrored to some extent the deceleration in growth of exports from developing countries. It is somewhat disturbing that the deceleration in the dollar value of our exports has been greater, than that of 'developing countries' during 1997 and 1998. Though real exchange appreciation since 1996 has contributed to this decline, we have to now go beyond such macroeconomic variables to address the more long-standing and intractable structural disadvantages faced by our exporters (relative to those of exporters in China, Malaysia, and Thailand).

82. During the last two to three decades, the fastest growing economies of the world have also had fast growth of (manufactured) exports and employment. Most of these countries have built a much more positive environment for exports (and investment), than we have been able to do. This has two aspects: a liberal and flexible policy regime for export production and marketing and simplified rules and procedures for exporters. The increased opportunity in the area of software and other service exports and knowledge-based industries has thrown up additional areas for policy reform and procedural simplification.

83. in terms of routine interaction between exporters and the organs of the state, such as customs, exchange control, tax authorities and licensing authorities (DGFT), a sea change in approach is required to bring it on par with successful exporters of East Asia. Even a neighbouring country such as Sri Lanka reportedly has a much friendlier operational environment for exporters than India.

84. The policies applicable to export production need to be transformed to remove the controls and constraints facing exporters. This requires a comprehensive re-examination of labour laws and SSI reservation as applicable to exporters, with a view to bring them on par with successful, exporting countries, like China. Warehousing and cargo handling of imports and exports at airports and ports remains a monopoly of the state, with the consequent deleterious effect on service. The supply of infrastructure services like electricity, telephones and rail transport to exporters, remain of as poor quality as for the general economy. If these policy and procedural steps (along with fiscal correction) are not taken, the balance of payments could again come under pressure. Better export promotion policies also require a

clear recognition that high import tariffs discourage exports, while lower tariffs enhance the relative profitability of exports. Greater liberalization of trade in agriculture is also desirable for promoting exports.

85. Radical reforms in the areas of infrastructure services, agriculture and factor markets are necessary to initiate a virtuous cycle of export growth, employment generation and economic growth. With only a year left before the start of the 21st century it is perhaps an appropriate time to start preparing for a second generation of economic reforms. Such a reform agenda must include reform of factor markets, public sector, government and other public institutions, legal systems, State level policies and procedures and reform of critical sectors such as infrastructure, agriculture, education, R&D and agricultural/rural extension.

86. Within factor markets, capital markets and the financial sector have also seen considerable reforms. The financial collapse in East Asia and other countries has, however, emphasized the fact that we still have some way to go in bringing the financial sector (including banking) to international standards. Completion of insurance and pension fund reforms is merely the first step in creating strong and vibrant long-term debt market. Other factor markets areas such as labour, land, natural resources and corporate management have not been tackled seriously by reforms so far.

87. The fact that primary responsibility for social sectors, agriculture and rural development is generally assigned to the States under the Constitution, underlines the importance of state level reforms. These include fiscal reforms, decontrol and de-licensing particularly with respect to transport, storage and processing of agricultural goods, reform of infrastructure sectors like electricity, canals and road transport and decentralisation and involvement of local bodies, including NGOs. Institutional reforms such as those related to size and quality of government, freedom of information, economic laws and the legal system require involvement of the Central and State Governments as well as the judiciary.

88. These reforms have to be designed to set in motion a process of self-sustained, employment promoting growth. Democratic participation and empowerment of the people through education, public health improvement and information/ knowledge is an essential element of such growth. Once policy distortions that promote capital intensity or discourage hiring of labour are identified and removed, investment can create more new productive jobs. Government administration and Public institutions will need to be transformed to recognise and appreciate the centrality of efficient investment (physical, human or knowledge capital) in any self-sustaining development process.

89. The award of the Nobel Prize in Economics to Prof. Amartya Sen has again brought home to us (if such a reminder was needed) that growth and development are ultimately about the entitlements of people. Universal literacy and compulsory primary education are necessary not only for sustaining productive employment and economic growth, but also for making every individual a full participant in the democratic life of the nation. The provision of public goods and basic amenities like water, sewage and sanitation must extend not just to the middle class but also to the poorest of the poor. Research & monitoring and control of contagious diseases and epidemics may not be glamourous activities but often have far reaching effect on the poor. Similarly, strengthening of the norms of civil society and elimination of violence and corruption will bring substantial benefits for the poor. It is critically important to refocus government priorities to those areas which are the basic responsibility of government and to withdraw from areas where private initiatives can often achieve the goals more efficiently.

E - 3.

CHC

From: "nizamudeen" <fedcotgs@rediffmail.com>
To: <chc@sochara.org>
Sent: Friday, October 08, 2004 5:58 PM
Attach: ATT00102.txt; national_env_policy_2004.pdf
Subject: Invitation

Ref : 777/2004-05/GS/FED Dt. : 08.10.2004

To

Dr. Thelma Narayan
Community Health Cell,
No. 367, Srinivasa Nilaya, Jakkasandra 1st Main,
Koramangala 1st Block, Bangalore 560 034
Ph : 080 5531518/ 5525372, email: chc@sochara.org

Dear Dr. Thelma Narayan,

Greetings!

The Government of India has released its National Environment Policy 2004 and comments on this NEP 2004 are due by October 30, 2004.

FEDCOT, The Other Media, DEPORT, Tamil Nadu Environment Council (TNEC) and Forum on Corporate Accountability and Environmental Health have jointly arranged a ROUND TABLE to critically discuss the National Environment Policy 2004 and send the outcome/recommendations of the Round Table to the Ministry of Environment and Forest, Govt. of India.

The Round Table will take place

On : October 19, 2004 Tuesday
Between : 9.30 a.m. and 4.30 p.m.
At : JJ Hall, ICSA - Jeevana Jothy
107, Pantheon Road, Opp. to Children's Museum
Egmore, Chennai. Ph: 044 - 28269244

It is planned to critically look at the overall NEP 2004 and specifically focus on the following themes:

- Objectives and Principles of the NEP 2004
- Forests and Wildlife
- Tribals
- Tourism
- CRZ and Coastal Eco-Systems
- Pollution - Air, water, land and health
- Water
- Legal issues - liability, public participation, role of Panchayats
- Environmental Standards, Management Systems, Certification, Environmental Awareness and Education

Web. enviornment file

SANTOSH : COPRA30@gmail.com.

10/11/04

Therefore, we invite you to take part in the Round Table and contribute to the discussion and give your recommendations to enhance or change the policy. We have invited only few experts for this Round Table and hence we request you to participate in this Round Table.

All the experts will make Presentations during the Round Table. Apart from general comment on the Policy each Expert will give her/his comments on the specific Theme allocated to them followed by a discussion on the comments/recommendations of the presenting expert.

The fame-work of the Presentation will be as follows:

First 5 Minutes : The Expert will give her/his overall Comments/Recommendations on the NEP 2004

Next 5 Minutes : The Expert will briefly say what the policy says about the given theme of the expert

Next 10 Minutes : The Expert will give her/his Recommendations alternative to the NEP 2004 on the Particular Theme of the expert

Next 5-10 Minutes : Feedback by the other Experts on the proposed Comments/Recommendations

We request you to make your presentation on the following Theme:

Your Theme : Pollution - Air, Water, Land & Health

Facilities: You could bring your presentation in a CD, which could be displayed using a Power Point Projector

Request: We request you to bring a hard copy apart from the CD for the Round Table.

Hope you would do the needful and oblige.

With Best Wishes,

M. Nizamudeen
General Secretary - FEDCOT
27, Abdul Kadhar Street,
Manjakuppam,
Cuddalore - 607 001
Tamilnadu.
Mobile : 094432 31978

Encl : Draft of Env. Policy 2004

On Behalf of the Organising Committee
FEDCOT, The Other Media, DEPORT, Tamil Nadu Environment Council (TNEC) and Forum on Corporate Accountability and Environmental Health

NATIONAL ENVIRONMENT POLICY 2004

(Draft for Comments: 30th October 2004)

Ministry of Environment and Forests
Government of India, New Delhi

National Environment[1] Policy
(Draft For Comments: 30th October 2004)

1. Preamble

A diverse developing society such as ours provides numerous challenges in the economic, social, political, cultural, and environmental arenas. All of these coalesce in the dominant imperative of alleviation of mass poverty, reckoned in the multiple dimensions of livelihood security, health care, education, empowerment of the disadvantaged, and elimination of gender disparities.

The present national policies for environmental management are contained in the *National Forest Policy, 1988*, the *National Conservation Strategy and Policy Statement on Environment and Development, 1992*; and a *Policy Statement on Abatement of Pollution, 1992*. Some sector policies such as the *National Water Policy, 2002*, have also contributed towards environmental management. Despite these policy documents a need for a comprehensive policy statement has been evident for some time in order to infuse a common approach to the various sectoral, cross-sectoral, including fiscal, approaches to environmental management. As our development challenges have evolved, and our understanding of the centrality of environmental concerns in development has sharpened, there is also a need to review the earlier objectives, policy instruments, and strategies.

This dynamic requires an evolving and flexible policy framework with a built in system for monitoring and review, and where necessary, revision. Sustainable development concerns in the sense of enhancement of human well-being, broadly conceived,[2] are a recurring theme in India's development philosophy. For this to occur, there is a need for balance and harmony between economic, social and environmental needs of the country.[3] India also plays an important role in several significant international initiatives concerned with the environment. It is a party to the key multilateral agreements, and recognises the interdependencies among, and transboundary character of, several environmental problems.

The *National Environment Policy* (NEP, 2004) is a response to our national commitment to a clean environment, mandated in the Constitution in Articles 48 A and 51 A (g), strengthened by judicial interpretation of Article 21. It is recognised that maintaining a healthy environment is not the state's

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1 *The "Environment" comprises all entities, natural or manmade, external to oneself, which provide value, now or perhaps in the future, to humankind. Environmental concerns relate to their degradation through actions of humans.*

2 *The present day consensus reflects three foundational aspirations. First, that human beings should be able to enjoy a decent quality of life; second, that humanity should become capable of respecting the finiteness of the biosphere; and third, that neither the aspiration for the good life, nor the recognition of biophysical limits should preclude the search for greater justice in the world.*

3 *See Tenth Five Year plan 2002-2007, Volume II, Chapter 1.*

responsibility alone, but also that of every citizen. A spirit of partnership should thus be realized throughout the spectrum of environmental management in the country. While the state must galvanise its efforts, there should also be recognition by each individual – natural or institutional, of its responsibility towards maintaining and enhancing the quality of the environment. The NEP, 2004 is also intended to be a statement of India's commitment to making a positive contribution to international efforts.

The NEP, 2004 has been motivated by the above considerations and is intended to mainstream environmental concerns in all development activities. It briefly describes the key environmental challenges currently and prospectively facing the country, the objectives of environment policy, normative principles underlying policy action, strategic themes for intervention, broad indications of the legislative and institutional development needed to accomplish the strategic themes, and mechanisms for implementation and review. It has been prepared through a process of extensive consultation with experts, as well as diverse stakeholders, and this process is also documented.

The NEP, 2004 is intended to be a guide to action: in regulatory reform, programmes and projects for environmental conservation; and review and enactment of legislation, by agencies of the Central, State, and Local Governments. It also seeks to stimulate partnerships of different stakeholders, i.e. public agencies, local communities, the investment community, and international development partners, in harnessing their respective resources and strengths for environmental management. On the whole, it is expected to do better than fiscal neutrality, and likely raise substantial resources from outside the fiscal regime to realize its objectives.

2. Key Environmental Challenges: Causes and Impacts

The key environmental challenges that the country faces relate to the nexus of environmental degradation with poverty in its many dimensions, and economic growth. These challenges are intrinsically connected with the state of environmental resources, such as land, water, air and their flora and fauna. The proximate drivers of environmental degradation are population growth, technology and consumption choices, and poverty, leading to changes in relations between people and ecosystems, and development activities such as intensive agriculture, polluting industry, and unplanned urbanisation. However, these factors give rise to environmental degradation only through deeper causal linkages, in particular institutional failures, resulting in lack of clarity or enforcement of rights of access and use of environmental resources, policies which provide disincentives for environmental conservation (and which may have origins in the fiscal regime), market failures, (which may be linked to shortcomings in the regulatory regimes), and governance constraints.

Environmental degradation is a major causal factor in enhancing and perpetuating poverty, particularly among the rural poor, when such degradation impacts soil fertility, quantity and quality of freshwater, air

quality, forests, and fisheries. The dependence of the rural poor, in particular, tribal societies on their natural resources, especially biodiversity, is self-evident. The poor are particularly vulnerable to loss of resilience in ecosystems.[4] Large reductions in resilience may mean that the ecosystems, on which livelihoods are based, break down, causing distress. The loss of the environmental resource base can result in certain groups of people being made destitute, even if overall, the economy shows strong growth. Further, urban environmental degradation, through lack of (or inappropriate) waste treatment and sanitation, industry and transport related pollution, adversely impacts air, water, and soil quality, and differentially impacts the health of the urban poor. This, in turn, affects their capability to seek and retain employment, attend school, and enhances gender inequalities[5], all of which perpetuate poverty.

