

"Formulation of a Comprehensive National Strategy and Action-Plan to Attenuate Major Environment and Occupational Health Risks Pertinent in Urban Setting"

(Final Report)

Submitted by

Dr. Hari Bansh Jha

Mr. Hari Barakoti

Mr. Hari Krishna Adhikari

Ms. Shyamu Thapa Magar

Submitted To

Nepal Health Research Council/WHO

Kathmandu, Nepal

March 2006

ACKNOWLEDGEMENT

In the present study, an effort has been made to identify the major environmental and occupational health risk factors in urban settings and prepare strategic action-plan to attenuate public health risks caused by major environmental and occupational health and safety situations within the urban settings. The study would not have been possible in the absence of necessary support from NHRC/WHO. Therefore, we would first of all like to extend our sincere gratitude to Dr. S.P. Singh, Member Secretary, NHRC for his valuable suggestions for the success of the study. Our obligation is due to Mr. Sharad Adhikari, National Operation Officer, WHO for sharing with us all needed information on the basic theme of the study. We would also like to express our sincere thanks to Mr. Meghnath Dhimal, Research Officer, Environmental Health Research Unit, NHRC for his support to our study team members in coordinating the research activities.

March 20, 2006

Professor Hari Bansh Jha
Team Leader

ABBREVIATIONS

BOD	Biological Oxygen Demand
CBS	Central Bureau of Statistics
CETS	Centre for Economic and Technical Studies
DDC	District Development Committee
DoHS	Department of Health Services
EIA	Environmental Impact Assessment
ENPHO	Environment and Public Health Organization
EPA	Environment Protection Act
GDP	Gross Domestic Product
INGO	International Non Governmental Organization
MoAC	Ministry of Agriculture and Cooperatives
MoH	Ministry of Health
MOHP	Ministry of Health and Population
MoI	Ministry of Industry
MOICS	Ministry of Industry, Commerce and Supply
MoPE	Ministry of Population and Environment
MOEST	Ministry of Environment, Science and Technology
MoPPW	Ministry of Physical Planning and Works
MoST	Ministry of Science and Technology
NHRC	Nepal Health Research Council
NPC	National Planning Commission
NEPAP	Nepal Environment Policy and Action Plan
NESS	Nepal Environmental and Scientific Services
NGO	Non Governmental Organization
OPD	Out Door Patient
TSP	Total Suspended Particulate
VDC	Village Development Committee
WHO	World Health Organization

CONTENTS

	Page
Acknowledgement	i
Abbreviations	
Contents	
List of Tables	iii
List of Photo	iv
Executive Summary and Recommended Strategic Action Plan	v

Chapter One

INTRODUCTION	1
1.2 Objectives	1
1.3 Methodology	1
1.3.1 Secondary Source Information	2
1.3.2 Interim Report	2
1.3.3 Primary Source Information	2
1.4 Information and Data Analysis	2
1.5 Draft Report	3
1.6 Workshop	3
1.7 Final Report	3
1.8 Limitation of the Study	3

Chapter Two

URBAN ENVIRONMENT AND OCCUPATIONAL HEALTH

2.1 Background	5
2.2 Environmental Policy	5
2.3 Health Policy	6
2.4 Environmental health Guidelines and Standards	7
2.5 Coordinating Environment and Health Policies	8
2.6 Urban Environment Health	8
2.7 Occupational Health	9
2.8 Vulnerability of Urban Setting	9
2.8.1 Meteorology	10
2.8.2 Population Growth	10
2.9 Vulnerable Groups	11
2.9.1 Children	10
2.9.2 Elderly	11
2.9.3 Workers	12

2.10	Conclusion	12
------	------------	----

Chapter Three

ENVIRONMENTAL AND OCCUPATIONAL RISK FACTORS

3.1	Background	13
3.2	Development of Indicators	13
3.3	Environmental Health Risk Factors	15
3.3.1	Air Quality	15
3.3.2	Water Quality	18
3.3.3	Solid Waste Problem	20
3.4	Occupational Health Risk Factors	24
3.5	Ranking of Pollutants	26
3.6	Cause and Effect Scenario	27
3.7	Conclusion	31

