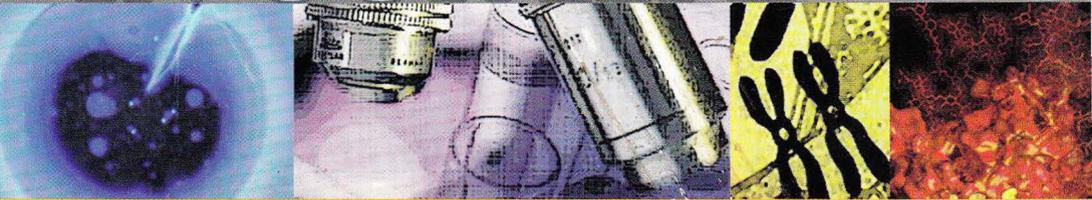


BIOLOGY AND BIO-RESOURCE MANAGEMENT IN OUR LIFE



Editor:

Acad. Mercedes B. Concepcion, PhD



National Academy of Science and Technology



Department of Science and Technology

ISSN 1655-4299

Biology and Bio-Resource Management in Our Life

**Proceedings of the NAST Social Sciences
Division Roundtable Discussions on
Biology as Destiny? I and II, and
Bio-Resource Management and Our
Common Future?**

**National Academy of Science and Technology
Department of Science and Technology, Philippines**

Mercedes B. Concepcion, PhD
Editor

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ISSN 1655-4299

Concepcion, M.B. (Ed.). 2007. *Biology and Bio-Resource Management in Our Life. Proceedings of the NAST Social Sciences Division Roundtable Discussions on Biology as Destiny? I and II, and Bio-Resource Management and Our Common Future?.* National Academy of Science and Technology (NAST) Philippines, Manila, 180 pp.

Published by the National Academy of Science and
Technology Philippines
3rd Level Science Heritage Building
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Foreword

The NAST Social Sciences Division organized a series of Round Table Discussions (RTDs) in preparation for the July 2006 NAST Annual Scientific Meeting (ASM). The Biological Sciences Division, in charge of the 2006 ASM, decided on the theme: Century of Biology (in celebration of the Century of Biology) The Social Sciences Division was assigned a plenary session for the presentation of papers along the chosen theme. Accordingly, the Division met to discuss how best to accomplish this assignment. The members agreed with the suggestion of National Scientist Gelia T. Castillo to organize two RTDs: the first on **Biology as Destiny?** and the second on **Bio-Resource Management and Our Common Future?** It was decided to involve the Outstanding Young Scientists (OYSs) who are social scientists as discussants in these two RTDs. Acd. Raul Fabella agreed to serve as the convenor for the first RTD while Acd. Edgardo Gomez of the Biological Sciences Division was invited to convene the second RTD. However, Acd. Gomez asked that a social scientist be selected to serve as his co-convenor. In this regard, Dr. Agnes Rola of UP Los Banos readily agreed to serve in that capacity. Dr. Allan Benedict Bernardo, OYS 1995 was designated to prepare a paper synthesizing the RTD discussion on **Biology as Destiny?** for presentation at the 2006 ASM. Similarly, Dr. Agnes Rola was to present the results of the RTD on **Bio-Resource Management and Our Common Future?** at the July 2006 ASM.

The first RTD was held on 16 March 2006 at the Philippine Social Science Center (PSSC) with some 25 participants. The discussants were Acd. Lourdes Cruz, OYS 1981, Dr. Ma. Concepcion Liwag OYS 1998, Dr. Cecilia Conaco, OYS 1991, and Dr. Emmanuel de Dios, OYS 1993. However, Dr. Allan Bernardo felt that the discussion was not representative of the social sciences as a whole since only an economist and a psychologist participated in the discussion. He requested that a follow-up discussion be held later. The Social Science Division acceded to Dr. Bernardo's request and scheduled another session on the same topic on 29 May 2006. Invited as discussants were Dean Antonio Contreras, political scientist, Dr. Eufrazio Abaya, anthropologist, Dr. Cynthia B. Bautista, sociologist, OYS 1988, and Acd. Lourdes Cruz. On 23 March 2006, the RTD on **Bio-Resource Management and Our Common Future?** was convened at the PSSC with 25 participants. Invited as discussants were Dr. Perry Ong, Dr. Federico Macaranas and Dr. Francisco Magno.

Part I features the paper of Dr. Bernardo as presented during the 2006 ASM and those of the discussants on the topic **Biology as Destiny?** and the open forum that followed. The paper by Agnes Rola as principal author is contained in Part II, followed by the power point presentation of Dr. Perry Ong, the paper of Dr. Federico Macaranas and the discussant's remarks of Dr. Francisco Magno. The questions and comments during the open forum come last.

The Social Sciences Division wishes to extend its appreciation to the discussants, particularly the OYSs, who readily accepted the invitation to participate in the RTDs and to enrich the excellent plenary session papers prepared by Dr. Allan Bernardo and Dr. Agnes Rola together with Acd. Edgardo Gomez, Dr. Perry Ong, Dr. Federico Macaranas, and Dr. Francisco Magno.

Acd. Mercedes B. Concepcion
Chair, Social Sciences Division

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Part I

PHILIPPINE SOCIAL SCIENCE IN THE CENTURY OF BIOLOGY: ENGAGING THE BIOLOGICAL DIMENSIONS OF BEHAVIORAL AND SOCIAL PHENOMENA¹

Allan B. I. Bernardo²

Abstract

My main thesis in the paper is that Philippine social scientists need to engage the biological (i.e., genetic and neurological processes shaped by human evolution) dimensions of behavioral and social phenomenon. In developing this thesis, I first broadly clarify the so-called nature vs. nurture debate which pits biological explanations against social and cultural explanations, then proceed to briefly explain contemporary perspectives of evolutionary psychology that recast the nature vs. nurture debate. In particular, drawing from examples of recent research and theory, I attempt to show that current theorizing underscores the close interaction between biological and socio-cultural processes, and thus there is no need to construe biological knowledge as antagonistic to socio-cultural theories. I cite some examples to show how social science theories are improved when biological factors are incorporated in the theories. I then discuss the implications to Philippine social science, and suggest that a small sector of the social science community should explore how the biological dimensions of social and behavioral phenomena can improve our theorizing. I further suggest that there is a need to re-examine how Philippine social scientists construe the biological nature of social beings, as this may influence and even constrain how biological knowledge is engaged in theorizing; and to consider some possible constraints within the social science research process in the country.

¹The ideas in this paper were culled from the proceedings of two Round Table Discussions (RTDs) entitled, "Biology as Destiny?" sponsored by the NAST Social Science Division. The ideas from this paper come from many brilliant social scientists (and one honorary social scientist) who participated in these RTDs and who I acknowledge as my co-authors for this paper. They are, in alphabetical order, Eufrazio Abaya, Michael Alba, Ledevina Carifto, Gelia Castillo, Mercedes Concepcion, Antonio Contreras, Lourdes Cruz, Raul Fabella, Corazon Raymundo, Agnes Rola, and I would like to especially acknowledge the contributions of Cynthia Rose B. Bautista, Emmanuel de Dios, and Ma. Concepcion D. Liwag. Correspondence regarding this paper may be sent to the author at De La Salle University-Manila, 2401 Taft Avenue, Manila 1004. Email may be sent to bernardoa@dlsu.edu.ph.

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The Nature Vs. Nurture Debate Is Dead! Or Is It?

Any discussion about any compelling human and social phenomenon inevitably makes reference to the so called, nature vs. nurture debate. The debate is particularly remarkable in discussions regarding the perceived lows and highs of Filipino achievement. Why do Filipinos generally do poorly in mathematics and science? Why can the Philippines not develop enough scientists and engineers? Why do girls consistently out-perform their male counterparts in academic achievement in many schools all over the country? But on the other hand, why are Filipinos apparently so gifted in boxing, billiards, singing, and entertaining? At some point in the discussions of these phenomena, some will make some reference to the possibility that there is something in the “nature” of the person or persons involved. But at some point as well, others might counter this notion with arguments appealing to the effect of parenting, of peers, of media, of the church or some other social or cultural institution, and of course of the individual’s own free will. So is it nature or nurture? Filipinos are most likely to say it is both and we continue living our lives, particularly as there are more pressing problems to attend to.

Recently, however, a small sector of the Philippine social science community was provoked by their idols National Scientist Gelia Castillo, Academician Mercedes Concepcion, Ledevina Cariño, and Raul Fabella in a roundtable discussion entitled, “Biology as Destiny?” purportedly inspired by the book by psychologist Steve Pinker (2002) entitled, “*The Blank State: The Modern Denial of Human Nature.*” The roundtable discussion, not incidentally, was being undertaken amidst the imposing backdrop of the “Century of Biology.” Suddenly, it seemed the nature vs. nurture debate was alive and maybe even quite fierce.

We are all aware of just how old this debate is in the social sciences. The debate of whether to emphasize the biological as opposed to the cultural aspects of human beings has marked the subdivisions of the discipline of anthropology. Sociologists, psychologists, anthropologists, and even political-economists who have looked at criminality, aggression, corruption, and other grave social phenomena have often taken sides in this debate. In psychology the debate has been particularly salient in theorizing about human growth and development, learning, and psychopathology, among others.

In the Century of Biology, more and more behavioral and social phenomena are being explained with reference to DNA, genes, neurons and neurotransmitters, and neurological architecture and processes that have evolved in the same way as our other biological endowments. It seemed important for Filipino social scientists to locate and position their theories and practice in relation to these scientific discourses.

The Evolutionary Psychology of Human and Social Phenomena: What it is and What it is Not

But what are these contemporary discourses that call our attention to the nature vs. nurture debate yet another time? Are these contemporary discourses arguing that evolution and biology can fully account for the full diverse range of behavioral and social phenomena? Is the discourse espousing biological or neurological reductionism, and evolutionary or genetic determinism? Is it now truly “Biology is Destiny?”

A thoughtful review of the relevant scientific research literature suggests that it does seem that much of human behavior can ultimately be explained by referring to neurons, synapses, and neurotransmitters, to genetic characteristics and predispositions, and to neural processes that seemed to have evolved following the same Darwinian principles as our other biological endowments (e.g., Pinker, 2002, Chapter 1). Recent scholarship in the fields of cognitive neuroscience, behavioral genetics, and evolutionary psychology have proposed that such biological principles can explain much if not most of human behavior, including perhaps the most “social” and “personal” of phenomena such as culture (Tooby & Cosmides, 1992), social stratification (Barkow, 1992), morality (Katz, 2000), religious beliefs (Boyer, 1992), consciousness (Nesse & Lloyd, 1992), and abstract and higher order thinking (Cummins, 1998). The availability of such biologically-based explanations does not, however, mean that it is the only important explanation of human behavior. Indeed, there are many other levels of understanding human behavior (such as the cognitive-functional level, the social-cultural level, etc.), which are also just as important. Recent scholarship in the cognitive and behavioral sciences has led to theories that integrate these different levels of explanation. The new theories referred to earlier describe how evolutionary processes resulted in biological constraints that afford psychological processes that effectively exploit, adapt and respond to features of the physical environment, as well as of the various types of social interactions embedded in different cultures.

We should be very clear at this point that recent biological theories of human and social phenomena are not arguing for biological determinism. No serious neuroscientist is asserting that naturally selected genes and hardwired neurological processes solely determine all human behaviors. What these biological factors do is to predispose human beings to think about and act on reality in certain ways – ways that were adaptive in the evolution of the human species, perhaps during the Mesozoic Period. But this biological predisposition interacts with a complex set of other factors to determine behavior. Pinker (2004) suggests that behavior is multiply determined by genes, the anatomy and architecture of the brain, the biochemical states of the brain, the person’s family upbringing, how the

person was treated by society, and the specific stimuli that confront the person at any given point in time. Pinker (2004), thus, wrote:

“Environmental interventions – from education and psychotherapy to historical changes in attitudes and political systems – can significantly affect human affairs. Also worth stressing is that genes and environments may interact in the statistician’s sense, namely, that the effects of one can be exposed, multiplied, or reversed by the effects of the other, rather than merely summed with them.”

However, recent theories of the biological dimensions of behavior and social phenomena underscore the need to fully appreciate the constraints that biology imposes on behavior. In his book, Pinker (2002) has argued that we should stop denying the biological nature of human and social phenomenon, and instead we should come to terms with how biology actually interacts with social structures and the human will.

Removing the “vs.” from Nature vs. Nurture

Recent scholarship indicates that the most powerful and fruitful lines of theorizing now seek to determine precisely how biology and social and cultural experiences interact to produce human behaviors and social phenomena. One specific area of study that has generated much new insights as well as controversies is the study of the genetic bases of human traits, such as intelligence and personality. Scientific research now indicates that *all* human behavioral traits are heritable (Turkheimer, 2000). Heritability refers to the proportion of variance in a trait that correlates with genetic difference (and this can be measured in various ways, Plomin, DeFries, McClearn, & McGuffin, 2001). The rest of the variance in behavioral traits is explained by what is referred to as the shared environment and the non-shared or unique environment. Shared environment refers to the external environment that impacts on a person and his/her siblings (e.g., parents, home life, immediate community, etc.). Unique environment refers to anything in the external environment that impacts on one person but not his/her siblings (e.g., specific relationship with parents, presence of other siblings, experiences with peers, and unique experiences like getting sick or meeting an accident, etc.). The most authoritative measures indicate that the genes account for about 40-50 percent of the variance in many behavioral traits, while the shared environment accounts for 0-10 percent, and the unique environment accounts for about 50 percent of the variance (Bouchard, 1994; Plomin & Daniels, 1987; Rowe, 1994; Turkheimer, 2000; Turkheimer & Waldron, 2000).

Note that even if the supposed influence of the shared environment is weak, we find very compelling examples of the interaction between genes and the shared environment. For instance, studies (e.g., Rowe, 1994; Rutter, 1997) indicate that “[c]hildren who grow up in the same home tend to resemble each other in their vulnerability to delinquency, regardless of how closely related they are” (Pinker, 2002, p. 392). Gottfredson and Hirschi’s (1990) study of adopted children in Denmark revealed that biological children of convicted criminals were more susceptible to criminal behaviors compared to biological children of law-abiding citizens – which shows the effect of genes. But this susceptibility to criminal behavior is significantly increased if the biological children of the criminals were adopted by parents who were also criminals and who lived in a large city – which shows the interactive effects of the high-crime social environment.

There are also many gratifying lines of research that show the complex interaction between social psychological phenomena that are now known to be shaped by biological evolution and cultural environments. One social phenomenon that has been explained using evolutionary theory is social sharing. Kameda, Takezawa, & Hastie (2003) have demonstrated that social sharing is an evolved human response when resources are uncertain. In cross-cultural experiments, Kameda et al. (2003) demonstrated that sharing was more profitable and stable compared to other ways of distributing resources. However, the studies also demonstrated that cultural factors may also amplify or suppress the evolved disposition to share. For example, people in higher social class contexts are less likely to share unexpected gains, whereas those in lower social class contexts are more likely to do so.

The social phenomenon of mate selection is one of the most well researched areas in evolutionary psychology. Extensive empirical research (Buss, 1998; Buss & Schmitt, 1993; Kenrick & Keefe, 1992; Kenrick, Keefe, Gabrielidis, & Cornelius, 1996) has supported the evolutionary theory prediction that older men are usually attracted to younger women because they are more likely to produce more and healthier children. In contrast, younger women prefer older men because they have more power and resources to endow their children. But in some cultures like the Tiwi of Australia, it is common for young men to marry older women. This is explained by referring to the interaction between culture and evolutionary predispositions. Tiwi men have several wives and all women have to be married all the time. The richer older men marry the youngest women leaving the older widows to the poorer younger men (Kenrick, Li, & Butner, 2003).

