

Some environmental problems in Viet Nam today

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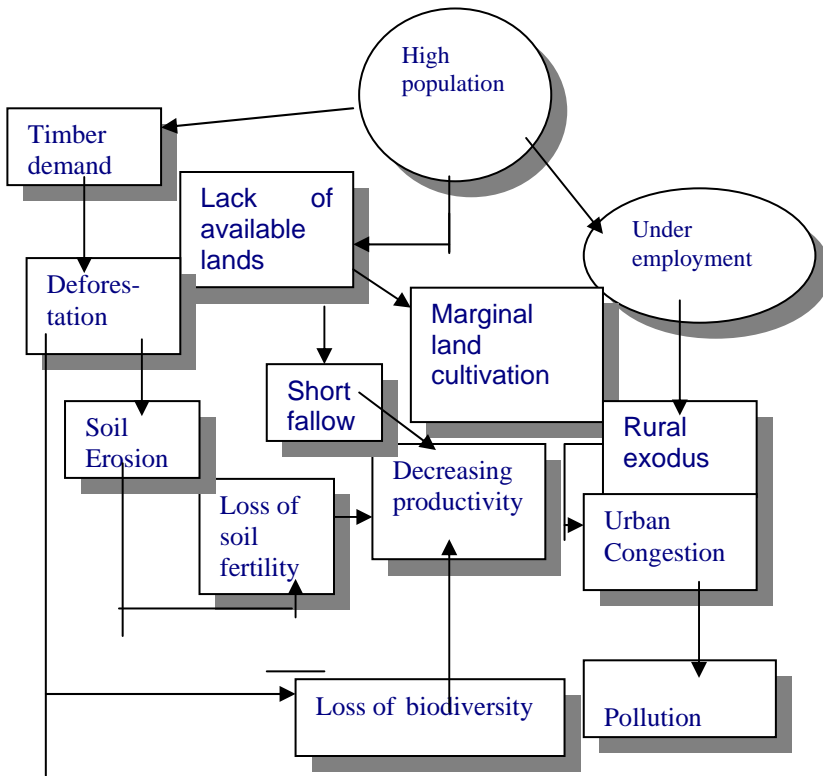
Abstracts

Demographic growth, urbanization, industrialization, infrastructure development...are contributing to increase stress on the natural resource base in Viet Nam today. The paper highlighted those stresses : the rural exodus to the cities due to scarce land resources in the countryside, the pollution problems in the urban environment, the migration of people to forested areas with direct impacts including the deforestation, the watershed degradation and the loss of biodiversity. Striking a balance between population growth and conserving the natural resources are necessary for a sustainable development which is to move away from resource exploitation and more toward resource management in controlling the overfishing, overgrazing, overcutting, overpumping, overhunting issues prevailing in Viet Nam today.

1 Introduction

With a population of 80 million inhabitants and an acreage of 331 114 sq km, overall population density in Viet Nam is 231 persons/ square km which is very high for an agricultural country. Viet Nam is now the third most densely populated Southeast Asia country (behind Singapore and Philippines) and the twelfth most populous country in the world. With 77% living in rural areas, agriculture and forestry occupy a large land base. This dependency and high population pressure on scarce arable land are exerting tremendous pressure on the natural environment. The rural exodus to the big cities to find employment as well as the industrialization are creating huge environmental problems: water, air, noise pollution. In the mountains, deforestation leads to the watershed degradation, reducing animal and botanical biodiversity, leading to soil erosion.

This diagram summarizes those issues:



2 Manpower mobility and influence on the environment

In Viet Nam, two movements of the population are observed: a rural exodus to big cities where living conditions and employment opportunities are better than in the rural areas and a spontaneous in-migration from poor and crowded areas to the Central Highlands or to the Southeastern region where land is still available.

21 Migration from rural areas to the big cities: urbanization and industrialization

From the beginning of the 20th century up to now, the population of Viet Nam has increased by 5 times. With population pressure, agricultural land per capita is diminishing year by year; underemployment in rural areas is very serious, thus creating a big rural exodus to the cities where many areas are becoming crowded and unhygienic. For example, Hanoi's average population density is 26 000 people per sq.km and up to 40 000 people per sq.km (400 persons/ha) in the Central Old Quarter.

It is estimated nearly 24% of the population are now in the big cities (Hanoi, Ho Chi Minh city or Saigon) and this urban population is likely to explode to 33 percent of the national population in 2010 and 45 percent in 2020. This increases the pressure over resources and is creating a number of environmental stresses in the cities, such as problems of water supply, water drainage, water pollution, air pollution, traffic congestion, just to mention a few.