Poverty itself can accentuate environmental degradation, given that institutional[6] failures persist. For the poor, several environmental resources are complementary in production and consumption to other commodities (e.g. water in relation to agricultural production, fuel-wood in relation to consumption of food), while a number of environmental resources are a source of income or food (e.g. fisheries, non-timber forest produce). This is frequently a source of cumulative causation, where poverty, gender inequalities, and environmental degradation mutually reinforce each other. Poverty and environmental degradation are also reinforced by and linked to population growth, which in turn, depends on a complex interaction of diverse causal factors and stages of development.

Economic growth, in its turn, bears a dichotomous relationship to environmental degradation. On the one hand, growth may result in "excessive" environmental degradation through use of natural resources and generation of pollution aggravated by institutional failures. If impacts on the environmental resource base are neglected, an incorrect picture is obtained from conventional monetary estimates of national income. On the other hand, economic growth permits improvement in environmental quality by making available the necessary resources for environmental investments and generating societal pressures for improved environmental behaviour and institutional and policy change.

It is increasingly evident that poor environmental quality has adversely affected human health. Environmental factors are estimated as being responsible in some cases for nearly 20 percent of the burden of disease in

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4 *Resilience is the capacity of an ecosystem to recover from shocks, and surprises, whether manmade or natural. If a system loses resilience, it may be rapidly transformed to a wholly different (and unwelcome) state when subjected to even a temporary perturbation.*

5 *For example, as money for medical treatment is preferentially allocated within households towards treatment of the wage-earning men folk.*

6 *Which may relate to both formal institutions such as legal rights over resources, and traditional, informal institutions, such as community norms of resource management.*

India[7] and a number of environment-health factors are closely linked with dimensions of poverty (e.g. malnutrition, lack of access to clean energy and water). It has been established that interventions targeted at environmental management – e.g. reducing indoor air pollution, protecting sources of safe drinking water, sanitation measures, improved public health governance – offer tremendous opportunities in reducing the incidence of a number of critical health problems. It is also evident that these environmental protection measures would be difficult to accomplish without extensive awareness raising and education.

Institutional failures, referring to unclear or insufficiently enforced rights of access to and use of environmental resources, result in environmental degradation because third parties primarily experience impacts of such degradation, without cost to the agents responsible for the damage. Such rights – both community based and individual - are critical institutions mediating the relationships between humans and the use of the environment. Traditionally, village commons – water sources, grazing grounds, local forests, fisheries, etc., have been protected by local communities from overexploitation through various norms, which may include penalties for disallowed behaviour. These norms, may, however, be degraded through the very process of development, including urbanization, and population growth resulting from sharp reductions in mortality, and also through state actions which may create conditions for the strengthening of individual over communitarian rights and in doing so allow market forces to press for change that has adverse environmental implications. If such access to the community resources under weakened norms continue the resources would be degraded, and the livelihoods of the community would suffer.

Policy failures can emerge from various sources, including the use of fiscal instruments, such as explicit and implicit subsidies for the use of various resources, which provide incentives for excessive use of natural resources. Inappropriate policy can also lead to changes in commonly managed systems, with adverse environmental outcomes.

Another major set of challenges arise from emerging global environmental concerns such as climate change, stratospheric ozone depletion, and biodiversity loss. The key is to operationalize the principle of common but differentiated responsibility of countries in relation to these problems. Multilateral regimes and programmes responding to these global environmental issues must not adversely impact the development opportunities of developing countries. Further, the sharing of global natural resources must proceed only on the basis of equal sharing per-capita across all countries.

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7 *Hughes et. al. 2001: Environmental health in India: Priorities in Andhra Pradesh, Environment and Social Development Unit, South Asia Region, World Bank.*

The causes, proximate and deeper, of degradation of key environmental resources are discussed below (Sec. 5.2).

3. The Objectives of NEP 2004

The principal objectives of this policy are enumerated below. These objectives relate to current perceptions of key environmental challenges. They may, accordingly, evolve over time:

i. **Conservation of Critical Environmental Resources:**
To protect and conserve critical ecological systems and resources, and invaluable natural and man-made heritage which are essential for life-support, livelihoods, economic growth, and a broad conception of human well-being.

ii. **Intra-generational Equity: Livelihood Security for the Poor:**
To ensure equitable access to environmental resources and quality for all sections of society, and in particular, to ensure that poor communities, which are most dependent on environmental resources for their livelihoods, are assured secure access to these resources.

iii. **Inter-generational Equity:**
To ensure judicious use of environmental resources to meet the needs and aspirations of present and future generations.

iv. **Integration of Environmental Concerns in Economic and Social Development:**
To integrate environmental concerns into policies, plans, programmes, and projects for economic and social development.

v. **Efficiency in Environmental Resource Use:**
To ensure efficient use of environmental resources in the sense of reduction in their use per unit of economic output, to minimize adverse environmental impacts.

vi. **Environmental Governance:**
To apply the principles of good governance (transparency, rationality, accountability, reduction in time and costs, and participation) to the management and regulation of use of environmental resources.

vii. **Enhancement of Resources for Environmental Conservation:**
To ensure higher resource flows, comprising finance, technology, management skills, traditional knowledge, and social capital, for environmental conservation through mutually beneficial multistakeholder partnerships between local communities, public agencies, and investors.

4. Principles

The above objectives are to be realized through various strategic interventions by different public authorities at Central, State, and Local Government levels. They would also be the basis of partnerships between public agencies, local communities, and various economic actors. However, these strategic interventions, besides legislation and the evolution of legal doctrines for realization of the objectives, need to be premised on a core set of unambiguously stated principles. The following principles, accordingly, would guide the activities of different actors in relation to this policy. Each of these principles has an established genealogy in policy pronouncements, jurisprudence, international environmental law, or international State practice:

i. **Human beings are at the Centre of Sustainable Development Concerns:**
Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.

ii. **The Right to Development:**
The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations.

iii. **Environmental protection is an integral part of the development process:**
In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.

iv. **The Precautionary Approach:**
Where there are credible threats of serious or irreversible damage to key environmental resources, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

v. **Economic Efficiency:**
In various public actions for environmental conservation, economic efficiency would be sought to be realized.[8]

This principle requires that the services of environmental resources be given economic value, and such value to count equally with the economic values of other goods and services, in analysis of alternative courses of action.

Further implications of this principle are as follows:

a) "Polluter Pays": Impacts of acts of production and consumption of one party may be visited on third parties who do not have a direct economic

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8 *Economic efficiency refers to the maximization of welfare across all members of a society, given its human, natural, and manmade resources, its technology, and the preferences of its members. Welfare is reckoned as the aggregate of net value realized by each member of society, in his or her subjective perceptions, on a common monetary metric.*

nexus with the original act. Such impacts are termed "externalities". If the costs (or benefits) of the externalities are not re-visited on the party responsible for the original act, the resulting level of the entire sequence of production or consumption, and externality, is inefficient. In such a situation, economic efficiency may be restored by making the perpetrator of the externality bear the cost (or benefit) of the same.

The policy will, accordingly, promote the internalisation of environmental costs, including through the use of incentives based policy instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment.

b) Cost Minimization: Where the environmental benefits of a course of action cannot, for methodological or conceptual reasons, be imputed economic value (as in the case of "Incomparable Entities" [see below]), in any event the economic costs of realizing the benefits should be minimized.

Efficiency of resource use may also be accomplished by the use of policy instruments that create incentives to minimise wasteful use and consumption of natural resources. The principle of efficiency also applies to issues of environmental governance by streamlining processes and procedures in order to minimize costs and delays.

vi. **Entities with *"Incomparable"*[9] Values:**

Significant risks to human health, life, and environmental life-support systems, besides certain other unique natural and man-made entities, which may impact the well-being broadly conceived of large numbers of persons, may be considered as "Incomparable" in that individuals or societies would not accept these risks for compensation in money or conventional goods and services. A conventional economic cost-benefit calculus would not, accordingly, apply in their case, and such entities would have priority in allocation of societal resources for their conservation without consideration of direct or immediate economic benefit. [10]

vii. **Equity:**

The cardinal principle of equity or justice requires that human beings cannot be treated differently based on irrelevant differences between them. Equity norms must be distinguished according to context, i.e. "procedural equity", relating to fair rules for allocation of entitlements and obligations, and "end-result equity", relating to fair outcomes in terms of distribution of entitlements and obligations. Each context, in addition, must be distinguished in terms of "intra-generational equity", relating to justice within societies and in particular providing space for the participation of underprivileged men and women, and "inter-generational equity", relating to justice between generations.

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9 *Termed "Incommensurable Values" in the relevant academic literature.*

10 *Examples of "Incomparable Entities" are unique historical monuments such as the Taj Mahal; charismatic species such as the Tiger; or unique landscapes, such as the Valley of Flowers.*

Equity, in the context of this policy refers to both equity in entitlements to, and participation of the relevant publics in processes of decision-making over use of, environmental resources.

viii. Legal Liability:

Civil liability for environmental damage would deter environmentally harmful actions, and compensate the victims of environmental damage.

Conceptually, the principle of legal liability may be viewed as an embodiment in legal doctrine of the "polluter pays" approach, itself deriving from the principle of economic efficiency.

The following alternative approaches to legal liability may apply:

a) Fault based liability

In a fault based liability regime a party is held liable if it breaches a pre-existing legal duty, for example, an environmental standard.

b) Strict liability

Strict liability imposes an obligation to compensate the victim for harm resulting from actions or failure to take action, which may not necessarily constitute a breach of any law or duty of care.[11]

ix. Public Trust Doctrine:

The State is not an absolute owner, but merely a trustee of all natural resources, which are by nature meant for public use and enjoyment, subject to reasonable conditions, necessary to protect the legitimate interest of a large number of people, or for matters of strategic national interest.

x. Decentralisation:

Decentralization involves ceding or transfer of power from a Central Authority to State and Local Authorities, in order to empower public authorities having jurisdiction at the spatial level at which particular environmental issues are salient, to address these issues.

xi. Integration:

Integration refers to the inclusion of environmental considerations in sectoral policymaking, the integration of the social and natural sciences in environment related policy research, and the strengthening of relevant linkages among various agencies at the Central, State, and Local Self-Government, charged with the implementation of environmental policies.

xii. Environmental Standard Setting:

Environmental standards must reflect the economic and social development situation in which they apply. Standards adopted in one society or context may have unacceptable economic and social costs if applied without discrimination in another society or context.

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11 *In terms of the Supreme Court's decisions in Shriram Gas Leak case and the Bhopal gas leak case, strict liability applies whenever the liable party damages a third party.*

Setting environmental standards would involve several considerations, i.e. risks to human health, risks to other environmental entities, technical feasibility, costs of compliance, and strategic considerations.

xiii. Preventive Action:

It is preferable to prevent environmental damage from occurring in the first place, rather than attempting to restore degraded environmental resources after the fact.

xiv. Environmental Offsetting:

There is a general obligation to protect threatened or endangered species and natural systems that are of special importance to sustaining life, providing livelihoods, or general well-being. If for exceptional reasons of overriding public interest such protection cannot be provided in particular cases, cost-effective offsetting measures must be undertaken by the proponents of the activity to restore as nearly as may be feasible the lost environmental services to the same publics.

5. Strategies and Actions

The foregoing statement of policy objectives and principles are to be realized by concrete actions in different areas relating to key environmental challenges. A large number of such actions are currently under way, and have been for several years, in some cases, for many decades. In some aspects new themes would need to be pursued to realize the principles and objectives. The following strategic themes, and outlines of actions to be taken in each, focus on both ongoing activities, functions, and roles, as well as new initiatives that are necessary. However, they are not necessarily a complete enumeration in each case.

5.1 Regulatory Reforms:

The regulatory regimes for environmental conservation comprises a legislative framework, and a set of regulatory institutions. Inadequacies in each have resulted in accelerated environmental degradation on the one hand, and long delays and high transactions costs in development projects on the other. Apart from the legislation which is categorically premised on environmental conservation, a host of sectoral and cross-sectoral laws and policies, including fiscal regimes, also impact environmental quality (some of these are discussed in the succeeding sections).

5.1.1 Revisiting the Legislative Framework:

The present legislative framework is broadly contained in the umbrella Environment Protection Act 1986, the Water (Prevention and Control of Pollution) Act, 1974, the Water Cess Act 1977 and the Air (Prevention and Control of Pollution) Act, 1981. The law in respect of management of forests and biodiversity is contained in the Indian Forest Act 1927, the Forest (Conservation) Act 1980, the Wild Life (Protection) Act 1972 and the Bio-diversity Act 2003. There are several other enactments, which complement the provisions of these basic enactments.

The following specific actions would be taken:

a) Institutionalize a holistic and integrated approach to the management of environment and natural resources, explicitly identifying and integrating environmental concerns in relevant sectoral and cross-sectoral policies through review and consultation, in line with the NEP, 2004.

b) Identify emerging areas for new legislation, due to better scientific understanding, economic and social development, and development of multilateral environmental regimes, in line with NEP, 2004.

c) Review the body of existing legislation in order to develop synergies among relevant statutes and regulations, eliminate obsolescence, and amalgamate provisions with similar objectives, in line with NEP, 2004.

d) Ensure accountability of the concerned levels of Government (Centre, State, Local) in undertaking the necessary legislative changes in a defined time-frame, with due regard to the Objectives and Principles of NEP, 2004, in particular, ensuring the livelihood and well-being of the poor.

