

Special Session 1

Urgent Environmental Health Issues in the Philippines: Overview and Case Studies

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The Philippines is located in South East Asia. It is an archipelago composed of 7,100 islands. Our land area totals 298,170 square kilometersⁱ (approximately three times that of Korea). Our population stands at some 87 millionⁱⁱ (approximately double that of Korea).

The objectives of this paper are to: 1. Identify and describe the urgent environmental health issues affecting the Philippines today, through case studies; and 2. Identify major factors that contribute to the identified environmental health issues.

Effects of Corporate Mining. This paper presents two (2) cases illustrating the effects of corporate mining on Philippine health and environment. The first case is that of Lepanto, the biggest gold mining corporation in the Philippines today. The main operations of Lepanto are located in Mankayan, Benguet, Northern Philippines. Lepanto is using a tributary of the Abra River System as part of their mine waste disposal. In 2003-2005, we studied the "Health Profile of Communities Living Near (Lepanto's) Large-Scale Mining Operations": We found that villagers living near the mine drainage reported significantly more health symptoms. Blood sampling of 15 of these villagers showed higher levels of cyanide, lead and copper compared to controls.

The second case is that of Marcopper Corporation on Marinduque Island. Marinduque Island hosted the largest copper mining operation in the Asia-Pacific Region, under the Marcopper Corporation. The Marcopper mines operated from 1969-1996, a period of almost thirty years of mining disasters resulting in the release of tons of mine tailings into a saltwater bay and two river systems. Elevated blood levels have been found among schoolchildren on the island.

Effects of Pesticide Use. Agriculture is the major source of livelihood for the vast majority of Filipinos. Rice, corn, coconut, sugar are among the most widely produced. Starting in the

i http://www.couchsurfing.com/regional_info.html?country_name=Philippines, as viewed on 12 May 2006.

ii <http://www.cia.gov/cia/publications/factbook/rankorder/2119rank.html>, viewed on 12 May 2006.

seventies there was a shift to high-yielding varieties of rice that required increasing amounts of pesticides.

In 2005, we studied 79 farming households in a village in the Mountain Provinceⁱⁱⁱ who were engaged in the planting of various temperate vegetables. We found the following patterns of pesticide use and poisoning:

- 10.56% of household members who work in the farms (and are potentially exposed to pesticides) are in the 13-17 year age group while 13.38% are less than 13 years old.
- All farmers applied pesticides almost monthly. In fact, many farmers were using pesticides every week.
- The only protective equipment used by the farmers were rubber boots. Masks and gloves were hardly used.
- 89% admitted experiencing pesticide spills while spraying.
- 98.73% have experienced having pesticides spill on their back.
- 50.63% dispose of pesticide containers in the field while 21.52% throw pesticide containers with other domestic garbage. Only 27.85% bury their containers.

The situation is even worse in the cutflower industry^{iv} where farmers spray pesticides 2-3 times a week, often in enclosed greenhouses which are less than 5 meters from their house. Children in the third grade (elementary school) are already tasked with carrying and mixing pesticides while children in the sixth grade already spray pesticides.

Toxic Waste in the Former US Bases. In 1992, the US General Accounting Office identified Subic (former) Naval Base and fifty-six (56) other sites used by American troops as potentially contaminated sites.^v The US GAO also verified the presence of polychlorinated biphenyl (PCB), lead and other toxics buried in landfills that leaked into the soil and groundwater of the former Clark Air Base Command. In 1992, “about 25 children suffer diseases such as leukemia, central nervous system disorder, congenital heart disease and speech impairments; 8 women have breast cancer and/or other forms of cysts and 19 have suffered reproductive system problems like spontaneous abortions, stillbirths and infantile deaths.”^{vi}

Other Industries, including Export Processing Zones. There are many more industries in the

iii CHESTCORE (Community Health Education, Services and Training in the Cordillera Region), “Pesticide Survey in Sitio Letang, Tapapan, Bauko, Mountain Province”, unpublished data, 2005.

iv Saint Louis University College of Medicine, various unpublished community surveys, 2004.

v Malay, R., “Clock still ticking for victims of toxic waste”, <http://inq7.net>, viewed 12 May 2006.

vi Task Force Bases Clean-Up, *Inheritors of the Earth: The Human Face of U.S. Military Contamination at Clark Air Base, Pampanga, Philippines*, Manila, 2000.