Reference

Annex I: Photo Of the Field Study

Annex II: PowerPoint Slide of dissemination workshop

Annex III: List of Person Present in Dissemination workshop

LIST OF TABLES

Table 3.1	Environmental Health Indicators in Nepal
Table 3.2	Indoor Patient in Selected Governmental Hospitals (Kartik 2061 to Chaitra 2061)
Table 3.3	Concentration of Different Gaseous Pollutants in Major Urban Areas
Table 3.4	Concentration of Various Gaseous Pollutants in Kathmandu Valley
Table 3.5	Bacteriological Water Quality from different sources in Kathmandu Valley
Table 3.6	Ranking of Pollutants based on their Effects on Health
Table 3.7	Annual Incidences of Some Diseases in Nepal
Table 3.8	Health Effect of Air Pollution
Table 3.9	Percentage of Total Deaths from Diseases linked to Air, Water and Sanitation

LIST OF PHOTOGRAPHS

- Photo No. 1 Dumping of waste along the highway of Biratnagar
- Photo No. 2 A handcart used for waste collection in Biratnagar
- Photo No. 3 Dumping of waste along the street of Nepalgunj
- Photo No. 4 Cleaning of Drainage in Birgunj
- Photo No. 5 Sate of urban poor in Birgunj
- Photo No. 6 Functionless incinerator in Birgunj Hospital
- Photo No. 7 Waste dumping in open field along the highway of Birgunj
- Photo No. 8 Awareness notice in Birgunj City
- Photo No. 9 Conducting workshop in Nepalgunj by consultant for the study
- Photo No. 10 Sate of occupational health and safety in industry of Nepalgunj
- Photo No. 11 Industrial toxic effluent discharge along the open field in Nepalgunj
- Photo No. 12 Pipeline water and hygienic condition in Nepalgunj
- Photo No. 13 Algal bloom in the wetland of Nepalgunj
- Photo No. 14 Blockage of sewage line due to waste accumulation in Nepalgunj

EXECUTIVE SUMMARY

In Nepal, the planners and policy makers started realizing the importance of environmental and occupational health risk issues basically from the Sixth Plan (1980-85). However, there is no sign of any meaningful change in environmental and occupational health risks in the urban areas. This is also due to the fact that major environmental and occupational health risk factors had not been identified in the country and there was also a lack of strategic action plan to address such issues. Hence, the present study was carried out to: (a) Identify the major environmental and occupational health risk factors in urban settings; (b) Prepare strategic action-plan to attenuate public health risks caused by major environmental and occupational health and safety situations within the urban settings; and (c) Disseminate the prepared strategic action plan by organizing a dissemination workshop.

To achieve the above objectives, both the secondary and primary source materials were used for data collection. The secondary source information was collected from various publications of government and non-governmental agencies, international organizations and different other sources. Similarly, the primary source data were collected partly by interviewing the key resource persons and partly through observations made on the state of environmental and occupational health risks in four urban settings of the country, including in Kathmandu, Biratnagar, Birgunj and Nepalgunj. Data, thus, collected through the secondary and primary sources were analyzed and were put in tabular form to make them presentable.

In course of the study, it was found that the protection of environment was essential for the growth of Gross Domestic Production (GDP), sustainable development of the national economy and poverty alleviation. Hence, the environmental and health policies, rules and regulations, and health guidelines and standards were developed for the improvement of environmental health situation in Nepal. Yet the environmental problems related to air, land, water and noise pollution are most precarious in urban areas like in Kathmandu, Biratnagar, Birgunj and Nepalgunj for their adverse effect on the health of the people.