211Water supply .The quality of urban water supply is poor, due to the discharge of untreated or partially treated wastes as well as domestic liquid wastes into rivers. Only 100 urban centers have piped water systems that deliver water to 47% of the urban population. In Hanoi, the piped water system is not only overloaded but also old, since it was constructed more than one hundred years ago under the French administration period . The consequences are 30% of total

water are lost, thus reflecting the urgent need for considerable investment in water facilities. At present only 40 per cent of municipal customers have water meters . The acute shortage of safe drinking water in the big cities causes high rate of water-borne diseases such as diarrhea or typhoid fever.

The recent development of water supply projects in the cities and townships has not met the increasing demands of urban population and huge investment is necessary to improve water supply facilities in the cities.

212. Water drainage

Most urban centers are served by various forms of open drainage such as ditches and street gutters. Only a small percentage has access to sewerage systems. The lack of wastewater treatment in the cities constitutes a major health hazard during periods of storm and flooding, when coliform and fecal pollutants from human wastes are easily spread through contaminated floodwaters. Water logging problems in the main cities are due to the dilapidated drainage systems and an aging culvert system, parts of which dated since the French administration.

The inadequacy of drainage systems causes flood in many areas in the cities and all the wastes flow together with the rainy waters into canals and lakes. Maintenance of existing systems has not kept pace with the increasing influx of population.

213 Water pollution. Water pollution is the most serious environmental problem and with a growing urbanization, many cities are ill equipped to provide their growing populations the safe water and sanitation they need.

a / Sources of water pollution.

It may come from:

- . wastewater from industries and minor handicrafts which have obsolete equipment and do not have waste treatment systems.
- . human and domestic wastes from houses built over and near canals.
- . accumulated pollutants such as garbage, sludge, soil, sand.
- . pesticides and fertilizers from agricultural areas.
- . dust, smoke and toxic gases in polluted air carried with the rain.
- . leachate from solid waste dump sites of the city.

b/ Categories of water pollution:

It may fall in one or more of these following categories: organic pollution, bacterial pollution, suspended solid pollution, nutrient pollution, pesticide pollution, heavy metal pollution.

. **organic pollution** is caused mostly by industrial wastewater. The chemical industry (rubber, paint, fertilizer, leather, dye, pulp and paper, battery, detergent ..), the textile industry, the food processing industry (cassava, sugarcane, shrimp and fish ..) all contribute to the water pollution problems by discharging wastewater in the canals with high organic contaminants which, once decayed, give a black color and cause an unpleasant odor to the population living nearby. Out of more than 300 000m³ of daily discharges of untreated wastewater in Hanoi area, 100 000m³ are from those industries, the rest is toxic wastewater from hospitals and domestic wastewater.

Insufficient wastewater treatment infrastructure in those industries, -some with an obsolete and inefficient equipment-, is a bad hazard to the environment and to human health.

Organic pollution is best described by the two parameters, namely BOD₅ (biochemical oxygen demand) and COD (chemical oxygen demand). The higher their levels, the more polluted the water.

And wastewater with high demand on oxygen (COD and BOD) would decrease the dissolved oxygen (DO), causing death of the water ecosystem as well as destroying aquatic life (fish, shrimp ..) in ponds and lakes.

On the whole, data showed that organic pollution in water from canals which receive domestic and industrial wastewater within the Ho Chi Minh city (formerly Saigon) is much higher than allowed limits. The same is true with rivers near Hanoi, passing through industrial zones which had pollution indexes in excess of national standards for safe water.

Huge investments are needed for a national scale of the treatment systems of the discharge of liquid wastes from industries which are responsible for the canal and river pollution

. **bacterial pollution** into groundwater usually results from domestic wastewater coming from septic tanks and unhygienic latrines; it may come also from point-source leakage (e.g., manure piles). It is indicated by the amount of *E. coli* and coliform.

. **nutrient pollution.** Fertilizer use in Viet Nam, especially urea, is increasing considerably during the last decade and overuse is frequent, leading to increasing nitrate content in water drainage, contributing to lake eutrophication, with a risk of oxygen depletion and causing proliferation of algae which when decaying will create more pollution.

Nutrient leaching can be reduced by balancing fertilizer application to suit local soil and crop needs, by regulating the amounts applied to soil, by refining fertilizer application and irrigation methods.

. **pesticide pollution**

Pesticides, which include herbicides, insecticides and fungicides are now widely used throughout Viet Nam to control weeds, insects and plant diseases. Viet Nam has used 200 different insecticides of various origins (organophosphates, carbamates and pyrethroids), 83 fungicides, 52 herbicides (Ministry of Agriculture and Rural Development 1995). Overuse of pesticides is frequent, mostly on vegetable production. Farmers spray insecticides even if there are no insect symptoms. Thus many vegetable producers and consumers get ill, due to pesticide poisoning. When pesticides are carried off the land into surface or groundwater, water pollution can occur.

