Population and environment: Why they matter together

By Ben S. Malayang III, Ph.D.

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When "population" pops up in ordinary conversations in the Philippines, the topic usually centers on numbers (how many we are now – about 83.7 million as of mid-2004). Or we talk of the rate we are increasing over time (presently 2.0 percent each year without counting migration – referred to as Rate of Natural Increase). Some would note that this is higher than other Catholic countries like ours, like Columbia (1.7 percent), France (0.4 percent), Italy (-0.1 percent) and Spain (0.1 percent). Or the conversation can go into the more controversial aspect of how we can control our population, such as to whether we should promote artificial contraception or not.

Some would compare that the prevalence of the use of artificial contraception in the Philippines (33 percent among married women) is much lower than in other Catholic countries like, again, Columbia (64 percent), France (69 percent), Italy (39 percent) and Spain (53 percent). We make the comparisons because we see that these other countries (and so most countries with smaller populations relative to the size of their land and seas from which they derive their basic wealth) are generally much more prosperous than us.

But beyond these, we frequently talk of "population" as something that really does not concern ourselves. We are concerned about our children and how many we need to feed, clothe and send them to schools and to doctors for check-ups, but "population" is something for government to worry about. Many would say that the government should worry about our population, but not for us to do so ourselves. It really does not matter to us personally.

Also, when "environment" pops up in our conversations, we dwell on only the usual topics like air and water pollution, garbage and wastes, deforestation, declining fisheries, and the protection of certain prominent species like the Philippine eagle (P. jefferyi), the tamaraw (B. mindorensis), turtles (Cheloniidae and Dermocheliidae), whales and other sea mammals like the sperm whale (P. macrocephalus), bottlenose dolphin (T. truncatus) and dugong (D. dugon), and the tarsier (Tarsius syrichta).

Then, too, beyond talking about it, most of us hardly take environment as our personal worry. We say that the government must do something about it because

we worry about how a bad environment will increase our doctors' bills, lower the market value of our homes, or allow toxic pollutants to seep into our foods, the air we breathe and our drinking water. But the "environment" itself is something we hardly fret about most days in our lives.

Not only that we don't think of the two as matters that concern us personally, we hardly link them as interwoven causes for our worry. Yet, they are, based on what are known in today's study of ecology:

1. **Population exerts a generally net negative pressure on the environment.**

Humans are on the top tier of the food chain (referred to as trophic structure). This means that they derive their subsistence from an array of plants and animals in the lower levels of the chain, which cascades into ever increasing amounts and numbers as they go down the chain. It works like this: each plant requires an array of nutrients from the soil where it grows and so a large number of plants that a plant-eater (herbivore) will need in order to survive, will require a large amount of soil nutrients that is multiple the amount required by one plant. Eaters of the plant-eaters (carnivores) will correspondingly require an even higher multiple amount of soil nutrients to support the amount of plants that the number of herbivores needed to support one carnivore, will need. And if in higher trophic levels there is one other organism (say, an omnivore, or an eater of both herbivores and carnivores, which also needs to survive, then the pressures on lower carnivores, herbivores and ultimately on the pool of nutrients in the soil, will multiply at a rate that increases ever higher (or geometrically) as one goes down the food chain. Humans are on top of all these. We consume omnivores, carnivores, herbivores and plants, for food, housing, fuels, clothing, industries, commercial products and medicines. A rapid increase in human populations exerts pressures on the food chain with an increasing probability that the pressure rises above the rate that Nature can replenish each affected element in the food chain (e.g., like if the demand for certain plant foods rises above the rate they can be grown). When the pressure continues to rise to a point beyond the ability of Nature to replenish the lowest elements in the food chain (e.g., soil nutrients), the food chain can collapse. Add to these the complex of factors in the trophic structures of our environment like pests, diseases, drought, flooding and severe climate events, which can further multiply the pressures on any one element of the food chain, and hence, ultimately, on their ability to support the other elements in the chain. This can be true to food chains on land, in seas or in those spanning both land and seas.