Of the different categories of pollutants such as air, water, land and noise, the air pollution is the most harmful as it enters into the body directly and affects the respiratory system and associated organs. The air quality in the urban areas is affected due to rapid growth in the number of motor vehicles, poor conditions of roads, inferior quality of automobile engines, adulterated fuel products and the emissions from the factories. Besides, the pollution level of most of the urban areas has aggravated due to rapid rate of growth of population and weak public institutions to manage the dense settlements with very little open space.

Moreover, the increasing level of water pollution in the urban areas account for diarrhoea and skin diseases. Industries discharge effluents in the rivers, canals, and other water sources. The chemicals and wastes discharged from the industries degrade water quality and the environment. Most of the houses in the urban areas lack the sewage treatment

facilities and as such the sewage is directly discharged into the rivers. The ground water quality in the urban areas is also contaminated due to seepage of the discharged effluents from the industries and workshops. Similarly, the improper management of solid waste leads to environmental pollution affecting public health.

Mostly children and elderly people suffer from different diseases and their problems get aggravated by the rising tide of pollution. Children are mostly victims of air pollution and unsafe drinking water. Absentee rate among the children in several schools is high because of the lack of clean environment. The elderly people are at higher risks from pollutants as they lose their immunity and defense mechanism. They are victims of various respiratory, cardiac or other diseases and even a low level of pollutants among these people cause severe problems related to lung, heart and skin diseases.

Emission, effluent discharge and solid waste generated from industries affect all invertebrates and vertebrates directly and indirectly, and once assimilated into living plants and animals, the contaminants move quickly through the food chain, affecting the health of animals and humans.

Occupational environmental diseases are mainly caused in the industries by chemical agents, radiation, and physical hazards. The effects of exposure, in both natural and work settings, are greatly influenced by the exposure routes: primarily air pollution and water pollution, contaminated food, and direct contact with toxins

However, neither the employers nor the employees in most of the industrial establishments are serious about the need of clean environment. This is mainly due to the inadequate occupational health guidelines and standards and for their poor implementation. The workers engaged in different occupations are victims of diseases caused by pollution because the exposure time and rate of exposure to pollutants is very high. Each year, many of the employees working in industries have premature death due to primary and secondary effects of exposed pollutants in the working environment.

The intensity of the diseases among the workers largely depends on the level of pollution among the different categories of industries. While the vegetable ghee and distillery industries account for a major percentage of pollution, the dairy and beer industries cause the least of pollution. Most of these industries, however, discharge effluents and emissions to the environment without any appropriate treatment.

Environmental factors play critical roles in spreading non-infectious diseases. For example, exposure to carbon monoxide in the environment has a long-term effect on the heart and vision. Similarly, lead in drinking water impairs children's mental abilities and increases blood pressure in adults. Occupational exposure to coal dust, cotton dust, and asbestos predisposes workers to black lung, brown lung and several other respiratory diseases. Respiratory diseases like asthma, bronchitis, throat infection, skin diseases, etc. are related to air pollution; whereas the gastro-intestinal diseases such as typhoid, cholera, diarrhoea and hepatitis "A" are linked to contaminated drinking water. The increased level of noise might cause insomnia, ulcers and hypertension.

Survey conducted in the past shows that asthma/bronchitis diseases are major cause of deaths in Nepal. Of the total reported cases of death, asthma/bronchitis alone accounts for 6.9 per cent deaths; followed by deaths from cholera/diarrhoea (4.5 per cent), pneumonia (4.2 per cent), heart disease (2.9 per cent) and typhoid (1.0 per cent). It is quite clear the huge urban populations have lost their life due to asthma and bronchitis caused by air pollution.

