Debate: "Indoor Air vs. Outdoor Air Pollution: Which Is the More Serious Threat to Public Health?"

Purpose
To integrate all the knowledge from the AMBIENT Air Module by creating a presentation taking a particular ethical stance or point of view which is researched and substantiated.

Overview
This is the culminating experience of the AMBIENT Air Module for students not completing the scenario role-play. Students will be asked to work in teams to develop a presentation and handout representing a particular point of view. This experience will require the students to synthesize their varied knowledge of air, air contamination, asthma, and other issues, organize this knowledge, and present it persuasively to their peers.

Of note, this Debate can be enriched by completing the Critical Reading Activity first since it raises some of the same ideas.

Time
3-5 two hour block class periods with team homework in between; the first session is to start the students, the second is to evaluate their progress, and the third is for them to present their debate/role play. This experience should involve time in and out of the classroom to collect, organize, and create the Team Presentations.

Key Concepts
This section particularly focuses on the ethical issues engendered by international indoor and outdoor air pollution. There are many different points of view in the International air pollution debate, ranging from health and social to economic. There is also the issue of the use of limited public resources to solve environmental problems, as well as how to prevent similar environmental problems in the future.

Skills
Students will work in teams to synthesize their air, asthma, air contamination, and environmental health knowledge as well as additional research to represent a particular point of view persuasively. They will create a handout and presentation materials to help communicate this knowledge and point of view. Finally, using these materials, they will practice public speaking to present their work.

Materials
Computer access to presentation software such as PowerPoint would be useful, but not essential since transparencies could be used to illustrate the speaking points. Although software (such as Microsoft Word or PowerPoint) would facilitate the creation a Brochure, Rap/Song or Poem or a Play, or Poster, these could be done purely on hardcopy incorporating pictures and text. Creation of a video would require video camera equipment.

A transparency projector or slide or LCD projector for presentation of transparencies, slides or computerized PowerPoint presentation.

Facilitator Preparation
You will need to divide the students into groups or teams representing different sides of the debate questions or as individuals/teams representing different roles. Knowledge of and

facilitating access to the computerized software with training will optimize this session. Prior knowledge of the Teachers Guide to Air Quality/Respiratory Illness, as well as other modules, will prepare you for the range of issues addressed in this section.

It is recommended that Facilitators initially organize the students into groups representing a particular "side" or role-playing point of view. The facilitators should meet with each group to evaluate their progress in deciding the type of handout, the medium, and the different parts in the presentation. Facilitators should encourage the groups to practice their presentations and keep to the time limits.

Background

What are the various issues raised by air, air contamination, and, in particular, the international indoor and outdoor air pollution as an environmental health issue? What is international indoor and outdoor air pollution? How are these problems different from the indoor and outdoor air problems we have in the US? How are they similar? What are the human health, economic, and ecological ramifications of international indoor and outdoor air pollution? As a political, historical and ethical issue? What does a society do if there are limited resources to clean and protect the air? On the other hand, if both international indoor and outdoor air pollution can potentially harm our environment, how does a society prevent this sort of environmental disaster from occurring in the future? What is the role and responsibility of the individual when faced with an environmental health issue?

In the situation of international indoor and outdoor air pollution, what are the effects for humans? All humans or just some? What are the effects on the environment? What are the negative and positive consequences of international indoor and outside air pollution? What is your response as an individual, a citizen, a scientist, a policy maker, a business owner, an environmentalist? How much money and resources should be devoted to this issue?

Other aspects are teamwork of the students in synthesizing, creating and presenting data and a particular point of view. If available, the use of various software packages can be incorporated to enhance presentations. Effective communication is one of the objectives of this section.

Procedure

Read the following responses representing different points of view on international indoor and outside air pollution. Students should be encouraged to seek out other sources of information on international indoor and outside air pollution.

