

ENVIRONMENTAL CHANGE AND VULNERABILITY IN THE PHILIPPINES¹

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Abstract

The environment-poverty connection has been the subject of recent discourse in environmental management. Despite this, there seems to be limited understanding and appreciation on the intricacies of this connection in the Philippine context. This paper is written to fill this gap. It aims to explore deeper the environment-poverty interlink by offering some explanations to the following questions:

1. What are the recently documented environmental changes in the Philippines and how are these impacting on the vulnerability of the poor?
2. How do environmental changes affect the population movements especially among the poor?
3. What are the strategies employed by the different sectors, especially the government, to reduce impacts of adverse environmental changes?
4. Which strategies seem to be more effective in reducing the vulnerability of the poor and how can they be improved?

The paper centers on five central messages. First, the Philippines' environmental situation, has reached a crisis proportion. Three sets of environmental problems beset the nation: pollution and waste management-related problems associated with the "brown" environment; problems associated with "green" environment or natural resource degradation that threatens agricultural production, forests, and biodiversity; and those linked with the "blue" environment that concerns water resources-related issues.

The second major point of the paper states that impacts of environmental problems are most severe to the poorer sector. Poor people are often the most vulnerable in society because they are most exposed to a wide range of risks. Their minimal income implies they can hardly afford to save and accumulate assets. Because poor people are also oftentimes powerless, they usually are unable to build social networks, access social and other forms of formal assistance, and avail of credit facilities. These, limitations restrict their capacity to deal with life's crisis, including the adverse impacts of environmental change.

That population movement is one of the poor people's way of coping with environmental change is the third central message of the paper. Three forms of population movement characterized this demographic strategy: forced, impelled, and voluntary population movements. Of these forms of movement, voluntary movement is the most common but

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more indirect in terms of its association to environmental change. Forced and impelled movements are more direct and easily associated with environmental change. In general, the effects of environmental change on population movement in the Philippines are barely understood and merit empirical investigation.

Various forms of strategies have been designed and implemented both by the government and other sectors that simultaneously attempt to address environmental problems and reduce the poor people's vulnerability to their negative impacts. Among the different strategies, various expressions of Community-Based Resource Management (CBRM) are believed to have the potential to reduce poor people's vulnerability from environmental change. The fourth important point raised by the paper, however, states that CBRM initiatives are currently faced with a number of issues and their ability to address these issues would determine their success in reducing the poor people's vulnerability.

Finally, for the fifth central message, the paper argues that more responsive strategies should be pursued by the concerned sectors to simultaneously address environmental problems and improve the poor people's coping mechanism to their adverse impacts. These include the need for a more responsive policy and practice on CBRM and environmental management, massive public environmental education, and strengthening support to research and development.

1. Introduction

The state of the Philippine environment – similar to its current economic and political conditions – is rapidly developing into a crisis situation. Through time, various forms of environmental problems have mounted into unmanageable proportion. Among these are massive deforestation, pervasive and health-impairing pollution, indiscriminate discharging of mine tailings and other pollutants into the rivers and lakes, coastal and marine ecosystems destruction, massive pesticide poisonings, degradation and erosion of agricultural lands, siltation of rivers and farmlands, salt water intrusion into aquifers, loss of biodiversity, and others (Republic of the Philippines, 1997).

The country's declining environmental quality manifests itself in the frequent occurrence of environmental disasters such as destructive floods and landslides during rainy season, prolonged drought during dry season, and large scale poisoning and death of fishes and other aquatic resources, to name a few. These in turn, persist to claim human lives and destroyed valuable infrastructures and properties including poor people's major sources of livelihood. Even the gains of economic growth are being diminished and/or negated by the numerous forms of environmental distraction. For instance, from 1988 to 1992 alone, the Philippine government had to avail of a total of \$731 million worth of forestry sector loans to rehabilitate what can be considered as one of the world's greatest forest plunder after World War II (Korten, 1994). Similarly, the costs of remediating water and air are equally high, estimated at a minimum of 34 billion and 16 billion pesos, respectively (Republic of the Philippines, 1997). Indeed, not unless the worsening environmental situation of the country can be arrested, its adverse impacts will bite heavily on its economy rendering elusive its pursuit towards sustainable development.