5.1.2 Process related reforms

(i) Approach :

The recommendations of the Committee on Reforming Investment Approval & Implementation Procedures (The Govindarajan Committee identified delays in environment and forest clearances as the largest source of delays in development projects - Appendix I), will be followed for reviewing the existing procedures for granting clearances and other approvals under various statutes and rules. These include the Environment Protection Act, Forest Conservation Act, the Water (Prevention and Control of Pollution) Act, the Air (Prevention and Control of Pollution) Act and Wildlife (Protection) Act, and Genetic Engineering Approval Committee (GEAC) Rules under the Environment Protection Act. The objective is to reduce delays and levels of decision-making, realize decentralization of environmental functions, and ensure greater transparency and accountability.

(ii) Framework for legal action

The present approach to dealing with environmentally unacceptable behaviour in India has been largely based on criminal processes and sanctions. Although criminal sanctions, if successful, may create a deterrent impact, in reality they are rarely fruitful for a number of reasons. On the other hand, giving lower level officials the power to institute criminal prosecutions may provide fertile opportunities for rent-seeking.

Civil law, on the other hand, offers flexibility, and its sanctions can be more effectively tailored to particular situations. The evidentiary burdens of civil

proceedings are less daunting than those of criminal law. It also allows for preventive policing through orders and injunctions to restrain prospective pollution.

Accordingly, a judicious mix of civil and criminal processes and sanctions will be employed in the legal regime for enforcement, through a review of the existing legislation. Civil liability law, civil sanctions, and processes would govern most situations of non-compliance. Criminal processes and sanctions would be available for serious, and potentially provable, infringements of environmental law, and their initiation would be vested in responsible authorities. Recourse may also be had to the relevant provisions in the Indian Penal Code, and the Criminal Procedure Code.

5.1.3 Substantive Reforms

(i) Environment and Forests clearances

In order to make the clearance processes more effective, the following actions will be taken:

a) Encourage regulatory authorities, Central and State, to institutionalise regional and cumulative environmental impact assessments (R/CEIAs) to ensure that environmental concerns are identified and addressed at the planning stage itself.

b) Give due consideration, to the quality and productivity of lands which are proposed to be converted for development activities, as part of the clearance process. Projects involving large-scale diversion of prime agricultural land would require environmental clearance whether or not the proposed activity otherwise requires environmental clearance.

c) Encourage clustering of industries and other development activities to facilitate setting up of environmental management infrastructure, as well as monitoring and enforcing environmental compliance. Emphasize post-project monitoring and implementation of environmental management plans through participatory processes, involving the government, industry, and the potentially impacted community.

d) Prohibit the diversion of dense natural forests to non-forest use, except in site-specific cases of vital national interest. No further regularisation of encroachment on forests should be permitted.

(ii) Coastal Areas:

Development activities in the coastal areas are regulated by means of the Coastal Regulation Zone notifications and Integrated Coastal Zone Management (ICZM) Plans made under them. However, there is need to ensure that the regulations are firmly founded on scientific principles, in order to ensure effective protection to valuable coastal environmental resources, without unnecessarily impeding livelihoods, or legitimate coastal economic activity, or settlements, or infrastructure development.

The following actions would be taken:

a) Revisit the Coastal Regulation Zone (CRZ) notifications to make the approach to coastal environmental regulation more holistic, and thereby ensure protection to coastal ecological systems, coastal waters, and the vulnerability of some coastal areas to potential sea level rise. The Integrated Coastal Zone Management (ICZM) Plans need to be comprehensive, and prepared on scientific basis, with the participation of the local communities both in formulation and implementation. The ICZM Plans should be reviewed at pre-determined intervals to take account of changes in geomorphology, economies, and settlement patterns.

b) Decentralize, to the extent feasible, the clearance of specific projects to State environmental authorities, exempting activities, which do not cause significant environmental impacts, and are consistent with approved ICZM Plans.

(iii)Living Modified Organisms (LMOs):[12]

Biotechnology has an immense potential to enhance livelihoods and contribute to the economic development of the country. On the other hand, LMOs may pose significant risks to ecological resources, and perhaps, human and animal health. In order to ensure that development of biotechnology does not lead to unforeseen adverse impacts, the following actions will be taken:

a) Review the regulatory processes for LMOs so that all relevant scientific knowledge is taken into account, and ecological, health, and economic concerns are adequately addressed.

b) Periodically review the National Bio-safety guidelines and Bio-safety Operations Manual to ensure that these are based on current scientific knowledge.

c) Ensure the conservation of bio-diversity and human health when dealing with LMOs in transboundary movement in a manner consistent with the Multilateral Bio-safety Protocol.

(iv)Environmentally Sensitive Zones:

Environmentally Sensitive Zones may be defined as areas with identified environmental resources with "Incomparable Values" which require special attention for their conservation. In order to conserve and enhance these resources, without impeding legitimate socio-economic development of these areas, the following actions will be taken:

a) Identify and give legal status to Environmentally Sensitive Zones in the country with environmental entities with "Incomparable values" requiring special conservation efforts.

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12 *In general, Genetically Modified Organisms require evaluation of their potential benefits and harms as part of relevant regulatory processes. The subset of LMOs, may, however, owing t0 their potential for replication, involve environmental concerns.*

b) Formulate area development plans for these zones on a scientific basis, with adequate participation by the local communities.

c) Create local institutions with adequate participation for the environmental management of such areas to ensure adherence to the approved area development plans, which should be prepared in consultation with the local communities.

(v) Monitoring and Enforcement:

Weak enforcement of environmental compliance is attributed to inadequate technical capacities, monitoring infrastructure, and trained staff in enforcement institutions. In addition, there is insufficient involvement of the potentially impacted local communities in the monitoring of compliance, and absence of institutionalised public-private partnerships in enhancement of monitoring infrastructure.

The following actions would be taken:

a) Give greater legal standing to local community based organizations to undertake monitoring of environmental compliance, and report violations to the concerned enforcement authorities.

b) Develop feasible models of public-private partnerships to leverage financial, technical, and management resources of the private sector in setting up and operating infrastructure for monitoring of environmental compliance, with ironclad safeguards against possible conflict of interest or collusion with the monitored entities.

(vi) Use of economic principles in environmental decision-making:

It is necessary that the costs associated with the degradation and depletion of natural resources be incorporated into the decisions of economic actors at various levels to reverse the tendency to treat these resources as "free goods" and to pass the costs of degradation to other sections of society, or to future generations of the country.

At the macro-level, a system of natural resource accounting is required to assess whether in the course of economic growth we are drawing down, or enhancing, the natural resource base of production, including all relevant depletable assets. In addition, the environmental costs and benefits associated with various activities, including sectoral policies, should be evaluated to ensure that these factors are duly taken into account in decision-making.

The current near exclusive reliance on fiats based instruments for environmental regulation do not permit individual actors to minimize their own costs of compliance. This leads, on the one hand, to non-compliance in many cases, and on the other, unnecessary diversion of societal resources from other pressing needs. Economic instruments, of which a large, feasible suite has emerged through practical experience in several developed and developing countries, work by aligning the interests of economic actors with

environmental compliance, primarily through application of "polluter pays". This may ensure that for any given level of environmental quality desired, the society-wide costs of meeting the standard are minimized. However, in some cases, use of economic instruments may require intensive monitoring, which too may entail significant societal costs. On the other hand, use of existing policy instruments, such as the fiscal regime, may significantly reduce or eliminate the need for enhanced institutional capacities to administer the incentive based instruments. In future, accordingly, a judicious mix of incentives based and fiats based regulatory instruments would be considered for each specific regulatory situation.

The following actions would be taken:

a) Strengthen the initiatives being taken by the Central Statistical Organization in the area of natural resource accounting with a view to its adoption in the system of national income accounts.

b) Develop and promote the use of standardized environmental accounting practices and standards in preparation of statutory financial statements for large industrial enterprises, in order to encourage greater environmental responsibility in investment decision-making, management practices, and public scrutiny.

c) Encourage financial institutions to adopt appraisal practices, so that environmental risks are adequately considered in the financing of projects.

d) Facilitate the integration of environmental values into cost-benefit analysis to encourage more efficient allocation of resources while making public investment and policy decisions.

e) Prepare and implement an action plan on the use of economic instruments for environmental regulation in specified contexts.

5.2 Enhancing and Conserving Environmental Resources:

Perverse production and consumption practices are the immediate causes of environmental degradation, but an exclusive focus on these aspects alone is insufficient to prevent environmental harm. The causes of degradation of environmental resources lie ultimately in a broad range of policy, and institutional, including regulatory shortcomings, leading to the direct causes. However, the range of policies, and legal and institutional regimes, which impact the proximate factors, is extremely wide, comprising fiscal and pricing regimes, and sectoral and cross-sectoral policies, laws, and institutions. Accordingly, apart from programmatic approaches, review and reform of these regimes to account for their environmental consequences is essential. In addition, there is lack of awareness of the causes and effects of environmental degradation, and how they may be prevented, among both specialized practitioners of the relevant professions, including policymakers, as well as the general public, which needs to be redressed. In this subsection, in respect of major categories of environmental resources, the

proximate and deeper causes of their degradation, and specific initiatives for addressing them are outlined.

5.2.1 Land Degradation:

The degradation of land, through soil erosion, alkali-salinization, water logging, pollution, and reduction in organic matter content has several proximate and underlying causes. The proximate causes include loss of forest and tree cover (leading to erosion by surface water run-off and winds), excessive use of irrigation (in many cases without proper drainage, leading to leaching of sodium and potassium salts), improper use of agricultural chemicals (leading to accumulation of toxic chemicals in the soil), diversion of animal wastes for domestic fuel (leading to reduction in soil nitrogen and organic matter), and disposal of industrial and domestic wastes on productive land. These in turn, are driven by implicit and explicit subsidies for water, power, fertilizer and pesticides, and absence of conducive policies and regulatory systems to enhance people's incentives for afforestation and forest conservation. It is essential that the relevant fiscal, tariffs, and sectoral policies take explicit account of their unintentional impacts on land degradation, if the fundamental basis of livelihoods for the vast majority of our people is not to be irreparably damaged. In addition, to such policy review, the following specific initiatives would be taken:

a) Encourage adoption of science-based, and traditional sustainable land use practices through research and development, pilot scale demonstrations, and large scale dissemination, including farmer's training, and where necessary, access to institutional finance.

b) Promote reclamation of wasteland and degraded forestland through formulation and adoption of multistakeholder partnerships involving the land owning agency, local communities, and investors.

c) Prepare and implement thematic action plans for arresting and reversing desertification.

5.2.2 Forests and Wildlife:

(i) Forests:

Forests provide a multiplicity of environmental services. Foremost among these is the recharging of mountain aquifers, which sustain our rivers. They also conserve the soil, and prevent floods and drought. They provide habitat for wildlife and the ecological conditions for maintenance and natural evolution of genetic diversity of flora and fauna. They are the traditional homes of forest dwelling tribals, the major part by far of whose livelihoods depend on forests. They yield timber, fuel-wood, and other forest produce, and possess immense potential for economic benefits, in particular for local communities, from sustainable eco-tourism.

On the other hand, in recent decades, there has been significant loss of forest cover, although there are now tangible signs of reversal of this trend. The principal direct cause of forest loss has been the conversion of forests

for agriculture, settlements, infrastructure, and industry. In addition, commercial extraction of fuel-wood, illegal felling, and grazing of cattle, has degraded forests. These causes, however, have their origins in the fact that the environmental values provided by forests are not realized as direct financial benefits by various parties, at least to the extent of exceeding the monetary incomes from alternative uses, including those arising from illegal use. Moreover, while since antiquity forest dwelling tribes had generally recognized traditional community rights over the forests, on account of which they had strong incentives to use the forests sustainably and to protect them from encroachers, following the commencement of formal forest laws and institutions in 1865, these rights were effectively extinguished in many parts of the country. Such disempowerment has led to the forests becoming open access in nature, leading to their gradual degradation in a classic manifestation of the "*Tragedy of the Commons*", besides leading to perennial conflict between the tribals and the Forest Department, and constituting a major denial of justice.

It is possible that some site-specific non-forest activities may yield overall societal benefits significantly exceeding that from the environmental services provided by the particular tract of forest. However, large scale forest loss would lead to catastrophic, permanent change in the country's ecology, leading to major stress on water resources and soil erosion, with consequent loss of agricultural productivity, industrial potential, living conditions, and the onset of natural disasters including drought and floods. In any event, the environmental values of converted forests must be restored, as nearly as may be feasible, to the same publics.