Outdoor

- Excerpts from: Valuing the health effects of air pollution by Maureen L. Cropper and Nathalie B. Simon from the Development Economics Vice Presidency of the World Bank, No. 7 April 1996 http://www.worldbank.org/html/dec/decnotes/DECnts/decnt007.pdf

Indoor

- Excerpts from: Indoor Air Pollution. Energy and Health for the Poor Issue No. 1; September 2000 World Bank

http://wbln1018.worldbank.org/sar/sa.nsf/2991b676f98842f0852567d7005d2cba/a169d6e66c9c0c7585256990006a2631?opendocument

As a starting point of discussion, responses to the following question are included at the end of this exercise: **Which is more harmful to human health and the environment internationally: indoor or outside air pollution?**

Organize an **International Indoor and Outdoor Air Pollution Debate**, taking different points of view as starting points to discuss the different issues raised by the current and possible future uses of international indoor and outside air pollution. Have each group develop a Power Point Presentation (or similar software) as part of the debate to organize and illustrate while they talk. Have the rest of the students participate as an audience representing US Citizens, Politicians, Scientists, or any of the roles suggested below.

In opposing groups, **Possible Debate Issues** include:
- International indoor and outside air pollution are major environmental health issues: which is the most important?
- International indoor and outside air pollution have major implications for human health: For and Against
- International indoor and outside air pollution have major implications for environmental health: For and Against

Have each group in the debate develop a **Brochure** briefly describing the health effects and differing issues of International indoor and outside air pollution from their debate point of view. Alternative work products could include: making a **Video**, creating a **Webpage**, making a **Rap/Song** or **Poem** or a **Play**, or creating a **Poster** to communicate their position on these International indoor and outside air pollution issues.

The debate could also involve **Role Playing** using some of the following roles to illustrate different views in the International indoor and outside air pollution Debate.
- Scientist against outside air pollution
- Scientist against indoor air pollution
- Parent of an asthmatic child living in downtown Los Angeles, CA
- Car manufacturer
- Scientist working for a major oil producing company
- Environmental health specialist involved in both International indoor and outside air pollution
- Engineer promoting public transportation
- Engineer specialist in indoor ventilation
- Reporter of local newspaper
- Scientist studying the habitats of the monarch butterfly
- Woman with 5 children in India or China
- Small Business owner with growing energy needs
- Small Family Farmer
- Large Energy Corporation
- Truck driver
- Owner of hotel
- Politician with limited monies and resources for public and environmental health
- Lawyer representing the Environmentalists against air pollution
- Lawyer representing the US Government on outside air pollution
- Director of the Health Department

Additional Activities

If they have not done so already in the Ethical and Critical thinking, have the students read the responses, and first identify the facts and then identify the opinions by underlining or highlighting

in different colors; then summarize in a paragraph the facts concerning International indoor and outside air pollution and/or discuss their conclusions in class.

Questions to ask about the Readings and the Debate: With regards to evaluating different opinions on International indoor and outside air pollution, does it matter who gives the opinion? How do you know from what point of view person is going to speak? Does it matter to you if the person has a conflict of interest? What is a conflict of interest?

Some interesting websites on this subject include:

http://www.usda.gov/agencies/biotech/faq.html
http://special.northernlight.com/gmairs/
http://www.pbs.org/wgbh/harvest/
http://www.trueairnow.org/shoppinglist.html
http://www.usda.gov/agencies/biotech/faq.html
http://scope.educ.washington.edu/gmair/position/

Follow up Activities

Students can use their handouts and presentation to discuss International indoor and outside air pollution as an environmental health issue for other students, families and neighborhood organizations.

What can the student(s) do about International indoor and outside air pollution? What can a group of people do? How can this situation be prevented, modified or made better for internationally with regards to air pollution and for similar environmental issues?

Students can assess environmental issues for their own neighborhoods, prioritize these issues, and create plans of how to address these issues to either remediate or prevent them.

Students can visit or have presentations by an air pollution scientist, a truck and car mechanic or an energy industrialist or scientist.

Student Assessment

Give the following presentation design components to each student team as a guide to their group presentations:

- Decide what facts are important to include to support their particular view point on the International indoor and outside air pollution issue
- Design a Handout that summarizes this information and their point of view (i.e. Brochure, Video, Webpage, Rap/Song, Poem, Play, Poster)
- Practice and keep their presentation within the time allotted
- Each group member should take part in the Presentation, even if it is just to read or explain one piece of the presentation
- Each group member should answer at least one question from the audience at the end of their Group presentation.

Assign points for the following components of the Team Presentation:

- Were the handout and presentation easy to read/effective at communicating the facts and the particular point of view?
- Were pictures/maps/illustrations used?
- Were proper science terms used?
- Was each group member actively involved in the presentation?
- Did the group report their sources?

