

# Keynote Address

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On behalf of the Department of Environment and Natural Resources, I would like to thank the National Academy of Science and Technology for inviting me here today.

For the greater part of the evolution of our planet, time has always been on its side. It took some three to four billion years to cool and settle this molten sphere into a suitable balance that would allow the elements to form into the basic building blocks of life. And, through all this time, nature generously allowed billions of years to pass, much like an oenologist waiting decades for a bottle of wine to age into perfection.

The next billion years or so saw the face of the earth in vigorous ferment, with life taking form and shape in ever higher degrees of evolution. Single-celled beings became multi-celled, taking on more complex forms. Living organisms sufficiently evolved, moved on to land from their previously waterborne existence. And, in the last 30,000 years, our forebears appeared to walk, and to settle the breadth of this planet.

The larger brain capacity of man, and his mobility, made it easy for him to adapt to various climes, and to think of ways and means to adapt to his environment. And, where he could not adapt, he devised measures to fend for, and defend, himself. He fashioned shelter and clothing from materials provided by his environment. He hunted food, then moved on to domesticating animals. And, where he finally found an environment that provided well enough for him, he settled down and planted favored crops.

From the very moment that man sought to adapt to his environment, science and technology came into being, for these two represent man's attempt to explain and to categorize the phenomena that occur in him and his environment, and his

adaptive reaction to them. But because man also styles himself as a creator, he has also used science and technology to bring into existence materials and processes previously unavailable to him through natural means. And, where he thought it necessary, man also created new environments.

It is this creative impetus which has given us the renaissance, the age of exploration and discovery, the industrial revolution, and the modern era that we now both enjoy and dread.

We enjoy because never before in the history of mankind have we attained such material progress. We have eradicated diseases, bridged oceans, created land and gone to the moon. And all these even as a man-made space craft hurtles along toward the outer reaches of the solar system and the milky way galaxy.

We dread, however, because where man has created wealth, he has also created inequity, deprivation and destruction. Billions of people living in the least developed countries live marginalized lives, far from the material comforts of the wealthiest countries, and far from the benefits of modern technology. They also live under the constant threat of deprivation caused by natural phenomena, such as drought, storms, earthquakes and other cataclysms. The recent cyclone episodes in Bangladesh and the eruption of Mt. Pinatubo have shown us just how vulnerable people are in a setting of underdevelopment and want.

Man has also used science and technology in order to put in his hands the means to destroy his planet and his race. The stock of nuclear arms possessed by the so called "atomic club" and the billions of dollars spent each year for conventional arms by the less developed countries have given nations the ability to wipe mankind out of the face of creation. The recent war in the gulf is a grim reminder of man's willingness to use these weapons against himself. That oil spills were deliberately staged in a sort of "eco-warfare" is an even more chilling specter of just how far man can take this aggression.

However, the greatest destruction unleashed by man is a destruction that happens quietly, and often under our very noses. But because this happens without the sound of gunfire, nor the exchange of words by world leaders, it does not get as much attention. And yet, it is among the most violent of man's destructive acts. Consider the following facts:

1. The earth is losing as much as 20.4 million hectares of its tropical forests annually due to improper logging, shifting cultivation and land conversion.

2. Animal and plant species are becoming extinct at a natural rate of about one species for every 1 1/9 years. But because of destructive human activities, the extinction rate is hundreds of times higher. Thus, there is a distinct possibility that species which may not have been discovered yet may become extinct.

3. In 1987, human activities released about 8.5 million mt of carbon dioxide, 255 million mt of methane and 770,000 mt of chlorofluorocarbons into the atmosphere, thus adding to the heat trapping phenomenon known as the greenhouse effect.

And so on. These grim statistics have far more terrifying consequences than Saddam's oil-fired eco-war. They show just how much and how rapidly man is changing the face of the earth, and changing it through destruction. Unfortunately, he is also changing it much faster than he can gain knowledge to understand the earth more fully. Thus, mankind stands at a point of risk and uncertainty -- continually prodding and testing the limits of nature and the environment, and yet not really knowing how nature and the environment will react when pushed too far. This state of affairs is rather like being given a bomb and being taught how to set it, without really knowing that bombs can, and do explode.

And, even if we can generate environmental statistics like those I cited earlier, they still cannot mask the general lack of understanding, a "knowledge deficit", if you will, that continues to afflict the fields of ecology and environmental science. Perhaps, we can say that we know a lot, and yet understand little. This is tragic when one considers that the proper management of our ecosystems absolutely depends on our clear understanding of the myriad of interactions and linkages that sustain life.