A collapse of the trophic structure of the environment can be, of course, mitigated. That is, if each human is able to put in more into the structure than

he/she derives from it. Meaning, a collapse can be prevented if each human that consumes plants, animals and nutrients is able to replenish what he/she consumes at a rate higher than his/her consumption. Indeed, there are many ways this is done today. The genetic traits of plants and animals are being modified so that we are able to produce more of them than before. The quality and regularity of our water supply are being improved and stabilized so that more plants, animals (and ourselves) can have better quality of life. And industries are being redesigned so that we can produce more of the things we need with lesser amounts of natural resources used to produce them.

But one problem remains: each human represents from birth to date a certainty of consumption but only a probability of production. That is, every human being is sure to need something to survive and to live a life but is not sure if he/she would be able to put back into Nature more than what he/she takes from it. And if our population is both large and rising fast (to a point when it becomes harder to fully feed, clothe, ensure the health, and educate our children), the probability increases that more of us would be net takers from Nature rather than net givers. Consequently, assuming all things equal (say, we don't send our people abroad), pressures on our environment will rise and trophic collapse can become even more probable. This matters to us. And it is a cause for our concern.

2. The symptoms of net negative human pressures on the environment are escalating.

Data from global surveys are showing that in places with higher populations per unit area of accessible land and marine economic zones, the quality of the environment is generally dropping. The quality of lands and soils, forests, biodiversity, freshwater resources, coasts and seas, air and water bodies, are observably on the decline in Africa, Latin America and the Caribbean, the Asia-Pacific and West Asia. In contrast, the quality of lands and soils in North America is slightly improving, and air quality and the quality of water bodies, forests, biodiversity, freshwater resources, coasts and seas, and of lands and soils is relatively stable in North America and the polar regions.

In the Philippines, the denser regions outside Metro Manila – e.g., Region 1 (third densest), Region 2 (first densest), Region 7 (second densest) and Region 6 (fourth densest) – have among the highest percentage of degraded lands among all regions (Region 1 is first, Region 3 is second, Region 6 is fourth, and Region 7 is sixth). The denser regions also generally have the lower percentage of remaining forests – e.g., Region 7 (second densest and the lowest forests left); Region 1 (third densest and fourth in lowest forests left) and Region 5 (fifth densest and second in lowest forests left). Also alarming are the regions with otherwise low resident population densities but have among the lowest forests

left (e.g., Regions 1, 9, 10, 11 and Caraga) and this is because their forests are cut to supply higher demand elsewhere (e.g., where population densities are highest like in Metro Manila, Cebu and other urbanizing centers in the archipelago).

Human pressures on coastal and marine resources have been increasing as well. This is particularly so in areas with high densities of coastal populations. It is well-known that less than 25 percent of our corals (which host the most of our near-shore fisheries) remain in good condition. Illegal and destructive fishing like the use of poisons and coral-destroying methods have been on the rise. These are reducing our ability to catch fish in our municipal waters in less costly ways.

Estimates point to our country losing as much as perhaps P130 billion a year in fisheries to illegal and destructive fishing and pollution. Catch per unit effort (CPUE) of fishing has been estimated to have declined by as much as 90 percent since the1950s.

There are many other indications of increased human pressures on our environment. For example, our mangrove cover has declined from over 500,000 hectares in 1908, to less than 150,000 hectares today; our soils are getting more salty in many areas, or more acidic in others, or exposed to inorganic pollutants from agriculture and mine tailings. And the air we breathe in many of our cities are ever increasingly laden with dusts and other dangerous pollutants (like carbon dioxide, sulfur oxides and nitrogen oxides).

Overall, the estimated value of environmental degradation from four economic activities in the country – which are activities to meet the rising demands for materials and services by our burgeoning population, including (1) agriculture, fishery and forestry; (2) manufacturing; (3) mining; and (4) land transportation) – has risen 137.8 percent in six years, from P3.7 billion in 1992 to P8.8 billion in 1998. Of the four, manufacturing seems to show the most increase from P2.2 billion in 1992 to P7 billion in 1998. Air pollution from manufacturing rose 92.3 percent from 789,020 metric tons (MT) in 1992 to 1.5 million metric tons (MMT) in 1998. Water pollution from manufacturing rose 23 percent from 2,094 MT of biological oxygen demand (or BOD, which is a measure of the rate of oxygen depletion in the water associated with microbial activities to decompose organic wastes in it, used as an indication of the amount of wastes in the water) in 1992, to 2,579 MT BOD in 1998. The value of degradation estimated from land transportation represents the emissions we are producing from heavily congested streets and highways which tend to accumulate as vehicles rev up in slow traffic. These are linked to our having a large and fast-growing population which is making it harder for the government to keep up on spending for additional infrastructure.