The National Forest Policy, 1988, and the Indian Forest Act, as well as the regulations under it, provide a comprehensive basis for forest conservation. However, it is necessary, looking to some of the underlying causes of forest loss, to take some further steps. These include:

a) Give legal recognition of the traditional rights of forest dwelling tribes. This would remedy a serious historical injustice, secure their livelihoods, reduce possibilities of conflict with the Forest Departments, and provide long-term incentives to the tribals to conserve the forests.

b) Formulate an innovative strategy for increase of forest and tree cover from the present level of 23 percent of the country's land area, to 33 percent in 2012, through afforestation of degraded forest land, wastelands, and tree cover on private or revenue land. Key elements of the strategy would include: (i) the implementation of multistakeholder partnerships involving the Forest Department, local communities, and investors, with clearly defined obligations and entitlements for each partner, following good governance principles, to derive environmental, livelihood, and financial benefits; (ii) rationalization of restrictions on cultivation of forest species outside notified forests, to enable farmers to undertake social and farm forestry where their returns are more favourable than cropping, and (iii) universalization of the Joint Forestry Management (JFM) system throughout the country.

c) Focus public investments on enhancing the density of natural forests, mangroves conservation, and universalization of Joint Forestry Management.

d) Formulate an appropriate methodology for reckoning and restoring the environmental values of forests, which are unavoidably diverted to other uses.

e) Formulate and implement a "Code of Best Management Practices" for dense natural forests to realize the Objectives and Principles of NEP, 2004.

(ii) Wildlife:

The status of wildlife in a region is an accurate index of the state of ecological resources, and thus of the natural resource base of human well being. This is because of the interdependent nature of ecological entities *("the web of life")*, in which wildlife is a vital link.[13] Moreover, several charismatic species of wildlife embody "Incomparable Values", and at the same time, are a major resource base for sustainable eco-tourism.

Conservation of wildlife, accordingly, involves the protection of entire ecosystems. However, in several cases, delineation of and restricting access to such Protected Areas[14] (PAs), as well as encroachment of human settlements on these areas has led to man-animal conflicts. While physical barriers may temporarily reduce such conflict, it is preferable to address their underlying causes. These may largely arise from the non-involvement of relevant stakeholders in identification and delineation of PAs.

In respect of Wildlife Conservation, the following elements would be pursued:

a) Expand the Protected Area (PA) network of the country, including Conservation and Community Reserves, to give fair representation to all bio-geographic zones of the country. In doing so, develop norms for delineation in terms of the Objectives and Principles of NEP, 2004, in particular, participation of local communities, concerned public agencies, and other stakeholders, to harmonize ecological and physical features with needs of socio-economic development. It must be ensured that the overall area of the network, in each bio-geographic zone would increase in the process.

b) Paralleling multistakeholder partnerships for afforestation, formulate and implement similar partnerships for enhancement of wildlife habitat in Conservation Reserves and Community Reserves, to derive both environmental and eco-tourism benefits.

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13 *For example, the presence of predators ("tigers") indicates that the prey base ("deer") is sound, in turn indicating that the vegetative cover ("grass") is healthy, for which the conservation of soil, water, and absence of pollution is essential. The last indicate conditions conducive to human health and livelihoods.*

14 *Protected Areas may include forest as well as non-forest ecosystems, e.g. deserts, marine sanctuaries, etc.*

c) Promote site-specific eco-development programmes in fringe areas of PAs, to restore livelihoods and access to forest produce by local communities owing to access restrictions in PAs.

d) Strengthen capacities and implement measures for captive breeding and release into the wild identified endangered species.

5.2.3. Biodiversity, Traditional Knowledge, and Natural Heritage:

Biodiversity, comprises both genetic and ecosystems diversity. Loss of biodiversity is primarily due to degradation or alteration of ecosystems, in particular the habitats of site-specific species. Damage to such habitats arises from land degradation, forest loss, conversion of wetlands, pollution of and excessive water drawals from rivers, and loss of coastal ecosystems, the reasons for which have been discussed separately. Conservation of genetic diversity, in particular, is crucial for development of improved crop varieties resistant to particular stresses, new pharma products, etc., apart from ensuring the resilience of ecosystems. However, it is presently difficult to foresee the future potential of any particular genetic resource, and accordingly economic values are uncertain. Traditional Knowledge (TK), referring to ethno-biology knowledge possessed by local communities, relates to uses of various indigenous plant and faunal varieties, including in traditional medicine, food, etc., and is potentially an important means of unlocking the value of genetic diversity through reduction in search costs.

Natural heritage sites, including endemic "biodiversity hotspots", sacred groves and landscapes, are repositories of significant genetic and eco-system diversity, and the latter are also important bases for eco-tourism. They are nature's laboratories for evolution of wild species in response to change in environmental conditions.

India is fortunate in having, through the efforts of dedicated scientists over many decades,[15] developed vast inventories of floral and faunal resources, as well as ethno-biology knowledge. India is, thus well-placed to tap this enormous resource base for benefits for the country as a whole, and local communities in particular, provided that the genetic resources are conserved, and appropriate Intellectual Property Rights (IPRs) conferred on local communities in respect of their ethno-biology knowledge.

A large-scale exercise has been completed for providing inputs towards a National Biodiversity Action Plan. These inputs would be reviewed in terms of the Objectives and Principles of NEP, 2004, scientific validity, financial and administrative feasibility, and legal aspects. In any event, the following measures would be taken:

a) Strengthen the protection of areas of high endemism of genetic resources ("biodiversity hot spots"), while providing alternative livelihoods and access to resources to local communities who may be affected thereby.

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15 *For example, in institutions such as Botanical Survey of India (BSI), the Zoological Survey of India (ZSI), the Bombay Natural History Society (BNHS), and others.*

b) Pay explicit attention to the potential impacts of development projects on biodiversity resources and natural heritage. In appraisal of such projects by cost-benefit analysis, assign values to biodiversity resources at or near the upper end of the range of uncertainty. In particular, ancient sacred groves and "biodiversity hotspots" should be treated as possessing "Incomparable Values".

c) Enhance *ex-situ* conservation of genetic resources in designated gene banks across the country. Genetic material of threatened species of flora and fauna must be conserved on priority.

d) Formulate and adopt an internationally recognized system of legally enforceable *sui-generis* intellectual property rights for the country's genetic resources, to enable the country, including where relevant the local communities, to derive economic benefits from grant of access to these resources.

e) Similarly, formulate and adopt an internationally recognized system of legally enforceable *sui-generis* intellectual property rights for ethno-biology knowledge, to enable local communities to realize significant financial benefits from permitting the use of such knowledge. Set up an on-line database of the inventory of such ethno-biology knowledge, once the legal regime, domestic and multilateral, for their protection is in place.

5.2.4 Freshwater Resources:

India's freshwater resources comprise the single most important class of natural endowments enabling its economy and its human settlement patterns. The freshwater resources comprise the river systems, groundwater, and wetlands. Each of these has a unique role, and characteristic linkages to other environmental entities.

(i) River Systems:

India's river systems typically originate in its mountain eco-systems, and deliver the major part of their water resources to the populations in the plains. They are subject to siltation from sediment loads due to soil loss, itself linked to loss of forest and tree cover. They are also subject to significant net water withdrawals along their course, due to agricultural, industrial, and municipal use; as well as pollution from human and animal waste, agricultural run-offs, and industrial effluents. Although the rivers possess significant natural capacity to assimilate and render harmless many pollutants, the existing pollution inflows in most cases substantially exceed such natural capacities. This fact, together with progressive reductions in stream flows, ensures that the river water quality in the vast majority of cases declines as one goes downstream. The results include loss of aquatic flora and fauna, leading to loss of livelihoods for river fisherfolk, significant impacts on human health from polluted water, loss of habitat for many bird species, and loss of inland navigation potential. Apart from these, India's rivers are inextricably linked with the history and religious beliefs of its peoples, and the degradation of important river systems accordingly offends their spiritual, aesthetic, and cultural sensibilities.

The broad direct causes of rivers degradation are, in turn, linked to several policies and regulatory regimes. These include tariff policies for irrigation systems and industrial use, which, through inadequate cost-recovery, provide incentives for overuse near the headwork's of irrigation systems, and drying up of irrigation systems at the tail-ends. The result is excessive cultivation of water intensive crops near the headwork's, which is otherwise inefficient, waterlogging, and alkali-salinization of soil. The irrigation tariffs also do not yield resources for proper maintenance of irrigation systems, leading to loss in their potential; in particular, resources are generally not available for lining irrigation canals to prevent seepage loss. These factors result in reduced flows in the rivers. Pollution loads are similarly linked to pricing policies leading to inefficient use of agricultural chemicals, and municipal and industrial water use. In particular, revenue yields for the latter two are insufficient to install and maintain sewage and effluent treatment plants, respectively. Pollution regulation for industries is typically not based on formal spatial planning to facilitate clustering of industries to realize scale economies in effluent treatment, resulting in relatively high costs of effluent treatment, and consequent increased incentives for non-compliance. There is, accordingly need to review the relevant pricing policy regimes and regulatory mechanisms in terms of their likely adverse environmental impacts.

The following comprise elements of an action plan for river systems:

a) Promote integrated approaches to management of river basins by the concerned river authorities, considering upstream and downstream inflows and withdrawals by season, pollution loads and natural regeneration capacities, to ensure maintenance of adequate flows and adherence to water quality standards throughout their course in all seasons.

b) Consider and mitigate the impacts on river flora and fauna, and the resulting change in the resource base for livelihoods, of multipurpose river valley projects, power plants, and industries.

c) Consider mandating the installation of water saving closets and taps in the building byelaws of urban centres.

(ii) Groundwater:

Groundwater is present in underground aquifers in many parts of the country. Aquifers near the surface are subject to annual recharge from precipitation, but the rate of recharge is impacted by human interference. Deep aquifers, on the other hand, occur below a substratum of hard rock. The deep aquifers generally contain very pure water, but since they are recharged only over many millennia, must be conserved for use only in periods of calamitous drought such as may happen only once in several hundred years. The boundaries of groundwater aquifers do not generally correspond to the spatial jurisdiction of any local public authorities or private holdings, nor are they easily discernable, nor can withdrawals be easily

monitored, leading to the unavoidable situation of groundwater being an open access resource.

The water table has been falling rapidly in many areas of the country in recent decades. This is largely due to withdrawal for agricultural, industrial, and urban use, in excess of annual recharge. In urban areas, apart from withdrawals for domestic and industrial use, housing and infrastructure such as roads, prevent sufficient recharge. In addition, some pollution of groundwater occurs due to leaching of stored hazardous waste and use of agricultural chemicals, in particular, pesticides. Contamination of groundwater is also due to geogenic causes, such as leaching of arsenic from natural deposits. Since groundwater is frequently a source of drinking water, its pollution leads to serious health impacts.

The direct causes of groundwater depletion have their origin in the pricing policies for electricity and diesel. In the case of electricity, where individual metering is not practiced, a flat charge for electricity connections makes the marginal cost of electricity effectively zero. Subsidies for diesel also reduce the marginal cost of extraction to well below the efficient level. Given the fact that groundwater is an open access resource, the user then "rationally" (i.e. in terms of his individual perspective), extracts groundwater until the marginal value to him equals his now very low marginal cost of extraction.[16] The result is inefficient withdrawals of groundwater by all users, leading to the situation of falling water tables. Support prices for several water intensive crops with implicit price subsidies aggravate this outcome by strengthening incentives to take up these crops rather than less water intensive ones.

Falling water tables have several perverse social impacts, apart from the likelihood of mining of deep aquifers, "*the drinking water source of last resort*". The capital costs of pump sets and bore wells for groundwater extraction when water tables are very deep may be relatively high, with no assurance that water would actually be found. In such a situation, a user who may be a marginal farmer able to borrow the money only at usurious rates of interest, may, in case water is not found, find it impossible to repay his debts. This may lead to destitution, or worse. Even if the impacts were not so dire, there would be excessive use of electricity and diesel.

The efficient use of groundwater would, accordingly, require that the practice of non-metering of electric supply to farmers be discontinued in their own enlightened self-interest. It would also be essential to progressively ensure that the environmental impacts are taken into account in setting electricity tariffs, and diesel pricing.

Increased run-off of precipitation in urban areas due to impermeable structures and infrastructure prevents groundwater recharge. This is an additional cause of falling water tables in urban areas. In rural areas several cost-effective contour bunding techniques have been proven to enhance

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16 *The marginal cost of extraction equals the marginal cost to the farmer of power ("zero") or diesel, and a small labour and depreciation cost. The capital cost of a bore well as well as the flat rate connection charge are sunk costs and do not count in the marginal cost of water.*

groundwater recharge. A number of effective traditional water management techniques to recharge groundwater have been discontinued by the local communities due to the onset of pump sets extraction, and need to be revived. Finally, increase in tree cover, is also effective in enhancing groundwater recharge.

Pollution of groundwater from agricultural chemicals is also linked to their improper use, once again due to pricing policies, especially for chemical pesticides, as well as agronomic practices, which do not take the potential environmental impacts into account. While transiting through soil layers may considerably eliminate organic pollution loads in groundwater, this is not true of several chemical pesticides.