These are just a few among the growing number of scientific studies revealing the intricate interaction between nature and nurture. Understanding the important role of the biological nature of humans and the evolutionary bases of many social phenomena does not imply denying

the important effects of social and cultural experiences. Indeed, the emergent scientific theories shown in these few examples are not just biological theories, nor are they purely social theories (see e.g. Cacioppo et al., 2000; Gottesman, 2001; Ochsner et al., 2001; Plomin & Crabbe, 2000). The emergent explanations of social phenomena truly embody the integrated processes that shape behavioral and social phenomena.

Implications for Philippine Social Science: Revising Assumptions about Human Nature in Social Science Theories

In this regard, I think that the more important ideas posed by this line of scholarship on the roles of biological constraints and socio-cultural processes in shaping human and social phenomena relate to how Filipino behavioral and social scientists do our theorizing. And perhaps, also to how our theorizing relates to social discourses and processes, particularly those outside the academe.

It could be argued that social science theory and research in other countries improved in specific ways when more scientific accounts about the genetic and neurobiological dimensions of humans and the evolutionary basis of behavioral and social phenomena were taken into consideration. In the field of economics, de Dios (2006) noted how assumptions of evolutionary psychology that relate to the human predisposition to reciprocity and cooperation can correct the limitations in the core assumptions of game-theory, particularly as they apply to non-cooperative games. Apparently, the prediction of evolutionary theory that human beings would cooperate under certain conditions of reciprocity can better explain actual data on how people behave in non-cooperative game situations (Fehr Fischbacher, & Gächter, 2002; Fehr & Schmidt, 1999), compared to theories that assume that humans would act on the basis of calculated, wealth-maximizing, self-interest. De Dios (2006) further notes how some traditional assumptions about the rationality of human beings in economic decision-making are actually false; instead, humans think and make decisions based on heuristic strategies that are proposed to be biological adaptations that serve evolutionary goals (Gigerenzer & Selten, 2001; Kahneman & Tversky, 1984; Tversky & Kahneman, 1974).

In the field of psychology, theory and practice has greatly improved when scholars and professionals began acknowledging the important neurobiological constraints that underlie many problematic psychological phenomena. For example, an improved understanding of the interactions between genetic risks and environmental risks in psychopathology has resulted in more rational and effective forms of prevention and intervention for many types of psychological disorders (Moffitt, Caspi, & Rutter, 2006; Neese, 2000). Recent discoveries related to the continued development of the human brain during the adolescent years (Casey, Geidd, & Thomas, 2000) has also helped psychologists better understand the heightened

variability in cognitive development among teenagers, particularly in various areas of reasoning and decision-making (Klaczynski, 2004). More importantly, research in the field of adolescent cognitive development has shown how adolescent experiences and the activities that the teenager engages in shape the brain development processes (Kuhn, 2006; Luna, Garver, Urban, Lazar, & Sweeney, 2004).

Similar theoretical and scholarly advancements have been achieved in specific fields such as medical anthropology and demography, where knowledge related to the biological nature of human beings are wedded to personal, social, cultural, and historical constructs.

But what about social science theorizing in the Philippines? My colleagues in sociology (Cynthia Bautista) and political science (Antonio Contreras) noted that the biological dimensions of human nature and of social life have not been problematized in the main streams or threads of social science discourse in recent and not-so-recent history (e.g., theoretical Marxism, structural functionalism, social constructivism, post-structuralism, feminism, post-colonialism, post-modernism, to name a few). The various big theories have some minor presuppositions about biology, but these suppositions are never in the foreground (perhaps with some exceptions in some subfields within anthropology, demography, and psychology).

Is there anything wrong with this? My immediate answer is no. There is so much rich insight that can be drawn from the proper and intelligent use of personal, social, political, and historical constructs and modes of analysis used by thoughtful Filipino social scientists. The lack of references to biology should not limit the useful insights that Filipino social scientists can generate. Indeed, as can be gleaned from various treatises, many of the exciting evolutionary theories of human behavior actually draw from studies of linguists, anthropologists, sociologists, psychologists, and economists who hardly think of the neurobiological dimensions of anything. And thus, I think that the Philippine social science community can grow and thrive as long as thoughtful Filipino social scientists continue to properly and intelligently use social science constructs and analysis.

However, advocates of evolutionary psychology take a very strong position that I think is worth considering. Pinker (2002) for one, argues that by ignoring or neglecting the neurobiological or evolutionary constraints in human and social phenomena, social and behavioral scientists may be posing theories that are not properly grounded or bounded. Denying the biological constraints and/or affordances of social and cultural phenomena is an act of gross misrepresentation, just as saying that biology is destiny is another act of gross misrepresentation. One challenge for Filipino social scientists, therefore, might be to determine how to properly engage the biological (i.e., genetic and evolutionary) theories of behavioral and social phenomena. In doing so, it would be

important to avoid knee-jerk responses that take extreme and totalizing positions (e.g., that biology is destiny on the one hand or that this thread of scientific discourse has a strong underlying conservative ideological agenda). Indeed, Filipino social scientists should be mindful that totalizing theoretical positions regarding both nature and nurture have been used to justify genocide (i.e., by Hitler, Lenin, Stalin, Mao, Pol Pot). Filipino social scientists should be careful about ignoring the ethical implications of any form of scholarly discourse. Pinker (2002), noted that all core assumptions of the standard social science models carry their respective moral burdens in the same token that application of biological and evolutionary theories also entails ethical dilemmas. Thus, we should warn against unnecessarily privileging either biology or social and cultural life in our attempts to appropriate these threads of scientific and scholarly discourse in understanding and transforming the personal, social, and cultural experiences of Filipinos.

In this regard, it might be important for Filipino social scientists to clarify their own conceptions about the role of biology or the biological nature of humans in their own theorizing. Is biology our destiny? Or does biology define the limits of human and social achievement? In our second roundtable discussion on this topic, NS Gelia Castillo lamented the recent trend to use the expression, "*Pasensiya na, tao lang*" apparently as a flippant excuse for various forms of shortcomings. A social psychologist colleague reminded me that a more benign version of the expression is found in the old romantic ballad, "*Sapagkat kami ay tao lamang*", where again human nature is used as the defense for inappropriate intimate relations. It seems that in popular social discourse, there is the implicit notion that human nature is flawed and that this flawed nature may be used to justify mistakes, poor performance, even misdemeanors and transgressions. But Acd. Lourdes Cruz reminded us that for the biochemist, genes define the human potential that can be fully realized in appropriate environments. Thus, the biological nature of humans is a definition of possibility, potentiality, and workability. This view resonates with the Confucian tenet on the perfectibility of all human beings, which underlies the moral notions of self-cultivation and self-improvement in Chinese or Confucian-heritage cultures.

I use these examples to illustrate how some fundamental ideas about the theoretical, social, and practical aspects of human nature can have some influence on how Filipino social scientists might want to engage and appropriate biological theories, principles and concepts in social science theory and practice.

But we can raise another concern about how to go about engaging the biological dimensions of behavior and social life in Philippine social science. In our first roundtable discussion, psychologist Ma. Concepcion Liwang raised concern about the prospect that Filipino social scientists will just read and talk about evolutionary, biological and genetic theories

of behavior and social phenomenon instead of actually doing research and theorizing about the same. She noted that there are very rare opportunities for Filipino social scientists to engage natural scientists in theoretical and scholarly discussions, much less engage in multidisciplinary research of the same level of sophistication as exemplified in the recent scholarship we have been referring to. Perhaps a greater source of concern should be the research environment within which Filipino social scientists undertake their scholarship. Most Philippine universities do not have substantial financial resources for research that would allow social scientists to undertake long-term research programs that would permit more sophisticated theorizing. Instead, university-based social scientists have to contend with short-term research grants that only allow for diminutive theoretical advancements. Alternatively, they can undertake research projects funded by national and international development agencies but doing so would require adopting the agencies' theoretical and ideological positions in the research approach. Social scientists in the Philippines will need to demonstrate extraordinary levels of creativity to thrive in these less-than-ideal research environments.

Conclusion

Perhaps the strongest motivation for Filipino social scientists is the desire to see change in a social order that is perceived to be unjust and backward. The work of social change or societal transformation inevitably presupposes certain theoretical propositions regarding human nature and the constitution of social life. There is a growing body of evidence pointing to neurobiological constraints and affordances to behavioral and social phenomena, and some related ideas and evidence may undermine certain core assumptions of traditional models in the social and behavioral sciences. Filipino social scientists do not necessarily have to incorporate these neurobiological and evolutionary discourses in their scholarship and practice. Filipino social science can continue to make contributions to human knowledge and Philippine society by drawing from the standard constructs and methods of the traditional social sciences. But there is probably a need for a sector of the Filipino social science community to reexamine these standard social science assumptions in the light of these evidences. Doing so would require engaging in a strange discourse, but it could point to a more fruitful line of theorizing about social and behavioral phenomena, and might even lead to more realistic interventions for social and behavioral change. Indeed, the most exciting prospects for change would take full recognition of the biological constraints in behavior and the interventions designed to help transcend, rise above, and even thrive amidst these constraints.

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Roundtable Discussion on Biology as Destiny? I

Acad. Mercedes B. Concepcion: The National Academy of Science and Technology has for this year's Annual Scientific Meeting (ASM) the theme, "The Century of Biology", The Executive Council, chaired by our President, Dr. Emil Javier, decided that to strengthen the collaboration of all the NAST divisions in the ASM was to have each division support that theme in its activities throughout the year whether pre-ASM, during the Annual Scientific Meeting proper or post-ASM. Each division has been assigned a plenary session during the 13-14 July ASM.

The Social Sciences Division decided to tackle two topics in Round Tables preceding the ASM. Our past Chair, NS Gelia Castillo, suggested the two topics: one of which we will be discussing today, **Biology as Destiny?** with Acad. Raul Fabella as the convenor. The second Roundtable Discussion will be held a week from today, on the topic **Bio-Resource Management And Our Common Future?** We have invited our OYSs to participate now and be inculcated into the Academy so that they can take over when our time comes to leave this planet. Since there are very few social scientist OYSs, some of them were alarmed at the topic to be discussed, particularly the book recommended by Acad. Fabella as reference material. I hold this in front of you so will see why they were awed because it is so thick. It is the **Blank Slate** by Steven Pinker of Harvard University. I have only read the first part, which was given to all of you and I admit that is very readable despite its being full of thought-provoking statements.

In deciding to have an RTD we also thought of assigning one of the discussants to synthesize what takes place during the roundtable discussion and then present it as our plenary session paper. Hence, we will have two topics to be discussed during the plenary session on 13 July. We have elected our OYS Dr. Allan Bernardo here of De la Salle who is the only person who has read the entire book. He is also the only one who has a copy besides Acad. Fabella. We were going to order the book but it would take 4 to 5 weeks, which means that it will arrive here after Easter so there was no point of ordering it for this roundtable.

The second roundtable, whose topic I already told you about is being convened by Acad. Edgardo Gomez who does not belong to the Social Sciences Division. He is very well known as a Marine Scientist and a member of the Biological Sciences Division. Since the topic is not only biological but also social he requested that there should be a co-convenor. We decided to harness Dr. Agnes Rola of UPLB to be the co-convenor. Together, they wrote a piece that would serve as the guide for their roundtable discussants next week. For this roundtable, as you can see

from the program we have invited not only Dr. Allan Bernardo but also Acd. Lourdes Cruz who belongs to the Chemical, Mathematical and Physical Sciences Division. She very willingly agreed to serve as discussant. She became an OYS in 1980. We invited Dr. Cecilia Conaco from the Department of Psychology, also an OYS. We have Dr. Emmanuel de Dios from the UP School of Economics, OYS 1993, who will come in probably just about the time that he is expected to speak and lastly, Dr. Ma. Concepcion Liwag, 1998 OYS, from the Ateneo. I welcome and I thank the OYSs and the non-OYS discussants who have readily agreed to participate in this discussion this morning. Hopefully they will have written papers because our intention is to publish a monograph based on these two roundtables. Thank you very much and we look forward to a morning of very interesting discussions and exchanges not only amongst the discussants but amongst the audience. I now turn it over to the convenor, Acd. Fabella.

Acd. Raul V. Fabella: Good morning everyone. This is not how I imagined the roundtable to be. I imagined it as small and intimate. And where rambling and free form discussion was acceptable. It is a bit more formal than I expected. So I did not write a piece as expected of this session convenor. In any case the physical environment does not really matter when science beckons. The topic today is clearly very exciting. The NAST Annual Scientific Meeting theme is The Century of Biology. That means that the last century was the century of physical sciences. And of course our attention has been riveted on such big subjects like the human genome project and genes, and such.

The Social Sciences are clearly intimately affected by biology. The social science discipline after all is about behavior – social and personal. And when one talks of behavior, one cannot avoid the age-old debate of nurture versus nature. I think the new biology, the emergent biology is revitalizing this debate and putting it on presumably more scientific basis. So that is really the attraction of Steven Pinker's book. It is a compendium of really hard-nosed studies that shed light on the various aspects of this debate.

Let me just give you an example. This is also very popular. Twins who are separated at birth or nurtured in different environments seemingly as if acting freely on their own realized to their surprise that their freedom was a little bit more circumscribed than they thought. And about 40 percent or probably more of supposedly free actuations are actually reflections of something more fundamental. And that is the gene baggage that they bring with them, that they carry with them at conception. So, the question is how free are we? Some of the more important, more really enlightening studies are concerned with the studies of twins, where supposedly you are able to control for a tremendous amount of things. Evolutionary psychology which is Steven Pinker's discipline has begun to gain perhaps infamy or

acceptance together with the Social Biology of Robert K. Wilson. This is really psychology and biology going hand-in-hand and has renewed, and as I have already mentioned, revitalized the nature-nurture debate. I can speak much more about Economics because I am an economist. And the influence of evolution and biology is now becoming very important.

In economics, as in every science, there is a very strong reductionist tendency, which is to try to explain the phenomenon on the basis of more and more primitive starting positions; for example, the atoms of behavior. And of course this is really the behavioral foundation of economics. And for a good long time, for reasons of convenience and ease of treatment, the behavioral foundations of economics have been extremely simple, that is, that individuals are strictly rationalist. In microeconomics for example, you explain by saying more is better than less all the time. And that individuals have only themselves as the criteria of behavior rather than other people or rather than the group. It is very easy to construct very interesting models on the basis of that simple behavioral assumption. It is also very easy to go astray with such behavioral assumptions. And of late, there have been many studies associated with actual behavior that shed light on the possibly alternative behavioral foundations of economics. For example, there has been a spate of what has become known as Ultimatum Games experiments.

Ultimatum Games are very simple. Two persons are to divide a pie or a resource, maybe a dollar or maybe as in Discovery Channel, a number of chocolate bars. If they are able to come to an agreement about the division then they keep their share. But if one rejects the sharing, then both of them lose everything. Both of them get nothing. So you would think that if an individual is a strict rationalist, one bar of chocolate is better than none. So Individual A will say I will give you one and I get 99. How about that? And in the language of economics, the sharing involving one against 99 is acceptable. Because the fall back position is 0. One is better than zero. Of course 99 is better than one. Ninety nine is also better than zero. So by strict rationalism, the individual has to accept. But experiments will show it never happens. The median is about 60/40. The sharing that is acceptable is about 60/40. The rate of rejection when I offer you 20 and I get 80 is very high. And that does not square very well with strict rationalism as the behavioral foundation of economics. And so economics is beginning to heave in the direction of how to incorporate this kind of new behavioral discovery.