- Could the group members answer questions from the audience about the facts and defend their point of view?

Readings on international indoor and outside air pollution

Outdoor

- Excerpts from: Valuing the health effects of air pollution by Maureen L. Cropper and Nathalie B. Simon from the Development Economics Vice Presidency of the World Bank, No. 7 April 1996 http://www.worldbank.org/html/dec/decnotes/DECnts/decnt007.pdf

Indoor

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That high levels of air pollution are bad for health and can cause premature death is well known. But policymakers need more specific information, especially about the costs and benefits of reduction measures, to set priorities

Air pollution is a serious and growing problem in many developing countries, particularly in rapidly expanding cities, where pollution levels are often several times the maximum level recommended by the World Health Organization. That high levels of air pollution are bad for health and can cause premature death is well known. But policymakers need more specific information to set priorities. Should available funds go to air pollution reduction—or would they be better spent on sanitation, education, AIDS prevention, or any of a host of other pressing concerns?

A cost-benefit analysis of air pollution reduction measures is a necessary input to such a decision. However, answers vary greatly depending on the method used. This note describes some of the pitfalls that commonly arise when attempting to estimate the dollar value of benefits associated with a given reduction in pollution levels in low-income countries. Because cost-benefit estimates are often necessary despite these pitfalls, box, not includedes describe how to prepare a rough estimate of the benefits of pollution reduction, using Delhi, India as an example.

Measuring the effects of air pollution on premature death

Air pollutants affect health in a variety of ways, from itchy eyes to premature death. Although air pollution affects both death and illness rates, greater social costs are likely to be associated with premature death. Chronic exposure to air pollution can lead to premature death by increasing the rate at which lung tissue ages, by contributing to chronic obstructive lung disease, and by exacerbating cardiovascular disease. Short-term peaks in air pollution (acute exposures) can increase the chance that a person in a weakened state (a person with pneumonia, for example) or a susceptible person (a person with asthma, for example) will die. The most accurate way to measure the impact of air pollution on death rates in a given area is to conduct epidemiologic studies for that area. To capture both acute and chronic effects, a large cross-section of individuals should be followed prospectively for at least ten years, measuring both the air pollution concentrations to which they are exposed and other factors that affect the risk of death (smoking behavior, body mass index, and family history). Because such studies are expensive, only two have been completed to date, both in the United States (Dockery and others 1993; Pope and others 1995). These studies show how pollution alters the survival function (the probability that a person survives to each age in a community) and allow the number of life-years lost as a result of air pollution to be calculated.

Because they are less expensive, retrospective studies that use aggregate data are common. Cross-sectional studies correlate aggregate variations in air pollution levels across counties with death rates by county. Cross-sectional studies are generally unreliable, however, for two reasons. First, if there has been recent immigration, historic air pollution levels in a county may not measure the concentrations to which people currently living in the county were exposed. Second, it is usually hard to control for confounding factors (smoking behavior, dietary risk factors) at the county level. Time series studies, which correlate daily variation in air pollution

with variation in daily mortality in a given city, avoid the problems mentioned above, but at best measure the effects of acute exposure to air pollution on death rates. Because they measure primarily the effect of acute exposure to air pollution on people who are in a weakened state and are therefore susceptible to death as a result of a sudden rise in pollution concentrations, such studies measure only some of the effects of air pollution on premature death. To the extent that many of these people would have had short life expectancies even in the absence of pollution, time series studies may overestimate the life-years lost as a result of air pollution. Such studies can provide a lower-bound estimate of the reduction in premature death that would accompany a reduction in air pollution, however.

Can results obtained for one country be applied to another?

In the absence of epidemiologic studies of the region in question, some researchers advocate the use of dose-response functions from other countries. The only prospective cross-sectional studies of the effects of chronic exposure to pollution on mortality come from the two U.S. studies mentioned earlier. Time series studies have also been conducted, primarily in the United States and Europe (other parts of the
world have been studied, such as Santiago, Chile by Ostro and others 1995, China by X. Xu and others 1994 and Z. Xu and others forthcoming, and São Paulo, Brazil by Saldiva and others 1994).