Philippines which pose threats to the Filipinos' health. We have issues regarding coal power plants, hospital incinerators and various factories using toxic chemicals or releasing toxic waste into the environment. A special concern are the export processing zones where most employees are women. Many of these industries are involved in the manufacture of computer components or semiconductors.

Why do industrial and agricultural endeavors that threaten health and environment continue to operate in the Philippines? Three main factors contribute to this situation: globalization and liberalization policies, gaps in the implementation of government regulations and lack of awareness of the health sector and the public.

What lies ahead for the Philippines in terms of environmental health? A main impetus for change are the communities themselves who have organized to oppose the chemical pollution they are exposed to. Through the efforts of organized communities and their allies from the academe, environmental health is brought to the attention of the public. With public pressure, government policies and regulation improve.

It is a slow process to achieve change but eventually we are hopeful that change WILL come.

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I. The Philippines: A Biodiversity Hotspot

The Philippines is located in South East Asia. It is an archipelago composed of 7,100 islands. Our land area totals 298,170 square kilometersⁱ (approximately three times that of Korea). Our population stands at some 87 millionⁱⁱ (approximately double that of Korea).

The Philippines has been described as the equivalent of ten Galapagos Islands in terms of its biodiversity. Roughly fifty percent (50%) of our plants and animals are endemic or found only in the Philippines.ⁱⁱⁱ

Unfortunately in the last five hundred years we have lost or damaged much of this biodiversity. We have lost more than 93 percent of our original forest cover.^{iv} Our whole country is now considered a biodiversity hotspot. Experts warn that the damage that continues to be wrought will be irreversible in 10-15 years.^v

Dr. Perry Ong, renowned academic from the University of the Philippines, has presented a list of five key environmental crises that the Philippines faces:

Table 1. Five Key Environmental Crises Faced by the Philippines^{vi}
(Modified from Perry S. Ong, Ph.D.)

<p>A. Water Crisis</p> <p><u>Destruction of water sources</u></p> <p><u>Reduction in Quantity</u></p> <p><u>Loss of Quality:</u> Contamination (<i>Biological, Chemical</i>: Pesticides, fertilizers, salt water intrusion; <i>Thermal</i>)</p> <p>B. Air Pollution Crisis</p> <p><u>Sources</u> (<i>Stationary</i>: industries, <i>Mobile</i>: vehicles)</p> <p><u>Quantity</u> (Volume and Scope)</p> <p><u>Quality</u> (Contamination from suspended particulates and toxic chemicals)</p> <p>C. Food Crisis</p> <p><u>Distribution</u></p> <p><u>Quantity</u></p> <p><u>Quality:</u> Heavy metal accumulation in fish, Formalin/ Pesticides in Vegetables, Genetically Modified Organisms</p> <p>D. Garbage Crisis</p> <p>E. Biodiversity Crisis</p>

ⁱ http://www.couchsurfing.com/regional_info.html?country_name=Philippines, as viewed on 12 May 2006.

ⁱⁱ <http://www.cia.gov/cia/publications/factbook/rankorder/2119rank.html>, viewed on 12 May 2006.

ⁱⁱⁱ Ong, Perry S. Ph.D., "The State of Philippine Biodiversity: Changing Mindscapes Amidst the Crisis", Center for Integrative and Development Studies, University of the Philippines, 2003 (updated 2004).

^{iv} Ibid.

^v Ibid.

^{vi} Ibid.

This paper focuses on sources of chemical pollution that contribute to the loss of quality of our water, air, food and human health.