Increasingly in economics now, there is recognition of the effect of evolution on how people behave. There is now a discipline in economics called Evolutionary Game Theory. And the Guru there, the master there is John Maynard Smith. He devised a solution concept called evolutionary stable strategy, which is quite interesting and is actually an elaboration of what is known in economics as the Nash equilibrium solution. This is very important because the study of institutions in Economics has gained much.

For a long while, institutions were relegated to the background. But so-called deep determinant studies of long-term economic performance have touched base with the importance of institutions, the importance of geography, and the importance of policy. Economic policy has become open to the encroachments of institutions and geography. When you talk geography, you are talking biology. There is a very robust statistical observation that good institutions owe something to geography. Because if you are born in a rather unfavorable geography, you would probably get bad institutions. This is flirting with very dangerous ideas.

As early as the late 17th century Montesquieu, for example, was the first one who said that institutions are basically geography-driven. And he talked about drunkenness... drunkenness being widespread in Germany and in Russia because of the cold. There are now a number of very respectable journals like "Evolution and Economic Behavior" that cater to the development of institutions as stable strategies.

I myself, am interested in this. For example, you think about why the "Divide-by-N" dominates. There is a sort of an ethic among Filipinos we call "Divide-by-N". When there is some resource available, chances are it is going to be divided by N rather than divided by merit. The observation is that it is stronger among the Filipinos than perhaps among other people. For example, the resources of UP are usually divided by N. One can actually construct a democratic game where the divided by N rule becomes an evolutionary stable strategy. It beats other strategies and becomes dominant.

There is also the question of the commercial trait among diasporites. Why is the commercial tendency among Jews for example, among the Chinese or among the Bombays here very strong? And how is that commercial trait selected for survival and perhaps at some point also for some dominance? So, the influence of evolution in economics will just grow. And perhaps also the other social sciences will just have to live with it and, if we have to change our enduring fundamental ideas, so be it. I think the message of Steven Pinker is that we do have to change a little. Thank you.

Acad. Ledivina V. Cariño: I now call on Dr. Allan Bernardo who will introduce Pinker's book and how it is related to the topic of this RTD.

Dr. Allan Bernardo: Thank you Acad. Cariño. I was very happy that the Academicians kept emphasizing informal because I was so worried about whether my attire is appropriate because my biology also does not allow me to wake up early in mornings. That is why I am late. I would like to thank Acad. Concepcion for inviting me to be part of this roundtable discussion because the major themes of the focal book of Steven Pinker, **The Blank Slate** are important things in my own research and my own scholarship and in the discipline of psychology and cognitive science.

However, at the outset I must say that the choice of the theme **Biology as Destiny** as title of the RTD, is quite unfortunate as it tends to misrepresent contemporary scholarship on biological, neurological and evolutionary constraints on human behavior. To me it even seems to simplify, overly simplify, a very complex issue. Maybe as a way of prefacing my discussion one of my professors in my last year in graduate school who was Steve Pinker's student asked a room full of cognitive psychologists to declare individually whether or not they believe in reductionism the term that Acd. Fabella talked about earlier. Each person in that room was asked to declare whether they believed that all human behavior can ultimately be explained by referring to neurological processes. The consensus by the psychologists in that room was that we all strongly believed that neuron and synopsis can explain much if not most of human behavior. But that it is most certainly not the only important explanation of human behavior. The consensus was that there are many other levels of understanding human behavior such as the cognitive functional level, the social cultural level, etc., which were also just as important. In more recent years, scholarship in cognitive and psychological sciences has led to theories that integrate these different levels of explanation. New theories now describe how evolutionary processes resulted in biological constraints that afford psychological processes that effectively exploit, adopt and respond to features of the physical environment as well as to the various types of social interactions embedded in different cultures. Within this intellectual milieu posing a theme such as Biology as Destiny even if it has a question mark, may seem to me inappropriate and even anachronistic. Just last year during the regional conference of the Psychological Association of the Philippines in Baguio I spoke about recent psychological research that shows the intricate relationship between biological constraints and socio-cultural processes resulting in specific psychological phenomena. I even flippantly told the audience that if they hear any psychologist posing the question of whether a phenomenon is caused by either nature or nurture they should slap this person because posing simplistic questions of nature versus nurture are just a waste of time given what we now know. I hope that we will not waste more time debating about whether human behavior is determined by either nature or nurture because we know that both nature and nurture play specific roles in shaping human psychology. If at all we should be debating the degree to which one influences the other.

Maybe I will take off from what Acd. Fabella talked about which is sharing. We know that evolutionary psychologists have already extensively argued that unexpectedly sharing is an evolutionary adoptive behavior. Pinker talks about that in some chapter of his book. And a psychologist in Hokkaido University, Tatsuya Kameda, actually proposed that sharing might be the human being default setting when sources are uncertain. He found that there is cross-cultural evidence, particularly comparing American and Japanese who were willing to share unexpected

windfalls in laboratory studies, that is, which we use as evidence for this proposition. And we use many computer simulations at evolution showing that it is indeed in human nature to share. However, Kameda's research also showed how local cultures may amplify or dampen this willingness to share. In particular, he showed how individuals in higher social class context are less likely to share an unexpected windfall but individuals from lower social classes are much more willing to share windfalls for the common good. So that is an example where clearly we see that certain behavioral tendencies seem to be biologically determined but moderated and modified by certain cultural processes. Another example I want to give relates to eating. No one is going to argue about the biological basis of eating. There is a whole machinery that has evolved for identifying, procuring, ingesting, digesting and metabolizing food. So for the very human behavior of eating there are clear biological and even evolutionary bases.

However, at the same time a psychologist, Paul Rosen, has shown, how cultures shape which foods are cultivated, even how foods are prepared -- when, why, where, whom and how they are eaten. For example, he has noted that in American culture, the emphasis seems to be on speedy consumption of large quantities of comfort foods, and it shows in their bodies. In contrast, the French who also have just as much love for food, tend to value more the slow and languid consumption of moderate quantities of high quality foods. So although there is a biological machinery that determines this behavior, cultures, have a way of shaping their specific form and manifestation.

The last example that I would like to give relates to one of those controversial aspects of evolutionary psychology, which is mate selection. One of the earliest tenets of evolutionary psychology is the idea that older men are usually attracted to younger women because they bear more and healthier offspring that are more biologically adaptive. In contrast, younger women or probably consistent with the former is that younger women prefer older men because they have more resources and power to invest in their offspring. We can talk about these more — some personal testimonies may be appropriate. Yet, another psychologist named Douglas Kendrick showed interesting exceptions to this apparent rule of evolutionary psychology which he found among the Tiwi Tribe of Australia where young men routinely marry older women. How does it happen? He explained, and I am just quoting from an article here that Tiwi men are polygamous and all of the women have to be married all of the time as you cannot have unmarried women in Tiwi culture. So the richest men marry the youngest women leaving the widows to the poorer young men. Eventually though, the Tiwi men inherit their first wives' property, so you see now how it works, and attain their wealth and status to marry younger women, the second time around, or the third or the fourth time around.

There we see how a biologically determined predisposition can be altered or shaped by specific cultural constraints. There are many other examples of such and maybe my colleague Dr. Liwag can talk about this later on. However, I think that the more important idea exposed by Pinker's book is the role of biological constraints and socio-cultural processes in shaping human and social phenomena related to how we in the behavioral sciences theorize and how our theorizing relates to social discourses and processes, particularly those outside the academe. And this is the point that Acad. Fabella, I think, wants us to focus on. The first question I want to pose in this regard relates to the stands of Filipino behavioral and social scientists regarding the concept of nature. Do behavioral and social scientists in the Philippines think that there is such a thing as human nature that is defined by biology and evolutionary processes and all other concomitant forces?

My strong suspicion based on a very gross reading of social science discourse in the Philippines is that the answer might be a big NO! Perhaps all of the big theories and meta-theories in Philippine social science refer to constructs that are above the material world or that might even minimize the significance of such material elements. When I think of post-modernism, social-constructivism, post-colonialism, post-feminism, and many other isms that underlie social science research by Filipinos, which I think fascinate the natural scientists in academe, I do not see any reference to the neurobiology and evolutionary basis and psychological, social or cultural phenomena, but I could be wrong so the people in the audience can perhaps address this point.

But is there anything wrong with this? My immediate answer is no! There is so much rich insight that can be drawn from the proper and intelligent use of such constructs and modes of analysis used by thoughtful Filipino social scientists. The lack of reference to neurobiology should not limit the useful insights that the Filipino social scientist can generate. Indeed as can be gleaned from Pinker's book many of the exciting theories of human behavior actually draw from the studies of linguists, anthropologists, sociologists, psychologists and economists, the last-named who hardly think of the neurobiological dimensions of anything. Thus, I think the Philippine social science community can grow and thrive as long as thoughtful Filipino social scientists continue to properly and intelligently use social science constructs and analysis. Of course, the sub text of the preceding sentence is that there are cases of improper and unintelligent use of such constructs and most analysis by mindless Filipino social scientists. And this is what we should strive to restrain and possibly eliminate.

However, Pinker takes a very strong position that I think is worth considering. Pinker argues that by ignoring or by neglecting the role of biological or evolutionary constraints in human social phenomena, social and behavioral scientists may be posing theories that are not properly

grounded or bounded. I think that Pinker is saying that denying the biological constraints and/or accordance of social and cultural phenomena is an act of gross misrepresentation just as saying that biology is destiny is another act of gross misrepresentation. In part three of the book which comprises four chapters, he develops very intricate and to my mind overdone arguments, about why social science discourse has shunned nature. But I do not want to deal with that as I think this argument applies mostly to western social science and may not always apply to Filipino and other Asian social scientists. In part five of the book comprising about five chapters, Pinker elaborates on his arguments about the limitation of conventional and contemporary social science approaches by referring to purely environmental, that is, cultural and social theories of such controversial social science topics as violence, gender, child and adolescent development, moral sense, political phenomena such as nepotism, greed, ethnocentrism, social inequality, social stereotyping, and biopsies.

He argues that many of the environmental theories of these phenomena are founded on false assumptions. What are some of these false assumptions that he targets? That human beings are by nature good, peaceful, peace loving, and altruistic creatures, that all human being are born with equal talents, that parenting and social processing shape the development of the children through adulthood, etc., etc. He seems to be saying that the evidence does not bear out these assumptions. I am sure that Filipino social scientists would have a heyday shooting down Pinker's arguments. But in order to effectively and intelligently do so the Filipino social science community has to engage the body of empirical scholarship that Pinker refers to. Which now leads me to think that it may be necessary for perhaps a small sector of the Filipino social science community to examine the implicit assumption regarding human nature that underlies some of the core social science concepts and theories of the community. This examination must then be informed by the empirical evidence that is presently available. In other words, we cannot continue to make assumptions about human nature when the current state of human knowledge may be providing strong evidence contrary to those assumptions. In my own specific field of scholarship I can see how ignoring biological constraints to human behavior may result in frustration and inappropriate interventions.

Some sector of the psychology and research community, for example, believe that all student learning can be improved with proper inputs such as good teaching, environment, and supported home and community. Moreover, appropriate student learning behavior can be shaped by appropriate classroom management policies and instructional strategies. There is also a strongly held assumption that problematic behavior among adolescents, for example, can be minimized by proper parenting, and supportive community, and social structures. And that emotional and social well being of individuals is a result of a healthy interpersonal relationship

and socialization. But such assumptions do not help the teachers of students who have learning disabilities and attention deficits that are clearly rooted in some neurological problems. Neither do they help the parents of a teenager who is suddenly very emotionally impulsive because the circuitry and chemistry of the brain is rapidly transforming. The assumption also does not help the loved ones of a person experiencing chronic depression because of some problems in some neurotransmitters in the brain.

What am I saying here? These examples tell me about the dangers of ignoring the neurobiological basis of psychological phenomena. But we in the behavioral sciences should be smart enough to know that just because some phenomenon has biological basis does not mean it is beyond the control or influence of social and psychological intervention. We should not mistake thinking that because some psychological phenomenon has biological basis then this phenomenon is the person's destiny. Individuals may be born with biological constraints or be endowed with natural gifts but these gifts and constraints do not define their destiny. Indeed the most exiting available interventions in the area I cited above take full recognition of the biological constraints and behavior and the interventions are designed to help transcend, rise above and even thrive, amidst these biological constraints.

Pinker makes similar arguments in many part of the book. He thinks the social science policy applications would be improved if they are properly grounded and bounded by more accurate assumptions about how human beings actually are. My intuitive sense that Filipino social scientists would respond positively to the notion that social interventions should be premised on an acceptance of actual realities. The challenge may be in reckoning with the neurobiological realities that underlie many social and cultural phenomena.

In closing, I would just like to summarize my discussion of Pinker's provocative book as it relates to Filipino social science discourse. Filipino social scientists do not necessarily have to incorporate the neurobiological and the evolutionary psychological approaches that Pinker advocates. I think Filipino social science can continue to make contributions to human knowledge and to Philippine society by drawing from contemporary constructs and methods of the traditional social sciences. However, there is a growing body of evidence pointing to neurobiological constraints and avoidances and that some related ideas and evidence that may undermine some core assumptions in the social and behavioral sciences. I think some Filipino scientists should re-examine these core assumptions in the line of these evidences.

Acad. Ledivina V. Cariño: Thank you, Dr. Bernardo, for contributing a lot to our understanding of social science. Acad. Cruz is a researcher from the Marine Science Institute of UP.

Acd. Lourdes J. Cruz: Thank you. As a biochemist, I may tend to be more reductionist and I do not agree that the gene is a baggage but I look at it as a potential to do things.

So the genes or the DNA are a blue print for the potential of each human being. I guess every one agrees now that interaction with the environment is a big factor in the final outcome. We appreciate the role of the environment in shaping the human being as it starts from a single fertilized cell until it become fully developed. One can look at environment at different levels from an individual cell to a tissue or into the whole organism. The environment is very important as the fertilized egg develops into an adult human being.

Yesterday I heard the talk about the current national program on neonatal screening for genetic disorder. This is to prevent and treat some harmful and potential fatal inherited metabolic diseases. One of the pictures shown by Dr. Carmencita Padilla is that of two children: one is a smiling pretty girl, the other is a small deformed child. The two are of the same age but both of them have hypothyroidism. So what is the difference? In the first girl that genetic defect was detected very early and she was treated with oral thyroid hormone replacement. And she is now even at the top of her class. The other who did not undergo a screening method was not treated. In addition to being abnormally small, the untreated child is mentally retarded and has other neurological abnormalities. So it is a very dramatic demonstration of what the environment can do for a given genetic composition.

Another striking type of inborn error metabolism or genetic disorder is the **Lehman** syndrome, which is characterized by compulsive destructive behavior. At the age of two or three, children with this disease begin to bite their fingers and lips and would chew them off if unrestrained. Children with this disease are mentally retarded. They behave aggressively toward others and they have some uncontrolled muscle movement. Looking at the biochemical composition abnormality, their uric acid level in the serum was found to be very high. This leads to kidney stone formation followed by gout years later. This syndrome is a recessive sex late disorder. It was found that the reason for this disorder is a single mutation in an enzyme involved in the recycling of bases. The genetic material is composed of bases sugar and phosphate. As the cell dies, the genetic material is destroyed and then is hydrolyzed. Then the components are recycled. In this particular syndrome the enzyme that is recycled is not present and the body overcompensates by accelerating the synthesis of the much-needed nucleotides by the body. This leads to overproduction of an acid, which leads to high levels of break down product—uric acid. It is not understood in the molecular level how the extra metabolites, the uric acid and another metabolite lead to this disorder in the nervous system. In a way that the biochemical metabolites found in our body can affect behavior, nutrient, nutraceuticals and phytochemicals are part of the

environment that determine how our brain works. Developments of the human brain are believed to occur at the age of two years. As the brain develops and connections reach maximum at age two, or peak at age two, proper nutrition is important. And the huge number of Filipinos who do not have access to proper food and nutrition is quite alarming. For example, among the Aetas, of the Canawan Negritos reservation in Morong, Bataan, most of them are malnourished. About 50 percent are underweight. **Boromeo Martin** led a study on the life and culture of Aetas. He found that most of them eat only once or twice a day with the meal consisting of 80-100 percent rice or root crops. Sometimes they have vegetables and fish. One of the Aeta fathers, Martin Cayetano, said he does not feed his children three times a day, even during times of plenty. Because his children might get used to it and when the time of "Tag-gutom" comes then he will have problems. So the Aetas survive on about 47 cents per day, which is way below the extreme poverty level of one dollar per day.