To reduce the possibilities of water pollution by pesticides, there is need to adopt integrated pest management measures, including physical, biological and chemical methods of control, to exploit biodiversity for sustainable pest management by planting different varieties in the same plot, to use less-persistent and more-specific pesticides than in the present as well as refining pesticide application .

. **heavy metal pollution.** Heavy metals such as lead, chromium and mercury from the battery, paint and electronic factories built without appropriate water treatment systems such as the case near Hanoi city are also hazardous to the river ecosystem, since they remain undegraded for a long time. They are of most concern because they persist and may enter the human food chain.

214 Air pollution is a burgeoning environmental problem in urban areas due to the combined emissions from both industrial and mobile sources.

Industrial sources include coal using factories, mostly from Quãng Ninh province where plenty of charcoal is available from Hon Gai coal mines or from husking and rice processing factories which emit suspended dust. Air pollution control devices are inexistent in industrial facilities which have old, low efficiency boilers. Some industrial estates that were in the suburbs during the 50's are now situated in the cities and pose a serious health hazard to the urban population.

Mobile sources are constituted by cars and imported motorcycles by the millions in the big cities, thus increasing air pollution.

215 Solid wastes

In big cities (Hanoi, Ho Chi Minh city), it is estimated only between 40 and 60 percent of the solid domestic wastes is collected for treatment and the rest is dumped in lakes, streams and

vacant lots which are not sanitary landfills. The percentage of collected solid wastes in small cities is of course smaller.

216 Hazardous wastes

Hospital wastes are most hazardous, since they contain a large volume of environmental pollutants. Generally no segregation of wastes or systematic treatment or disposal of hazardous wastes takes place. Liquid hazardous wastes from landfills, leachate is generally discharged directly into streams or rivers that are used as a source for agricultural/aquacultural purposes or as a drinking water source by the local community. It was reported that leachate from sugarcane factories poured into La Nga river has damaged to a great extent fish population.

217 Groundwater pollution

The quality of groundwater is generally good, except for high levels of iron and manganese in areas with acid sulphate soils and sodium in saline areas near the sea in coastal regions. Contamination of groundwater in urban areas, particularly in Hanoi, is becoming increasingly a critical issue, as virtually the entire population depends on groundwater for drinking and household use. Recent news from Hanoi mention about the contamination of groundwater by toxic Arsenic. Arsenic in the deep groundwater is also a potential problem in the Mekong delta.

22 Migration from provinces with scarce land resources to the Central Highlands and Southeastern provinces : deforestation and loss of biodiversity

221 deforestation and watershed deterioration

Due to rural poverty and a lack of arable land, besides the rural exodus to big cities, an in-migration (not immigration!) from lower lands to Central Highlands, (mostly to Darlac) and to the SouthEastern Region (Binh Phŭc mostly) has taken place.

A growing population needs more energy and materials: forests are cleared every year for growing crops and for providing fuelwood as well as timber. During the past 50 years, about 5 million ha of forests have been lost or an average of 100,000 ha per year. The natural forest cover has shrunk from 43% in the mid 40's to 25% of land area in 1993.

Recent years have seen anything from 100,000 to 200,000 hectares of forests destroyed by migrants coming from the poor provinces of the North (Cao Bŭng, Lŭng Sŏn), of the Central (Quŭng Trŭ, Quŭng Nam, Quŭng Ngŭi) to the Central Highlands and the South Eastern Region , accaparating land of the ethnic minorities, leading to the recent unrest (February 2001) in Darlac and Pleiku provinces

Those spontaneous in-migrants contribute to deforestation which quickly exhaust water resources and deteriorate watersheds. With no forest to soak up heavy rains, fast-flowing waters can run off bare hills and cause heavy devastation in lowlands areas. Loss of forests induces also heavy sedimentation and thus reducing the life of water reservoirs such as the Yali hydrodam, the Lower Ayunh dam., diminishing the water availability for irrigation, damaging freshwater and marine ecosystems, thus threatening the loss of biodiversity. With population pressure, shifting cultivation with shorter fallow periods will induce the loss of soil fertility, thus lowering food productivity and compelling farmers to clear more lands to compensate the deficit of food production. The vicious cycle continues (see diagram at the beginning of the text).

222 loss of biodiversity

a / Deforestation has led to the loss of wild animals.