The objectives of this paper are to:

1. Identify and describe the urgent environmental health issues affecting the Philippines today, through case studies;
2. Identify major factors that contribute to the identified environmental health issues.

II. Environmental Health Issues

Among the major environmental health issues affecting the Philippines today are the following:

- a. Effects of Corporate Mining
- b. Effects of Pesticide Use in Farming
- c. Toxic Waste in the former US Bases
- d. Other Industries, Including Export Processing Zones

(This paper focuses mainly on the first two.)

A. Effects of Corporate Mining

The Philippines is a mineral-rich country. We rank second worldwide in terms of gold production and third worldwide in copper production.^{vii}

This paper presents two (2) cases illustrating the effects of corporate mining on Philippine health and environment.

1. The Case of Lepanto Consolidated Mining Corporation and the Abra River System

Lepanto is the biggest gold mining corporation in the Philippines today. Its projects are listed by our President as part of the priority projects for implementation. Lepanto has been in existence since 1936 when it was set up by American colonial-era geologists.

The main operations of Lepanto are located in Mankayan, Benguet, Northern Philippines. At present, they are using a tributary of the Abra River System as part of their mine waste disposal. (The Abra River System is one of the biggest river systems in the Philippines, with at least 121,000^{viii} of our citizens, mostly indigenous peoples and farmers, living along its banks.)

^{vii} Kalikasan-People's Network for the Environment and Center for Environmental Concerns, "Philippine Environmental Situation: An Overview", powerpoint presentation, Manila, 2005.

^{viii} Save the Abra River Movement, "What is happening to the Abra River? (A Primer on the Effects of Corporate

In 2003-2005, we studied the “Health Profile of Communities Living Near (Lepanto’s) Large-Scale Mining Operations”:

The first phase of this study focused on determining the prevalence of symptoms attributed to acid mine drainage among residents of exposed communities through questionnaire-guided interviews of residents in the three (3) communities of: Sitio Paalaban, Barangay Paco, Mankayan, Benguet; Sitio Batbato, Barangay Cabitin, Mankayan, Benguet; and Sitio Camay, Barangay Comillas North, Cervantes, Ilocos Sur.

The residents of the 3 communities reported the following routes of exposure to mine drainage: inhalation, immersion and non-intentional ingestion. Cough (48.5%), nasal irritation (31.6%), skin symptoms such as rash, pruritus and burning sensation (31.6%), eye irritation (16.5%) and vomiting (10.5%) were the most prevalent symptoms reported in relation to exposure to mine drainage.

Residents in Lower Paalaban (the community nearest Lepanto’s Mill Outlet), located nearer the mine drainage flow, reported more health symptoms. Differences in prevalence of skin symptoms, eye irritation, nasal irritation and vomiting between Upper and Lower Paalaban were significant. At the time of the household survey in Paalaban (May 2003), we found that levels of cyanide were elevated at the CIP Mill Outlet and at Tailings Dam 5A. Lead and mercury levels were elevated at the CIP Mill Outlet and at Tailings Dam 5A during spot sampling.

The second phase of the study involved blood sampling of 15 Paalaban residents who were exposed to mine drainage for at least 12 hours a week and matching them (for age and sex) with controls living downstream, with little or no exposure to mine drainage.

This study showed a positive linear correlation between the hours of exposure to mine drainage and the subjects’ hemoglobin, blood cyanide and lead levels. Statistically significant differences in the blood levels of copper, cyanide and lead between the subjects and controls were also found. The subjects had higher levels of these chemicals in their blood as compared to the controls. On the other hand, the subjects had lower levels of serum creatinine compared to the controls. These blood test results indicate the possible chemicals responsible for the symptoms originally reported in the preliminary phase. Cyanide is pinpointed as possibly playing a prominent role.^{ix}

Meanwhile a team of biologists has found that water draining from these mines inhibited plant

Mining Along the Abra River”, Baguio City, 2004.