The following action points emerge:

a) Take explicit account of impacts on groundwater tables of electricity tariffs and pricing of diesel.

b) Promote efficient water use techniques, such as sprinkler or drip irrigation, among farmers. Provide necessary pricing, inputs, and extension support to feasible and remunerative alternative crops from efficient water use.

c) Support practices of contour bunding and revival of traditional methods for enhancing groundwater recharge.

d) Mandate water harvesting in all new constructions in relevant urban areas, as well as design techniques for road surfaces and infrastructure to enhance groundwater recharge.

e) Support R&D in cost effective techniques suitable for rural drinking water projects for removal of arsenic and mainstream their adoption in rural drinking water schemes in relevant areas.

(ii) Wetlands:

Wetlands, natural and manmade, freshwater or brackish, provide numerous ecological services. They provide habitat to aquatic flora and fauna, as well as numerous species of birds, including migratory species. The density of birds, in particular, is an accurate indication of the ecological health of a particular wetland. Several wetlands have sufficiently unique ecological character as to merit international recognition as Ramsar Sites.[17]

Wetlands also provide freshwater for agricultural and domestic use, help groundwater recharge, and provide livelihoods to fisher-folk. They may also comprise an important resource for sustainable tourism and recreation.[18] They may be employed as an alternative to power, technology, and capital intensive municipal sewage plants; however, if used for this purpose without proper reckoning of their assimilative capacity, or for dumping of solid and

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17 *For example, the Chilka Lake and the East Kolkata Wetlands.*

18 *For example, the Dal Lake (Srinagar), the Otacamund Lake, and the Nainital Lake.*

hazardous waste, they may become severely polluted, leading to adverse health impacts. The inadvertent introduction of some alien species of flora in wetlands[19] have also degraded their ecology.

Wetlands are under threat from drainage and conversion for agriculture and human settlements, besides pollution. This happens because public authorities or individuals having jurisdiction over wetlands derive little revenues from them, while the alternative use may result in windfall financial gains to them. However, in many cases, the economic values of wetlands' environmental services may significantly exceed the value from alternative use. On the other hand, the reduction in economic value of their environmental services due to pollution, as well as the health costs of the pollution itself, are not taken into account while using them as a waste dump. There also does not yet exist a formal system of wetland regulation outside the international commitments made in respect of Ramsar sites.

The following action points emerge:

a) Set up a legally enforceable regulatory mechanism for identified valuable wetlands to prevent their degradation and enhance their conservation. Develop a national inventory of such wetlands.

b) Formulate conservation and prudent use strategies for each significant catalogued wetland, with participation of local communities, and other relevant stakeholders.

c) Formulate and implement eco-tourism strategies for identified wetlands through multistakeholder partnerships involving public agencies, local communities, and investors.

d) Take explicit account of impacts on wetlands of significant development projects during the environmental appraisal of such projects; in particular, the reduction in economic value of wetland environmental services should be explicitly factored into cost-benefit analyses.

e) Consider particular unique wetlands as entities with "Incomparable Values", in developing strategies for their protection.

5.2.5 Mountain Ecosystems:

Mountain ecosystems play a key role in providing forest cover, feeding perennial river systems, conserving genetic diversity, and providing an immense resource base for livelihoods through sustainable tourism. At the same time, they are among the most fragile of ecosystems in terms of susceptibility to anthropogenic shocks. There has been significant adverse impact on mountain ecosystems by way of deforestation, submergence of river valleys, pollution of freshwater sources, despoliation of landscapes, degradation of human habitat, loss of genetic diversity, retreat of glaciers, and pollution. The most significant proximate causes of these are illegal logging and commercial fuel wood collection, besides faulty construction of

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[19] *e.g. Water Hyacinth.*

infrastructure such as roads, power transmission lines and large dams, unplanned urbanization and lack of enforcement of building bye-laws, absence or disrepair of sanitation systems, setting up of polluting industries, climate change, and excessive use of agricultural chemicals. The underlying causes relate to absence of conducive policies to enable local communities to derive adequate financial returns from afforestation and non-consumptive use of forest resources, pricing policies for agricultural chemicals, inadequate enforcement of pollution standards, poor institutional capacities for urban and regional planning and municipal regulatory functions, and preparation of environmental impact assessments of infrastructure; besides absence of consensus on means of financing municipal infrastructure. Clearly, there is need to address these shortcomings through review of the relevant sectoral and cross-sectoral policies, and institutional capacity building. Additionally, the following elements of an Action Plan would be taken up:

a) Adopt "best practice" norms for infrastructure construction in mountain regions to avoid or minimize damage to sensitive ecosystems and despoiling of landscapes.

b) Encourage cultivation of traditional varieties of crops and horticulture by promotion of organic farming, enabling farmers to realize a price premium.

c) Promote sustainable tourism through adoption of "best practice" norms for tourism facilities and access to ecological resources, and multistakeholder partnerships to enable local communities to gain better livelihoods, while leveraging financial, technical, and managerial capacities of investors.

d) Consider particular unique mountainscapes as entities with "Incomparable Values", in developing strategies for their protection.

5.2.6 Coastal Resources:

Coastal environmental resources comprise a diverse set of natural and manmade assets, including mangroves, coral reefs, estuaries, coastal forests, genetic diversity, sand dunes, geomorphologies, sand beaches, land for agriculture and human settlements, coastal infrastructure, and heritage sites. These provide habitats for marine species, which, in turn comprise the resource base for large numbers of fisherfolk, protection from extreme weather events, a resource base for sustainable tourism, and agricultural and urban livelihoods. In recent years there has been significant degradation of coastal resources, for which the proximate causes include poorly planned human settlements, improper location of industries and infrastructure, pollution from industries and settlements, and overexploitation of living natural resources. In the future, sea level rise due to climate change may have major adverse impacts on the coastal environment. The deeper causes of these proximate factors lie in inadequate institutional capacities for, and participation of local communities in, formulation and implementation of coastal management plans, the open access nature of many coastal

resources, and lack of consensus on means of provision of sanitation and waste treatment. The following further aspects may be addressed in an action plan:

a) Mainstream the sustainable management of mangroves into the forestry sector regulatory regime, ensuring that they continue to provide livelihoods to local communities.

b) Disseminate available techniques for regeneration of coral reefs, and support activities based on application of such techniques.

c) Embody considerations of sea-level rise in coastal management plans, as well as infrastructure planning and construction norms.

5.2.7 Pollution Abatement:

Pollution is the inevitable[20] generation of waste streams from the production and consumption of anything. Pollution directly impacts the quality of the receiving medium, i.e. air, water, soil, or electromagnetic spectrum, and when this impaired medium acts upon a receptor, say, a living being, also impacts the receptor. In general, the impacts on the receptor are adverse, but not always.[21] Typically, ecosystems have some natural capacities to assimilate pollution; however, these vary considerably with the nature of the pollutant and the ecosystem. In general, it is cheaper to reduce the emissions of pollution, than to mitigate it after generation, or to treat the receiving medium or receptor. The impacts of pollution may differentially impact the poor, or women, or children, or developing regions, who may also have relatively low contributions to its generation, and accordingly the costs and benefits of abatement may have important implications for equity.

(i) Air Pollution:

Air pollution may have adverse impacts on human health, as well the health of other living entities, manmade heritage, and life-support systems, such as global climate. Depending upon the lifetime of the pollutants, the location of the source, and the prevailing air currents, the receptors may be located at homestead, local, regional, or global levels, at time intervals from near instantaneous, to several decades.

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20 *"Inevitable", as a consequence of the operation of a fundamental natural law, that of increase in entropy of systems taken together with their surroundings, a derivation from the second law of thermodynamics. "Inevitable", however does not mean that waste generation cannot be reduced (upto a point) within the limits of the natural law.*

21 *For example, several organic waste streams may have adverse impacts on human health if ingested, but may have value as plant fertilizer.*

The direct causes of air pollution are emissions from the use of fossil energy, and other industrial processes, and some consumption activities.[22] The deeper causes arise in a multiplicity of policy, and institutional, including regulatory shortcomings, in particular, inefficient pricing of fossil fuel based energy. Indoor air pollution, a special case, arises from the low societal status of women, leading to continued use of polluting, inefficient biomass stoves, besides pricing policies for agricultural chemicals which lead to substitution of biomass based fertilizer by chemicals, the biomass then being used inefficiently as fuel. These deeper causes need to be addressed through policies and programmes for redressing women's status, and dialogue aimed at consideration of the environmental impacts of pricing policies for agricultural chemicals.

In addition, the following specific actions need to be taken:

a) Accelerate the national programmes of dissemination of improved fuel wood stoves, and solar cookers, suited to local cooking practices.

b) Strengthen the monitoring and enforcement of emission standards for both point and non-point sources, with participation in monitoring by the local communities.

c) Prepare and implement action plans for major cities for addressing air pollution for both point and non-point sources, relying on a judicious combination of fiats and incentive based instruments.

d) Formulate a national strategy for urban transport to ensure adequate investment, public and private, in low-pollution mass transport systems.

e) Promote reclamation of wastelands by energy plantations for rural energy through multistakeholder partnerships involving the land owning agencies, local communities, and investors.

(ii) Water Pollution:

The direct and indirect causes of pollution of surface (river, wetlands) water sources, groundwater, and coastal areas have been discussed above. The following comprise further elements of an action plan:

a) Develop and implement, initially on a pilot scale, public-private partnership models for setting up and operating effluent and sewage treatment plants. Once the models are validated, progressively use public resources, including external assistance, to catalyze such partnerships. Enhance the capacities of municipalities for recovery of user charges for water and sewage systems.

b) Enhance reuse of treated sewage and industrial wastewater before final discharge to water bodies.

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22 *For example, noise, smoking, cars.*

c) Enhance capacities for spatial planning among the State and Local Governments, with adequate participation by local communities, to ensure clustering of polluting industries to facilitate setting up of common effluent treatment plants to be operated on cost recovery basis.

d) Promote R&D in development of low cost technologies for sewage treatment at different scales, in particular, replication of the East Kolkata wetlands model for sewage treatment to yield multiple benefits.

e) Take explicit account of groundwater pollution in pricing policies of agricultural inputs, especially pesticides, and dissemination of agronomy practices involving their use.

f) Develop a strategy for strengthening regulation, and addressing impacts, of ship-breaking activities on coastal and near marine resources.

(iii) Soil Pollution:

Similarly, the immediate and deeper causes of soil pollution have been considered above. The following are elements of an action plan:

a) Develop and implement viable models of public-private partnerships for setting up and operating secure landfills and incinerators for toxic and hazardous waste, both industrial and biomedical, on payment by users, taking the concerns of local communities into account. The concerned local communities and State Governments must have clear entitlements to specified benefits from hosting such sites, if access is given to non-local users.

b) Develop and implement strategies for clean up of pre-existing toxic and hazardous waste dumps, in particular, in industrial areas, and reclamation of such lands for future, sustainable use.

c) Strengthen the capacities of local bodies for segregation, recycling, and reuse of municipal solid wastes, and setting up and operating sanitary landfills, in particular through competitive outsourcing of solid waste management services.

d) Give legal recognition to, and strengthen the informal sector systems of collection and recycling of various materials; in particular enhance their access to institutional finance and relevant technologies.

e) Promote organic farming of traditional crop varieties through research in and dissemination of techniques for reclamation of land with prior exposure to agricultural chemicals, facilitating marketing of organic produce[23] in India and abroad, including by development of transparent, voluntary, science-based labelling schemes.

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23 *There is considerable evidence of consumer preference for organic produce, which thereby may command a substantial premium.*

f) Develop and implement strategies for recycle, reuse, and final environmentally benign disposal of plastics wastes, including through promotion of relevant technologies, and use of incentive based instruments.

(iv) Noise Pollution:
Persistent exposure to elevated noise levels has been established to result in significant adverse health impacts. While in many instances, the identification of a particular sound as "noise" is unambiguous, in the case of others, such as "music" or "chanting" or "fireworks displays", it is inherently subjective. In all such cases, societal well-being would require that exposure levels to third parties be maintained below levels at which significant adverse health impacts may occur. At the same time, it needs to be understood that certain environments in which people choose to live and work necessarily involve a certain level of noise. The following would comprise elements of an Action Plan on abatement of noise pollution:

a) Make appropriate distinctions between different environments in terms of setting ambient noise standards, e.g. rural versus urban; educational and medical establishments versus other areas; night-time versus daytime in residential areas; areas in the vicinity of road, rail, and airport infrastructure; etc.

b) Distinguish between noise standards and protection measures in the context of occupational exposure, and environmental exposure to third parties.

c) Formulate noise emissions norms (e.g. loudspeaker, automobile horns, fireworks ratings) appropriate to various activities to ensure that exposure levels to third parties who are not participants in the activity do not exceed prescribed ambient standards.

d) Encourage dialogue between State/Local Authorities and religious/community representatives on the adoption of enforceable specific durations, timings, and use of loudspeakers/fireworks, etc. in case temporary exceedance of prescribed ambient noise standards for observance of traditional religious/cultural/social events cannot be avoided.

5.2.8 Conservation of Manmade Heritage:
Manmade heritage reflects the prehistory, history, ways of living, and culture, of a people. In the case of India, such heritage is at the core of our national identity. At the same time, considerable economic value, and livelihoods may be derived from conservation of manmade heritage and their sustainable use, through realization of their tourism potential.