The infant mortality is very high—about 140 per 1000 live births compared to other indigenous tribes like the tribes in Cordillera who have 63 to 67 per 1000 infant mortality. And the usual cause of death is microbial infection and intestinal parasites, which can also be related to poor nutrition and sanitation. I believe nutrition is a very important consideration in why "unats", the lowlanders, describe the "kulots" or the Aetas as "tamad" at "mahina ang utak". And if you recall Rizal stated that the Spaniards called Filipinos indolent. I think part of it was the weather and maybe also the conditions that we have here. Although the Aetas try to give more fruit to a pregnant mother and infant, the food given is certainly not enough and lacking in essential nutrients.

Our emotions also affect the way the chemicals behave in our body. Laughter is now being studied as to how it affects the different neurotransmitters in our brain. I heard a talk about ten years ago at a neuroscience meeting where a scientist said that he studied the effect of stress on the cells in the hypothalamus. When there is a lot of stress, some of the cells die in our hypothalamus. It is because of the over activity of some cells and over activation leads to high levels of calcium which can kill cells.

There is a very strong interaction between the environment and the genetic material. I think the decision that each person makes at a given time will determine the environment that we are exposed to and will determine how our life probably will proceed. I mean from the point of view of someone who believes that the molecules mean a lot but of course we cannot really explain everything in terms of molecular interaction and molecules. Well, not yet at this stage. I do not know if we can reach the stage where we can explain everything through the interaction of molecules. Thank you.

Acad. Ledivina V. Cariño: Thank you Acad. Cruz for that. We welcome you as a social scientist. Well, Dr. Conaco sent her regrets as she cannot join us this morning. Now we welcome Dr. de Dios, OYS of 1993, and Professor of the School of Economics, to give his remarks.

Dr. Emmanuel de Dios: Thank you for inviting me to give a few remarks on Pinker's book. It is a volume that has preoccupied me for a few months now, so I was glad when Acad. Raul Fabella informed me that there might be a round table discussion about it. I confess to being no expert in this field, so this in a way is a kind of adventure for me. I was confident an economist might contribute something useful, so I gladly accepted the invitation.

Like Dr. Allan Bernardo, I looked at the title of the roundtable – “Biology as Destiny?” – and said, (pardon my German) “*Na, und?*” (Translation: “So what?”) I start with this provocative riposte, since the title of the roundtable is itself a provocation. But I shall argue here, it is a provocation that is entirely irrelevant and unwarranted. The hackle-raising part of this roundtable title stems from its juxtaposition of a scientific term “biology” with a moral-philosophical term, “destiny”, which is the opposite of another ethical term, “free will”. It seems to suggest that if we accept the thesis of Pinker's *Blank slate*, we are bound to deny free will. And, who would want that?

The dilemma, however, is not peculiar to Pinker's book or his argument. It is peculiar to *all* scientific explanation. As Pinker himself notes in his other prominent book, *How the Mind Works*, “Any cause of behavior, not just the genes, raises the question of free will and responsibility. The difference between explaining behavior and excusing it is an ancient theme of moral reasoning captured in the old song, ‘To understand is not to forgive.’”

In short, therefore, even if we denied Pinker's claim regarding the effect of evolution on human psychology, even if we were, say, to become rabid adherents of the purely nurture school, we would still have to contend with the problem of free will. Suppose we replaced “biology” in the title with “early nutrition” or “family upbringing”, so that we had “Early nutrition as destiny”, or “Family upbringing as destiny”. How would we then deal ethically with murder or rage by people who were malnourished at a young age? Or people who were brought up in dysfunctional families? Would this, too, not lead to excusing such acts and taking them in stride because some people were in some way “destined” to commit them? Would one not be similarly able to argue that these people had no free will and therefore could not be held completely responsible for their actions? Would we be any more comfortable with “nutrition as destiny”, or “family upbringing as destiny”?

Again it is worth listening to Pinker, who argues persuasively for keeping the two spheres of ethics and science apart: He writes: “I believe

that science and ethics are two self-contained systems played out among the same entities in the world. Just as poker and bridge are different games played with the same 52-card deck. The science game treats people as material objects and its rules are the physical processes that cause behavior through natural selection and neuro-psychology. The ethics game treats people as equivalent, sentient, rational, free-willed agents and its rules are the calculus that assigned moral values to behavior through behavior's inherent nature and its consequences. In other words we should not mix the two."

A blunter way to put it is that as scientists and researchers – that is, to the extent we are playing the science and research game — it is not our main job to care first and foremost about the effects of our findings on human society. For that matter it would be no better than tailoring and censoring our findings in order to attain some ulterior motive no matter if that end is the most benevolent and noblest cause in the world. Rather the task is primarily to explain and if possible to predict natural phenomena and human behavior. Just as soldiers are prevented from letting their private political beliefs determine where they should train their guns, scientists should not let their private ethics sway their results, at least not while wearing their lab coats.

Having gotten that out of the way, let us now turn to what Pinker actually asserts about nature and nurture.

The strong claim of evolutionary psychology is that many human behaviors and habits of thought may in fact be products of evolution, which also implies this will be common or universal to all individuals belonging to the species. That is, they ultimately have a genetic foundation. The bold leap lies in appealing to natural selection to explain not only the physical features and design of human beings, but also significant aspects of their behavior and beliefs, in much the same way that the principle has been used to explain the behavioral traits of animals. I believe the seminal work, which Pinker cites, was by Leda Cosmides and John Tooby. The scope of evolutionary explanation is thus made to comprehend mating behavior and sexual preferences, facility in language, visual perception, numerical and statistical abilities, fear, anger and retaliation, benevolence, prejudice, cooperation (which is very important for economics), retaliation, morality and even religion itself.

As an aside, I was struck by the word "reductionist", which is how some may term the gene-based explanations. Pinker writes that reductionism actually has evolutionary roots: to simplify, classify, and lump things together as stereotypes, neglecting a lot of details is also an evolved habit. We could not have understood the world otherwise, although stereotyping is admittedly an imperfect and inaccurate, and even occasionally offensive methodology. Pinker himself admits our instincts may often deceive us when it comes to real scientific knowledge. In many ways we need to *unlearn* what is instinctive if we are to make real scientific

progress. Learning one's evolved predispositions, however, is the first step towards overcoming their shortcomings and inaccuracies.

Pinker is far from asserting, however, that the only determinant of human behavior is naturally-selected genes. At most, genes point to certain predispositions and tendencies among human beings to act on and perceive reality in certain ways, ways that have favored the species' survival in the past. But like most results of blind evolutionary prophecies whose continued serviceability now may be called into question, Pinker and other evolutionary psychologists regard the brain as a mass of circuitry with distinct components that were selected in response to evolutionary conditions in some distant past.

Pinker differs in this respect from other evolutionary theorists like Stephen J. Gould, who regard the mind's various capabilities as a simple consequence of its great size and complexity, which arose with respect to no specific purpose. Thinkers like Gould post a co-evolution that is, as it were, accidental. The mind evolved for a certain purpose but in the process other aspects of it were developed as a simple structural consequence, although not for any specific purpose. The iconic example he uses is the panda's thumb. The panda actually possesses no proper thumb, but owing to a biological fluke, it came to evolve a kind of bony structure, which later on came to be useful in stripping bamboo leaves, i.e., functioning as a proper "thumb" might.

This is Gould's idea of spandrels. A spandrel is an architectural element; it is the unintended but inevitable space created by the superimposition of a dome on a square base. Gould notes that spandrels, though unintended, are typically filled in with beautiful paintings. Spandrels were not created owing to a prior intent to display paintings. Rather, paintings were created to the extent spandrels already existed anyway. In short, it is possible for some ability or predisposition to coevolve accidentally, which turned out to be useful subsequently and upon hindsight. In a sense, Gould would dispute Pinker's notion that processes and components of the mind's circuitry actually evolved to fulfill a certain adaptive purpose. He is able to maintain that, like spandrels in architecture, the human mind continues to be versatile and open, lacking any predisposition and therefore, capable of being deployed by individuals themselves. In this way one might be able to retrieve something akin to the notion of free will.

In the meantime, the lines in the nature-nurture debate are becoming more blurred, with one side imperceptibly shading into another. People who have studied genetics say, for example, that while an environmental impact on human ability can be documented, most of it is hardly manipulable. The crucial period for influencing a child's intellectual ability, for example, is the period spent in the mother's womb. That is, of course, nurture, or environment – on the other hand, it is not something we know a lot about or can do something about.

On the other hand, the actions of genes themselves can be conditioned by the environment. Hence, for example, some work seeks to explain how particular genes are associated with violence and depression, but that these genes express themselves only in people with histories of stress. We also have very little knowledge about when and how chemical messages (neuro-transmitters) are generated in living human bodies as a result of individual experiences or emotions. Chemicals may condition the expression of certain genes. Pinker himself admits that behavior is a complex interaction among a person's genes, the anatomy of a person's brain, the biochemical state, that person's family upbringing, the way society has treated the person., and the stimuli that impinge upon the person.

So environmental intervention – from education and psychotherapy to historical changes in attitudes and political systems – can significantly affect human affairs. It is also worth stressing that genes and environments may interact in the statistician's sense: namely that the effects of one can be magnified or diminished by the effects of the other, rather than the independent effect of each being merely summed up. In other words, if one did a regression where behavior was on the left side, your right-side variables might include heredity as one variable, environment as another variable, and an interaction between heredity and the environment. Then if one took the derivative of behavior with respect to heredity, it would contain the environment. And if you took the derivative with respect to environment, it would contain heredity. In a subsequent article, Pinker actually says the prevailing consensus on this issue is what one might call "holistic interactionism". But while he recognizes that a consensus exists, *galit pa rin siya nun* (he still manifests a discontent with the present state of affairs). He notes the problem with the current consensus is that people tend to wave away the problem rather than examining it more closely. His point is not to deny the existence of multiple causes, but to exhort scientists to understand the exact relationship. For ultimately, he says, it is *not* true that *any gene* can have *any effect* depending only on the environment. This implies the falsifiable claim that we ultimately cannot design an environment to produce whatever outcome we value. It is not enough to claim vaguely that nature and nurture both play a role, somehow. Rather it is the job of science to tease out the actual relationship.

The final part of these long remarks pertains to some aspects of evolutionary psychology that carry special significance for economics, some of which Acd. Fabella has already mentioned. Economics has long worked with the assumption that the human species is *homo oeconomicus*, self-aware, calculating, wealth- and happiness-maximizing. A good deal of neoclassical economics is built upon the hypothesis of rational self-interested choice. Again, virtually all of game theory has been developed under these assumptions leading among others to the famous theoretical

result, the Nash solution for non-cooperative games, one version of which is particularly well-known, namely, the prisoner's dilemma: people who are unable to communicate are condemned to suffer a sub-optimal result for want of cooperation.

A prediction of game theory under this action, therefore, is the dismal one that cooperation is generally hard to come by. Indeed, the market would be the only impersonal mechanism conceivable that secures de facto cooperation, while of course in politics people cooperate only via the state, which uses coercion. This is one of the implications, if one takes the Nash's non-cooperative outcome seriously. The problem, however, is that many predictions flowing from the *homo oeconomicus* axiom do not accord with the facts. At the level of individual subjects, numerous experiments have shown the empirical invalidity of the theory of subjective expected utility. The late NS Encarnación was among those who spent their lives arguing that subjected expected utility theory was misguided. In this respect, he had his own theory of lexicographic preferences. Other researchers have also demonstrated that people do rely on rules-of-thumb, are susceptible to framing effects, asymmetries of marginal gains and marginal losses, are unable to detect purely random series, tend to assign patterns where there are really none, use invalid stereotypes, and many other anomalies. Kahnemann won the Nobel prize in economics for some work on this. As it turns out, and as Pinker demonstrates, many of these can be understood as having evolutionary roots.

More importantly, at the level of social interactions, experiments also show that *homo oeconomicus* vanishes. Acđ. Fabella has mentioned Ultimatum Games, where one player must initiate a proposal to share some large amount, say 1000 pesos to a second person, who must approve the sharing scheme. If the second person rejects the offer, neither receives anything. If both people were *homines oeconomici*, the first person would propose a high and unfair deal favoring himself, and the other player would do best to accept it, since the alternative would be receiving nothing. In practice, however, people do not act this way. The first player offers something closer to a fair or an even split, say, 40 to 50 percent of the 1000 pesos, while the second player frequently rejects what is perceived as a highly inequitable sharing, as reported by Fehr and Smith.

More tellingly, in the dictator game, the other party has no veto power. In other words, in the dictator game, the other party *cannot* reject whatever the first player proposes. So one would expect that in that game, the proposer would just say, "I'll offer you nothing and I will get everything," and that would be the end of the matter. Even here, however, the typical offer is nowhere near as selfish as a pure economic man might make. Nonetheless, it is interesting that the offers in the dictator's game tend to be smaller than in the ultimatum game. An article reports that in a 10-dollar dictator game, 21 percent of the proposers offered nothing, that

is, 21 percent said, "Go rot, I'll take everything". On the other hand, 21 percent offered an equal share. Now in a 10-dollar ultimatum game, the same value, 75 percent of the proposers offered at least an even split, while no one offered zero. If people were motivated by innate altruism or by egalitarianism alone, then their behavior should not be different as between the ultimatum game and the dictator game. For then it would be an autonomous motive on the part of the person to be kind. The difference in actual behavior in these two games indicates that people are not simply acting on altruism but are conditional cooperators. Their actions appear sensitive to the structure of the game and particularly the potential effects of others' actions on their interest. They can and do anticipate that others such as themselves would retaliate when faced with unfair, low offers. They, therefore, take the appropriate action. Pinker suggests that these games yield results that are different from what the wealth-maximizing hypothesis predicts, since evolution has favored a universal strategy of reciprocity, or tit for tat. It is as if people have been hard-wired to reward cooperators and punish cheaters. Pinker then concludes that people are neither the immoral egoists of classical economic theory, nor the all-for-one and one-for-all communalists of utopian fantasy. The results of game-theory experiments seem to bolster this. In other words, people are innately for themselves, but they also watch for what other people think or do and are sensitive to whether they are being observed or monitored.

Two things seem to bolster this hypothesis. First is the fact that this backward induction strategy does not depend on repeated interaction. Game theory does predict that cooperation might emerge if the same people keep dealing with one another. Ultimately they find they are getting nowhere by not cooperating and discern that in the end it is better to cooperate. That much is known from the theory of repeated games. So one would expect people to learn to cooperate over a long period of interaction. The paradox, however, is that results of the conditional reciprocity in the ultimatum and dictator game are *not* learned in the course of the game itself since these are typically one-shot encounters. In fact in the typical way these games are played, you do not even know who the other person is. Rather, people are assigned a role either as proposer (or dictator) or receiver, so they are unaware who their partner will be. Moreover, the game is played only once, so there is no time to learn about the behavior of others in the course of repeated interaction. This suggests that the players' understanding of the situation is in fact built-in from the start. In a sense evolution has built in us the history of this game-playing. The situation is not something that must be learned anew every time, that is, we are not blank slates in this situation. The history of past evolution has been embedded into us through natural selection, which is why even if you played the game only once, you play it that way. No repeated interaction is required.