^{ix} Leung, Ana Marie, “Health Profile of Communities Living Near Large-Scale Mining Operations in Mankayan, Benguet (An Environmental and Occupational Health Hazard Assessment)”, 2005, unpublished.

root growth and resulted in more chromosomal aberrations, and that these aberrations were related to the elevated cyanide levels as well.^x

To this day, the (Lepanto) company continues to discharge its effluents into the Abra River System.

2. The Case of Marcopper Corporation and Marinduque Island

Marinduque is an island province located within the Visayas group of islands in the central portion of the Philippines. It has a total land area of nearly 960 square kilometers (which is larger than the land area of Busan of 763 square kilometers^{xi}).

Marinduque Island hosted the largest copper mining operation in the Asia-Pacific Region, under the Marcopper Corporation. Forty percent (40%) of Marcopper was owned by the Canadian company Placer-Dome while fifty percent (50%) was supposedly owned by then Philippine President Ferdinand Marcos.^{xii}

The Marcopper mines operated from 1969-1996, a period of almost thirty years of mining disasters:

(F)rom 1975-1991... 200 million tons of mine tailings were dumped directly into the shallow waters of Calancan Bay, covering corals and seagrasses and the bottom of the bay with 80 square kilometers of tailings.^{xiii}

A study conducted by our Department of Health and the National Poisons Control and Information Service (NPCIS) reported the following:

Initial health examination showed 7 schoolchildren out of 108 volunteer subjects from 6 barangays have elevated blood lead levels exceeding the WHO recommended limits of 10 ug/dl. Mean blood lead levels = 15.86 ug/dl (Range: 13-19 ug/dl). Electromyograph and nerve conduction velocity (EMG-NCV) results were compatible with peripheral axonal degeneration in 6 children and beginning damage in 1 child...In the succeeding health assessment, 59/59 schoolchildren from 3 barangays namely were found to have elevated blood lead levels. Range: 10-18 ug/dl. 43/64 (67.18%) have anemia. Soil samples collected 7 km from the causeway and

^x Rafanan, J and Almo, A., "Effects of Selected Water Samples from the Abra River on the Growth of *Allium fistulosum*", Department of Biology, University of the Philippines Baguio, 2005.

^{xi} http://www.apecceosummit2005.org/trevel_02.html, viewed on 13 May 2006.

^{xii} Coumans, C., "Placer Dome Case Study: Marcopper Mines", April 2002 as viewed at http://www.miningwatch.ca/updir/PD_Case_Study_Marcopper.pdf, viewed on 13 May 2006.

^{xiii} Ibid.

the causeway itself showed three (3) sites with lead, cadmium, copper and zinc levels were found in all sampling sites. Ambient air monitoring results showed lead values exceeding the recommended US-EPA limits.^{xiv}

In 1993 an earthen dam built to prevent mine waste (from the San Antonio site) from spilling into the Mogpog River burst. Houses were swept away, crops destroyed and two children drowned. The Mogpog River was documented to have low pH and elevated levels of sulfates, iron, cadmium, copper, zinc, calcium and magnesium, as late as 2004. These chemicals have been identified to pose “a potential hazard to human health”.^{xv}

In 1996 there was another massive tailings spill. This time the 26-kilometer long Boac River was flooded with 3-4 million tons of tailings.^{xvi} These eventually wash out into the sea.

To date there has been no comprehensive health risk assessment or surveillance system instituted on Marinduque island.

B. Pesticides

Agriculture is the major source of livelihood for the vast majority of Filipinos. Rice, corn, coconut, sugar are among the most widely produced. Starting in the seventies there was a shift to high-yielding varieties of rice that required increasing amounts of pesticides.

A 2000 study^{xvii} by our National Poisons Control and Information Service and Department of Health characterized hospital admissions for pesticide poisoning in four (4) regions with a high level of agricultural activity as follows:

- 273 cases of pesticide poisoning were recorded.
- There were slightly more males (53.1%) than females involved.
- Intentional (oral) exposures were the most common except among the 0-5 year old where most exposures were accidental.
- The usual pesticides involved were pyrethroids (29.3%) and organophosphates (22%). These included cypermethrin, malathion, carbofuran, etc.
- Recovery occurred in 79.5% of cases. Sixteen deaths (16) were reported.