How appropriate is it to transfer results from epidemiologic studies conducted in industrial countries to developing countries? At a minimum, such projections must be made for disease-specific deaths. Extrapolating the effect of air pollution on total death rates from a study in the United States makes no sense if the distribution of deaths by cause differs greatly between the United States and the country of interest. For instance, the effect of a change in particulate concentrations on total deaths comes mainly from its effect on respiratory and cardiovascular deaths. In the United States half of all deaths are caused by cardiovascular disease or respiratory illness. In Delhi, India, by contrast, fewer than 20 percent of all deaths are attributable to these causes. Even if people in Delhi reacted to a given change in particulate pollution in exactly the same way that people in the United States did, the effect of the change on total mortality would be lower in Delhi (box, not included 1). The figures in the last row of the table in box, not included 1 represent the most accurate estimates of the benefits of reducing air pollution in Delhi based on extrapolations from U.S. studies. These figures may, however, represent lower-bound estimates, for two reasons. First, they represent only the gains from reducing acute exposure to air pollution. Second, people in Delhi may be more susceptible to the effects of air pollution than people in the United States because of lower levels of baseline health and more limited access to medical care.

Estimating the dollar value of lives lost from air pollution

Economists calculate the value of a reduction in risk of death by determining how much an individual is willing to pay for it. One approach to measuring willingness to pay is to infer the value from compensating wage differentials in the labor market. The theory behind this approach is simple: other things being equal, workers in riskier jobs are compensated with higher wages for bearing more risk. A second approach to measuring willingness to pay is to ask people what they would pay to reduce their risk of dying. This is referred to as the contingent valuation approach.

Recent compensating wage studies in the United States have produced estimates of the value of a statistical life in the range of $1.9–$10.7 million (1990 dollars). Contingent valuation studies

have produced slightly lower estimates of $1.2–$9.7 million (1990 dollars). Compensating wage studies measure compensation for risk of instantaneous death for people who are about 40 years old and thus measure the approximate value of 35 years of life (Viscusi 1993). Because death from air pollution reduces life-years by less than 35 years on average, labor market estimates should be adjusted accordingly. Compensating wage and contingent valuation studies have not yet been conducted in developing countries. Premature death in these countries is typically valued by using estimates of the value of a statistical life from the United States and adjusting for income differences between the two countries, or by calculating forgone earnings. Which method is preferable? Economic theory tells us that the willingness to pay approach yields a value of a statistical life that exceeds the value of forgone earnings as long as people are risk averse (Rosen 1988). In the United States, for example, estimates of the value of a statistical life are typically five to ten times higher than the value of forgone earnings. If people in other countries were equally risk averse, then it would be appropriate to multiply the value of forgone earnings in the country of interest by the same factor found in U.S. studies. It is, however, likely that risk aversion varies with living standards and that the value of a statistical life in developing countries is a smaller multiple of forgone earnings than it is in the United States. Until further research provides estimates of the value of a statistical life in developing countries, one approach to valuation is to use forgone earnings as a lower bound to the value of changes in life expectancy and projections of the value of life from U.S. studies as an upper bound, as shown in box, not included 2.

—by Maureen L. Cropper
and Nathalie B. Simon

Further reading

Dockery, Douglas, and others. 1993. “An Association Between Air Pollution and Mortality in Six U.S. Cities.” *New England Journal of Medicine* 329(24): 1753–59.

Ostro, Bart. 1994. “Estimating the Health Effects of Air Pollutants: A Model with an Application to Jakarta.” Policy Research Working Paper 1301. World Bank, Policy Research Department, Washington, D.C.

Ostro, Bart, Jose Miguel Sanchez, Carlos Aranda, and Gunnar S. Eskeland. 1995. “Air Pollution and Mortality: Results from a Study of Santiago, Chile.” Policy Research Working Paper 1453. World Bank, Policy Research Department, Washington, D.C.

Pope, C.A., and others. 1995. “Particulate Air Pollution as a Predictor of Mortality in a Prospective Study of U.S. Adults.” *American Journal of Critical Care Medicine* 151(3):669–74.

Rosen, Sherwin. 1988. “The Value of Changes in Life Expectancy.” *Journal of Risk and Uncertainty* 1:285–304.

Saldiva, P.H.N., and others. 1994. “Association between Air Pollution and Mortality Due to Respiratory Diseases in Children in São Paulo, Brazil: A Preliminary Report.” *Environmental Research* 65:218–25.

