

ENVIRONMENTAL AWARENESS

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CLIMATE CHANGE AND THE PHILIPPINES

By Manuel 'Pogs' Gaspay, Ph.D.

Allow me first to give you a background on the motivation for writing this article on climate change and the Philippines. One is that our ever servant brod, Willie Vergara, has been hounding me to write about my experiences as a Director of the Environmental Management Bureau of the Philippines (EMB, 1996-1997) which is the Philippine equivalent of our EPA (Environmental Protection Agency) here. Another is that I recently received a copy of two thoughtful reports on climate change from a Philippine perspective -- one is a Technical Report on Climate Change in the Philippines (2008) prepared by the Manila Observatory, the most credible of sources about this topic in the Philippines; and, the other is a policy discussion paper on what the Philippines should be doing about the reality of climate change (In the Eye of the Perfect Storm, 2008) by a panel of some of the most credible and serious Philippine scholars of this issue.

Climate change as an environmental threat was already a hot topic in international environmental policy circles in my time as the Director of the Philippine EMB. But it was not a priority action area for us then, as we in the Philippines, while recognizing it to be a global threat, considered it to be more of a priority threat then for the more developed countries such as the USA, who not only had the resources to deal with this global problem more effectively, but were also already reasonably dealing well with more localized environmental threats such as water and air pollution. Obviously for the Philippines, our priority was the water and air pollution problems that were seriously damaging the quality of life of its citizens especially in the denser populated areas (urban and rural). Why worry about a problem that could kill you in say 30-50 years from now when you were already dying from poisoned waters and airs?

Reading the two reports, however, made me realize that evidences unfolded in the past 11 years or so since, may have changed that priority assessment. The Philippine response to its water and air pollution problems have not improved (in fact may have become worse), but the reality of climate change has become the proverbial elephant in the room or the gorilla in the china shop. The probability of a climate change consequence killing anybody in this planet not only increased to plausible levels but also fast becoming sooner (no longer in the 30-50 years horizon but more like 20-30 years). The prospect of economic damages is even more staggering that it is truly sobering.

So, while these two reports are about the Philippines, they may move you more than the comprehensive and exhaustive Al Gore report (The Inconvenient Truth, 2005), simply because most of us still have a more Filipino perspective and more viscerally affected by Filipino images. Let me share with you then my reaction to these reports.

Revisiting the Evidences

When people talk about climate change they are invariably referring to global warming and its associated effects on climate patterns. Global surface mean temperatures have been assiduously recorded ever since the thermometer was invented in the 1800's. As the accompanying graphs show, an accelerating trend of higher temperatures has been recorded for the past 100 years.

About the Author

Brod Manuel "Pogs" Gaspay '68 was the Director of the Environment Management Bureau of the Philippines from Jan 1996 to Jun 1997. Brod Pogs Gaspay holds a Ph.D. in Development Economics from Stanford University and earned engineering degrees (BSGE and MEIE) from the University of the Philippines.

Brod Pogs is a sustainable development specialist and advocate. He worked in rural development programs under Brod Teodoro C. Rey Jr., at the DAP and the FSDC from 1973-1983 and was the Director for Regions 3 and 4 when he left for the US to pursue his doctorate studies. He was an Associate Professor at the AIM from 1993-2000 and spent a year in Vietnam (1997-1998) as an ADB specialist in program development evaluation and management. He now teaches economics and management courses at the Northwestern Polytechnic University at Fremont, where he is also the Associate Dean for its School of Business and Info Technology.

Brod Pogs was Past President of the UP Alumni Association in San Francisco and led the hosting of the Pre-Centennial UP Alumni Convention in SF last year, an event attended by alumni chapters from all over North America and which raised over \$510,000 in turned-over donations and 3 professorial chairs to the university.