^{xiv} Castillo E. et al, *Health and environmental assessment of the impact of mine tailings spillage in the Philippines*, J. Phys. IV France, 107 (2003) 275.

^{xv} A&S R Tingay Pty Ltd as commissioned by Oxfam Community Aid Abroad, “Water Quality in the Mogpog River, Marinduque Island, Republic of the Philippines”, 2004.

^{xvi} Coumans, C., “Placer Dome Case Study: Marcopper Mines”, April 2002 as viewed at http://www.miningwatch.ca/updir/PD_Case_Study_Marcopper.pdf, viewed on 13 May 2006.

^{xvii} Dioquino, C., “Report on Pesticide Poisoning in the Philippines (Report for the 7th Global Information Network on Chemicals Meeting)”, Japan, 2001.

This data does not adequately reflect the situation in rural farms and fields where most pesticide exposure occurs. In cooperation with the National Poisons Control and Information Service, we conducted some community-based studies.

1. The Vegetable Industry

Production of non-indigenous vegetables such as carrots, cabbages and lettuce were introduced in the Cordillera Region of Northern Philippines during the American colonial period. These commercial crops continue to be planted today for sale outside the region. The cultivation of these vegetables require imported seeds, pesticides and fertilizers.

In 2005, we studied 79 farming households in a village in the Mountain Province^{xviii} who were engaged in the planting of various temperate vegetables. We found the following patterns of pesticide use and poisoning:

- 10.56% of household members who work in the farms (and are potentially exposed to pesticides) are in the 13-17 year age group while 13.38% are less than 13 years old.
- All farmers applied pesticides almost monthly. In fact, many farmers were using pesticides every week.
- The only protective equipment used by the farmers were rubber boots. Masks and gloves were hardly used.
- 89% admitted experiencing pesticide spills while spraying.
- 98.73% have experienced having pesticides spill on their back.
- 50.63% dispose of pesticide containers in the field while 21.52% throw pesticide containers with other domestic garbage. Only 27.85% bury their containers.

This scenario is repeated all over the provinces of Mountain Province and Benguet.

2. The Cutflower Industry

The situation is even worse in the cutflower industry^{xix} where farmers spray pesticides 2-3 times a week, often in enclosed greenhouses which are less than 5 meters from their house. Children in the third grade (elementary school) are already tasked with carrying and mixing pesticides while children in the sixth grade already spray pesticides.

^{xviii} CHESTCORE (Community Health Education, Services and Training in the Cordillera Region), "Pesticide Survey in Sitio Letang, Tapapan, Bauko, Mountain Province", unpublished data, 2005.

^{xix} Saint Louis University College of Medicine, various unpublished community surveys, 2004.

By no means is the pesticide problem in the Philippines confined to these two industries. There are many more cases in the south (in Mindanao) where large-scale spraying of pesticides is being done by commercial plantations.

3. Toxic Waste in the Former US Bases

In 1992, the US General Accounting Office identified Subic (former) Naval Base and fifty-six (56) other sites used by American troops as potentially contaminated sites.^{xx}

The US GAO also verified the presence of polychlorinated byphenyl (PCB), lead and other toxics buried in landfills that leaked into the soil and groundwater of the former Clark Air Base Command. In 1992, “about 25 children suffer diseases such as leukemia, central nervous system disorder, congenital heart disease and speech impairments; 8 women have breast cancer and/or other forms of cysts and 19 have suffered reproductive system problems like spontaneous abortions, stillbirths and infantile deaths.”^{xxi}

According to the People’s Task Force for Bases Clean Up, at least a thousand deaths have been attributed to exposure to these toxics. 18,000 out of 34,000 former base workers are ill from exposure to asbestos and other chemicals.