Of course, this reflects the unfortunate priorities established in many of the scientific and technological communities around the world -- priorities driven by commercial demand, and not by real human and natural needs. If this gripe sounds familiar, it is reminiscent of the old criticism against the scientific community, which has put a man on the moon, and yet has not found a cure for the common cold. And yet, it is a complaint that becomes even more valid now, where, even as the earth is threatened by



ecological doom, we still find the time and the resources to develop more weapons of destruction, and material whimsies that cater only to the wants of the more advanced consumer societies.

These unfortunate priorities, and the general lack of knowledge, really become more obvious when the setting becomes the third world.

For example, in the Department of Environment and Natural Resources, there is a dearth of environmental scientists. Admittedly, this is not an acceptable situation for a government organization that has made the environment the centerpiece of its efforts. And yet, the reality of it is that we are not able to recruit environmental scientists because there are so very few of them around, and those who are there rarely want to take on the vicissitudes of public service.

This "knowledge deficit" can be seen in many other aspects of our work. We have made, for example, the bold decision to stop logging in the virgin forests of our country. The reason here is to conserve biodiversity, with the knowledge that future Filipinos will reap the benefits of improved agricultural crops, medicine and other products that can be derived from such a move. In a sense, we have asked the current generation to make a sacrifice for succeeding generations.

The problem, however, is that while we know that biodiversity conservation is good, we do not know yet the potential species within our virgin forests that could become a boon for us in the near and far future.

There are still a lot of unknowns even in just the identification of floral and faunal species. In a very short botanical expedition of a Swedish group in Palawan, for example, it was able to discover three plant species never before known to science. The group members, as well as other plant scientists, have assured us that there are still many yet undiscovered. However, the tragedy of deforestation is such that we may have already lost many species without even knowing what, where and how important they were.

But even if we already know these species and their potentials, we still have to hurdle another level of scientific and technological limitation. I refer to the ability to transform the genetic material or the chemical product from these species into

forms of concentrated utility to man, such as in improved varieties of food crops and medicines.

It is said that there are only about 2,500 experts on this worldwide. Unfortunately, most are in the developed countries and in the multinational corporations. Thus, without a truly aggressive effort on our part to develop such capabilities, we may end up having the raw materials and yet still be dependent on the developed countries for their processing, marketing and use.

The management of ecosystems also requires an understanding of the socio-cultural dynamics of people dependent or linked to these ecosystems. While sociology or cultural anthropology are sometimes considered the poorer cousins of the hard sciences, such as biology and physics, it is increasingly realized that they do point out how best to strengthen man-nature interrelationships.

A case in point is the relocation of the Aetas displaced by the eruption of Mt. Pinatubo, which would have been much easier had we possessed a better understanding of their ways, value systems and livelihood technologies. While consultations may help resolve this, such consultations gain in value only if government and/or the assisting donor groups understand the Aeta perspective.

There is also an increasing awareness that we can learn a lot about sustainable management of natural resources from indigenous societies, which have been very close to nature and have peacefully co-existed with their environment. Indigenous or tribal people can identify more plant species and their uses than many of our best botanists. Such indigenous knowledge should be supported and utilized. We should support efforts at this new field of study called "Ethnoecology" so that we may learn to work in closer partnership with nature, just as our forebears, and our indigenous cultural communities, have.

Admittedly, we are entering the realm of ecology and environmentalism rather belatedly. The more advanced countries, and even some of the more enlightened developing countries, took up the cudgels of formal environmental education at least a couple of decades ago. Even the more prestigious universities of this country have just recently begun including ecological and environmental sciences in their academic offerings. Therefore, the local academic and scientific communities have much catching

up to do, if only to bring our body of ecological knowledge within reasonable distance of the frontrunners.

Our efforts at building our body of eco-knowledge, however, have given many of us a valuable insight, which may do us all well to remember in the future.

During the stages of human development, man was thought to be constantly awed by the power of untamed nature. He was brought to his knees by lightning. The power of earthquakes shook his very consciousness. And the might of volcanic eruptions made him worship. But when man began to develop his body of knowledge -- his sciences and his technologies -- he began to think that he could, after all, become the master of nature.

And yet, after years of trying, after years of building his mastery, man continues to be under the dominion of nature. He is still prone to earthquakes, to floods, to storms and to volcanic eruptions. And, he is still subject to the hidden wrath of nature, a wrath unleashed by his disrespect of the elements, and of natural rules. Thus, man is now victim to such unheard of phenomena as black rain, acid rain and global warming.

But, because of all these, man has again realized, and is willing to admit that, even after all these years, and even after all his claimed, and ignorant supremacy, he is still awed by nature and its forces.

For, the more he learns about nature, the more he is impressed by its diversity, its relatedness, its might and most importantly, its wisdom.

Thank you and good day.