Second, it is notable that these results for dictator- and ultimatum-games appear to be confirmed across countries and cultures. In particular the 2001 work by various people including the anthropologist J. Henrich and economists such as S. Bowles and H. Gintis report on the conduct of the same game-theoretic experiments in 15 different social-cultural environments, ranging from urban environments to hunter-gatherer societies. Remarkably, the results arrived at are substantially similar. This leads to the conjecture that if cross-cultural results are validated substantially then the behavior traits in question cannot have simply been learned but may be of older evolutionary provenance. The picture that emerges is one of human beings already predisposed to respond to incentives to cooperate with one another. The potential exists and requires only incentives and structures for it to operate. One is reminded of Adam Smith's account of the basis of the division of labor, which is man's "propensity to truck and barter". Smith was possibly talking about the same kind of built-in human nature that predisposes people to be receptive to deal-making and a tit-for-tat strategy. This exists as a hard-wired trait presumably because the tit-for-tat strategy served survival well in the past.

In a sense, therefore, the entry of evolutionary psychology into economics actually helps us fix some of our puzzles and paradoxes. It provides one possible explanation to kinds of experimental results people are getting in social games, although I must relate one exception to these results. The same ultimatum and dictator games have been administered, but to subjects with economics training. And somehow these subjects tend to pick the "right" or "rational" choices suggested by economic theory, acting quite selfishly in the manner of *homo oeconomicus*. Such people have learned the theory of the game and are trying to give responses as one would to an exam. While one can quarrel with their degree of success in the long run, this nonetheless illustrates Pinker's point that one can actually overcome evolutionary predispositions through new learning – in this case, learning game theory.

Ultimately, quoting Marx, freedom comes from the recognition of necessity. And if indeed there is a neuro-biological foundation to our behavior, then you do not become more free by denying it but by recognizing it and seeing where its limits lie. Thank you very much.

Acad. Ledivina V. Cariño: Well, thank you Dr. de Dios. I think we are going to erase the title of this RTD before the end of the morning. No rational question about what human nature is? And we were not only asking questions about what human nature is, we were actually looking at our own sciences and asking why we were reductionist to start with? We will now ask our discussant Dr. Ma. Concepcion Liwag who is the chair of the Department of Psychology of Ateneo and also another Outstanding Young Scientist.

Dr. Ma. Concepcion Liwag: Thank you very much and a pleasant good morning to every one. First of all, thank you for inviting me to this roundtable discussion to share my thoughts and reaction to — yes — this provocative topic from the perspective of a developmental psychologist who works mainly with very young creatures — like the five-year-old grandchildren of Prof. Angangco? And let me confess though that one intrinsic motivation for me to come here is to be with my good friend Dr. Bernardo whom I rarely see because of the vast geographical distance between Ateneo and De La Salle. It is good to see him.

There are advantages and disadvantages to being the last speaker. Well, an advantage is that it is less nerve-wracking. But I guess one disadvantage is that you will probably find that most of the things I will share are already echoes of the things that have been said by our previous speakers. Nevertheless let me give you my two cents' worth. Actually, with the dollar-peso conversion, two cents probably is how much *na lang yon*. One peso or something like that.

Yes, Steven Pinker is, I think, a very naughty and provocative psychologist. I must also confess that I only read the part that was given to us, the first chapter of *The Blank Slate* but his other book *How the Mind Works* is actually the textbook that I use for my cognitive psychology class. Because he is always a very thrilling read although I do not agree with some or even many of his ideas.

From the developmental perspective indeed, the nature versus nurture issue is one of the most ancient debates that from the very beginning pitted the nativist position that goes all the way back to Plato who philosophized on the existence of a realm of preformed pre-existing ideas against the empiricist position where the mind is *tabula rasa* at birth. In psychology, in developmental psychology in particular, the behaviorist paradigm that ruled psychology for many years was very much allied to the empiricist position. But that only illustrates that in the history of psychology the pendulum has really swung back and forth from the two extremes — on the nativist end, we have had Gestalt theories, Sheldon, Lorenz and ethology, Gessell, Jensen and the IQ controversy, and on the empirical side, we have had Hebb, Schneirla, Gagne, Kagan, and so on. But I agree very much with Dr. Bernardo that even as early as 1958, developmental psychologists began to take a less dichotomous and less contentious perspective and critique on this issue.

In a classic psychological review article in 1958, Anne Anastasi* already very strongly asserted that the problem in conceptualizing the nature-nurture controversy is that the wrong question has been asked. The wrong question being, "Which one?" This question assumes that the effects of nature and nurture are independent of one another, which is

*Anastasi, A. (1958). "Heredity, environment, and the question 'How'". *Psychological Review*, 65, 197-208.

clearly illogical because there is no place to see the effects of heredity except in the environment and there will be no one in the environment without heredity!

Another way in which this question has been misleadingly misrepresented, according to Anastasi, is to ask "How much of each one?" This question assumes that we can divide up the contribution of genes and the environment, that we can take some trait like mathematical ability or scientific success or sexual preference and determine whether 30 percent of it is due to genes and 70 percent due to environment. But most developmental psychologists and even most developmental biologists, following Anastasi, would say that this way of thinking about the problem is profoundly misconceived.

So indeed the current perspective, as I have already mentioned, is one of holistic interaction — which Pinker was clearly not comfortable with — where human development is seen as 100 percent due to Nature and 100 percent due to Nurture and neither one can be ignored. Proponents of this view, at least in developmental psychology, such as **Karl Riegel** will, of course, insist that Nature and Nurture are inextricably linked and reciprocally related. In fact, according to Diane **Halpern**, who is the Past President of the American Psychological Association, even simple distinctions like dividing variables into biological and environmental categories are very difficult to make and may even be impossible to maintain. Consider, for example, the fact that there are differences in male and female brains. The differences in brain structure could have been caused, enhanced or decreased by environmental stimuli. Although as mentioned by Acd. Cruz, there are critical periods in brain development. Yet we know that brain size and structure remain plastic throughout life and brain-imaging techniques have shown that there could be changes in **cortical** representations occurring after specific experiences such as laughing or stressful experiences. So what we learn influences structures like dendritic branching and cell size, but our brain architecture in **turn**, supports certain skills and abilities which may lead us to select specific additional experiences. So it is also important to remember, of course, that we all develop within a social context and socialization practices are forces to **be reckoned** with, as documented in the psychological, anthropological, and sociological canon.

To further quote **Diane Halpern**, the interface between experience and biology is seamless. Biology and environment are as inseparable as conjoint twins who share a common heart. So yes, the right question, and one that as scientists we should continue to pursue relentlessly and passionately — although Pinker does not think that we are doing this enough — is "How do nature and nurture interact to produce human development?" Truly very complex. A difficult question to ask and answer. One approach to this empirical issue is to conceive of nature and nurture as both having a continua of effects. On the genetic side, for instance, we

know very well that nature effects are diverse and always mediated by the environment. Very few genetic inheritances are manifested wholly as such. *This implies that we cannot specify, a priori, what behavioral effects a particular heredity contribution will have.* This is the familiar “norm of reaction” concept of Dobhansky which asserts that there is little isomorphism between the phenotype and the genotype; the same genotype can lead to a wide array of phenotypes depending on the environment on which it is expressed.

One can therefore think of nature effects along a Continuum of Directness, from Most Direct Effects, to Moderately Direct Effects, to Inherited Susceptibilities, to Least Direct Effects. But many even direct effects of heredity which can interfere with normal development can be countered somewhat by the environment. Congenital deafness, for instance, will definitely change the developmental trajectory of communication skills development but the degree of difference between a hearing child and a non-hearing child will depend on the environment in which the deaf child is brought up.

Inherited susceptibilities are another less direct working-out of our genetic legacies. One may have a family history of heart disease, diabetes, or allergies. But it is very possible that one may not develop any of these conditions through health interventions such as diet and exercise.

And then, of course, we have the least direct effects of heredity which involve genetic conditions whose developmental “effects” are really due to social-cultural processes. One can have a hereditary condition such as skin color, which one might think one cannot affect or change. (Well, the exception is probably Michael Jackson.) But definitely the effects of being black, brown or yellow are clearly mediated by societal reactions, prejudices, and stereotypes. So again, to echo what has been said earlier, work on behavioral genetics has demonstrated over and over again that the effects of genes depend crucially on the ranges of the environment in which people grow up.

By the same token, nurture or environmental effects also vary in terms of the degree of their pervasiveness. Certainly the environmental condition of being dressed in pink or blue as a child and how it would affect one’s social or sexual orientation is a very different thing from the effects of being malnourished as a child. Occasionally witnessing a *tampuhan* or a petty squabble between your parents is a very different environmental experience from that of growing up in a family where chronic family violence is the norm. So the effects of nurture can also be seen in terms of a Continuum of Breadth where you have some environmental conditions that have indeed very broad organic effects relating to many dimensions of psychological functioning, and enduring effects that last for relatively long periods of time, while certain kinds of environmental effects only really have very narrow minimal impacts making their contributions to a limited segment of a person’s behavior

and development and only for a relatively short transitory period. Damage to the fifth vertebra paralyzed Christopher Reeves for life but your encounter with a rude taxi driver this morning will probably only change your mood, and your irritation will probably last, hopefully, for just a minute.

To summarize then, for developmental psychologists, nature and nurture cannot be seen as two ends of a single pole. All of us are predisposed by our biology to acquire some skills more readily than others. But all of us encounter and select experiences in ways that are also biased by our prior learning histories and the opportunities accorded to us by our environment. These experiences can transform our neural structures as well, which, in turn alter how we would again respond, and so on. Learning is a biological, social, environmental event. Brain structures reflect learning and experience and change even into very old age, thus, blurring nature and nurture distinctions beyond usefulness for most purposes.

Finally, I would like to end with the important notion that I always emphasize with my own students, that in this endless interplay between nature and nurture, we should not forget the role that human beings themselves play as agents or contributors to their own development. Maybe this is the developmental psychologist's version of free will. It is probably one of the greatest genetic gifts to humanity. And this is my optimistic view of human nature — that we have the ability to change our lifeworlds, to transform our very environments in ways that enable our genetic inheritance to be expressed in unprecedented and creative ways. Consider two sentences: "I am a millionaire because my father was one" and "I am a millionaire because my father was *not*." There are many conceivable pathways to becoming rich. And I am not just talking financially.

Human beings' capacity to intentionally and radically change their environments have been observed even in very young children who can already picture the world around them and imagine the alternative ways that the world could be and intentionally act to change the world accordingly. Who would imagine that an empty tin can be used as sports equipment in the game of *tumbang preso*, creating hours of enjoyment even for the poorest, toyless street children, for instance. So even very young children have causal theories of the world. They know how one thing can make another thing happen. And from these early capacities germinate the later sophisticated powers of hypothetical and counterfactual thought and planning and intervention.

But to paraphrase the famous quote from Spiderman, "This gift and this power to determine our own development by changing our personal and political worlds come with equally great responsibility". If we decide that we want a particular kind of world where not only one's self but everyone else had the opportunity to develop to his or her fullest genetic potentials or a world with as many life chances for everyone in terms of education or economic prospects or social justice as we can get,

then we need to experiment with new possible environments to try to get the outcomes we want. We need to use our... and here, I use the word "innate capacities" as scientists, for theory and imagination to conceive of these brave new worlds and to determine empirically what the effects of these environments will be. And then, scientists and non- scientists alike, we need to work together to create these nurturing environments in our family, in our schools, in our political culture because these places are where the broadest, deepest and most enduring effects probably lie. And if we can, go further than that as far as our minds and our hearts can see. Thank you very much.

Acad. Ledivina V. Cariño: Thank you Dr. Liwag. It is appropriate that you are the last discussant because you already gave us the policy recommendation. Well, this is the time to make this a roundtable discussion. And I hope the people around the table will feel able to join us. Yes I already see a hand there. Please introduce yourself and your discipline. There is a mike.

Dr. Michael Alba: I am an economist from La Salle, formerly from UP. I was really excited to join the discussion because I was kind of hoping that Dr. de Dios was going to take off from what Acad. Fabella mentioned in his remarks that geography is a short step from biology and geography gives rise to institutions. I was hoping that Dr. de Dios was going to pick up on that and introduce Diamond's book, "Guns, Germs and Steel" because to a large extent, I think that the world as we see it today is shaped by historical forces which were based on natural resources to begin with and I think this has not entered the discussion.

Acad. Ledivina V. Cariño: Dr. Jose, you wanted to say something about that too.

Dr. Ricardo Jose: When geography was raised during the discussion, I immediately thought of Diamond's book because we also concern ourselves with not just the biological aspects but geographical features as well. When I went over Dr. Diamond's book, I noted several omissions from that which we can probably bring out because some of the points I think brought out earlier were, would the theories raised here be applicable in the Philippine case because we do have problems. Do we have enough data on the Philippine thinking? Do we have any traditional views of nature versus nurture, in the Filipino psyche? Maybe that is something we can try to look into because the western schools have gone into these in very great detail. In the Filipino concept, I think this is one thing where empirical studies may still be important. This might be a form of a proposal to work on Filipino perceptions, Filipino ideas vis-à-vis Pinker's theories.

We have heard that what a person is is due to nature and nurture. According to the last speaker, how much is due to nature or nurture is due to his genetic make up plus the environmental conditions he is subjected to. But the environment can only modify the genetic make up to a certain level. So it will be the genetic make up that will limit the influence of the environment. I think both will play a role but the environment can only modify the genetic make up to a certain point. For example, the color of the skin, given here as an example. You can modify the color of your skin by applying cosmetics but only up to a certain point. Or intelligence. Intelligence is inherited. But if you have the intelligence of a moron, no matter what environment you are subjected to, you can never be a genius. But if one has that genetic make up of a genius, if subjected to the right environmental condition, then he would become a genius. So what I would like to say is the genetic make up limits the effect of the environment.

Acd. Ledivina V. Cariño: A provocative statement there. Any other hands? National Scientist Castillo.

National Scientist Gelia T. Castillo: I plead guilty to the title of this RTD but I think it has served its purpose. The reason why this came to mind was those of you who go abroad or who even stay here, when you are asked the question “Bakit ba ang Pilipinas ganito?” “Bakit tayo hindi makaunlad?” Pero yung Pilipino dalhin mo sa Amerika, dalhin mo sa ibang bansa, they blossom naman. I do not know if you people have good explanations, I know the economist would try to explain it in terms of economic policies. I remember Dr. Balisacan who authored the book on the Philippine Economy, said that the most painful part of writing it was coming to the last chapter. Yesterday, someone asked me to read the book that he was writing and the last chapter was on everything that is wrong about the Filipino and the Philippines. Could we not do something better than this if this is going to be a textbook? This is something that really really bothers me. Wala ba tayong magandang explanation.

The other thing is somebody mentioned about mutants. I have asked our genomics experts, because in genomics they have these intellectual property rights. Therefore, I asked if you create a mutant, who owns it? If you look historically our lifespan has improved considerably, what has caused it? I never forget Dr. Dayrit when you consider him about cardiology, he would always answer, “Genes! Genes!”. When you go to a cancer specialist, the doctors will always ask, “do you have someone in your family who has hypertension, etc.?” And then when you hear that somebody has cancer, “O tatay at nanay niyan parehong namatay sa cancer” These are things that are very very real in our present situation. In other words, environment can do something also about the genes. At least that is what I tend to hear with respect to rice. It is fun coming to this meeting because on a day-to-day basis, I hear nothing but

rice and sweet potato. But a lot of the issues they have are the same issues we are dealing with but there are certain inherent dangers when we focus on biology as destiny. Because if you are born a woman, if you are born Chinese, if you are born American, if you are born black, the implications are really quite terrible. And especially if you are born Filipino, what does that mean? It is interesting that Acd. Lourdes Cruz who is about as hard-nosed a biologist as you can get, is the one who has a more social science view. I think it is because of her exposure now to the project that she is doing. This simply means that we have to do more research. And I am so proud of our OYS, I think we did not make a mistake in our selections. Thank you all for coming.