The criteria for, and processes of identification of heritage sites, besides legislation and fiscal measures to ensure that they are not damaged or converted by direct human interference, are outside the scope of the NEP, 2004. However, the impact of environmental quality on their conservation is an environmental policy concern. Heritage sites may be impacted by

pollution, or they may face threats of inundation or conversion by development projects. Several prominent heritage sites may be held to possess "Incomparable Values".

The following action points would be pursued:

a) In setting ambient environmental standards, especially for air quality, the potential impacts on designated heritage sites must be taken into account.

b) Heritage sites considered to have "Incomparable Values" would merit stricter standards than otherwise comparable situations, and particular attention should be paid to monitoring and enforcement of environmental standards in their case. Integrated regional development plans should be drawn up, with participation of the local community, to shift polluting activities or render them much less polluting, to treat waste streams, to review transportation options, and adopt building norms which maintain the overall heritage ambience of the area.

c) Impacts on designated heritage sites must be considered at the stage of developing the terms of reference for environmental impact assessments of projects, and consideration given to the potential impacts during appraisal, in terms of the Objectives and Principles of NEP, 2004.

5.2.9 Climate Change:

Climate change, resulting from anthropogenic emissions of a suite of gases (called "greenhouse gases" or GHGs) due to fossil fuel use, certain agricultural and industrial activities, and deforestation, leading to their increasing concentrations in the atmosphere, has the potential, over the next few generations, to significantly alter global climate. This would result in large changes in ecosystems, leading to possibly catastrophic disruptions of livelihoods, economic activity, living conditions, and human health. On the other hand, abatement of GHGs, would involve significant economic costs.

While climate change is a global environmental issue, different countries bear different levels of responsibility for increase in atmospheric GHGs concentrations. Further, the adverse impacts of climate change will fall disproportionately on those who have the least responsibility for causing the problem, in particular, developing countries, including India.

India's GHG emissions at 1994 level were 1228 million ton (Mt) CO_2 equivalent (India's initial National Communication to UNFCCC 2004), which is below 3% of global GHG emissions. In per-capita terms, it is 23 per cent of the global average, and 4 per cent of USA, 8 per cent of Germany, 9 per cent of UK and 10 per cent of Japan per capita emissions in 1994. In terms of the GHG intensity of the economy, in Purchasing Power Parity terms, India emitted a little above 0.4 tonne CO_2 equivalent per 1000 US dollars in 2002, which is lower than those of the USA and the global average. In terms of primary energy use, India's share of renewable energy (being a non – GHG emitting energy form) at 36 per cent is far higher than industrialized

countries can hope to reach in many decades. Since GHGs emissions are directly linked to economic activity, India's economic growth will necessarily involve increase in GHGs emissions from the current extremely low levels. Any constraints on the emissions of GHGs by India, whether direct, by way of emissions targets, or indirect, will reduce growth rates.

On the other hand, India's policies for sustainable development, by way of promotion of energy efficiency, renewable energy, fuels mix, energy pricing, pollution abatement, afforestation, mass transport, besides differentially higher growth rates of less energy intensive services sectors as compared to manufacturing, results in a relatively GHGs benign growth path.

Anthropogenic climate change, significant responsibility for which clearly does not lie with India or other developing countries, may, on the other hand, have severe adverse impacts on India's precipitation patterns, ecosystems, agricultural potential, forests, water resources, coastal and marine resources, besides increase in range of several disease vectors. Large-scale resources would clearly be required for adaptation measures for climate change impacts, if catastrophic human misery is to be avoided.

Accordingly, the following would comprise essential elements of India's approach to multilateral efforts at addressing climate change:

a) Adherence to the principle of common but differentiated responsibilities and respective capabilities of different countries in respect of both mitigation of GHGs, and adaptation measures.

b) Reliance on multilateral approaches, as opposed to bilateral or plurilateral or unilateral measures.

c) Equal per-capita entitlements of global environmental resources to all countries.

d) Over-riding priority of the right to development.

5.3 Environmental Standards, Management Systems, Certification, and Indicators:

5.3.1 Environmental Standards:

Environmental Standards refer both to the acceptable levels of specified environmental quality parameters at different categories of locations ("ambient standards"), as well as permissible levels of discharges of specified waste streams by different classes of activities ("emission standards").

It is now well understood that environmental standards cannot be universal, and each country should set standards in terms of its national priorities, policy objectives, and resources. These standards, may, of course, vary (in general, become more stringent) as a country develops, and has greater

access to technologies and financial resources for environmental management. Environmental standards also need to relate to other measures for risk mitigation in the country, so that a given societal commitment of resources for achieving overall risk reduction[24] yields the maximum aggregate reduction in risk.

Specific considerations for setting ambient standards in each category of location (residential, industrial, environmentally sensitive zones, etc.) include the reductions in potential aggregate health risks (morbidity and mortality combined in a single measure[25]) to the exposed population; the risk to sensitive, valuable ecosystems and manmade assets; and the likely societal costs, of achieving the proposed ambient standard.

Similarly, emissions standards for each class of activity need to be set on the basis of general availability of the required technologies[26], the feasibility of achieving the applicable environmental quality standards at the location (specific or category) concerned with the proposed emissions standards, and the likely unit costs of meeting the proposed standard. It is also important that the standard is specified in terms of quantities of pollutants that may be emitted, and not only by concentration levels, since the latter can often be easily met through dilution, with no actual improvement in ambient quality. The tendency to prescribe specific abatement technologies should also be eschewed, since these may unnecessarily increase the unit and societal costs of achieving the ambient environmental quality, and in any case because a technology that is considered ideal for meeting a given emission standards may not be acceptable on other relevant parameters, including possibly other sources of societal risk.

The following specific actions would be taken:

a) Set up a permanent machinery comprising experts in all relevant disciplines to review notified ambient and emissions standards in the light of new scientific and technological information as they become available, and changing national circumstances, ensuring adequate participation by potentially impacted communities, and industry associations.

b) Strengthen the network for monitoring ambient environmental quality, including through participation by local communities, and public-private partnerships. Progressively ensure real-time, and on-line availability of the monitoring data.

5.3.2 Environmental Management Systems, Ecolabeling and Certification:

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[24] *Environmental quality is not the only source of societal risk; virtually every activity of humans is fraught with risk. Other sources of risk, which may be regulated, include safety standards for vehicles, aircraft, water, food and pharma, contagious diseases (quarantine and immunizations), etc. Risk mitigation in each case involves societal costs; these must be weighed against the potential benefits*

[25] *E.g. "Disability Adjusted Life Years" (DALY)*

[26] *Specifically, that a range of technologies from numerous vendors should be available, to preclude windfall gains to one or a small set of manufacturers and resultant high costs of the technologies.*

Environmental Management Systems (EMS), such as ISO 14000, by requiring the adoption of standardized environmental management practices, documenting their actual use, and third party verification of the fact, may significantly ease the public burden of monitoring and enforcement of prescribed emissions standards. On the other hand, their adoption may involve transaction costs, which, for small and medium enterprises may be significant in relation to their total investment. Global harmonization of EMS[27], however, is a safeguard against adoption of arbitrary national EMS regimes to serve as non-tariff barriers.

Ecolabeling (and other voluntary certification mechanisms) differ from the EMS in that they address the preferences of environmentally conscious consumers, rather than ensuring adherence to national environmental standards. They may involve review of the entire product cycle, from sourcing raw materials, to final disposal of the product after use, and since they are concerned primarily with consumer preferences, may relate to external or ad-hoc, rather than national environmental standards. Further, at present, non-public bodies have established several labelling schemes in India's export destinations, with no satisfactory evidence of being based on scientific knowledge, or participation by the potentially affected producers. Moreover, they may be based on prescriptions of production processes, and not only of the product characteristics, and for this reason, their mandatory application is inconsistent with provisions of the WTO regime.

Ecolabels, etc., clearly have the potential to be employed as trade barriers, at least by competing firms in the export destinations, if not directly by their Governments. The obtaining of an ecolabel, especially one granted by an agency located in a developed country, may involve large transactions costs. However, ecolabeled products may command significant price premia, as well as ease of entry to markets. On the other hand, the fact of a large, rapidly growing, environmentally conscious consumer base in India itself, may provide the required leverage to realize significant advantages from mutual recognition of ecolabeling schemes.

The following actions would be taken:

a) Encourage industry associations to promote the adoption of ISO 14000 among their members, through provision of technical and training support. Mainstream promotion of ISO 14000 in the small-scale sector in the various promotion schemes for the sector.

b) Encourage adoption of EMS through purchase preference for ISO 14000 goods and services for Government procurement, except for items reserved for the small-scale sector at any given time. Mandate ISO 14000

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27 *Global harmonization of EMS however relates to achievement of national, not externally imposed emission standards.*

when a sufficient number of domestic suppliers for each good or service have ISO 14000 certification.[28]

c) Formulate "Good Practice Guidelines" for ecolabels to enhance their scientific basis, transparency, and requirements of participation. Promote the mutual recognition of Indian and foreign ecolabels, which adhere to the Good Practice Guidelines, to ensure that Indian exporters enhance their market access at lower costs.

5.4 Clean Technologies and Innovation:

Clean technologies, as distinct from "end-of-pipe" abatement technologies minimize the generation of waste streams in the production processes themselves, rather than treating the waste after generation. In general, clean technologies are less intensive in use of raw materials and energy, than conventional technologies, which rely on pollution abatement after generation. For this reason, they may also offer significant cost advantages to the producer.

Barriers to the adoption of clean technologies are, first, the fact that many of them are proprietary, and protected by strong patent regimes held abroad. The vendors, accordingly, would be able to extract large premiums in the absence of competitive substitutes. Second, lack of capacity in development financial institutions for appraisal of proposals for switching existing production facilities to clean technologies. Third, the lack of coordination in R&D efforts in India aimed at developing a shelf of commercially viable clean technologies. The last should also be viewed against the fact that in future, almost all commercial transfers of production technology worldwide may be for clean technologies.

The following would comprise elements of an action plan:

a) Encourage capacity building in the financial sector for appraising clean technology switchover project proposals.

b) Set up a mechanism to network technology research institutions in the country, public and private, for cooperation in R&D for clean technologies. Promote the dissemination of the new technologies both in India and abroad.

c) Consider use of revenue enhancing fiscal instruments to promote shifts to clean technologies in both existing and new units.

5.5 Environmental Awareness, Education, and Information:

Enhancing environmental awareness is essential to harmonize patterns of individual behaviour with the requirements of environmental conservation. This would minimize the demands placed on the monitoring and enforcement regimes; in fact, large-scale non-compliance would simply

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28 *Even firms which sell only part of their output to Government may be expected to obtain ISO 14000 certification, since it would not be cost-effective for them to maintain separate production lines for certified and non-certified products.*

overwhelm any feasible regulatory machinery. Awareness relates to the general public, as well as specific sections, e.g. the youth, urban dwellers, industrial and construction workers, municipal and other public employees, etc. Awareness involves not only internalization of environmentally responsible behaviour, but also enhanced understanding of the impacts of irresponsible actions, including to public health, living conditions, and livelihood prospects.

Environmental education is the principal means of enhancing such awareness, both among the public at large, and among focused groups. Such education may be formal, or informal, or a combination of both. It may rely on educational institutions at different levels; the print, electronic, or live media; and various other formal and informal settings.

Access to environmental information is the principal means by which environmentally conscious stakeholders may evaluate compliance by the concerned parties with environmental standards, legal requirements, and covenants. They would thereby be enabled to stimulate necessary enforcement actions, and through censure, motivate compliance. Access to information is also necessary to ensure effective, informed participation by potentially impacted publics in various consultation processes, such as for preparation of environmental impact assessments and environment management plans of development projects.

The following actions would be taken:

a) Mainstream scientifically valid environment content in the curricula of formal education, at primary, secondary, tertiary, and professional levels, focusing on the content appropriate at each stage, and without increasing the course load overall. Special mid-career training programmes may be conducted for groups with special responsibilities, e.g. the judiciary, policy makers, legislators, industrial managers, city and regional planners, voluntary and community based organizations, etc.

b) Prepare and implement a strategy for enhancing environmental awareness among the general public, and special groups, by professional production and airing of information products through diverse media catering to the different target groups. The media products should, as far as possible, eschew focusing on the achievements of public agencies, but instead document real world events of human interest. The production, as well as dissemination may involve public, private, and voluntary agencies.

c) Enhance real-time, on line public access to monitoring information, both in respect of ambient quality, as well as major point sources of pollution. Archival data to be also made publicly available in convenient format.

5.6 Partnerships and Stakeholder Involvement:

Conservation of the environment requires the participation of multiple stakeholders, who may bring to bear their respective resources,

competencies, and perspectives, so that the outcomes of partnerships are superior to those of each acting alone. Implementing and policy making agencies of the Government, at Central, State, Municipal, and Panchayat levels; the legislatures and judiciary; the public and private corporate sectors; financial institutions; industry associations; academic and research institutions; independent professionals and experts; the media; community based organizations; voluntary organizations; and multilateral and bilateral development partners may each play important roles in partnerships for the formulation, implementation, and promotion of measures for environmental conservation.