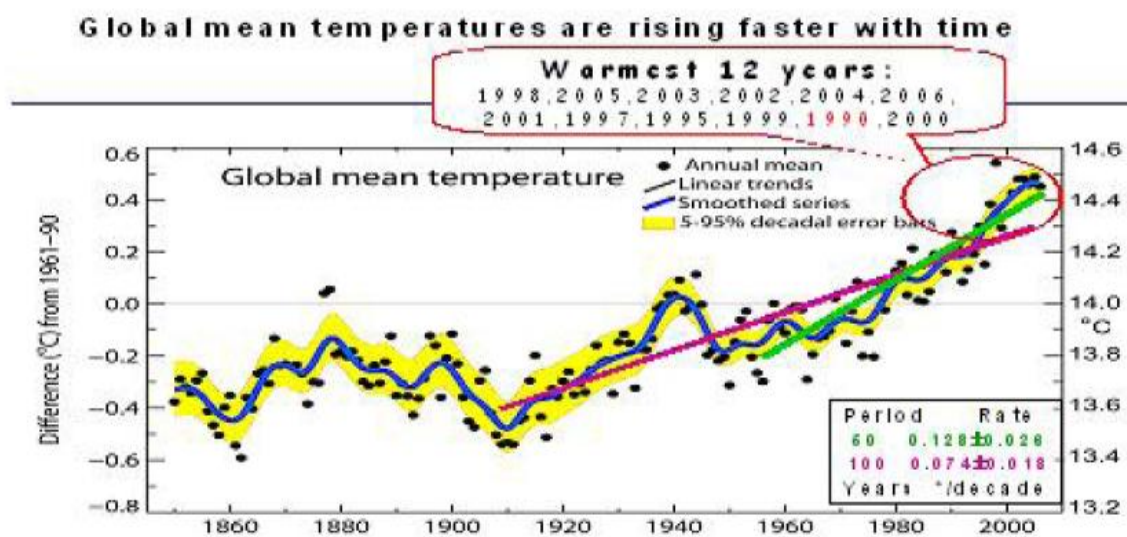


Figure 1: Global Mean Temperature Showing the Warmest 12 Years

The reality of this statistical artifact has been bolstered by recent observations of disappearing permanent ice covers in the polar regions as well as on extreme elevations in other regions. In 2002, a very large mass of ice (Larsen B shelf, some 1,250 square miles) broke off into several pieces in Antarctica. Just the other day (July 29), the newspapers were reporting the breaking off of a huge ice sheet (some 8 square miles) in a part of Canada. Many scientists are now predicting ice-free summers in the Arctic as early as 2013.

There have been also other observed symptoms of this rising global temperatures such as changes in the migratory patterns of birds and even changes in sex concentrations among fishes. There is simply, as what lawyers will say, a preponderance of evidence for global warming. Consequently, no legitimate scientist now questions the veracity of this phenomenon. And what used to be more debatable – whether the global warming was being caused by an increase in greenhouse gases caused by human activity – is also now becoming an accepted assertion in scientific circles. Only politicians and superficial scholars seriously challenge this.

I myself have no doubt about the reality of global warming and how it is changing our climate. I used to be more circumspect about whether it was indeed being chiefly caused by human activity, but am now being swayed by a lot of evidence being uncovered by scholarly studies about this causality. Moreover, it does not really matter to me whether we have caused it or whether it is but a part of a natural climate cycle of warming and cooling by our planet, for us to do something about it. In the face of global warming certainty, should we not amend our ways and lifestyles if we want our species to survive?

Mulling the Consequences

The Philippine reports are instructive reading on what to expect from global warming in terms of more direct consequences to our lives and wealth. Sea surface temperatures in the Philippines are already warmer by a half-degree Celsius compared to their 1961-1990 mean, and are projected to be between 1 to 3.5 degrees warmer in the next 50 years. The reports clearly points to three major areas of threats for the Philippines: 1) rising sea levels and the resulting loss of land areas, 2) increasing occurrences of typhoons and similar devastating weather disturbances, and 3) changes in the pattern of rainfall as in shorter wet seasons versus longer dry spells.

Rising Sea Levels

Being an archipelago with lots and lots of shoreline, the most visible effect of a warmer climate for the Philippines will be a rise in sea levels. Some islands will disappear and many coastal areas will be inundated. Signs of sea level rise have already been detected in major ports of the country where tide gauges have been installed. Recorded data from Manila and Legaspi that were analyzed by a UK Climate Research Unit indicates that the rise started in the 1970s. What is interesting is that the observed rise is even beyond what climate models from global warming predict. Geologists point out that this may be due to the fact that continued exploitation of groundwater sources is sinking the land mass as well. A 1999 study by PAGASA predicts that a 1 meter rise by 2025 is likely and that this will lead to a loss of 5,000 hectares of land area and displace some 2 million people around Manila Bay (see Vulnerability Map for Manila Bay). It is important to note, that the Philippines biggest cities, such as Cebu and Davao, are mostly coastal. From a global perspective, 30% of the world population is said to reside in coastal areas.