Acd. Ledivina V. Cariño: That does not close our roundtable, there are still questions on the table, perhaps the question of Dr. Jose about Filipino studies related to this issue and well, Dr. Bernardo wants to talk about this.

Dr. Allan Bernardo: Obviously the Philippine data on the kind of phenomena that evolutionary biologists have been working on is not extensive, just simply because our infrastructure and the number of social scientists addressing this issue is very small. However, there are some relevant work that tend to address this point. In evolutionary psychology there seems to be a consensus that in terms of personality traits there are what we call the big five factors that have been shown to be universal. Research has also shown that there seems to be evolutionary reasons for why these are the five traits that would define personality. I will not go into that. Maybe, Dr. Liwag knows the big five personality dimensions. Anyway, what was interesting is that when a group of psychologists in De La Salle studied these big five in the Philippine context there persisted a sixth factor that did not disappear. And that factor, believe it or not, is gregariousness, which probably makes a lot of sense in the Philippine context. But that kind of Philippine research supports the existence of the innate five dimensions of personality but it also indicates room for other traits. And it is a very robust finding. And there are similar findings in African and South American countries where the basic five personality traits which are supposed to be evolutionary adoptive are there, but then one or two other factors persist within that cultural context. So maybe those kinds of studies would be relevant.

Dr. Emmanuel de Dios: Actually, one question that can be raised is whether such phenomena are a case of evolutionary selection or to what extent it is, say, cultural learning. In other words, I do not think we have settled the level at which these things exist. The hard science challenge to people like Pinker is to show that there are indeed mental processes that are inherited. The evolutionary argument after all is based on heritability

of these mental habits or predispositions, so that they are hard-wired or built into the human brain, therefore not just learnt.

Alternatively, one can ask to what extent cultures (and this is related to geography) that are separate from each other do develop their own behavioral traits and by what mechanism these are passed on. Is it hereditary, or is it learned in the culture? So actually, a lot more hard science needs to be done in terms of neuroscience. In what areas of the brain do these things actually exist (as indicated perhaps by some areas lighting up)? To establish evolutionary psychology, it is not enough to observe these matters behaviorally. If there is a heritable factor, then it must ultimately be manifest in some physical structure or chemical activity.

Acd. Ledivina V. Cariño: Dr. Bernardo, before you answer, may I butt in? I am teaching ethics, administrative ethics so I am reading on Origins of virtue and all that. And if we are looking for evolutionary basis, there are several books that show certain qualities being passed on from, not person to person but from creature to creature. I like particularly the story of vampire bats. You know they are called vampire bats because they are vampires. They actually get blood from some other creatures and that is what they use to fend for themselves. And they have made studies of vampire bats which tend to show that they have utang na loob, cooperation and reciprocity and that these are passed on from one generation to another, so that is evolutionary. They regurgitate the blood and give it regularly to certain bats not necessarily related to themselves. These bats B then, if they have excess supply, would seek out bat A and then regurgitate that blood to that other bat. Anyway Dr. Bernardo, I am sorry I interrupted you..

Dr. Allan Bernardo: Actually Dr. de Dios, the data, the possibility that certain processes, particularly learning process are hard wired is quite strong at this point. Much of the evidence comes from data on language development. In fact, the methodology involved is usually you make assumptions about what are some of the things that children learn even when the input from the environment is insufficient. For example, the evidence is very strong that the infant brain seems to be predisposed to focus on certain aspects of the auditory environment; in particular the sound of the mother's voice. And this has been shown across cultures, across social economic status. And if you think about it there is nothing unique about the acoustic properties of the mother's voice that distinguishes it from other sounds like the dog's bark or the whistle, etc. But somehow the child's brain seems to be wired to pay attention to that. It is evidence like this that actually is quite robust. Not just in terms of language acquisition, color perception, etc. But having said that let me qualify that the solid evidence is for some very basic and fundamental psychological processes and these are what relates to my comments to

how the environment can shape genetics. We know that there seems to be changes in the brain, talk about brain plasticity. However, what we should realize is that the effects of brain plasticity are mainly in the cortex, whereas the claims of evolutionary psychology are in the thalamus, the central brain, which determine very basic survival processes. I guess, as Dr. Liwag said, the effects of the environment also have degrees. So that might assuage the concern of NS Gelia Castillo. That the environment does have an effect on the brain but I think you should be mindful also that the effects might be limited to those that are functions of the cortex, which are more plastic. There is almost no evidence to show the influence of environment on our brain. Maybe, that is the short answer to Dr. de Dios. But we Filipino social scientist have not been looking for that kind of evidence.

Dr. Ma. Concepcion Liwag: Probably because I am a chair of a psychology department, one of the insights I got from this discussion also has to do with the pedagogical implications, at least for the social sciences, which of course feed into the way we do research. I agree very much with Dr. Bernardo that for the moment, I think, psychology and psychological research can cheerfully proceed even without the input from the neurobiological side. And in fact the input from the neurobiological side is really that we read books like Pinker's, but we do not do research like this, we are not trained to do research like this. We probably do not have the resources to do research like this. The majority of Filipino psychologists have only seen brain images by watching Discovery Channel. And when we talk in class we pretend to be an authority on this, but in fact we do not have first hand knowledge or experience in this kind of research. And most of the research training has really been on the analysis of nurture. So this probably brings us to the notion of how we can work together, collaborate with our colleagues in the biological side. In fact, we should not even talk about sides maybe, even though we are in a square table discussion. Because even in the area of clinical psychology for instance, the tension remains. Our psychiatrist colleagues would say well the depression is really monoamino deficiency, etc. but the psychologist would say, the person is very sad, has no self esteem because as a child he was bullied and so on, and so forth, committed suicide because grades were low and sometimes the twain really do not meet even for all the discourse that we have here in the interactionist perspective. So cross disciplinary work will be a very important agenda.

Acd. Ledivina V. Cariño: Acd. Fabella?

Acd. Raul V. Fabella: Very interesting. I would like to say something first about what Acd. Cariño said about bats and all that. That we observed phenomenon like altruism, cooperation among animals as well as really

among people is an indication that perhaps the center of the universe is not the individual. And Richard Dawkins' thesis of the selfish gene is very interesting because I will behave altruistically towards you as long as in the process I am advancing the survival or the benefits to my own genes, genes being the central issue, the central mechanism. These are interesting indications or phenomena that cannot be understood from viewpoints of the rationalist homo oeconomicus. Take for example the suicide bomber, it is a phenomenon now and we have to face the fact that there are suicide bombers. If the individual is the center of the universe then clearly a suicide bomber does not make sense but since it is a phenomenon we have to explain it. Clearly the selfish gene approach can be used to understand that. It is a genetic reaction, in a sense. An attempt to try to perpetuate the race. The individual is then sacrificed, but the individual is not the center of the universe anyway. This is not only with respect to the suicide bomber. There are normal phenomena which one might not call normal but in agriculture they are still normal. For example, the phenomenon that I always relate which is about four Japanese high school students who lured a classmate to the woods and killed her. And the reason that they gave was that she was different. She was iconoclastic. In the process the four students will of course be punished. They have put themselves in the line of fire. But in a sense they were acting with the interest of the group at heart because this other student was a threat to the group. So this is what the Japanese researchers called spite. They are willing to sacrifice individual well-being for the society. But this is also what we observed during the second World War. It is called the Samurai ethic. These are phenomena that have to be explained where Dawkin's selfish gene has a nice ring to it in that sense.

Dr. Emmanuel de Dios: Actually, it is interesting that you gave those examples because they actually do not correspond to the viewpoint of purely biological evolution. The idea of group-selection in biology is not well-accepted. Nonetheless this seems to be what these things point to. A person tying a bomb around himself and then killing himself for whose sake? People who are not necessarily his relatives. So the circle in this case has been drawn much wider than the immediate biological circle. It is the same thing with respect to the social cohesion of the Japanese. The question is whether a different process is going on at that level, separate from just purely biological evolution. That something else, I think, is beliefs. People are capable of drawing a larger circle than their immediate kin. And that has to do with institutions and the progress NS Castillo was concerned with. Some would say that part of the problem with Philippine society is its inability to draw larger, inclusive circles. Therefore, you are reduced to that basic biological unit, the family and kin. While that unit may suffice for very simple exchanges and face-to-face encounters (drawing now from institutional economics), it may not suffice as soon as

one considers more complicated transactions, e.g., anonymous exchange and markets with a great temporal and geographical scope. You do not know who the supplier is; you buy and sell from people you do not know. You pay taxes to a government from which you feel distant. The restriction of the social circle to the family does not suffice to operate in those much larger, complicated institutions. Indeed some would say, it is the intrusion of considerations of private personal exchange into what ought to be impersonal exchanges that is part of the problem of governance in this country. The reason this happens is that we seem not to have evolved the kind of belief-system needed for us to accept and operate those much larger structures, namely the polity, the market, the economy. Therefore, we behave as if we were still in that small sphere that is very certainly biologically determined. One can argue that the progress of an entire country is actually an achievement in the sense of overcoming its members' initial, very immediate concern for their kin. In fact the notion of nationality, *bayan (bahayan, kabahayan mo siya)*, is an enlargement of a kinship or at least a proximity relationship. Except in some societies people come to believe it, whereas in our society, we apparently still do not.

Acd. Ledivina V. Cariño: Dr. Liwag? How large a circle do you need? Very large, 85 million?

Dr. Ma. Concepcion Liwag: No this is almost just an aside because of the compelling example given about the suicide bomber. I just wanted to share that one of my colleagues in the psychology department, Dr. Montiel who is a political scientist, has just written a paper in which she looks at the construal or the label of a suicide bomber where that is in fact a construal from a particular side of the conflict while the suicide bomber is in fact seen as a freedom fighter from the other side. Again the notion of beliefs, and so on.

Dr. Allan Bernardo: Actually Dr. de Dios, that notion of our moral sense extending to bigger and bigger circles -- some evolutionary psychologists are saying that there is a evolutionary-based, biological basis for that. The idea is that if you look at a peaceful western culture, the evolution of moral systems seems to be expanding circles. From the moral systems applying only to white men and then starting to care for women as well and then for people who are not white and then for people who have different sexual orientation and then we are expanding the circle to animals and environments, and so on. There is an argument that that moral sense is biologically predisposed. But as you suggest, expanding it to bigger circles probably needs to be supported by certain cultural and social processes. And I would like to take this chance to link to the question of NS Castillo and link it with Dr. Liwag's concern about methodology. If for example we want to learn from Pinker's book and try to answer NS

Castillo's question of Why are Filipinos not doing well in the Philippines but are doing well in other countries? I am sure that the economist, political scientist, sociologist, psychologist have so many theories but Pinker would probably suggest is maybe we should change our hypothesis. Maybe we should begin examining certain assumptions in our theorizing about why certain Filipinos thrive in certain environments and why others do not. In the very back of Pinker's book, there is a very interesting appendix which is supposed to be a list of human universals. And some of the universals include things like economic equalities or a consciousness of economic equalities, materialism, corporate statuses. They also talk about things like, territoriality, about statuses and roles. What am I trying to get at? There might be some revisions needed in terms of our assumptions about human striving. Acd. Cariño was saying earlier maybe we should examine our views of what is human nature. Because we might be starting from a more positive rational assumption, when it might be more powerful for us to assume our more negative view of human nature or maybe other positive aspects of what people are predisposed to. I do not know. But short of what Dr. Liwag was talking about doing more direct research of this type. One thing that we social scientists could do is maybe reexamine the hypothesis. And begin appropriating different types of constructs that draw from alternative frameworks that may give a different view of human nature. You might come up with different stands of theorizing and hypothesizing.

My concern is that the discussion this far has has emphasized the micro aspects of the topic, I think. But I also think we need to bring in the perspective of the very long and the very large that is the theme of Diamond's book. And this speaks from NS Gelia Castillo's point about the tremendous advantages and disadvantages that one immediately has by accident of birth, simply because of one's biology. So if you are born white as opposed to being black in America, you have tremendous social advantages. And I think it should be part of social science research to also try to understand why the world came to be as it is, which Diamond actually wrote on. In particular, an implication of this book is that the natural resources in the country could not have given rise to a society that will be as rich as the US or even Japan. And I mean that is something that I think should frame how far we can go at least.

Acd. Raul V. Fabella: Let me go really wild here.. Off the record. Perhaps we are defining success in a way that works against us. After all the suicide rate in the Philippines is not as high as Sweden. Sweden is a very developed country but the suicide rate is very high. Is material development a criterion for success? If we define it differently, we might be a little bit happier. That is what I am saying. After all economics is utilitarian. And it has to be the greatest happiness for the greatest number as the real criterion. But is there only one criterion by which we judge success? And if you ask the

people in the Pacific islands, they probably say who cares about a Honda or a BMW? I am reminded of a friend of mine who was concerned about his sister. His sister was going around Mindanao, I think she is a missionary. He keeps calling her and saying "I have a job for you, you will enjoy this." And this girl suddenly turned to him and said simply "Are you happy?" And he said "Yes." "Will you change your life for mine?" He said "No." "Why do you not ask me the same question?" and he started thinking. From then on I think he stopped badgering her about defining success in his way rather than in his sister's way. That is what I am saying. This is not going to be acceptable in economics. But perhaps we are allowed to be wild in this forum.

Acad. Lourdes J. Cruz: Going back to the Aetas, you know our study about what they consider as progress. The Aetas, although quite poor, are gregarious. They work happily and they do not measure success in terms of money, etc., because it is a barter society. It is more of preservation of their culture, their communal owning of the land, and maintenance of that culture that is the most important thing.

Acad. Emil Q. Javier: I was not disappointed to come all the way from Los Baños this morning. I suppose we from the biology side are sort of taking pride that in many ways the discipline of biology is making a lot of impact on the way people are living and on so many things about how and where we are now as creatures. Relative of course to the notion that in the previous centuries, the other natural science field, namely chemistry and physics, appeared to have made the most significant contributions to the way human beings lived. Now of course our often maligned reductionist methodologies are really delving, going deeper and deeper into even, from the individual to the cell to the molecular level, trying to reconstruct and explain as best as we can how these bigger things come about. Of course so much that we know now, that we did not know before came out of this reductionist science. On the other hand, we realize as well that as we go deeper and deeper the more and more we realize that we do not know much, especially when it comes to human beings. I have been reading on socio-biology and it fascinates me the many many things that these people are telling us that I never would have thought of as a farmer. Anyway, I am listening very intently and I am really pleasantly surprised on the many ways that the social sciences look at things. Of course that division is a maverick in our Academy anyway. They always think differently from the rest of us and so of course as usual we prescribe, hey you, you're suppose to do this and this and all the divisions comply except this division. And for a while I was thinking what will they do? And that really was my motivation for coming here because they have these two topics. And I really did not know how they would handle it. I have some inkling that Biology as Destiny as put here is really a debate on nature and nurture.