4. Other Industries, including Export Processing Zones

There are many more industries in the Philippines which pose threats to the Filipinos’ health. We have issues regarding coal power plants, hospital incinerators and various factories using toxic chemicals or releasing toxic waste into the environment. A special concern are the export processing zones where most employees are women. Many of these industries are involved in the manufacture of computer components or semiconductors. They use chemicals such as acrylonitrates, aniline, anesthetic gases, arsenic compounds, benzene, benzo(a)pyrene, beryllium, boron (boric acid), cadmium, carbon disulphide, carbon monoxide, chlordicone, chloroform, chloroprene, dichloromethane, epichlorohydrin, ethylene oxide, formaldehyde (formalin), hexachlorobenzene, lead (organic/inorganic), methyl ethyl ketone, monomethylformamide, nitrogen dioxide, ozone, selenium and compounds, thallium, toluene, vinyl chloride and xylene.^{xxii} Some of these chemicals are classified as persistent organic pollutants while others are known teratogens and/or mutagens.

^{xx} Malay, R., “Clock still ticking for victims of toxic waste”, <http://inq7.net>, viewed 12 May 2006.

^{xxi} Task Force Bases Clean-Up, *Inheritors of the Earth: The Human Face of U.S. Military Contamination at Clark Air Base, Pampanga, Philippines*, Manila, 2000.

^{xxii} Aning J., “Industrial hazards take toll on reproductive health - study”, <http://inq7.net>, viewed 12 May 2006.

III. Contributory Factors

Why do industrial and agricultural endeavors that threaten health and environment continue to operate in the Philippines? Three main factors contribute to this situation:

a. Globalization and Liberalization Policies

Our country, with the blessings of the World Bank, maintains a liberalized economy. In order to attract foreign investments, it continually cuts down on regulatory mechanisms and taxation while increasing the privileges of big corporations. For instance, under the Mining Act of 1995 a mining corporation may mine an area for 25-50 years while it remains tax-free for the first seven (7) years of operation. The government promotes pesticide-dependent high-yielding varieties of crops and has approved the planting of GMO (genetically-modified organism) crops. Export processing zones are maintained as no-strike zones where workers cannot strike even regarding health issues. Workers are hired on contracts that run less than six months.

b. Gaps in Implementation of Government Regulations

Implementation of government regulations, especially in the area of environmental health is sorely deficient. For instance, our Department of Environment and Natural Resources is the primary promoter of large-scale mining. The Philippine Fertilizer and Pesticides Authority has a small budget as well.

Our national budget for health is a mere 0.6% of Gross National Product or less than one US cent (34 centavos) per person per day.^{xxiii} Most of this budget goes to funding a few big hospitals in the major cities and provinces rather than to public health, less so for environmental health. Surveillance for chemical-related morbidities and mortalities are fragmented, if at all being done.

c. Lack of Awareness of the Health Sector and the Public

There is also a lack of awareness among the health sector and the public on environmental health issues. In our country where majority live below the poverty line, earning a living is of primary importance even if that source of living is slowly causing disease and even death. Few too are the health professionals who are aware of environmental health issues or even screen their patients for chemical exposure.

^{xxiii} Nisperos, G., "The Philippines Health Situation: Crisis and Other National Afflictions", slide presentation, 2004.

IV. What Lies Ahead?

What lies ahead for the Philippines in terms of environmental health? Much needs to be done if things are to change. A main impetus for change are the communities themselves who have organized to oppose the chemical pollution they are exposed to. In the region where I work for instance, the Cordillera Region people's organizations have united to oppose corporate mining along the Abra River. They have partnered with scientists who conduct environmental investigatory missions. They have formed the Save the Abra River Movement.

Through the efforts of organized communities and their allies from the academe, environmental health is brought to the attention of the public. With public pressure, government policies and regulation improve.

It is a slow process to achieve change but eventually we are hopeful that change WILL come.