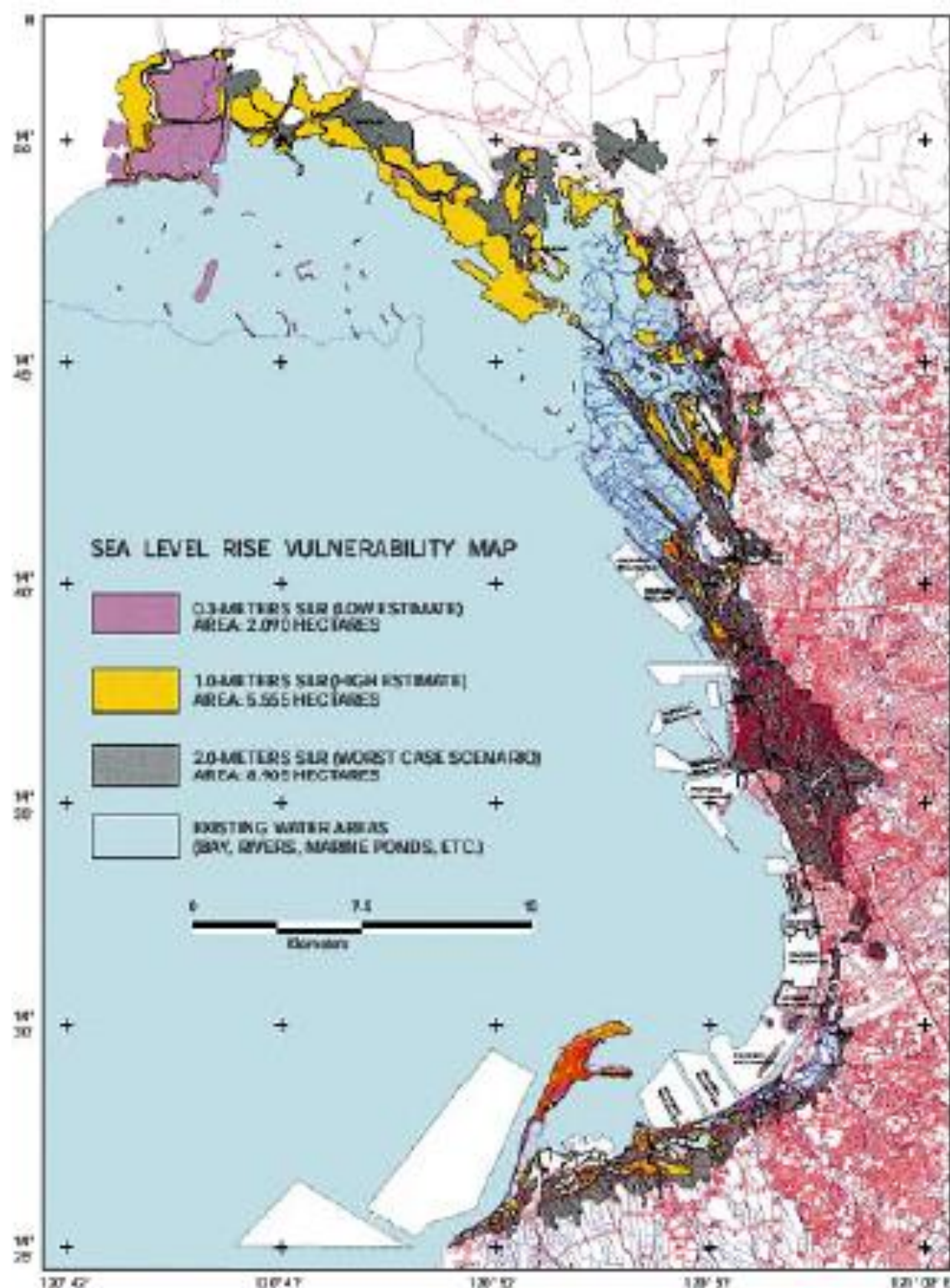


Figure 2: Impacts of 1 meter sea level rise (Perez et al, 1999)

During my brief stint as the Philippine EMB Director I did casually observe evidences of this rise in sea level. Some small islands in the eastern part of the country were already then being reported to be completely under the water for some parts of the year.