While adverse environmental change has negative repercussions on the entire citizenry, it has its greatest impact on the lives of the poor. Poor people are often the most vulnerable in the society because they are most exposed to a wide array of risks including those associated with environmental disturbance. Their low income means they are less able to

save and accumulate assets, which in turn restricts their ability to deal with environmental crisis when it strikes (World Bank, 2000a).

Because of the poor people's vulnerability to the changing environment, the issue of environment-poverty connection has recently gained global attention. Despite this, however, very limited materials that delve into the issue have been written about the Philippines. Moreover, there is lack of national and/or regional discussions that probe deeper into the matter, as basis for designing project interventions that simultaneously address the environmental and developmental needs of the poor.

This paper hopes to contribute to the dearth of literature available in the Philippines focusing on the environmental change-poverty connection. It provides a general overview of recent environmental situation in the country and explores its link to the vulnerability of the poor. The paper is divided into five parts. Following this introduction is an outline of the recent environmental trends in three areas, namely, the brown, green and blue environment. The third section explores the impacts of environmental change to the vulnerability of the poor. This is followed by a discussion on the various forms of strategies designed and implemented both by the government and non-government organizations (NGOs) to reduce the poor people's vulnerability to adverse environmental impacts. The paper concludes by outlining more responsive strategies that simultaneously address current environmental problems and minimize the poor people's vulnerability to these impacts.

2. Trends in the Philippine Environment

The World Bank's recent issue of the Philippine Environmental Monitor 2000 depicts the country's deteriorating environmental condition (World Bank, 2000b). Three sets of environmental problems are reported based on environmental indicators, classified under the "brown", "green", and "blue" environment (Table 1). These problems are summarized below and reflected in Map 1.

Brown Environment

The first set of environmental problems relates to the brown environment or pollution and waste management-related problems. This is characterized by declining air quality in key urban centers especially Metro Manila, declining water quality in river and coastal waters, and increasing solid and hazardous waste generation and improper waste management. In Metro Manila, particulate levels currently exceed standards by more than two times. A study conducted by the University of the Philippines College of Public Health from 1990-1991 revealed that this deterioration of air quality has caused adverse impacts on public health among drivers and commuters in the area. Air pollution is also rising in other urban centers such as in Baguio, Cebu and Mandaue City based on limited monitoring conducted in these places.

Similar to air quality, nearly half of the country's classified rivers fall below normal quality standard. However, some rivers in the country are still pristine, particularly in Mindanao. Limited data gathered by the Department of Environment and Natural Resources (DENR) from 1990 to 1995 indicates that seven rivers in Region 10 and 11 in Region 11, still have biological oxygen demand (BOD) and mean dissolved oxygen (DO) levels within the guidelines for Class AA to Class C waters. Some of these, however, may have already been subjected to varied forms of environmental pressures that could result to decrease in water

quality. Laguna de Bay, the country's biggest fresh-water body and a source of drinking water for some parts of Metro Manila is presently subjected to expanding agro-industrial activities and urbanization. While the bay at this time falls within class C – with water still suitable for growth and propagation of aquatic life – some areas are already beginning to face larger BOD and nutrient loads and increasing siltation. As a result, the culture period of some fish species (bangus and tilapia) has been noted to lengthen. Fish kills have occurred seasonally in the western portion of the lake where industries and settlements are concentrated, to the detriment of the livelihood of the poor fisher folks.

The quantity and quality of groundwater have likewise been adversely affected. Since 1955, the groundwater table in Metro Manila has been estimated to recede by 5-15 meters per year. This has led to salt water intrusion in a 2-kilometer coastal strip extending from Cavite to Navotas-Malabon. Similarly, 15 of the 35 operating wells in Davao City were observed to have lowering of the piezometric levels. This is brought about by the five times increase of daily extraction rates reaching a maximum of 135 million liters/day over a sixteen-year period from 1981 to 1997.