But I know there is no debate anymore because it is really both at different levels and different places, and so forth, and so on. Anyway, in the discussions in the Academy, a lot of times we really look at our colleagues in the social sciences because a lot of our problems really have not much to do with the technology or knowing the technology or having access to technology but the social part of it. Not even the economic part of it. It's really the social dimensions. Anyway, now that I have heard this part of the session, I am relieved that something will come out of it. But I could not resist reacting to your statement about geography. Yes, that is correct, but the other things, other than natural resources, because some nation state, however small, is able to get away by realizing that economic activities do not have to rely on natural resources alone. Because there are other things like trading, marketing, information and so on, and so forth. Anyway, I am rambling already but I wish I could be listening till the rest of the afternoon but it is only a half-day session. Congratulations for what you have been talking about so far. Now I wonder what Dr. Bernardo will be writing on and reporting, thank you very much.

Acc. Ledivina V. Cariño: Well, we now give Dr. Bernardo the floor unless there are others. NS Castillo?

National Scientist Gelia T. Castillo: Throughout the years when I had been involved in the pro-poor initiatives, you will always find that given the same program, in the same place, why is it some people respond immediately, positively, some people respond negatively, and some people do not respond at all. What bothers me is my attitude now. I say, "kung ayaw nila di huwag! Doon na lang tayo pumunta sa may gusto." Which I think is not right. But I have to find the reason. And sometimes, if you have been in a program long enough, you can almost predict the families who will make it and the families who will not. But what gives? We need answers to this one. I am very much bothered about it.

Acc. Ledivina V. Cariño: Just one more point..

Dr. Patalinhug: I am Dr. Patlinhug from UP also. And one of the topics that I really like was animal behavior. And even from organismal up to our social behavior there is a very strong link with our coping mechanisms. How we cope and some of these are natural and some of our coping mechanisms are nurtured. So with respect to that poverty reduction I think the social scientists, may I suggest that we focus more on what the mechanisms are so that people exactly mentioned by Dr. Castillo that "ayaw nila" ng development or progress or to go out of the poverty mindset will be properly induced to get out of that framework. Thank you.

Acc. Ledivina V. Cariño: Thank you. Now Dr. Beranrdo, may we hear your thinking.

Dr. Allan Bernardo: You may not actually.. I was telling Dr. Concepcion that it seems that President Javier is skeptical about what the social science people will do in the ASM. You will not be able to sleep well Dr. Javier because the paper will still evolve and there are three months by which these ideas can be pushed and shaped by other social scientists. Let me just try to synthesize and raise some of the issues that I felt would be good for us to focus on. It was quite a pleasant surprise to find that the social scientists in this room felt very comfortable accepting the role of biology as one of those factors that shaped social and behavioral phenomena. Indeed it was the molecular biologist who took the most blank slate view and looked at biology not as a constraint or a predisposition but as a potential. Social scientists in the room took a more innate view and looked at biology as something that truly poses a constraint or actually predisposes people to act and behave in specific ways. I think this is an interesting event here. However, having said that, I think that too many economists and psychologists spoke this morning and psychologists and economists are really not in the normal standard deviation of social scientists in the Philippines. I would have like to hear more sociologists and political scientists on what they think about human nature. I think their point of view would be quite different from the economists and other social scientists. And I am sure Dr. Jose would have said more. Ok, but that was something we could take into consideration.

I think one important thing we should focus in our discussions is, if we accept these ideas what does it mean for the work of social sciences in the Philippines. NS Gelia Castillo raised important points that it seems there are a lot of things we do not yet know. And research really is the basic answer. Several speakers, Academician Fabella for one, noted that maybe the ideas and constructs of evolutionary psychology may affect theorizing by way of fixing and correcting the limitations of some of our theories in the social sciences. Some of our discussants like Dr. Liwag pointed out that there might be constraints in the research environment of the social sciences that do not allow us to engage these theories and study them directly. Having said that, President Javier noted that there are a lot of ideas that are already out there. And they give us theories, concepts, even methods that can influence the way we theorize about important social phenomena and maybe what is imperative is how social scientists begin engaging that. And in some of the discussions, I think we realize that engaging these ideas will be important not just for the sake of theory building but also to understand some very basic social problems in Philippine society that we need to address.

There is one point that was not discussed that Dr. de Dios made a big point about and this is the distinction about separating scientific knowledge from what is moral. I think this is something that the social sciences will really need to engage in a more direct way. Because from my sense of indigenous views of knowledge, I was just talking to Dr.

Abaya of the Anthropology Department last weekend and he was saying that in indigenous cultures, our views of knowing that is seen to be separate from our views of what is moral. In some of my readings of ancient Chinese views about learning and knowledge, virtue is always coming in. And in my reading of the work of social scientists in the Philippines, there is a very strong moral, if you want to use that word, activist orientation, a very strong sense that social science knowledge is not neutral with respect to issues like social justice and morality in Philippine culture. Given that, I think there will be built-in constraints about how we appropriate evolutionary biological theories in our work. I am not sure if it would be easy for us to separate scientific knowledge with moralizing about social phenomena. That is something that might explain why social scientists in the Philippines are talking more about the nurture than the nature.

There are other important points raised by the discussants and the audience. And I will do my best to put that together. But I think that at this point we did something very important today. We now have another door to open, so to speak, and we have a new set of tools that we realize we can actually appropriate. I think the challenge is actually to begin acting on this and using these tools. Hopefully, we can draw from the ideas of this morning to move along in this process. Thank you.

Acd. Mercedes B. Concepcion: May we now call on President Javier. Before this sessions closes, it is my pleasant task to reward the discussants for their ready acceptance of the tasks that we have set for them. Not only ready but very well acquitted. You acquitted yourselves excellently and we are very proud of you.

Dr. Allan Bernardo

NS Lourdes Cruz

Dr. Ma. Concepcion Liwag

Dr. Emmanuel de Dios

And now closing this session is Acd. Cariño.

Acd. Ledivina V. Cariño: Thank you very much for having honored our invitation to come. As you can see this is an input to the annual scientific meeting and I do not know if you are convinced that this is a century of biology but we thought we would go along with looking at how the social sciences are impinged upon by biology and vice versa. I think we acquitted ourselves very well this morning, as Acd. Concepcion has already said. There are a number of items that will still be in the agenda because as you have pointed out a lot of Filipino research has not yet been done. We are still looking at the western research and trying to apply it to our own society but we do not really know to what extent these works apply to ourselves. Definitely I think we have again slammed the door on the nature-nurture debate. Recognizing that it is at best an interaction and that these

two will work together for a long time. Which means that humans will still be the potent force as they have always been. I will leave you with that because the summary is really Dr. Bernardo's. We would like to invite you all to the next roundtable discussion on **Bio-Resource Management and Our Common Future** which will be held in this same room at the same time on Thursday, March 23. We have profited very much from the interaction of the social science and the other sciences. Thank you very much.

Acad. Mercedes B. Concepcion: As I have mentioned before, we will try to write up this discussion for a monograph, I would really appreciate if you could give us your notes. Dr. Liwag promised to put her notes together and submit it to us as soon as possible, and NS Cruz has something prepared already. So could we have them for Dr. Bernardo's sake.

National Scientist Gelia T. Castillo: I would like to suggest to Dr. Bernardo that if he feels he needs another RTD before July 13 and 14, I think he can call the Secretariat and get it organized.

Acad. Mercedes B. Concepcion: We tried to invite a political scientist and a sociologist here. We had invited Dr. Cynthia Bautista, but unfortunately with the death of Dr. Doronila, Dr. Bautista inherited all the latter's work and projects. I would like again to thank everybody and if this idea of another RTD to help shape the paper that Dr. Bernardo will be preparing for presentation in July, is a favorable one, then we can invite you back with the addition of representatives from political science, anthropology and sociology to round up the social sciences. And thank you very much Acad. Cruz for joining us from the Biochemical field.

Acad. Ledivina V. Cariño: Acad. Concepcion introduced the people who have been asked to speak, I think it is opportune that the other members of the audience introduce themselves so you can see the different disciplines represented here. And they are not all from social science. We already know Acad. Cruz and Dr. Liwag. May we ask you ma'am to just introduce yourself, where you are from and what discipline?

Prof. Aileen Samonte: I am Aileen Samonte. I am connected with the De La Salle University. I am one of the recipients of the DuPont Talent Search for Young Scientist last year.

Prof. Adoracion Arañes: I am Adoracion Arañes of the UP Institute of Biology, a retired Professor.

Acad. Magdalena C. Cantoria: I am Magdalena Cantoria of the Biological Division of the Academy. I was attracted by the title of the symposium so

we are here to listen to the roundtable discussion. I doubt if we can contribute much but we are more interested in listening.

Dr. Patalinhug: I am Epictetus Patalingod from the UP Diliman College of Business.

Dr. Lee: I am Romeo Lee from the La Salle University. My specialization is on men's health.

Andrew Ariola: I am Andrew Ariola, Kaisa para sa Kaunlaran, a Chinese Filipino NGO.

Mrs. Ofelia Angangco: I am Ofelia Angangco. I am here as a grandmother who must answer several questions raised by my five year-old grandson. And also my apostolate as a senior citizen is concerned with basic education. Thank you.

National Scientist Gelia T. Castillo: I'm Gelia Castillo from the National Academy.

Acad. Mercedes B. Concepcion: She is a National Scientist and former chair of the Social Sciences Division.

Dr. Michael Alba: Michael Alba, De La Salle University Economics Department.

Acad. Emil Q. Javier: I am Emil Javier. I am from the NAST Biological Sciences Division.

Dr. Ricardo Jose: I am Ricardo Jose. UP Department of History, OYS 1997.

Acad. Ledivina V. Cariño: Coming in is Acad. Teodulo Topacio of the Agricultural Sciences Division. And I am Ledivina Carino from the National College of Public Administration and Governance, UP.

Roundtable Discussion on Biology as Destiny? II

Acad. Mercedes B. Concepcion: We are conducting this Roundtable Discussion (RTD) in preparation for the 2006 Annual Scientific Meeting of the National Academy of Science and Technology which will be held on 12-13 July at the Manila Hotel. The Conference is the Academy's contribution to the country's celebration of the Century of Biology. You are all cordially invited to attend the two social science presentations by colleagues who are here this morning—Dr. Allan Bernardo, who will be presenting the final paper that would draw from this RTD and the one held previously, and Dr. Agnes Rola, who, together with Acad. Edgardo Gomez, led the discussion of the RTD on which the final paper on Bio-resource Management and Our Common Future will be based.

I will not spend more of our precious time explaining what the NAST is about since most of you are familiar with it. It is sufficient to say for now that we are trying our best to pass on the torch to younger colleagues. This RTD is a means of involving you, the younger ones. Without much ado, let me welcome you all and pass on the microphone to Dr. Allan Bernardo.

Dr. Allan Bernardo: Thank you Acad. Concepcion. I would like to start the discussion by recapping some of the key points that were agreed upon in the last RTD as well as some of the unresolved issues.

The title of this RTD and an earlier one—'Biology as Destiny?' was agreed upon to provoke lively discussion rather than capture and summarize the sentiments of social scientists, or biologists for that matter. The previous RTD provided a venue for a lot of sharing regarding the stance of Philippine social scientists on the role of biological constraints in social science theorizing. Most of the participants were quite emphatic in arguing against a highly deterministic view of biology and human and social phenomenon. No one seems to be buying the extreme argument that biology determines individual human actions and social phenomenon. However most of the participants identified and articulated the role of biological constraints, neurological processes, and genetic constraints in specific aspects of human behavior, psychological phenomena, economic behavior etc.

There was also some discussion on how social phenomena and human experiences might be shaping or influencing the development of biological, neuro-biological processes in human beings.

Although the earlier RTD stimulated very rich discussion, reflections on the Philippine context remained theoretical. This may be

because Filipino social scientists have not engaged biological or neurobiological constraints in their research and theorizing. We noted that the rather warm acceptance by the RTD participants of the ideas Steve Tinker expressed in his book might have been due to the lack of wide social science representation in the RTD. The participants consisted mostly of economists and psychologists who are probably not adopting mainstream social science models in their work. For instance, it was so easy for Acad. Raul Fabella and Dr. Emmanuel de Dios to cite examples of how economic theories have improved by incorporating or revising some evolutionary assumptions and constraints. For psychologists, on the other hand, the biological dimension of human behavior has long been part of psychological theorizing. Thus, it wasn't too much of a stretch for them to also adopt Pinker's view of biological constraints as predictive of human behavior.

Given the composition of the first RTD, there were issues that we felt were left hanging or that participants were probably still not in a good position to resolve for the final paper that I am assigned to write. For this reason, I requested the holding of another RTD, this time with wider representation from the different social science disciplines, to address the questions that were left hanging: the role of biological constraints to social science theorizing and explaining human and social phenomena.

In relation to the first RTD, we are not here today to revisit the book. Nor are we here to position ourselves vis-a-vis Pinker's thesis. Rather, we are here to reflect on how the ideas in the book might relate to the practice of social scientists in the Philippines. For example, we wanted to know, for purposes of the final paper, how Filipino social scientists view the biological nature of human beings. Do Filipino social scientists even consider the biological aspect, e.g., that human beings are animals as well, in their work? Or do Filipino social scientists remove the biological in their theorizing.

Considering these questions that social scientists tend to assume or gloss over, I am very pleased that today we have an anthropologist, political science, sociologist, and demographer in the room. We can thus go a bit further to inquire into how knowledge about the biological nature of humans can have a role in social science theorizing. In light of the strong applied flavor of Philippine social science research scholarship, we wanted to see whether the biological point of view or the biological model will have any role if at all, in social science theorizing and application in the Philippines. In particular we are interested in whether it has had the same role in the other social sciences as in economic theorizing. At the end of the day, our interest is to find out if the biological point of view would improve social science theorizing in the Philippines.

In the first roundtable discussion, some academicians raised questions that were particularly compelling. The feeling then was that cultural or social explanations were inadequate in explaining interesting

aspects of the Filipino social experience. So we are concerned really with how it is possible to improve the practice of social science in the Philippines by appropriating biological assumptions.

One other important issue that was left hanging from Pinker's discussion, which Dr. Emmanuel de Dios picked up, is the conceptual distinction between scientific explanation and moral stands. Pinker's book [as noted by Dr. de Dios] made a very strong argument that explaining a human or a social phenomenon in biological terms does not make it moral or right. Just because a negative behavior or observation is 'natural' or is considered part of human nature, does not mean it is moral. However we noted in the first RTD that Philippine social science has a very strong ethical and moral dimension. In light of this, I wanted to probe to what extent such ethical considerations influence our theorizing in the social sciences and link the results of our inquiry to the appropriation of the biological constrains in our theories and moral positions.

Indeed, these are very difficult questions but I do not think we expect to come up with crystal clear answers this morning. What is important for our purposes is to begin articulating our ideas and, as far as the final paper for the ASM is concerned, aim to keep on provoking Filipino social scientists to reflect on the biological dimension in social science theorizing and how its appropriation can ultimately improve social science application and theorizing in the Philippine context. I will stop here so that our discussion can move on.

Acad. Ledivina V. Cariño: Our next speaker is a biochemist [on whom we hope the title of National Scientist will be conferred soon] but our social science community can adopt her now because of her significant work with the Aetas. We would like to invite Acad. Lourdes Cruz to share her reflections from the perspective not only of a natural scientist but also of one who has devoted her energies to linking science with communities.

Acad. Lourdes J. Cruz: I would like to begin by reading an excerpt from Pinker about the brain as a source of human nature. In Chapter 12, Pinker observed that the starting point for acknowledging human nature is sheer awe and humility in the face of the staggering complexity of its source, the brain. Organized by three billion bases of our genome and shaped by hundreds of million of years of evolution, the brain is a network of an imaginable intricacy, a hundred billion neurons, linked by a hundred trillion connections woven in...convoluted three-dimensional architecture. Humbling too is the complexity of what it does... even the mundane talents we share with other primates walking, grasping, and recognizing the solution to engineering problems at or beyond the cutting edge of artificial intelligence. The talents that are human birth rights are speaking, understanding, using common sense, teaching children...other people's motive were probably not be duplicated by the machines in our lifetime.