In the forties, forests in Vietnam abound in deer, peacock, pheasants, wild boars, black bears, panthers and tigers. Those wildlife areas have disappeared. Loss of natural habitat restricts the

range of wild animals which lead to their extinction: primates cannot interact, breed or forage as widely as needed, resulting in inbreeding and sickly populations; elephants which roamed along the La Nga river in Binh Thuan province are steadily declining. Forests in Ban Don Darlac province were the stronghold of elephants; 10 years ago, the number was 250 now it is only 50.

b / Deforestation has led to the loss of biodiversity.

Of the total natural forest, areas with medium to rich quality forests are now estimated to cover less than one million ha (3% of land area) and these are the forests that house Viet Nam and the world's valuable biological diversity. Over 7,000 species of plants have been recorded in Viet Nam. Of these 7,000 named species, 2,300 are used as foodstuffs, 3,200 are herbs, and more than 200 are species such as hard woods with high commercial value. More than 10 per cent of the world's animals, birds and fish are found in Viet Nam and over 40 per cent of special-use plants can only be found here.

The proportion of endemics has been variously recorded as 33 and 40 percent, from 2,310 to 2,800 species. (Thai van Trung, 1970). The foci of plant endemism are the three largest mountain ranges Hoàng Liên Sơn, Dalat Plateau and Central Highlands. Some forest species are becoming rare, such as cĂm lai (*Dalbergia oliverrii*), hoàng Çàn (*Cupressus torulosa*), pŌmu (*Fokiena hodginsii*). According to General Statistical Office, on the average, 200 000 ha of forests are planted every year, but according to the Lao Dong newspaper, 150 000ha of forests are burned, cut, slashed; that means reforestation just barely covers the forest loss.

With such huge natural habitat degradation and destruction, many species of flora and fauna have been listed as endangered in the official Vietnam Red Book.

3.Income Inequality and the Challenges of Sustainable Development

31 Income inequality

Approximately 80% of its 80 million people is rural. Although benefiting from a high economic growth rate, 4 million families, representing 24% of the country's total number of households lives below the poverty line (**less than one US dollar per day**). And poverty limits the choices on how to use the environment.

While Viet Nam presently exports some 4 million tons of rice per year, some remote and mountainous areas suffer from a high degree of food insecurity. There is disparity of income between rural and city areas :while urban poor live in miserable social conditions, affluence of the rich increases material consumption and waste.

32.Some issues of natural resources management.

321 Overpopulation

Due to rapid population growth, there is a shortage of agricultural lands. In many areas of Central Viet Nam, a six-member household owns only 1 000m² of land. In the Red River delta, land per rural capita is now only 300m² (compared to the national average of 1100m² which already ranks among the lowest in the world).

Population pressure in turn exerts pressing demand for timber and firewood.

322 Overhunting

Wildlife overhunting had decimated animals, including gibbons, monkeys, wild boars, elephants... in virtually all forested areas of the country. Also, Viet Nam is a major corridor for wildlife trafficking to China. All kinds of animals, snakes, tortoises, pythons, wild ducks, pangolins, squirrels are then turned into pills, powder, soups and special dishes to cater to a large and growing consumer class. Many forests are crisscrossed with traps to catch wild animals, especially bears which are exploited for their biles. Bear bile can fetch up to

VND200,000 (\$14.20) per millilitre. It is used to treat conditions such as stomach disease and muscle injury. A 100-130 kg bear can produce between 50-80 millilitres per extraction. After three or four extractions, the animal usually dies or the owner will kill the bear because they believe the bile is no longer any good.

323 Overfishing

Overfishing in inland waters as well as along the coast's shallow waters are leading to a rapid decline of fish stocks.

324 Overgrazing by livestock such as goat and cattle in the savannas along coastal terraces and low hills of Central Viet Nam has brought soil compaction, deteriorating soil structure, thus reducing water infiltration and increasing more runoff and more erosion. Overgrazing by livestock also prevents forest regeneration.

325 Overpumping

Intrusion of saline water from the estuaries is becoming acute during the dry season, due to both overpumping in the plains and overcutting in the uplands. With these two factors combined, the river discharge during the dry season is smaller. In Central Viet Nam, salinity intrusion comes deeper into all the rivers, making more lands unsuitable for rice cultivation during the dry season. Overpumping causes groundwater depletion and consequently land subsidence.

326 Overcutting

Overcutting reduces the forest acreage and is correlated with the overpopulation and/or the rural poverty. It brings adverse environmental impacts. Overcutting in the coastal mangrove areas reduces the natural habitat for wildlife, restricts the breeding, feeding and nursery grounds for commercially important aquatic species. Some forests are destroyed by forest pirates '*lâm tặc*', who even attack the forest guards.