Increasing Occurrences and Intensities of Cyclones

In theory, warmer sea surface temperatures will mean more frequent and stronger storms. However, climate modeling studies have not been very definitive about these effects nor their extent. What has been observed is that the number of tropical cyclones has been increasing in the Western Pacific in recent years (see Figure 6 reprint from Technical Report 2008). This has particularly been more pronounced for the Visayas in the Philippines.

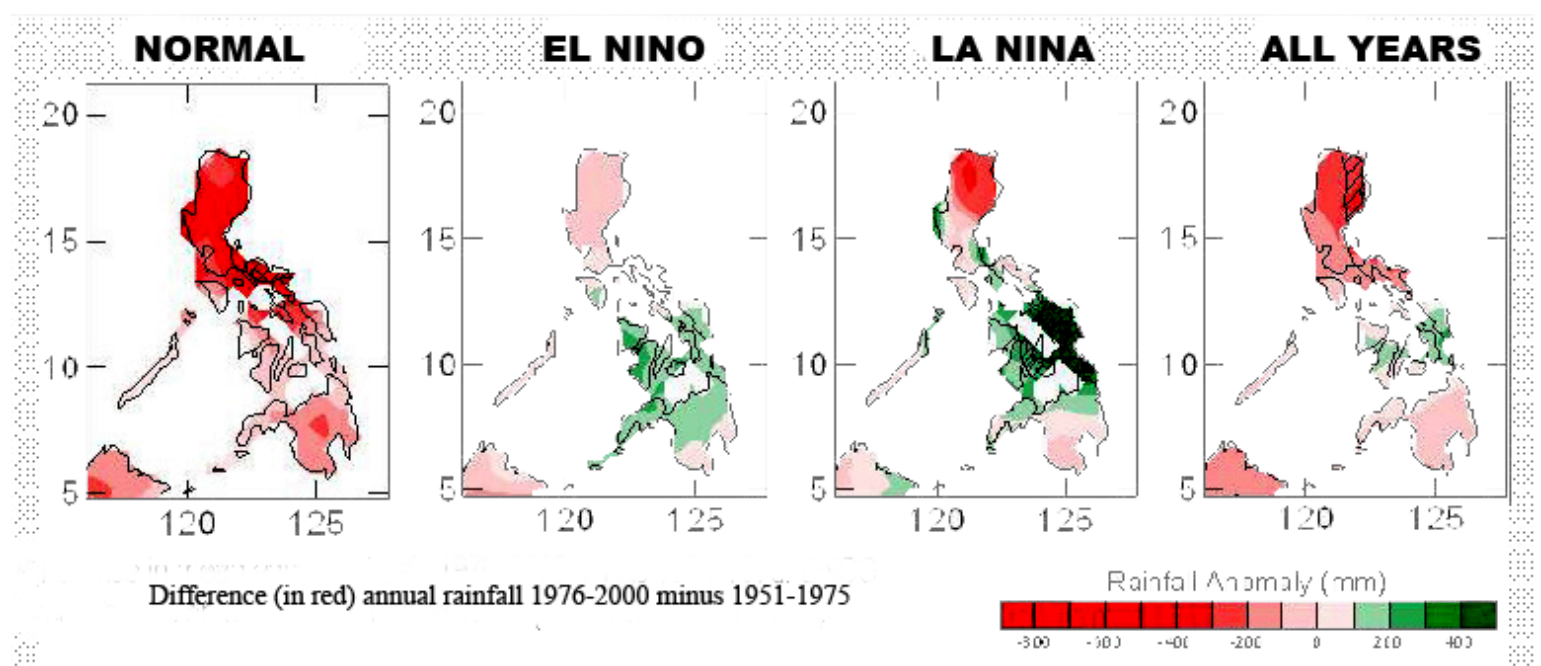
As to increasing typhoon intensity, the scientific evidence is not yet clear. But, there have been a number of super typhoons recorded lately and two recent studies (Emanuel 2005, Webster et al 2005) did provide evidence of an

increase in the maximum velocities of both Atlantic and Pacific Ocean disturbances that were correlated with rising sea surface temperatures. However, some scientists caution that it may be hard to definitively claim that these are being caused by global warming and not some natural long-term variability factor. In other words, there is no preponderance of evidence yet.