Household solid waste and industrial hazardous waste have likewise risen significantly and its widening disposal to the environment is a growing threat to the quality of water, air and land. Compounding this problem is the lack of environmentally sound disposal and treatment facilities and the low budget allocation for solid waste management. Improper waste management has caused tragic human and environmental consequences. A classic case of this is the case of the Smokey Mountain, Manila's main dumpsite in Payatas. In July 2000, an enormous wall of garbage collapsed in the area killing over a hundred people. The victims were impoverished squatters, including many children, whose main source of livelihood is to pick through the dump to collect items they can sell.

Green environment

The second set of problems concerns the green environment or natural resource degradation that threatens agricultural production, forests and biodiversity. Land degradation persists with massive conversion of forest and grasslands into agricultural lands and urban use. A 1993 study of the Bureau of Soils and Water Management revealed that about 45% of the country's land area suffers from moderate to severe soil erosion, while only 24% exhibits no apparent soil erosion. More than one third (38%) of the Mindanao's agricultural lands are moderately or severely eroded. Moreover, Mindanao recorded the highest soil erosion in non-agricultural lands with 40% of its areas classified as moderately or severely eroded compared to 38% and 32% for the Visayas and Luzon, respectively.

Despite increasing inputs like the application of chemical fertilizers and pesticides, yield in lowland agricultural areas has been static and relatively low by Asian standards. On the other hand, upland agriculture is even less productive and often leads to severe soil erosion due to cultivation of sloping lands using standard lowland farming techniques.

Forest cover continues to decline through time. From 17.1 million ha or 57% of the country's total land area in 1934, this has been substantially reduced to the present 5.4 million ha or only 18% of the total land area. In Mindanao, where abundant forest used to be located, forest cover has decreased from 3.72 million ha in 1976 to 1.92 million ha in 1997 or a total of 1.79 million ha in 21 years. Average annual deforestation rate in this area was 2.29%, which is significantly higher than the national average of 1.9% in the same period. At the national

level, reforestation performance lagged behind annual deforestation record except in 1989 and 1990 during the height of the government-initiated reforestation projects.

The principal direct causes of deforestation in the country are logging, slash and burn farming, forest fires, and conversion of forestlands to agricultural lands, human settlements and other development projects. While logging operations has been drastically reduced, it remains a threat to deforestation. As of 1998, 57% (2.85 million m³) of the country's supply of industrial roundwood came from the informal sector including illegal logging.

Conversion of uplands into agricultural areas is also on the rise. Widespread poverty and limited livelihood opportunities have resulted to the influx of migrants to the upland areas especially between 1980 and 1985 (Cruz *et al.*, 1992). As a result, about 20 million people are now residing in these areas including the Indigenous Peoples. Most of them depend on upland resources for livelihood. It is anticipated that this huge population will continue to exert pressure on the fragile upland resources. These include the 5 million ha forestlands considered as "open access" areas, which are abandoned by Timber License operators whose permits were cancelled or expired during the last decade. The government's recent adoption of Community-Based Forest Management as the national strategy for sustainable forestry and social equity is expected to place these areas and other suitable upland sites under responsible forest management.

The continuing onslaught of the country's forest cover and habitat also threatens its rich biodiversity. The Philippines is one of the countries identified to have the highest biodiversity loss rates among the world's biodiversity hotspots. Within a span of only eight years, the country's endangered species have increased by 34%, that is, from 212 in 1990 to 284 in 1998. Findings from recent biodiversity assessment indicate that existing infrastructure – roads, power and energy, ports and harbors and growth area – badly endangers around 1.6 million ha of biodiversity-rich ecosystems.

Blue Environment

The third set of environmental problems concerns the blue environment, which deals on water resources-related issues. Major problems under this category include the difficulty of meeting water demand, watershed degradation, and declining coastal and marine resources. While national demand for water is less than one third of the renewable water available (226,430 MCM), some areas of the country continue to experience water shortage. These include densely populated cities such as Metro Manila, Cebu and Baguio City, which have experienced water shortages as early as 1995. The mismatch in the demand and supply of water in these areas has been attributed to lack of infrastructure. In rural areas such as the remote uplands of Mindanao, problems of potable water supply have been attributed to absence of government infrastructure and environmental degradation resulting to contamination of rivers and lakes.