The pollution level in the urban settings and urban health risks can be controlled by implementing Strategic Action Plan as recommended below:

Recommended Strategic Action Plan

Strategic Action Plan	Responsible Institutions	Time Frame
1. Constitute a Steering Committee comprising of high level officers from MoEST, MoICS, MoHP and other concerned agencies with secretariat at MOHP/NHRC to take care of occupational health situation	MOHP/NHRC	Immediate
2. Strengthen institutional capacity at different levels (local: municipal, central) to take care of occupational health situation prevailing in Nepalese urban settings	MoHP/MoICS	Continuous
3. Develop monitoring mechanism at all levels to monitor the indicators of occupational health hazards	MoHP/MoICS	Immediate
4. Develop rules and regulations to control industrial pollution completely to a level not causing adverse affects to health	All stakeholders like MoHP, MoEST MoICS	Immediate
5. Enforce the existing rules to control industrial pollution e.g. air pollution, water pollution, land pollution, noise pollution, etc.	MoEST/MoICS	Immediate

<p>6. Develop more specific rules and regulations to take care of occupational hazards due to environmental pollution</p>	<p>MoHP/MoICS</p>	<p>Immediate</p>
<p>7. Develop human resources at different levels to take care of occupational health e.g. facility level, local level, central level, etc.</p>	<p>MoHP</p>	<p>Dec 2007</p>
<p>8. Improve citizen participation in environmental compliance and enforcement</p>	<p>MoHP/MoICS</p>	<p>Longterm</p>
<p>9. Prioritize occupational health issues within national development strategies</p>	<p>NPC/MoICS</p>	<p>Short Term</p>
<p>10. Enhance government commitment to promote the occupational health status through prevention and control, especially for the health of the poor and to tackling the constraints and inefficiencies in health systems and institutions</p>	<p>MoHP/MoICS</p>	<p>Continuous</p>
<p>11. Increase government commitment to mobilize resources to improve access and provision of health care for the poor</p>	<p>NPC/MoF</p>	<p>Long Term</p>
<p>12. Better coordination with national partners/stakeholders/donors and improve predictability of aid by harmonizing partner objectives and capacities to support country</p>	<p>All stakeholders, including Government bodies, I/NGOs</p>	<p>Continuous</p>

<p>level priorities</p> <p>13. Include occupational Health issues in Development of multi-sectoral health investment plans</p> <p>14. Promote research activities and create awareness among the target population about the need to improve environmental conditions of the urban areas so as to reduce the burden of diseases and also to encourage measures for occupational safety of the urban industrial workers.</p>	<p>and Donor Agencies</p> <p>MoHP/MoICS</p> <p>All stakeholders, including Government bodies, I/NGOs and Donor Agencies</p>	<p>Long Tem</p> <p>Long Term</p>
---	---	----------------------------------

Chapter One

INTRODUCTION

1.1 Background

In Nepal, there is a growing realization on the part of the planners and policy makers to address issues related to environmental and occupational health risks. Accordingly, the concerned organizations have made certain efforts to improve the situation in these sectors. But the efforts are so meager that there is no sign of the environmental and occupational health risks getting diluted particularly in the urban areas. The problem is precarious also due to the fact that the major environmental and occupational health risk factors have not been identified. In addition, there is no strategic action plan as such to attenuate public health risks caused by environmental and occupational health risk factors. So an attempt was made in the study to fill this void and help the planners and policy makers of the country to reduce the magnitude of environmental and occupational health risks in the urban settings.

1.2 Objectives

The overall objective of the study was to identify the major environmental and occupational health risk factors with a view to making strategic action plan to attenuate public health risks in urban settings. Specific objectives of the study were to:

1. Identify the major environmental and occupational health risk factors in urban settings;
2. Prepare strategic action-plan to attenuate public health risks caused by major environmental and occupational health and safety situations within the urban settings; and
3. Disseminate the prepared strategic action plan by organizing a dissemination workshop.

1.3 Methodology

In order to achieve the above objectives, both the secondary and primary source materials were used for data collection. A variety of techniques were developed for gathering such information.

1.3.1 Secondary Source Information

While collecting the secondary source materials, all available literature on the environment and occupational health issues were collected and reviewed. The secondary source data were collected from different sources, including books, articles, and published and unpublished source of information.

1.3.2