In seeking to realize partnerships among these diverse actors, it is essential to eschew the confrontational posturing sometimes adopted in the past. While it is not possible that the interests and perceptions of all stakeholders will coincide on each occasion, nevertheless, it is necessary to realize that progress will be seriously impeded if the motives of other partners are called into question during public discourse. It is also essential that all partnerships are realized through, and are carried out in terms of the principles of good governance, in particular, transparency, accountability, cost effectiveness, and efficiency.

A number of specific themes for partnerships have been identified above. A generic classification of some, not exhaustive, possible partnerships is as follows:

a) Public-Community Partnerships, by which public agencies and local communities cooperate in the management of a given environmental resource, each partner bringing agreed resources, assuming specified responsibilities, and with defined entitlements, e.g. Joint Forestry Management.

b) Public-Private Partnerships, by which specified public functions with respect to environmental management are contracted out competitively to private providers, e.g. monitoring of environmental quality.

c) Public-Community-Private Partnerships, in terms of which the partners assume joint responsibility for a particular environmental function, with defined obligations and entitlements for each, with competitive selection of the private sector partner, e.g. afforestation of degraded forests.

d) Public-Voluntary Organization Partnerships, similar to public-private partnerships, in respect of functions in which voluntary organizations may have a comparative advantage over others, the voluntary organizations, in turn, being selected competitively, e.g. environmental awareness raising.

e) Public-Private-Voluntary Organization Partnerships, in which the provision of specified public responsibilities is accomplished on competitive basis by the private sector, and the provision is monitored by competitively selected voluntary organizations, e.g. “Build, Own, Operate” sewage and effluent treatment plants.

5.7 Review of the Policy:

We live in a rapidly changing global community, in a rapidly developing, highly diverse country. The environmental issues that are salient as of now may evolve over time, and new ones may take their place. Scientific understanding of environmental matters would advance rapidly. Changes in economic structure, technologies, resource availability, in each case nationally as well as globally, are likely, as are evolution of global environmental regimes, and norms arising from jurisprudence.

To set forth an immutable National Environment Policy in this dynamic situation would be unwise. A prudent course would be to provide for updating every few years in light of new knowledge and developments, and a comprehensive review, perhaps overhaul, in about a decade.

The following provisions are, accordingly made for review, updating, and renewal of NEP 2004:

a) Undertake consultations every three years with groups of diverse stakeholders, i.e. researchers and experts, community based organizations, industry associations, and voluntary organizations, and update the National Environment Policy.

b) In the third of the three-year reviews, undertake a more comprehensive examination of the scientific and policy understanding of environmental issues, redefine the Objectives and Principles, and recast the Strategic Themes for Action. A new National Environment Policy should be the outcome.

5.8 Review of Implementation:

Any policy is only as good as its implementation. The NEP, 2004 outlines a significant number of new and continuing initiatives for enhancing environmental conservation. These require the coordinated actions of diverse actors, for the major part organized and stimulated by one or more public agencies.

While coordination and review mechanisms are necessary in respect of the individual action plans under each of the strategic themes at relevant operational levels, a formal, periodic high level review of implementation of the different elements of NEP, 2004 is essential. This would enhance accountability of the different public agencies responsible for implementation. It would also reveal practical issues in implementation, including absence of political will at concerned levels, or official indifference.

Accordingly, the Cabinet Committee on Economic Affairs (CCEA) may be requested to review the implementation of NEP, 2004, once a year, within three months from the close of the previous fiscal year. The findings of the CCEA in the review should be publicly disclosed, so that stakeholders are assured of the seriousness of the Government in ensuring implementation of the Policy.

6.0 **Process of Formulation of this Policy:** (To be documented on completion of the formulation process).

E - 3.

community health cell

NB - The need will be pushed out - future → hits - environ + health folks to TH 7/12

From: "E/The Environmental Magazine" <newsletter1@emagazine.com>
To: <chc@sochara.org>
Sent: Thursday, December 02, 2004 12:23 PM
Subject: OurPlanet... environmental newsletter

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Week of December 1, 2004

NEWS THIS WEEK

Bush Administration Likely to Reject Ocean Reform Recommendations

Marine conservation activists were dismayed to learn last week that the Bush administration is unlikely to institute recommended policy changes regarding the way it handles ocean pollution, coastal development, fisheries management and other marine environmental issues. The White House is mandated to officially "respond" by December 20 to recommendations set forth by the U.S. Commission on Ocean Policy last year.

Go to all articles - Go to this article

White House Poised to Increase Pacific Northwest Logging

Environmentalists are bracing for stepped-up efforts by a re-elected Bush administration to dramatically increase logging of old-growth trees and other forestlands in the Pacific Northwest over the next four years.

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Reporting by Roddy Scheer

SPECIAL APPEAL

Four More Years? We're Ready for the Challenge—But We Need Your Help.

Read more

THIS WEEK'S COMMENTARY

Down on the Filthy Farm

An investigative report in Cleveland's *Plain Dealer* November 27 makes it plain why large corporate

TH 8 6/12

animal farms are terrible neighbors-and why communities that welcomed them in often regret their decision. *By Jim Motavalli*

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IN THE CURRENT ISSUE OF E

GREEN LIVING

Peru's Wild Life

Touring The Amazon Basin

With hundreds of species going extinct every day in the world's tropical rainforests, eco-travelers need to see Peru's cradle of the world's biodiversity while there are still intact tracts. Posada Amazonas, an eco-lodge along the Tambopata River deep in Peru's Amazon basin, provides the ultimate jumping-off point to learn about the region's wildlife and ecology, while also helping the local indigenous community make a sustainable living. *By Roddy Scheer*

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CURRENTS

Flower Power

With an Entrepreneur's Jump Start, the Organic Market Blossoms

Flowers are the most pesticide-intensive crop and that flower workers pay a heavy price. In Ecuador, the second-largest exporter of flowers to the United States, 60 percent of workers suffer from headaches, nausea. Doctors in Cayambe, the rose capital of Ecuador, confirm these findings and add birth defects, sterility and miscarriages to the list. Gerald Prolman's vision began to take shape three years ago. He launched Organic Bouquet in 2001 with the idea of selling organic flowers over the Internet. *By Ross Wehner*

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WE NEED YOUR SUPPORT

E34 -

Environmental and Health Balance Sheet of Sundsvall -

an important tool for citizen participation

Important milestones in Sundsvallis efforts on the way from a one-sided industrial society to a sustainable city

The third World Health Conference, arranged jointly by the WHO and the UNEP, was held in Sundsvall in 1991. The theme was Supportive Environments for Health. At the conference the **Sundsvall Declaration on Supportive Environments for Health** was adopted. The Declaration has been a guiding document in Sundsvall's work to create a sound living environment for its residents.

In 1988 Sundsvall was given the opportunity to conduct a [redacted]dish project to find ways to create a healthy living environment. The work resulted in a report, Clean by 2000 (Rent till 2000) - how to create a sound living environment for residents by the new millennium? The project allowed Sundsvall to obtain a good understanding of the state of the environment and resulted in the adoption of an action plan. In 1990 the City Council adopted the following goal:

"Sundsvall should be a municipality with a good environment in ecological balance, where people can live in good health and enjoy unspoilt natural surroundings. The image of Sundsvall as environmentally burdened industrial centre shall be changed, the city will be wellknown for the results of its good environmental protection efforts."

The work resulted in our local vision, the Sundsvall's Agenda 21, that by year 2020 Sundsvall will be a sustainable society. The most important goals are:

Knowledge - Knowledge is a cornerstone for sustainable development. Schools, associations, employers and organisations must be involved.

Power - Participation in community development is an important basis for democracy. Involvment in making decisions make it easier to support those decisions.

Health - Good public health and high quality of life form the foundation for Sundsvall's development planning.

The Sundsvall's Agenda 21 work is therefore called **Sun[redacted] - Environment for Life (Livsmiljö Sundsvall)**. Agenda work requires an overall perspective, cooperation across boundaries and an open, democratic spirit.

Sundsvall Agenda 21 work has had a good living environment as a guiding light. In its local Agenda 21 work Sundsvall has been concerned with the environment, social issues and finances, and has had a heavy focus on **resident participation**. The basic approach is that if changes are to be made they can only be made if the residents themselves participate in the process of change. The role of the city is to encourage, support and create the necessary conditions.

To create a good living environment

In Sundsvall participation and empowerment are central to achieve a sustainable society. People, particularly young people, must feel that they can influence developments. For this purpose all inhabitants have access to the same information as the experts in an annually published environmental and health balance sheet.

[redacted]e Environmental and Health Balance Sheet (Livsmiljöbokslut)

The first environmental sheet published by a Swedish city was completed in Sundsvall in 1991. The balance sheet is an annually published document that includes statistical data and an analysis of the present environmental situation. The balance sheet is part of the policy of open and transparent governance. Both positive and negative developments should be described. For the same purpose, openness and transparency, Sundsvall now also publishes a report that describes the state of health of it's residents as well as an annual report on how the city's work according to the Sundsvall's Agenda is progressing.

The environmental and health balance sheet has perhaps been the most important component of the eco-auditing process in Sundsvall. It has so far been prepared for fourteen years running. Each Environment and Health Balance Sheet is a published document that concentrates on describing the environmental and public health situation of Sundsvall and the work carried out to improve it by the municipality and others over the preceding year. It covers a number of environmental and health topics: citizen involvement in environmental initiatives, local neighbourhood improvements, biological investigations, nature reserves, old pollution problems, lakes, traffic and trans[redacted] communications, air quality, environmental protection, environmental impact assessment, major industrial firms in Sundsvall, energy, waste (including hazardous waste), drinking water, sewage treatment, environmental education, the everyday environment of the people, public health and international environmental work.

For each topic the emphasis is on identifying which environmental projects that have been carried out by the municipality in the previous year and identifying recent trends in environmental quality and health status. The material is mainly informative and educational, intended to raise awareness about local (and global) environmental and public health concerns. The Sundsvall Environmental and Health Balance Sheet is a central feature of the city's bottom-up auditing initiatives.

Please visit our website if you would like to read more about a number of our projects.
www.sundsvall.se

Livsmiljö Sundsvall
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Sundsvall is a medium-sized city with a population of 94,000, situated in the centre of Sweden, some 400 kilometres north of Stockholm. The city is located on the coast of the Gulf of Bothnia. For over one hundred years the Sundsvall region has been the industrial, commercial and financial heart of northern Sweden. As a result of its industrial heritage and its particular topography, the Sundsvall area has experienced a range of environmental problems.

E-3

RACE TO SAVE THE PLANET

ACT NOW

Are you doing your bit to help save the planet?

"What can I do? I'm not a scientist.

Who me? I'm only a kid.

I don't think I can do much. I have so much to do in the house, you know.

It's not my business. I don't work in the government.

No. I really don't have the time."

But you are doing lots of things to help save the environment! You want to know what?

Switching off fans and lights when you go out of the room.
Selling old newspapers.
Reusing plastic bags.

But what do these things have to do with saving the environment? A lot! Each of these things we all do as a matter of course helps to conserve the resources of the earth and save the environment. And did you know that these things that are so routine for us, are now being re-discovered in many other countries! Books are being written and seminars held to encourage people to recycle paper and glass; to take a cloth shopping bag along when they go shopping; to use public transport whenever possible! Seems strange, doesn't it? While many of our traditions are environmentally sound, there is still need to re-examine our practices and make changes in our life style. And don't underestimate the difference you can make to the environment through your actions.

Here is a checklist of environmentally friendly actions. You're probably already doing many of them, but now, every time you do these things, you'll also have the satisfaction that you're being a conservationist!

Food for thought

Did you know that 50 per cent of all the energy used in India is for cooking? So improving fuel efficiency in the kitchen will help save trees, conserve fossil fuels and return more animal waste to the soil to improve it. Here are some simple ways to make the most of your cooking fuel.

- Keep the vessel covered with a lid during cooking--it keeps the heat in and helps cook faster .
- Don't cook continuously on a high flame. When the liquid in the food starts boiling, the flame size can be reduced. This habit can save as much as 40 per cent fuel!
- Use the smaller burner of the gas stove whenever possible.

- A pressure cooker can save up to 75 per cent of the fuel and time spent in cooking.
- Food cooks faster in aluminium vessels than in stainless steel ones.
- To achieve better fuel efficiency, ensure that the bottom of the cooking vessel is large enough to entirely cover the burner.
- For faster cooking, use flat, wide-bottomed vessels which expose a larger area to the flame.
- Turn off the stove a few minutes before the cooking is finished and keep the vessel covered to save fuel.
- Plan and keep things ready before the stove is turned on, to reduce fuel wastage.
- Get the family to eat together--it saves having to reheat food several times.
- Maintain the stove--ensure that the holes are not clogged, that the wicks are trimmed, etc.--to increase fuel efficiency.
- Smokeless *chullahs* (improved cookstoves) are more fuel efficient than traditional ones.

Have you thought of using a solar cooker for some of your cooking needs? The price is subsidized by the government and there is no worry about the gas running out, availability of kerosene or rising prices of fuel.