Saldiva, P.H.N., and others. Forthcoming. “Air Pollution and Mortality in Elderly People: A Time Series Study in São Paulo, Brazil.” *Archives of Environmental Health*.

Schwartz, Joel, and Douglas Dockery. 1992. “Increased Mortality in Philadelphia Associated with Daily Air Pollution Concentrations.” *American Review of Respiratory Disease* 145:600–4.

Viscusi, W. Kip. 1993. “The Value of Risks to Life and Health.” *Journal of Economic Literature* 31:1912–46.

Xu, Xiping, Jun Gao, Douglas W. Dockery, and Yude Chen. 1994. “Air Pollution and Daily Mortality in Residential Areas of Beijing, China.” *Archives of Environmental Health* 49(4):216–22.

Xu, Z.Y., and others. Forthcoming. “Air Pollution and Daily Mortality in Shenyang.”

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Heaven is where home is, they say. But not when homes are heavily polluted with smoke that threatens life. Seventy-five per cent of India's households use biomass fuels (wood, dung, and crop residues) for cooking and heating. This fuel is typically used in open fires or simple stoves, mostly indoors, and rarely with adequate ventilation or chimneys. This situation leads to some of the highest ever recorded levels of air pollution, to which young children and women are exposed daily for many hours. This exposure causes half a million premature deaths every year. According to the World Health Organization, indoor air pollution due to biomass smoke is one of the largest environmental risk factors for ill health of any kind. This area needs greater policy attention and commitment.

Indoor air pollution implicated in alarming health problems

Traditional biomass fuels account for 80 per cent of India's domestic energy consumption. When these fuels burn in simple cookstoves during meal-preparation, air inside homes gets heavily polluted with smoke that contains large amounts of toxic pollutants such as carbon monoxide, oxides of nitrogen, sulfur dioxide, aldehydes, dioxin, polycyclic aromatic hydrocarbons and respirable particulate matter. The resulting human exposures exceed recommended World Health Organization levels by factors of 10, 20 or more.

Prolonged exposure to biomass smoke is a significant cause of health problems such as:

- Acute respiratory infections (ARI) in children;
- Chronic obstructive lung diseases (such as asthma and chronic bronchitis);
- Lung cancer and
- Pregnancy-related problems

Some key findings are presented below

Exposure to biomass smoke increases the risk of acute respiratory infection (chest infections, coughs, colds and middle-ear infections) in children under five years of age.
Children in The Gambia found riding on their mothers' backs as they cooked over smoky cookstoves were six times more likely to develop ARI than unexposed children.

In Nepal, the incidence of moderate and severe cases among 2-year-olds increased as they spent greater number of hours near the fire. A study in Tanzania found that children younger than five years who died of ARI were almost three times more likely to be sleeping in a room with an open cookstove than healthy children in the same age group.

Source: Sumeet Saxena, Tata Energy Research Institute

Studies conducted as early as the 1980s in India found a higher occurrence of chronic bronchitis in women exposed to biomass stoves.

Studies in India, Nepal and Papua New Guinea show that nonsmoking women who have cooked on biomass stoves for many years exhibit a higher prevalence of chronic lung disease

(asthma and chronic bronchitis). In Mexico, women exposed to wood smoke for many years faced 75 times more risk of acquiring chronic lung disease, about the level of risk that heavy cigarette smoker's face, than women not exposed to wood smoke. One recent Colombian study found that women exposed to smoke during cooking were three times more likely to suffer from chronic lung diseases. Studies in South America and India have shown that exposure to indoor air pollution severely reduces lung function in children.

Gambian infants exposed to smoky cookstoves are six times more likely to get acute respiratory infection
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A study in Japan found high rates of cancer in women who had previously used wood as a fuel. However, results are mixed with regards to cancer; women's lung cancer rates in developing countries are low. The risk of lung cancer is high in Chinese women exposed to coal smoke in homes.

Exposure to high indoor smoke levels is associated with pregnancy-related problems such as stillbirths and low birth weight. One study in western India found a 50 per cent increase in stillbirths in women exposed to indoor smoke during pregnancy. Likewise, a study in Africa found that cooking with wood greatly increased the risk of stillbirth.
Considerable amounts of carbon monoxide have been detected in the bloodstream of women cooking with biomass in India and Guatemala.