3. A weakened environment generally weakens the ability of human populations to meet their needs.

Human needs, for the most part, are procured from ultimately natural sources. Foods, fuels, fiber, most clothing materials, construction materials, medicines and many other products used by humans, come from the flora, fauna and other biological entities (or their extracts), minerals and processes (like water, carbon and nutrient cycles) in Nature. Synthetic products like nylon, rubber, pesticides, inorganic fertilizers and molluscicides are laboratory mimics of information from Nature. When the regular functions of Nature are disrupted (say, by pollution or by nutrient loss in soils), its ability to produce (or to support the production of) goods and services needed by humans would be disrupted as well. This makes it harder for humans to derive additional products and services from Nature.

For instance, it has been shown that, in general, in our country where forest cover is low, water recharge tends to be also low, thus, water availability can decline and this seems presently indicated by the price of delivered water in our urban areas which has been mostly rising in the past 10 to 15 years.

Or, when large mining areas are improperly abandoned (after having been mined out), their sites can remain as wastelands degraded by pollution from tailings and cyanide and mercury from processing ores; they can no longer support agriculture or biodiversity or become sites for healthy human settlements, which are equally critical needs of the population.

When forests decline, their capacity to hold water, or to act as wind and pest breaks to protect agriculture and human communities, could decline to a point that what are otherwise already catastrophic events (like typhoons, heavy rainfall or pest infestations), can become even more catastrophic whenever they occur (a phenomenon I earlier referred to as "enviromagnification").

When human populations increase, the consequence is too often that the land they would need for siting their homes, schools, roads, hospitals and other needed infrastructure (like seaports and airports, parking sites and recreational areas) could go up as well, thus removing from the environment large areas of land and water that otherwise can support agriculture, the production of trees, the protection of biodiversity, or to sequester water; today, 22.9 percent of our total land area is built-up (or used for these purposes). Some 33 percent of our lands are devoted to farming, leaving only 44.3 percent for other equally important environmental production like forests, freshwater reserves, pastures and lands for wildlife. The general trend is that degraded environments offer less opportunities for the production of important ecological services, or if the services

were to be maintained under these conditions, they would be costlier than before. This, too, matters to us.

Conclusion.

Population and environment are not apart from how we are able to pursue a quality life. They are a part of it. We might deny their impacts on our personal lives and choose to disregard the evidence of science; that is our choice. But it does not make the impacts untrue if, as most scientific studies suggest, they are, in fact, true. And if only because they might be true, let us at least think about them as two issues that do matter to us personally.

(The data used in this article came from many sources. The author acknowledges them. Limited publication space, however, precludes their being listed here. The list can be provided upon request.)

The author holds a Ph.D. degree in Wildland Resource Science from the University of California at Berkeley, USA. He also holds a Masters degree in Philosophy (majoring in Philosophy of Science and Ethics) and a Masters degree in International Affairs (focus on Southeast Asia Studies majoring in Economics and Political Science). He is currently the environmental science member of the *National Committee on Biosafety* of the Philippines and, as a member of its Council of Fellows, lectures on Sustainable Development and Environmental Governance at the Development Academy of the Philippines. He is the chairman and president of the Philippine Sustainable Development Network and is among the coordinating lead authors of the ongoing *Millennium Ecosystem Assessment* which is a collaboration of the United Nations and other international bodies. He is a member of the International Science Planning Committee of the International Human Dimensions Programme based in Bonn, Germany. He is a member of the editorial board of *Agriculture and Human Values* (a journal of the Agriculture, Food and Human Values Society) published by Kluwer Academic Publishers. His research interests are environmental policy and governance (particularly relating to forests and biodiversity, and recently to mining and water), and environmental policy and ethics. He can be reached at **beniiim@yahoo.com**