But what is sobering is the observation that vulnerabilities to these typhoons have increased as human settlements gradually encroach on high-risk areas. With more impoverished people being pushed to live along marginally habitable areas – swamps, floodways, slide-prone hillsides, shifting soil bases – the risk and extent of damages increase even if the intensity of these typhoons may not. Several recent disasters in the Philippines brought about by extreme weather disturbances, such as the 2005 Oriental Mindoro inundation and 2006 Leyte landslide, dramatically bring home this point.

Changing Rainfall Patterns

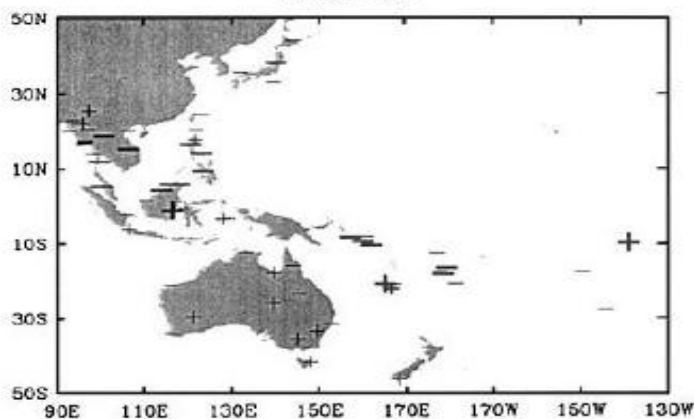
Predicting rainfall pattern changes due to global warming is a difficult and less understood science due to the co-effects of natural cycles (ex. El Niño and La Niña) and location-specific micro-climate factors. Climate change prediction studies take two approaches. One is to build models and simulate changes in global temperatures to predict effects on climate outcomes such as rainfall (causal models). The other is to simply look for trends from past data that may be reasonably assumed to continue in the future (time-series models). The latter rely on the logical preposition that if global warming is already happening, then its impact may already be reflected in the behavior of the time-series data of the variables (such as rainfall) that it affects. The two reports examined both types of predictive models.



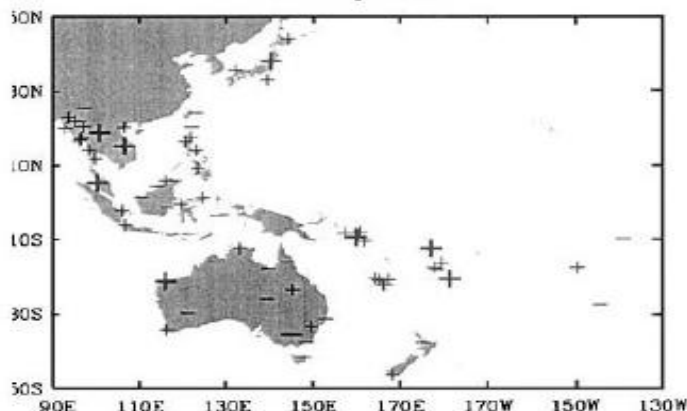
Changes in Mean Annual Rainfall in the Philippines

Climate change simulation models do tend to indicate drier and wetter patterns – more droughts and floods in general. But these models do not indicate at all or are less reliable in predicting regionalized and localized effects. For Southeast Asia, the prediction is a likely increase in rainfall overall. But the model used for this prediction does not have enough detail to predict localized outcomes for the Philippines.

Alternatively, analysis of past rainfall data (Manton et al 2001) from 1961-1998 reveal a trend to fewer wet days but heavier rains during these wet days. As a result it predicts a slight decrease in overall annual rainfall for the country. It also indicates geographical differences as it predicts a decrease in mean rainfall for Luzon and Mindanao but an increase for the Visayas.