Other than these four major categories of illness, indoor air pollution is associated with blindness and changes in the immune system. 18 per cent of blindness in India is attributed to the use of biomass fuels. Further, a 1995 study in Eastern India found the immune system of newborns to be depressed due to the presence of indoor air pollution.

One study in Western India found a 50 per cent increase in stillbirths in women exposed to indoor smoke during pregnancy
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What can be done?

Ideally, a range of interventions can be used to reduce exposure to indoor air pollution. These are:

Technical interventions

- Smoke removal - Flues attached to stoves, hoods and chimneys to remove smoke. Other stove improvements which reduce emissions, through better combustion and more efficient heat transfer. Stoves with longer life span.
- Housing design - Changes to kitchen design to increase ventilation and control the distribution of pollution.
- Fuels - Methods of cleaning existing fuels, for example bio-gas and other "clean" bio-mass products, or promoting fuel-switching to alternatives such as kerosene or LPG.

Behavioral interventions

- Promoting awareness of long-term health effects on the part of users. This may lead to people finding ways of minimizing exposure through better kitchen management and infant protection

Policy level interventions

- Local micro-credit facilities for the upfront costs of switching to gaseous fuels, examination of targeted (as opposed to across-the-board) subsidies to enable low income households to switch, income generation opportunities
- Training - to develop skills and expertise for stove development, improved housing design, and better education about health risks.

World Bank and IAP related activities in India

Given the magnitude of the problem of indoor air pollution in India, the World Bank initiated a study in March 2000, entitled Household Energy, Air Pollution and Health.

The objectives of the study are:

- Promote efficient strategies and policies and identify cost-effective options for mitigating indoor air pollution and facilitate Government commitment to addressing the problem
- Improve knowledge and foster greater awareness among government officials, NGOs communities and other stakeholders
- Develop practical tools for measuring and predicting exposure levels and health impacts due to indoor air pollution.

On March 27 2000, the World Bank organized a launch workshop for the above-mentioned study in New Delhi to identify the key issues that are critical for addressing indoor air pollution in India. The workshop was attended by 36 outside participants from government agencies, research institutions, private sector marketers and NGOs representing the health, environment, rural development and energy sectors.

The workshop speakers and participants reiterated the enormous health costs of indoor air pollution in India causing more than half a million premature deaths every year, particularly among rural women and children. A recent World Bank study found that in rural India, the transition from fuel-wood to cleaner fuels such as kerosene and LPG would have a significant impact on infant mortality, halving the mortality rate for children under the age of five. Experts noted that a serious problem with improved stoves in India so far has been their short life span. Available statistics indicate that about 15 per cent of the improved stoves distributed under the Government of India (GOI) Program break down in the first three months and one-third of the cookstoves become non-functional within a year of installation. Therefore, the life span of improved stoves needs to be increased considerably for them to have a significant impact on public health.

Voices

“It is unlikely that fuel wood will be completely replaced in rural areas as poorer sections of the community lack the cash resources to purchase the minimum amount of kerosene or LPG, or the appliances for these fuels”

N C Saxena, Secretary, Planning Commission, New Delhi

“There is a need for working out a definite policy to reduce human exposure to biomass fuels. Due priority should be given by the government to the problem of indoor air pollution”

N K Ganguly, Director General, Indian Council of Medical Research, New Delhi

"Phasing out dirty fuels would reduce rural child mortality by about one-third in India"
Gordon Hughes, The World Bank, Washington DC

"Half a million children and women die each year from indoor air pollution in India"
Kirk Smith, School of Public Health, University of California Berkeley

"Deepam Scheme in Andhra Pradesh has eliminated the problems faced by the traditional cookstoves in which the entire family used to suffer due to heavy smog, smell and irritation in the eyes"
H S Brahma, Commissioner Civil Supplies, Government of Andhra Pradesh

Workshop Recommendations

The workshop participants recommended that the World Bank program carry out the following four activities, two at the national level and two focusing on Andhra Pradesh (AP). The recommendations are highlighted below:

National Level Components

Stove Programs: Evaluation of the GOI program of improved stoves for market penetration, customer acceptance, institutional set-up and sustainability based on selected case studies.

Clean fuels: Preparation of a concept paper on the economic and operational issues and barriers relating to the uptake of LPG and kerosene in rural India.