Many of the country's river basins are in varying state of degradation. About 90% of the 119 declared watershed reservations covering 1.36 million ha are considered degraded. Watershed degradation has resulted to severe soil erosion, erratic streamflow, siltation of dams and reservoirs, poor water quality, diminishing groundwater resource, flash flooding, prolonged drought, loss of biodiversity, micro climate deterioration, declining land productivity, and other imbalances in the ecosystem (DOST, DENR, DA and UPLB, 1999). Identified causes of watershed degradation include lack of clear overall watershed strategy,

fragmented land management, limited resources for development and protection, and increasing population pressure.

Like the other forms of natural resources, coastal and marine resources are likewise deteriorating. The country's coral reefs are in poor situation with only 4.3% in excellent condition. Even this is under threat from siltation, pollution, over fishing and destructive fishing techniques. Mangrove forests are likewise vanishing rapidly. Fifty-seven percent (57%) of the area has been lost in the last 23 years due to land conversion, and indiscriminate cutting for firewood and construction. Moreover, growing population and a rise in export have increased pressure on marine fisheries over the last 25 years. Declining fish yields have been observed as a result of over fishing in open access fisheries, siltation of inshore reefs, and poor fishing techniques.

3. Impacts of Environmental Change on the Vulnerability of the Poor

A comprehensive assessment of the impacts of environmental change to the Philippine economy and society is wanting. However, the 1997 Philippine Strategy for Sustainable Development ascertains that the fast deteriorating environmental quality of the country has reached a critical stage that the gains of economic growth are being diminished and/or negated by the abovementioned host of environmental problems. The impacts of environmental problems are most severe to the poorer sector since they are most vulnerable to all forms of risks and disasters.

The Concept of Vulnerability

The most recent World Development Report on "Attacking Poverty" published by the World Bank identifies "vulnerability" as one of the three major dimensions of poverty, the other two being material deprivation including low achievements in education and health, and voicelessness and powerlessness. The same document describes vulnerability as the "resulting possibility of a decline in well-being" (World Bank, 2000a:139). The event triggering the decline has been referred to as shock, which can affect an individual (in terms of decline in income, illness, death, etc.) or a community, a region, or even a nation (through natural disaster or macroeconomic crisis, etc.) Vulnerability is said to measure the resilience against a shock, that is, the likelihood that a shock will result in a decline in well-being. It has been observed to be a function of a household asset endowment and insurance mechanisms, as well as the characteristics of the shock in terms of its severity and frequency.

In a related conceptualization, Chambers and Conway (1992) argue that livelihoods and survival of human individuals, households, groups and communities, are vulnerable to stresses and shocks. Vulnerability, according to these authors, has two aspects: external, the stresses and shocks to which they are subject; and internal, the capacity to cope (Cf. IDS, 1989). Stresses are referred to as pressures which are typically continuous and cumulative, predictable and distressing, such as seasonal shortages, rising populations or declining resources and related occurrences. Shocks, on the other hand, are impacts which are typically sudden, unpredictable, and traumatic such as fires, floods and epidemics.

Poor people are often the most vulnerable in society because they are most exposed to a wide range of stresses and shocks (World Bank, 2000a). Their minimal income implies they are less able to save and accumulate assets. Because poor people are also oftentimes

powerless, they can hardly link to social networks, access social and other forms of formal assistance, as well as avail of credit facilities. These, in turn, restrict their capacity to deal with life's crisis, including the impacts of environmental change, when it strikes.

Impacts of Environmental Change to the Poor

There is hardly any empirical study that comprehensively analyzes the vulnerability of the poor to stresses and shocks brought about by environmental change in the Philippines. However, scattered documented cases in developing countries, anecdotal reports, and personal observations of the author corroborate that it is possible to identify some of the major impacts of environmental change to the country's poor sector. These impacts can also be gleaned from a general conceptualization of the poverty and environmental connection based on the 1989 study of Overseas Development Council on the "Environment and the Poor", which to some extent also applies to the Philippine situation. The impacts could be categorized into socioeconomic, geographic, demographic, and cultural.