Rain Days

**Change in the frequency of days
with rain**

Extreme Proportion

**Change in the proportion of total annual
rainfall contributed by heavy rain**

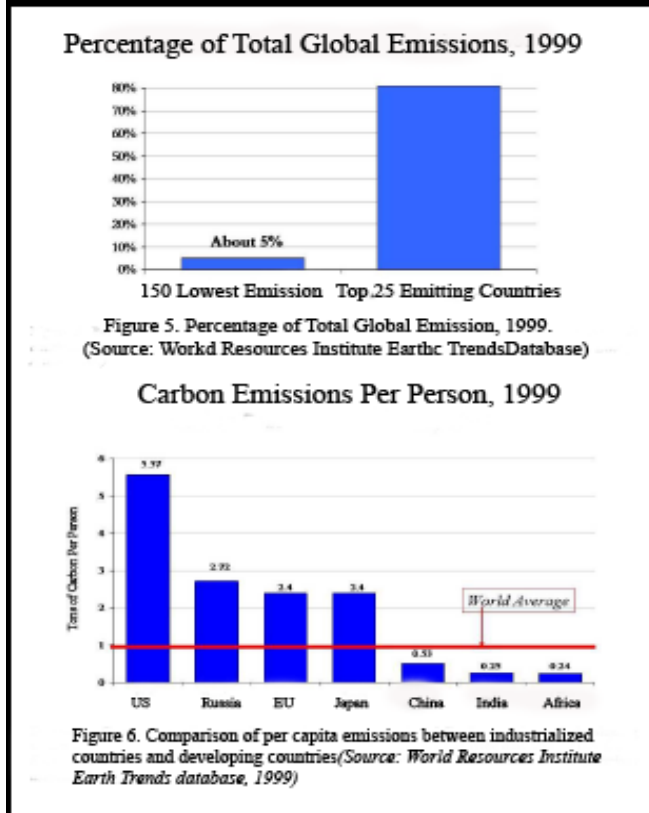
Changes in regional rainfall extremes, 1961-1998 (Manton et al , 2001)

My own take from these studies is that since the recent trend for fewer but wetter wet days is global (observed for most parts of the world) then there must be a global climate factor responsible for this and that this must be expected to continue. In other words, more drought and deluge events are to be expected even as we are not sure whether it is global warming causing this.

How Should We Respond

Assessment of the global warming threat has gone from conservative uncertainty to a highly likely probability. While the localized threats may be less understood, save for the rising sea level threat, prudence dictates we take reasonable precautions. Fortunately, despite the head-burying-in-the-sand attitude of many political leaders of this country, the rest of the world had been taking intelligent steps in dealing with the global warming threat. This is well expressed in the PREVENT, MITIGATE and ADAPT principles of action in the Kyoto Protocol of 2003 and the follow-up Bali Conference agreements in 2007 that is in the process of ratification of countries that now includes our very own USA. The Philippines has embraced these three precautionary principles and added a co-benefit approach in crafting its specific responses. The co-benefit approach essentially requires any precautionary response to have other desirable outcomes (ex. cleaner air, lower energy costs), must not entail unnecessary sacrifices (ex. economic growth neutral), and must be useful even if no climate change related-threat occurs.

The PREVENT principle is being operationalized in commitments to cleaner development strategies by countries seeking to reach the standards of living of the wealthier countries. Under the Kyoto Protocol, a financing scheme as well as transfer of technology mechanisms, are also being developed to assist these aspiring countries veer away from development tracks that add more to the already GHG (green house gases) laden world atmosphere we now have. Each adherent country is making an inventory of GHG emissions within their territory to be able to identify the most effective points of these preventive interventions. The recent significant investments of large businesses in developing cleaner technologies is proof that these policies are working. Albeit, the skyrocketing of fuel price have a lot to do with it too. Even in the Philippines, the Ayala and Lopez group of companies are reportedly allocating significant amounts to such investments as what our brod Danny Lachica mentioned in his presentation at Pismo Beach last January.