4 Challenges of sustainable development

Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It covers environment integrity, economic security and social equity and it implies :

- . a productive capacity of the natural resource base while protecting the environment
- . a food security, namely a continuous supply of food for present and future generations
- . a durable employment and decent working for all people

41 Environment integrity (environment protection)

The basis of environment integrity is to reduce as low as possible the degradation of natural resources including land, fresh water, flora, fauna and to ensure their sustainable use by a growing population.

Soil resources .

Two third of the country, - the upper regions of the North and the Truong Son mountain range in the central part- are mostly formed by sloping lands which are highly prone to **soil erosion** once bare of vegetation cover, bringing at the onset of the monsoon season land slides, mud slides and most important the loss of soil fertility. In the plains, soil resources along the seacoast are at high-to-severe risk of bare sand dune **wind erosion**, leading to desertification in some provinces such as in Quảng Bình, Quảng Trị, Thừa Thiên. Also, risk of **salinization** is apparent in the maritime plains, due to low discharge of the rivers as well as to overpumping.

Risk of **acidification** occurs in acid sulfate soils, which once drained are subject to oxidization, increasing the solubility of aluminium and iron to toxic levels and reducing crop growth .

In the mountains, instead of shifting cultivation in the sloping hills, there is need to intensify wetland rice cultivation in the valleys, or gravity-fed sprinkler irrigation to grow high value crops such as vegetables and flowers. Erosion control practices should be applied and include agroforestry systems, residue management, planting shelterbelts. Agroforestry which combine woody perennial trees such as rubber, tea, coffee, fruit trees, shading trees and annual crops should be encouraged to provide diversified products

Water resources

Urbanization, industrialization, irrigated agriculture, hydropower all place growing pressure on freshwater resources. The lack of safe drinking water for the population, of good quality water for industry and for irrigation is a major issue especially in the dry season at the coastal marine regions. Viet Nam has many rivers, lakes, ponds, wetland areas of various types. Out of the rivers, two are most prominent : the Red River in the North and the Mekong in the South. Their surface water availability is problematic, since these rivers are of transboundary type : 90% of the Mekong basin lies outside of the country and 50% of the Red River basin are in China. So, like in soil conservation, there is also the need for **water conservation** : land use in the dry season should be shifted to less water demand crops than rice, such as sesame or groundnut. Drip irrigation which is a water efficient method should be promoted to save water to mitigate the consequences of salt intrusion. To help the water pollution control, a charge should be levied on the polluter discharging pollutants.

Forestry resources

Reforestation and watershed protection, better forest management by allocating bare forest lands to capable households for long term land use, environmental education to raise awareness are necessary measures to reverse the present trend. The utilization of biogas from animal droppings in rural farms is a promising solution to mitigate the dwindling of forest resources.

Better grazing control in the savannas could be maintained if livestock is moved from areas in time for the native plant species to germinate to other grazing areas where the natural plant community had managed to reestablish a standing crop. Otherwise, cattle and goat would consume not only annual grass but also perennial seedlings which would favor desertification, since the shrubs protect annual seeds to sprout.

42. Economic security (productivity and stability)

Economic security implies accessibility and affordability of goods and food. Besides food security for a growing population, crop diversification with high value and easily marketable crops is necessary to protect against price fluctuations due to the variability of the climate and other socioeconomic factors (marketing, price of inputs, outputs..) Resources should also be devoted to encouraging off-the-land activities, by promoting small cottage industries in rural areas to reduce pressure on land.

43 Social equity

Social equity means social development to alleviate poverty, especially for the ethnic minority groups living in the remote and mountainous areas, to provide to every people access to safe drinking water, to schooling, to health delivery services, to deal with social problems of the street children, disabled, urban poor, girl trafficking, prostitution, HIV/AIDS, joblessness, delinquency, drug addiction. Rural poverty compels farmers to rely on forests and their products

to live, so there is need to help them in off-the-land activities which could diminish pressure on the nearby forests.

5 Conclusions

Environmental problems in Viet Nam today are multidimensional, from environmental management (watersheds reforestation, biodiversity conservation, rehabilitation of mangrove and coastal areas, promotion of sustainable aquaculture..) to law enforcement, and governance. The real challenge is to achieve modernization and industrialization while at the same time minimizing the negative effects resulting from environmental degradation.

Maintenance of high-quality water, air, and soil is important for every part of the Vietnamese society, from agriculture to industry. Everyone needs to work together to help protect, enhance, improve the quality of the environment and only with a sustainable resource base so vital for future generations can Viet Nam truly prosper economically.

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