a. Socioeconomic impacts

Socio-economic impacts of environmental change are numerous. In urban areas, these could include acquisition of diseases due to air pollution, water contamination and improper waste management. Because the urban poor also settle in ecologically hazardous places which characterized most slum areas, they are vulnerable to natural disasters particularly the frequent occurrence of flood. In rural areas, loss of harvest due to unpredictable rainfall pattern, drought, occurrence of fire and crop infestations is common phenomena relevant to environmental change. Destruction of vegetative cover in watersheds and soil erosion also lead to declining land productivity, which in turn could reduce on-farm income of the household. Decline in land productivity could also mean additional labor force to support the household cash requirements, which increase the demand for child and women to engage in off-farm activities. Where decline in productivity is severe, malnutrition has also been found as a consequence (Ghai, 1994)

Fuelwood shortage due to increasing population in both the uplands and coastal areas has also socioeconomic implications. In these areas, household members including women and children have to spend more hours for fuelwood gathering. In areas where local substitute materials for fuel are limited, people have to resort to unconventional sources such as petroleum gas, adding to strain to the already tight financial budget.

As experienced in practically all parts of the country's forest areas, large-scale deforestation has led to loss of potential forest-based production including sources of food and medicine. Deforestation is also the main cause of biodiversity loss, which limits the potential of the poor to benefit from the country's rich natural endowment.

Other socio-economic impacts of environmental deterioration to the poor include the loss of assets or lives due to downstream flooding, decline in income due to reduction of fish catch, and other adverse effects.

b. Physical isolation

As experienced in many upland areas in the country, the occurrence of flood due to watershed destruction frequently damage physical infrastructures such as access roads and bridges that leads to physical isolation of the poor. Oftentimes, people's access to market is

temporarily cut which could result to hunger and disease particularly among the children. The situation also prevents the children from going to school resulting to their poor scholastic performance compared to their lowland contemporaries. Destructive floods could also bar the poor from having access to other forms of social services usually located in downstream communities or the lowland. These include the health service, lending institutions, church, or even amusements centers. In general, physical isolation weakens the poor people's potential to cope with or mitigate the impacts of environmentally driven stresses and shocks.

c. Population movements

People also move to other places to cope with or mitigate adverse environmental change. Three forms of population movements induced by environmental degradation have been documented elsewhere but could also apply to the Philippines: forced, impelled, and voluntary population movements (Lonergan and Parnwell, 1998). Flooding is said to be one of the most extreme environmental forces that leads to population movement. A good example of this is the case of Bangladesh, which continues to exhibit regular inundation of flood plains, erosion, and shifting courses of country's major river systems which annually displaces close to one million people (Zaman and Hague, 1991). This intensity of forced movement has not occurred in the Philippines except probably the population movement caused by the eruption of Mt. Pinatubo in 1990.

Impelled movement, on the other hand, is the type of demographic shift where movement is resorted to as a means of coping with environmental disturbance. For instance, Scoons (1992) has shown that pastoralists in Southern Zimbabwe use movement as a means of coping with drought. Here, people regularly move between ecological zones as a way of maintaining the quality of and provision of grazing. Accordingly, when the conditions in the lowlands become too arid during the summer, flocks and herds may be moved to uplands to take advantage of the short but highly productive growing season there. The animals are then moved back to lowlands to obtain shelter and fodder during harsh winter months. Herdsmen have adopted this system, especially when drought conditions are worse as a system of maintaining herd sizes and livelihood. There is certain parallelism of this experience with the Taubuid, one of the subtribes of Mangyan in Mindoro. An ethnographic study conducted by Pennoyer (1981) revealed that the Taubuids have evolved bilocal placement of fields and dwellings termed as "summer" and "winter" residences. These residences may be in different ecological sectors with one at a higher more interior zone. The Taubuids rotate between these two dwellings to avoid bad weather in each place (Olofson, 1981).