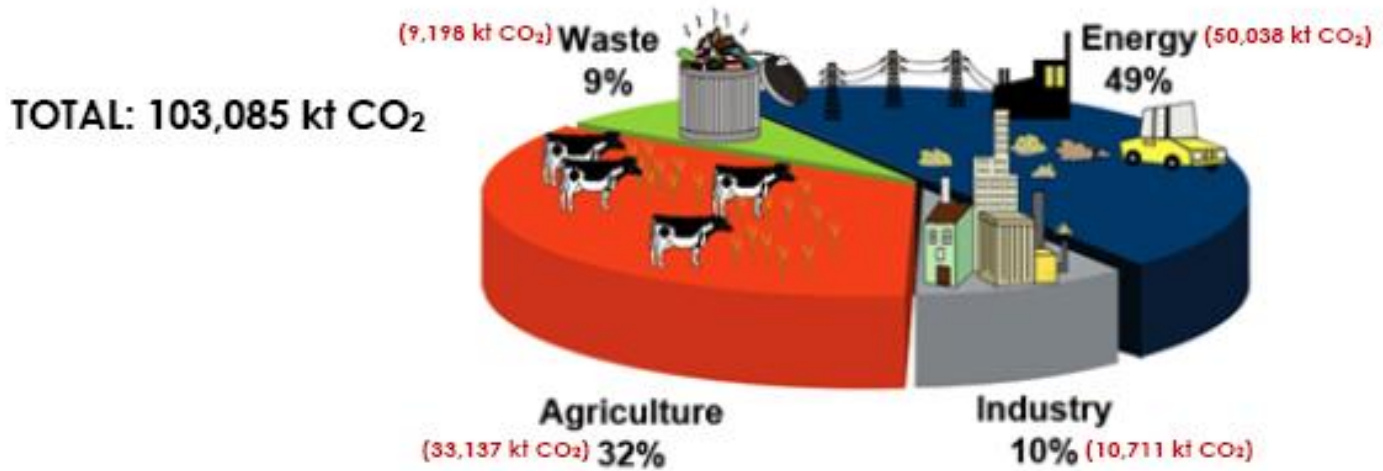


The MITIGATION approach is mostly aimed at curbing current emissions of GHG. The burden of reducing current emissions are placed on already highly-industrialized countries that now account for very high per capita emissions. As Figures 5 and 6 shows, the U.S., Russia, European Union countries and Japan account for most of these. The Philippines estimated 1 ton per capita-year emission is right on the average. What is worrying is that while China and India's per capita emission rates are still much lower than the average, they are fast soaring as they try to catch-up with the industrialization race; and, by virtue of their large populations will surely significantly increase emissions of GHG in the future. Thus, the rationale for the Kyoto Protocol's provision of financing and transfer of technology mechanisms to assist developing countries pursue cleaner economic development model alternatives.

The ADAPTATION approach deals with what we need to do to with the irreversible effects of a higher global temperature, higher sea levels, more occurrences of extreme weather events and changes in climate patterns. The Kyoto Protocol provides a good framework for the global cooperation and action needed to combat the global threats. It even provides, through financing and technology transfer, incentives and assistance for countries with less resources to adapt to the climate change realities they locally will face. For me, this ADAPTATION approach is the more critical as the other two approaches are heavily based on the assumption that GHG emissions are driving the global warming. Whether this assertion is true or not, we will have to adapt to the realities of a warming Earth.

Each country's responsibilities are clearly drawn in the Kyoto Protocol. The Bali Conference Agreement strengthens the commitment to these responsibilities by specifying emission reduction targets and time frames. Each country will have to make an inventory of their GHG emissions and assessment of localized global warming impacts. Each country too individually draws up their Climate Change Response Action Plan (CCRAP), given their Protocol commitments and may be financially and technically assisted depending on their development status under the Protocol. This makes sense and is similar to the approach adopted in successfully reversing the depletion of the Ozone Layer caused by CFC emissions.

In the Philippines, the inventory has uncovered energy generation (including transport) as the number one source of GHG emissions (49%) followed by agricultural activities (32%). Industry accounts only for 10% of the emissions (see Figure 8). Thus, the Philippine CCRAP lists renewable energy development and clean transportation development as the two top items in its action agenda. It also lists promotion of weather-variation resistant crop and farming technologies as a priority, together with fishery and forest resource protection, disaster preparedness, public infrastructure and engineering works development as well as public information and education campaigns.



Summary of the 1994 emissions for the Philippines. (Source: Manila Observatory, Underlying data source: Initial National Communication on Climate Change, 1999)

The good news is that the Philippines has been a very active participant in these global initiatives and even have good policy frameworks and organizational plans for acting on these environmental threats as evidenced by a reading of its CCRAP. The bad news of course, specially gleaned from my EMB experience, is the reality of weak and defective implementation capabilities in the Philippine bureaucracy. And, of course the obvious question is "Is it too late?"

Judge for yourself and as well ask "What have we been doing in the U.S.?"