Andhra Pradesh Components

Clean Fuels: Case study assessment of the Deepam Scheme in Andhra Pradesh where the government subsidizes the cylinder deposit fee for women from households with incomes below poverty line to facilitate the switch from biomass to LPG.

Exposure and Health Assessment: Collection of better and systematic information about actual exposure levels experienced by households in different districts and climatic zones and development of a model for predicting the exposure levels based on fuel use and other household data therein (exposure atlas).

How feasible are clean fuels in India?

Clean fuels such as LPG and kerosene can be promoted on a wider scale in some parts of rural India. However, a number of policy and institutional barriers need to be overcome for this to become a feasible option.

Two-tier pricing
There is a two-tier pricing system, whereby the state-owned Public Distribution System (PDS) suppliers sell at subsidized prices to domestic users who are primarily urban dwellers, and private sector distributors at market prices (which are above the government subsidized price). This leads to a significant amount of leakage, whereby subsidized LPG from the PDS for domestic use is diverted to commercial users. The PDS targets primarily urban users, and

there is a waiting list of 11 million households, although the government plan is to eliminate this waiting list by December 2000.

No role for private sector in state schemes for increasing access Private sector LPG distributors are barred from such government-sponsored schemes as the Deepam Scheme, when private marketers may have more extensive networks of distributors in rural areas which are targeted by the Scheme.

Sustainability in the face of mounting subsidies
Across the board subsidies for domestic kerosene and LPG in India today are known for their diversion and the enormous drain on the government budget. Their overall effect
May even be to reduce the accessibility of kerosene and LPG to low income households. The subsidies for kerosene and LPG for domestic use in India are untargeted and, therefore, enormous. Further, they benefit the relatively well off who can afford to pay the market prices for these products, or worse, in the case of diversion, those who should be paying the market prices. The poor for whom these subsidies were originally designed do not use kerosene or LPG for cooking for the most part. The poor with no fixed addresses cannot get kerosene in fair price shops. Subsidized kerosene for domestic use is diverted to automotive diesel and LPG to the commercial sector. Mounting subsidies do not give incentives to the government to expand the distribution of kerosene. The response of the Government of India has been to freeze the total amount of kerosene distributed in PDS, and decrease the allocation where possible.

Need for a Multisectoral Approach

Tackling indoor air pollution is a formidable challenge. This involves dealing with the difficult question of developing financially viable services for which the poor are willing to pay. Several technical and economic barriers need to be overcome to promote improved stoves and clean fuels as mitigation options. The area is “cross-sectoral" in nature and requires collaboration and commitment between agencies responsible for health, energy, environment, housing and rural development. Other agencies and organizations are strongly encouraged to address the issue and assist in providing possible solutions.

References

A Agrawal et al, 1999, State of India's Environment: The Citizens Fifth Report, Centre for Science and Environment.

D M Bowes, 1999, Allergy, Sensitivity & Environmental Health Association: Health Effects of Woodsmoke, http://www.asehaqld.org.au/health effects of wood smoke.htm

D Barnes et al, 1994, What Makes People Cook with Improved Biomass Stoves? A Comparative International Review of Stove Programs, Technical Paper Number 242 (Energy Series), The World Bank.

Environmental Health Project, 1999, Lowering Exposure to Children to Indoor Air Pollution to Prevent ARI: The Need for Information and Action, Capsule Report, Number 3. Camp Dresser and McKee International Inc.

G Hughes and M Dunleavy, 2000, Why Do Babies and Young Children Die in India? The Role of the Household Environment, The World Bank

K R Smith and S Mehta, 2000, The Burden of Disease from Indoor Air Pollution in Developing Countries: Comparison of Estimates, Report for the USAID Global Technical Consultation.

N Bruce, 1999, Global Forum for Health Research: Indoor Air Pollution and Childhood ALRI in Developing Countries, World Health Organization, http://www.globalforumhealth.ch/docs/Forum3doc321.htm

Tata Energy Research Institute, Solid Residential Fuels: Key Concerns, http://www.teriin.org/indoor/solid.htm

World Resources Institute, 199899 Tackling the Problems of Poverty, Environment and Health: Tackling Indoor Air Pollution, http://www.wri.org/wri/wr9899/indoor.htm