The third type of movement, "free" movement, is a voluntary movement of people in response to the deterioration of environmental conditions and/or the depletion of natural resources. Lonergan and Parnwell (1998) contend that this is the most prevalent and chimeric type of movement among the three. Under this movement, the influence of environmental stresses on demographic shifts is indirect. Movements are more typically associated with various economic imperatives which themselves may be created by environmental degradation. A typical example of this in the case of the Philippines is the movement of forest dwelling communities as a result of pressures from various sectors such as commercial exploitation of forests for timber and other products, forest conversion to agriculture and other purposes, colonization by farmers and ranchers, and others. This type of movement is reflected in the emergence of "ghost towns" of some parts of Mindanao as a result of the massive depletion of the forest during the so-called "timber boom" period from 1950s to early 1970s.

d. Cultural impact

Environmental change has also adverse cultural impact. Experiences in many parts of the country attest that forest degradation has been associated with the cultural disintegration of Indigenous People including the lost of their indigenous knowledge systems. This in turn has contributed further to widespread forest destruction.

General Discussion on Environmental Impacts

The interaction of poverty and environmental destruction is believed to set off a downward spiral of ecological deterioration that threatens the physical security, economic well-being, health, and cultural integrity of the country's poorest people particularly those who live in slums areas and the fragile uplands. Since poverty in the Philippines is mainly a rural phenomenon, with two thirds of the 27 million poor people located in these areas, the vulnerability of rural people to "downward spiral" is higher compared to the well-off sector. In terms of island comparison, the poor from Mindanao are most vulnerable since Mindanao has recorded the highest poverty incidence since 1991, comprising 26% of the total poor in the country (ADB, 1998). Within the Mindanao area, the rural poor of the Autonomous Region of Muslim Mindanao (particularly Magindanao) and Central Mindanao (particularly Lanao del Norte) seem to be more vulnerable due to high poverty incidence and degraded environmental condition.

4. Strategies for Reducing Vulnerability

Various forms of strategies have been designed and implemented both by the government and non-government organizations (NGOs) to reduce the poor people's vulnerability to impacts caused by environmental change. These strategies range from enacting national policies to actual implementation of programs and projects aimed to address problems confronting the environment and the poor. Some of these strategies, are briefly discussed below:

Policy interventions

Since early 19970s, a host of national and local legislations have been enacted to promote environmental development and conservation as well as advance the well-being of the poor. The more prominent ones among these legislations are:

1. Pollution Control Law Presidential Decree 984 (1976) – Provides guidelines for prevention, abatement and control of pollution of water, air and land.
2. Philippine Environmental Impact Statement System Presidential Decree 1586 (1978) – Mandates EIS for government and private sector projects affecting the quality of the environment.
3. Philippine Constitution (1986) – Contains the State's obligation to protect and advance the right of the people to a balanced and healthful ecology (Article 2, Section 15 and 16).
4. Comprehensive Agrarian Reform Law Republic Act 6657 (1987) – Exempts land devoted to reforestation, wildlife, etc. from land conversion.
5. People's Small Scale Mining Program Republic Act 7076 (1991) – allows small mining operators including the poor people to benefit from the country's mineral resources.

6. Local Government Code Republic Act 7160 (1991) – certain sections strengthens the role of LGUs in the environmental governance of the country.
7. National Integrated Protected Area System (NIPAS) Republic Act 7586 (1992)
8. Community-Based Forest Management Executive Order No. 263 (1995) – Adopting Community-Based Management as the national strategy for the sustainable development of the country's forestland resources and for social equity.
9. Indigenous People's Right Act Republic Act 8371 (1997) – Recognizing vested rights of Indigenous People over their ancestral lands.
10. Agriculture and Fisheries Modernization Act or Republic Act 4835 (1997)
11. Comprehensive Air Pollution Control Policy (otherwise known as the Clean Air Act or Republic Act 8449 of 1999)

Despite the expressed good intents of these legislations there is very limited monitoring mechanisms installed to determine compliance. Assessments of the impacts of these laws particularly those that have been enacted for more than a decade have not received priority.

National programs/projects

With the popularization of the concept of participation and social equity in natural resource management, focus of environmental interventions at the national level has been towards community-based resource management (CBRM). These programs are designed to simultaneously address the interrelated problems of poverty, social inequity, and resource degradation. In forestry, there are currently around 5.5 million ha under community-based forest management compared to 32,000 ha in 1982. This people-oriented forest management allows for 25-year tenure security and provides some incentives and support towards sustainable use and development of forest resources. Similarly, several community-based coastal resource management (CBCRM) projects funded by the government and foreign donors are being implemented in the country. CBCRM is currently being enhanced through integration, community involvement, and decentralization (World Bank, 2000b).