Paper tiger

India's production of paper is estimated to be upwards of 14 lakh tonnes a year. Feeding paper mills with raw materials --bamboo and trees--to produce this paper is causing forests in many parts of the country to disappear. So it's important to ensure that paper is not wasted. Selling old newspapers helps to do this, because all that paper gets 'recycled', i.e., reprocessed and made into paper again.

- Ensure that every scrap of used paper in the house is sold. While newspapers and magazines are regularly sold, single sheets of paper often end up in the dustbin. Ensure that all these--including bills, used

brown paper covers, used envelopes, hand bills, old diaries and calenders--find their way to the pile to be sold to the *kabadiwala*.

- Write on both sides of every sheet of paper.
- Keep your school textbooks in good condition. Then you can pass them on to your juniors when you go to the next class.
- Make rough pads with all the blank sheets from old notebooks.
- Use a slate for doing rough work, taking messages, keeping lists etc.
- Store and reuse paper bags (and plastic bags too).
- Help cut down paper waste in your workplace--encourage photocopying on both sides of the paper, use only half sheets of paper for short memos, and if your office has personal computers, find a way of using the back of the computer paper.

A 'treeling' experience

Given above are some ways to save trees and other vegetation from being cut. But what about growing a tree yourself? Its not difficult, its fun and satisfying too--to see your efforts take root and bear fruit.

- Get in touch with the forest department or a voluntary organization working in the field of afforestation. They will be able to give you saplings and also advise you on how to plant and take care of them.
- Spend some time choosing the type of tree you would like to plant. Usually, local species are better for the enviornment than an exotic, i.e., a species not native to the place.The choice of tree species would also depend on what grows well in your area. For instance, the following five trees grow well in many parts of India.

Comman Name	Scientific name	Names in some regional languages
Flame Of The Forest	*Butea monosperma*	Dhak (Hindi), Khakharo (Guj.),

		Palas (Hindi, Beng., Mar., Mal.), Parasa (Tam.)
Indian Almond	*Terminalia catappa*	Adamarram (Mal.), Badamchettu (Tel.), Bangla badam (Beng.), Deshi badam (Hindi), Natvodom (Tam.)
Neem	*Azadirachta indica*	Limdo (Guj.), Neem (Hindi, Beng.), Vepa (Mal., Tam., Tel)
Peepal	*Ficus religiosa*	Arachu (Mal.), Ashvatham (Beng., Mal., Tam.), Pimpal (Mar.), Pipal (Hindi), Piplo (Guj.)
Tamarind	*Tamarindus indica*	Analam (Mal.), Amli, Ambli (Hindi, Guj.,Beng.) Chincha (Mar.), Chintachettu (Tel.), Puli (Tam., Mal.) Tentul (Beng.).

(P.V. Bole and Yogini Vaghani. *Field Guide to the Common Trees of India.* Bombay: Oxford University Press, 1986)

- Think about where you want to plant the tree. The soil should be good and it should be a place where you can water the sapling and watch over it.
- Start a small nursery. The forest department may be able to give you seedlings and practical tips on doing it. Saplings raised in your nursery would make good gifts.

Miracle Grass

What on earth is miraculous about grass? It seems a simple unobtrusive plant, not worth a second glance. But think about it and you'll realize that the grass family...

- is the world's most important crop
- provides the bulk of fodder and forage
- covers a quarter of the land surface of earth, from the snow covered Arctic regions, to the dry desert areas
- grows in saline soil, nutrient-poor soil, waterlogged soil
- can withstand trampling, grazing and fires
- provides raw materials for buildings and handicrafts
- feeds large industries--paper, alcohol and molasses, and home-based industries--brooms, mats, baskets and toys
- plays a major role in soil and water conservation
- prepares the soil for other kinds of vegetation to grow
- comes in various sizes--from the familiar lawn grass to the towering bamboos.

So green with grass. It spreads rapidly because it not only regenerates by means of seeds, but also by putting out horizontal stems along and under the surface of the ground, each joint of which is able to sprout roots and leaves. But a word of caution: most grasses cannot grow in the shade.

- Choose a sturdy variety of grass. Most of us are used to thinking only in terms of the lawn variety, but the grass family with about 10,000 species

is the third largest family in the plant kingdom! The forest department may be able to help you in finding out about other species.

- It's easiest to begin close to home--green any bare patches of land, however small, with grass.
- If you can convince the people in the area, you could even grow grass on bare patches in the neighbourhood. The grass could then be cut and sold as fodder. Its not easy to do this on non-private land--people will walk on it and cattle will graze it. But if you can find a way...

Garden wisdom

While you're outdoors, how about some environmentally sound practices for the garden?

- Water the garden early in the morning or late in the evening. This reduces water loss due to evaporation.
- There is always a temptation to overwater the garden. Water only till the soil becomes moist, not soggy.
- Explore water efficient irrigation systems. Sprinkler irrigation and drip irrigation can be adapted to garden situations.
- Make your garden lively--plant trees and shrubs which will attract birds. You could also put up nest boxes and put out food. In the hot summer months, a bird bath is something which will really please the birds.
- Put waste to work in your garden--sweep the fallen leaves and flowers into flower beds or under shrubs. This will increase soil fertility and also reduce the need for frequent watering.
- If you have a little space in your garden, you could make a compost pit to turn organic waste from the kitchen and garden to soil enriching manure. To make a compost pit:

Dig a pit about 1/2 metre wide, 1 metre deep and as long as you can make it. Preferably make it at the far end of the garden.

Line it with straw or dried leaves and grass.

Put in the waste material as and when generated and cover with a sprinkling of dried leaves.

Water once a week to keep it moist .

Turn the contents of the pit every 15 days.

The compost will be ready in 3-4 months. Take it out and spread in your garden.

Some things that can go into your compost pit:

Used tea leaves.

Vegetable and fruit peels and cores.

Overripe or spoilt vegetables and fruits.

Leftover or spoilt food.

Egg shells.

Cut grass and fallen leaves.

Transport troubles

Talking of economics, each one of us has felt the impact of spiralling petrol prices. Measures you take to keep your petrol bill down will save irreplaceable fossil fuels and cut down on atmospheric pollution.

- Drive at a steady speed. Each vehicle has an optimum recommended speed--you'll find that in the manual given to you when you buy the vehicle.
- Depend on the accelerator rather than the brake to control the vehicle.
- Get the vehicle serviced regularly to keep it in good condition and to keep the petrol consumption down.
- Use public transport whenever possible.
- Walk or cycle short distances--and the bonus of course is, you'll be in better shape.
- Ensure that the air pressure in your tyres is as per the specifications. This increases tyre life and vehicle mileage.

Cool it

In a hot country like ours, we spend a lot of energy just trying to keep cool. It's a challenge to keep cool without using too much electricity or other resources. Here are some ways to get started.

- The roof is responsible for up to 50% of the heat entering the house. Spread gunny sacks on the terrace and keep them wet by sprinkling with water. This could be a good way of using some of the rinse water from the kitchen. (See 'Elixir of life'.)
- Three coats of whitewash on the terrace floor will maximize the heat being reflected. This can make the house cooler by up to 5 degrees!
- During summer, keep the lower level windows closed and the upper level ventilators open. This lets out the hot air which is lighter.
- Night air is cool, so keep the windows open at night to let it in. First thing in the morning, close the windows to keep in the cool air and keep out the hot air.
- Use *khus* curtains in summer. Not only do they keep the house cool, they also smell nice. But the challenge is to devise a system for keeping the curtains wet, without wasting water !
- If there are windows on the sun-facing sides of the house, it would be more effective to hang the curtains on the outside rather than on the inside of the windows.
- If you want a real cool bath in summer, don't open the tap and let the water run till the flow is cold. Fill a bucket of water and and let it stand for a few hours.
- Keep the *matka/surahi* covered with a thin, wet cloth. This will help it cool faster and better.
- Fill fridge bottles with water already cooled in the *matka* or *surahi*. This way you'll spend less electricity to cool the water to the same temperature.

Adapt these ideas to keep warm in winter. Maximize the use of sun's energy.

Electrifying information

Gadgets which were luxuries just ten years ago are becoming commonplace in our homes today. Now that they're here to stay, it's important that we use them properly, to cut down waste of electricity. Here are some simple ways.

- Maximize the use of natural light--early to bed and early to rise can really cut down on your electricity bills. Position reading tables near windows.
- Switch off fans and lights as you leave the room. If its a tubelight, switch it off if you're going to be out of the room for more than fifteen minutes. This seems a very obvious thing but just monitor yourself for the next few days and see if you do it everytime. It's especially important in offices, schools and public places, because in such places nobody feels really responsible for such things and so they never get done.
- Use tube lights rather than bulbs wherever possible--a 40 watt tubelight is equivalent to a 100 watt bulb.
- Keep bulbs, tubes etc. clean--dust can decrease lighting levels by 20 to 30 per cent, and may also shorten the life of the fixtures.
- Don't open the fridge too often and don't keep it open too long when you open it.
- Wait till milk or food cools before putting it into the fridge.
- Defrost the fridge regularly.
- Keep the coils at the back of the fridge dust free--this will help it cool more efficiently.
- Position the fridge so that the coils are ventilated sufficiently--this will help it cool better.
- Use the mains rather than batteries whenever possible.
- Switch off the television or radio as soon as the programme of interest is over.
- Install a solar water heater. In most parts of the country, it can be used for at least eight months out of twelve, and you could save up to Rs.1000 per year in electricity bills.

It would be a good idea to compare your 'before conservation' and 'after conservation' electricity bills. You'll find that these measures in addition to being environmentally sensible, make sound economic sense too.

Elixir of life

Ready availability of clean water contributes greatly to the quality of life. But when it is available, we tend to use it wastefully without even being aware of it. We need to be more aware of how we use water and of simple things we can do to collect and conserve it.

- When you turn on the tap, don't turn it the whole way--have a slow flow.
- Make sure the tap is turned off while you brush your teeth or wash your face.
- Ensure that the tap is closed when clothes are being washed or vessels cleaned.
- Get leaking taps fixed as a priority.
- When you need to fill a glass of drinking water, take only as much as you need.
- In case you store water in the house, utilize the unused stored water for soaking clothes, watering the garden, mopping the floors etc.
- Wash vegetables, fruits etc. in a pan of water rather than under running water.
- Keep a large bucket in the kitchen and pour water used for washing food items or rinsing vessels into this. This water can be used for watering plants.
- Collect rain-water during the rainy season. Rain-water is pure and apart from uses like washing and bathing, you can use it for watering delicate plants. Brass vessels washed with rain-water stay sparkling for a long time.
- Store as much rain-water as you can. You could use a channel from the terrace to feed a tank. To give an idea of how much water is involved: If

your house has a roof of 25 sq meters and you live in a place with 50 cm annual rainfall, the rain-water runoff from your roof is close to 12,500 litres per year. This is the amount of water needed by a household of four people for drinking, cooking, bathing and washing for a period of two months!

- Use defrost water from the refrigerator for watering delicate plants, after it has warmed to room temperature.

Close to home

To live in a nice, clean neighbourhood is everyone's dream. The primary responsibility of ensuring that our neighbourhood is beautiful is ours, both by taking action--individual and collective--and by seeing to it that the civic authorities act as and when necessary. Here are some ways to get started.

- Find out whom to complain to if taps on the roadside are leaking, if there are unfilled pot-holes on the roads or the garbage does not get cleared. Share this information with your neigbours. This way, when something goes wrong, someone or the other will complain.
- Plant trees or grass wherever possible.
- Don't let people spoil your neighbourhood by putting up posters and handbills. If you can get all the residents together, it is possible to stop this.
- If there is a monument in the locality, work out ways it can be kept clean and looked after, so that it does not fall into disrepair.
- During the rains ensure that there are no pools of stagant water which breed mosquitoes and become a public health hazard. If it is a small pool, you can fill it with mud or sand. Spray kerosene along the edges of larger pools.
- Start a drive to keep your neighbourhood free of noise pollution. This would include creating awareness about the use of vehicle horns, volume at which radios or televisions are played, and the use of public address systems during weddings, festivals etc.

Wisdom of the ages

Many of our traditional practices are environmentally sound, but we're either forgetting the practices, or practising them as rituals without analyzing them from a scientific point of view. Talk to people of the older generation to find out more about such practices so that they can be adapted to our needs today. You can begin with practices like:

- Water harvesting--several old houses have efficient ways of collecting and storing rain-water.
- Pest control--most mothers and grandmothers have effective recipes to keep away cockroaches, silver-fish and other household pests. *Neem* leaves among the woollens, dried lemon peels in book shelves, turmeric powder to keep away ants and *dhoop* to deter mosquitoes are a few of these. These cost little and don't cause pollution in their manufacture or use.
- Biodegradable containers--sounds high-tech, but thats what leaf plates and *kuluds* are! What about using them for journeys/picnics/parties, rather than plastic plates and cups?
- Traditional cleaners--ash or mud to clean utensils are as effective as factory-made powders.

Speak out for the planet

And most important, **share your concern for saving the environment with your family and friends**--your ideas could help us all to become enviornmental activitists.

- Share with family and friends your ideas about how to save the environment .
- Write letters to editors of newspapers on environmental issues of concern in your area.

- And write in your suggestions to us at:

Centre for Environment Education
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