Initial experiences on the implementation of various community-based resource management (CBRM) programs across sectors produced varied results. While national CBRM programs, have broadly address the social equity issue at a national scale particularly in forestry, the socio-economic and environmental benefits expected from these programs at the local level still needs to be ascertained. In some cases, poor implementation of these programs under an antagonistic socio-political context has produced contradictory outcomes (Pulhin, 2000). Such projects may have inadvertently made the participating poor people more vulnerable to environmental change. On the other hand, encouraging results are achieved where project implementation are responsive to the needs of the poor under a supportive local socio-political context. In these cases, forest protection and better socioeconomic well-being of the participating communities are achieved, and hence, their vulnerability reduced. Currently, a national comprehensive assessment of all forms of CBRM initiatives from the forest down the coastal areas is needed to determine their impacts on the rural communities' livelihood and the sustainability of natural resources.

Locally supported initiatives

In addition to national programs, myriads of people-oriented environmental projects are implemented in different localities nationwide. Targeting specific geographic areas, these projects are mostly initiated by Non-Government Organizations/People's Organizations, Local Government Units, international agencies, and the private sector. Examples of these initiatives are the Land Care Movement initiated by the International Center for Research in Agroforestry (ICRAF) in Mindanao, the Watershed Development Project initiated by the Provincial Government of Nueva Viscaya in Luzon, and the numerous people-oriented environmental projects initiated by the NGOs and the private sector.

Like the national programs, the implementation of these projects also produces a mixture of results. Likewise, no comprehensive overall assessment has been conducted so far to determine the general impacts of these projects to the overall vulnerability of the poor. In general, however, the relative flexibility enjoyed in the implementation of most of these projects especially those initiated by NGOs outside government bureaucracy, made them more responsive to the needs of the poor compared to national programs. While their limited area coverage may be a constraint in terms of achieving broader impacts, their site specificity and ability to focus, give them greater advantage to reduce the vulnerability of specific target groups.

Self-initiated resource management

Self-initiated resource management refers to initiatives done outside the conventional "project-type" of intervention or with very little interference from external agencies. The local people, particularly the IPs, mostly initiate them using their rich indigenous knowledge, to cope with the changing environment. Examples of these are indigenous forest management practices such as the *muyong* of the Ifugaos, and the *tayan* of Bontocs, both in Northern Luzon. Traditional management practices have also been documented among the Maranaos of Lanao del Sur. These include their indigenous protection and management of common property resources such as land, forest and water bodies, and native fishing practices using their traditional fishing equipments. Similarly, the Matigsalogs of Bukidnon, Cotabato, and Davao are known to practice environmentally-friendly resource management practices such as those involved in upland farming, hunting and trapping, and inland fishing activities (ILO, 1998).

Documentation of self-initiated resource management practices has revealed their positive impacts to human lives and natural resource conservation. Among the cited impacts of these practices are in-depth understanding of intricate way of life, contribution to sustainable survival, contribution to cultural preservation and ethnic groups, and biodiversity conservation (ILO, 1998). However, while some of their dynamic nature maybe continuously modified for the better, most are in the process of disappearance (if not already disappeared) because of the strong forces of modernization.

Overall Assessment

Strategies on addressing the intertwining problems of poverty and resource degradation should enable to poor people to reduce, mitigate, and cope with the impacts of stresses and shocks associated with environmental change. Such strategies should go beyond the traditional approach typical of environmental projects, which merely focus on the physical environment rehabilitation (e.g. reforestation per se) with limited attention to the socio-economic and political needs of the poor. Fortunately, a more integrated approach to environmental intervention is now being pursued through recent initiatives such as those

under the general description of CBRM. Most of these projects attempt to simultaneously address the problem of environmental degradation at the same time attack the identified causes of poverty. What seem to be lacking are the appropriate mechanisms that would ensure the success of these projects/initiatives. Such mechanisms should be able to effectively address the following issues:

- Insufficient information for sound decision-making and planning (i.e., limited regional and national study on the relationship between environmental changes, demographic shifts, poverty and vulnerability of the poor).
- Absence of a common development framework that focuses on building the asset-base of poor people including human (capacity for basic labor, skills, and good health), natural (land), financial (savings and access to credit), and social assets (networks of contract and reciprocal obligations).
- Restricted participation of poor people in the design, implementation, monitoring and evaluation of environmental projects.
- Lack of social safety net to ensure that the poor sector would really benefit from environmental cum poverty alleviation initiatives, instead of the well-off sector.
- Inadequate emphasis on the importance of grassroots mobilization and organization in altering the constellation of social forces to ensure that environmental initiatives serve the interest of poor people.
- Limited experience and initiatives on modular approaches that directly tackle the vulnerability of poor people from impacts of environmental change and other risks in life. Such approaches could include health insurance, old age pensions, unemployment insurance and assistance, workfare program, social funds, microfinance programs, and cash transfers (World Bank, 2000a).
- Lack of emphasis on value formation as a core strategy for promoting responsible environmental management
- Lack of coordination and sharing of information, experiences, lessons, and resources among concerned sectors on the environment such as policy makers, planners, implementors, financing institutions and the rural poor themselves.
- Limited time provided by funding institutions (usually 3-5 years only) for projects to succeed and achieve sustainable benefits to the poor.

5. Conclusion and Recommendations

Recent assessment on the state of the Philippine environment depicts its worsening situation. Three major types of problems brought about by environmental change besiege the nation needing immediate attention: pollution and waste management-related problems; natural resource degradation that threatens agricultural production, forests and biodiversity; and water resources-related issues. While adverse environmental change has negative repercussions on the entire citizenry, it has its most severe impact on the lives of the poor. Poor people are often the most vulnerable to environmental disturbance since their low income means they are less able to save and accumulate assets. Moreover, since poor people are also oftentimes powerless, they usually fail to build social networks, avail of credit facilities, and access social and other forms of formal assistance. These limitations restrict their capacity to cope with adverse impacts of environmental risks and disasters. These adverse impacts include decline in socio-economic well-being including the lost properties and lives, physical isolation, population displacement, and cultural disintegration including the lost of indigenous knowledge systems that contribute to further environmental degradation.

In general, current attempts to reduce the poor people's vulnerability to adverse environmental impacts, including the various forms of CBRM, have yet limited gains at the ground level. To improve present performance, a three-pronged strategies should be pursued: develop a more responsive policy and practice on CBRM and environmental management, conduct a massive and continuing public environmental education, and strengthen support to research and development.

At the policy level, efforts should be made to improve present approach of policy formulation and implementation. Policy formulation should veer away from the current emphasis on content towards the development of an institutionalized mechanism or process that builds consensus among stakeholders including the poor sector. Such mechanism/process should also be able to strengthen the link between science and policy with scientific information as the standard basis for policy decision. Moreover, monitoring and feedback mechanism should be instituted to determine compliance and ensure policy relevance at the ground level. Impact assessment of the different environmental legislations particularly those that have been enacted for more than a decade should receive priority.

Field implementation of the different CBRM initiatives should likewise be improved to be more responsive to the needs and priorities of the poor. Specifically, there is a need to effectively address the above-mentioned issues confronting the various CBRM approaches if they are to significantly contribute to reducing the vulnerability of the poor to damaging environmental impacts.

A massive and continuing environmental education at all levels should also be vigorously pursued to elevate the level of consciousness of the entire citizenry on environmental issues and to mobilize their support in addressing these issues. Environmental activities should be incorporated in school/university curricula at all levels as well as in the programs of the different government agencies, NGOs and the private sectors. The media sector should likewise be required to conduct environmental education as part of their public service.

Finally, support to research and development should be strengthened. One way to do this is to require big foreign-assisted environmental programs/projects to include research and

development as one of the project components to support field implementation. Opportunities for South-North research collaborations should likewise be tapped to build the capacity of local researchers and have access to research funds and related resources.

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