All these should serve... to counter... the image of the mind as formless raw material and people as insignificant atoms making up the complex being we call society.

As I mentioned in the first RTD, the development of new techniques for investigating the brain has accelerated the elucidation both of its molecular basis and the effect of the environment on brain function, memory, etc. and the over all physiology of man. A lot still remains unknown, however; perhaps science would never be able to explain the molecular basis for everything happening in the brain.

I also mentioned in that RTD, that for us natural scientists, genetic heritage is not a baggage but a blue print of our potential as human beings. Our interaction with our genetic heritage and our environment is a big factor in our decision to use that potential for our own survival and that of our family, community, the Philippines and the world. Pinker thinks organisms may develop creative ways of ensuring their own survival as in the formation of herds to confuse predators or living by each other's by products. Mutualism, symbiosis, and cooperation are survival mechanisms of biological organisms. Since a group survives better when there is reciprocal altruism, Pinker thinks the demands of reciprocal altruism explain the evolution of the social and moral emotion.

Accordingly, as society becomes more and more complex, various forms of reciprocal altruism evolve within extended families and groups: for instance, parents and elders, take care of and sacrifice for the children, anticipating that they would take care of their parents when they grow old [although at times this doesn't happen]. Among students a good example of reciprocal altruism is their involvement in study groups to help improve each other's grades. Such altruism, however, becomes deplorable when students decide to help each other achieve the same purpose by cheating. Among politicians, reciprocal altruism is manifested in helping each other campaign for votes in their respective regions [and pad each other's votes, unfortunately]. What we want is to enhance the dimension of altruism that augurs well for the common good while undermining those that benefit particularistic interests at the expense of the bigger community. There are many forms of reciprocal altruism but there is a delicate balance between those that will be good for the whole community and those that would be detrimental to its survival.

I think what sets human beings apart from other organisms is that *Homo sapiens* is the only species capable of learning from the experiences of ancestors through written documents and oral traditions. **Jared Diamond**, author of **Guns, Germ, and Steel**, examined in the book ***Collapse***, the cause of the fall of the great civilizations to learn from their fates. From the pre-historic Polynesian culture in Easter Island, to the Ansarsist and the Mayas of America, from the Medieval Viking country of Greenland to the modern world, his historical cultural thesis is that civilizations collapse when people squander their resources and reproduce

too fast while ignoring the tell tale signs of irreversible damage to the environment. In modern times similar problems brought disaster to some countries like Rwanda, and Haiti. We do not have to go too far because the Philippines today faces problems akin to those that brought destruction to previous civilizations. Rapid development, population explosion, and the destruction of natural habitats are going at a very fast pace, preventing communities like the Aetas as well as mainstream communities, from adjusting to and correcting the problem.

It is urgent for us to do something now to prevent the destruction of our forests and natural habitats, and to avoid a full grown tragedy of the commons. Let us do our best to keep our country from gearing towards a collapse mode. Jared Diamond marked the political trouble spots and the environmental trouble spots in the modern world. It is worrisome that in the two maps of the world that highlight these spots, the two categories converge in the Philippines, which is among those marked as both political and environmental trouble spots. I think this is an area where the social scientists can make a profound contribution. They can, for instance, influence and change the mind sets of politicians and the citizenry as a whole. The social scientists ought to collaborate with environmentalists and natural scientists in the hope of preventing the self destruction of our society.

Acd. Ledivina V. Cariño: Thank you Acd. Cruz, I will now call on Dr. Cynthia Bautista to speak from the perspective of sociology.

Dr. Cynthia Rose Bautista: I thank the organizers for this opportunity to reflect on fundamental questions that lie at the core of our respective disciplines and ideological perspectives as well as domain assumptions about everyday life that we may be unaware of. I apologize for not having read the book in it's entirety. Since I had no access to a copy before this RTD, much of what I know about Pinker is constructed from the introductory chapter provided by the RTD organizers and several book reviews in academic journals.

On the question 'How do Filipino social scientist view the biological nature of humans?'

Let me share my own experience as a Filipino sociologist. I began my career in sociology from the mid-1970's to the mid-1980. At that time, theoretical Marxism had just won the struggle for inclusion in the mainstream theorizing of the discipline [here and abroad]. Marxism critiqued a universal conception of human nature, arguing that the capitalist mode of production provides the condition which makes a universal notion of human nature possible. In other words, it is capitalism that enables us to imagine or construct human nature [e.g. the ideal typical homo economicus in economics] as universal rather than shaped by different

structural contexts. By contextualizing ‘human nature’ and, thereby demystifying its essence and universality, Marxism prevented us from unpacking the concept [of human nature], which would have inevitably led to a discussion of the links between biology, culture and the socio-political economic realities.

Outside Marxism, the dominant school of thought in sociology—structural functionalism, was more amendable to the influence of biology. Although it relegated the biological dimension to the background, it nevertheless unwittingly adopted elements of a Darwinian evolutionary perspective, albeit at the macro level of societal development. Its hold, however, was too weak to make biology salient in sociological theorizing. The period, from the mid-1970’s to mid-1980’s was, after all, also a time when sociologists began to veer away from the totalizing theories of Marxism and structural functionalism, to focus on culture and meaning. They argued that while there might be regularities in the social world, sociologist should be more concerned with understanding or interpreting. Despite the need to take the role of genes into account, Pinker noted the difficulty of dislodging the blank slate paradigm in the face of scientific evidence. Being a sociologist, I, for one have contributed to this difficulty by underscoring the important role of the environment in shaping behavior although I do acknowledge the interaction of biology and the environment. Our stress on the environment is understandable considering that our discipline does not straddle the natural and the social sciences the way psychology does.

I have had my own concrete but limited experience in how the environment can be designed to shape behavior. In my first few months as dean of the College of Social Sciences and Philosophy, my attention was called to the physical state of Palma Hall during a visit of an East European demographer. I personally accompanied the guest professor and his interpreter. The interpreter was a young and smart Filipina who at one point responded to the professor’s query by saying, “yes, UP is a government university that is why it is not well maintained.” I was shocked by the remark. For the first time, I began to see Palma Hall through the eyes of an outsider. I saw the broken windows, the condemned equipment and the litter all over, in the Palma Hall lobby, the AS steps, and even the corridors. I subsequently observed the behavior of students who would leave their styrofoams after lunching in the lobby or the AS steps.

Relaying my story to friends, we were informed of the broken windows theory of Malcolm Gladwell and urged to intervene in the environment of Palma Hall. Even without reading the book closely, we adhered to its core message. Our strategy then was to put garbage bins all over the place, fix broken windows, clean the lawn regularly, assign janitors to remind students to throw their litter and, more importantly, repaint Palma Hall inside and out. This strategy seemed to have worked.

I read Gladwell's *Tipping Point* closely much later. By then, my experience resonated with his writing. The book sighted the remarkable decline of crime in New York in the 1990's. It alluded to the broken window's theory of Wilson and Kelly, two criminologist who argued that crime is an inevitable result of disorder. Accordingly, if windows are left broken and unrepaired, people would conclude that no one cares and no one is in charge. In the mid 1990's Kelly was hired by the New York transit authority as consultant. He urged his contractor to put the broken window theory in practice. The person in charge of the transit system acceded. He rebuilt the subway system by painting all the train cars and removing the graffiti. Unperturbed by the criticism that removing graffiti was inconsequential, he countered that graffiti symbolized the collapse of the system. To make a long story short the change in the environment is said to have contributed to the decline in crime rates in the New York Subway.

By tinkering with small details in the immediate environment, a situation that needs to be changed, according to Gladwell, could move slowly towards a point where it tips. Once the tipping point is reached, the changes become quite significant. I had read Gladwell's book en toto by the time I reviewed the country's largest experimentation education reform in 8000 elementary schools in 23 poor provinces, It was useful for making sense of our data.

The comprehensive intervention in these schools entailed the repair of classrooms; provision of textbooks, instructional materials, and teacher training; and the granting of autonomy to principals in planning the direction of their schools. The repair of dilapidated classrooms and the construction of new rooms in schools where classes were once held under the trees, coupled with the flurry of activities in these schools heralded winds of change that translated into remarkably improved performance in the national achievement test. The performance of the schools improved to the level of or even surpassed those in the non-poor provinces.

The broken windows approach is an environmental argument. Gladwell asserts, for instance, that existing theories including genetic predispositions to crime is associated with a criminal personality type distinguished by insensitivity to norms. But the broken window theory or the belief in the power of context argues that the criminal is actually "someone acutely sensitive to his environment, who is alert to all kinds of cues and who is prompted to commit crime based on the perception of the world around him".

Other experiments suggesting the underestimated role of context are discussed in Gladwell's book. The mock prison in a university is a case in point. In this experiment, decent individuals assume the cruel behavior of prison guards because they are made to play such role.

The Princeton experiment of John Darby and Daniel Dustin of the biblical story on the good Samaritan also shows that cheating is not a universal phenomenon: there are conditions that predispose honest individuals to cheat. In this experiment, a group of seminarians was asked to prepare within a very short time, a brief extemporaneous speech on a biblical theme and walk over the next building to present it. Some were told they were already late; others were not.; some were given the Good Samaritan story, others were not. Along the way each seminarian came across a coughing and groaning man slumped in a corner. Neither their motivations for entering the seminary nor their being reminded of the Good Samaritan story on the way to the next building accounted for the decision of most of the seminarians to proceed and ignore the coughing man. What mattered was whether they were in a rush and whether they had a few minutes to spare. What this is suggesting according to Gladwell is that the conviction of the heart and the actual content of thought seem to be less important in guiding actions than the immediate context of the behavior.

The environmental argument underlying the broken windows approach complements but deviates from our focus on the environment in the 1970s or 1980s. We associated criminality then with macro-level structural factors—social injustice, inequities, unemployment, institutional neglect. Not that these factors are unimportant but the broken windows theory seems to sensitize us to lower- and middle-range variables that we can tinker with (or intervene in) to produce changes even if the overall social structures remain fundamentally unchanged. The intermediate changes might even push the limits of these structures and result in a process of their transformation

The broken windows approach does not mean however that inner psychological states and personal histories are not important in explaining behavior. An enormous percentage of those engaged in violent acts for example have psychiatric disorders or come from deeply disturbed backgrounds. But for Gladwell, there is a world of difference between being inclined towards violence or criminal acts and the actual commission of such acts. For a crime to happen, he says, something extra has to happen to tip a troubled person towards violence. Biological considerations alert us to possibilities but their actualization depends on the extras in the context.

Even if my discipline tends to lean more heavily towards nurture in the nature-nurture paradox, my own experience as dean keeps me from disregarding nature. I did not realize how the performance and behavior of our students is affected by hormonal imbalance until one of our bright students, who had failed to take her medications attempted, to commit suicide on campus during a lantern parade. Focusing on this case, I learned from colleagues in the College of Medicine's Department of Psychiatry that we have a significant number of manic depressive students and faculty

members, who appear normal because they consistently take their medications.

On the Perceived Role of knowledge about the biological nature of humans in social science theory and application or how such knowledge constrain, improve, or limit social science theories

The idea that we are a mix of nature and nurture would seem to be common sense by now. But the position against nature may be fairly strong because of the straw man that is biological determinism. In this regard, it may help to unpack the notion of biological determinism. Drawing from Johnson, the word 'biological' can refer to three different types of propositions, each with its own distinct set of implications.

The first is categorized under the umbrella of evolutionary psychology. Evolutionary psychologists like Pinker argue that our brains are not general learning machines shaped entirely by culture. Instead, natural selection has endowed us with a set of mental modules to give us innate skills and predispositions. The second kind of biology that is at work in biological determinism focuses on the differences between large groups, say between men and women or races. The third kind addresses the question of individual genetic destiny, how much of one's intelligence, phobias etc. are heritable and therefore how much are influenced also by experience. The true straw man of biological determinism is genetic destiny which implies that people are enslaved by their DNAs. I don't think, however, that Pinker is positing biological determinism the way the straw man of determinism is drawn.

Why? Because we can unlearn what biology predisposes us to learn. Johnson argues, for instance, that human beings may be prone to violence but it does not mean that we have to accept violence as a society. We overcome our so called instincts and predispositions all the time. In fact, he says, we fly airplanes, when we are poised to be afraid of heights by our evolution. That doesn't make life in the skies impossible. Certain things are just more difficult to pull off because they are not what our genes have been evolved to be. Understanding the particular channels that we are prepared to learn despite our genetic evolution can bring the achievements of our culture into sharper relief.

Pinker's biological explanations in discussions of human society, by no means eliminates the validity of other explanations. The introductory part of Pinker's book, talks for instance about the high levels of acceptance in the US of creationism, which may not be as context free as it seems. Creationism does not seem to hold as much sway in Canada, Europe and even the Philippines possibly because their peoples might have been more capable of integrating an evolutionary model of the world and their Christianity.

There is a lot of room to work in the intersection of biology and cultures, since evolution is a response of organisms to more complex environments. Indeed our genes have given us versatility. But knowing how culture impacts on and even overwhelms genes is important. I remember a colleague in UP, a psychologist telling us that even our habits are encoded into our genetic scheme. I don't know the validity of this assertion but it would help if Filipino social psychologists, who straddle the natural and social sciences, pursue more research on the cultural basis of specific traits or the cultural expressions of presumably universal traits.

Social psychologists can also assess the implications of the so-called channel capacity in cognitive psychology for social organization. Since most human evolution took place before agriculture, when humans lived in small groups, our biological adaptive mechanisms are said to be more adjusted to conditions that no longer exist. Accordingly, we have been predisposed by evolution to feel strongly about a few people and more comfortable with short distances and brief intervals in time. If this is the case, social psychologists can help us ascertain the level of social organization or group complexity we can handle.

Interestingly, there are plans in UP to conceptualize a project involving archeologists, anthropologist,, and DNA experts that would trace the development of cultures through DNA swabs. Inspired by the book *Genes, Language, and People*, such a project on the peopling of the Philippines might shed light on the intersection of biology and culture.

What about the relationship between knowledge of the biological nature of humans and its ethical implications? I think the nature nurture debate is extremely nuanced by its ideological implications. The acceptance of a static universal notion of human nature has led to the Holocaust. It has also resulted ethically in a lowering of the bar, as in the passive acceptance of cheating by powerful politicians as part of human nature. On the other hand, discounting an evolving human nature, in the words of Tinker, has led to human tragedies. Faith in the malleability of human beings (or the blank slate vis-à-vis the environment) has resulted in totalitarian regimes.

The balance, I think, lies precisely in assuming the intimate link between nature and nurture and the possibility that it can be established. If indeed they are linked, the following questions can eventually be answered. How, for instance, has our genetic pool changed with adaptation to the increasing complexity of our environment? If our genes evolved in the course of human development and continue to evolve, how would they adapt to globalization and the virtual world of cyberspace? To understand phenomena such as globalization and its impacts on cultures and peoples, how would biology/genes limit or mediate the influence of culture, technology, politics, the economy and the environment? Conversely, how would these factors affect genetic evolution? How would biology and culture combine to help us move towards a more humane and

just society in this century? Put differently, would it be possible for cultural norms on love, friendship and humanity to be eventually encoded into our genetic make-up and override our selfish genes?

Acd. Ledivina V. Cariño: Thank you Dr. Bautista for complicating the problem further by showing us how the environment has changed over time and bringing back the issue of human nature. Our next speaker is Dr. Eufrazio Abaya who will share a view from anthropology.

Dr. Eufrazio Abaya: Thank you for inviting me to participate in this roundtable discussion. I apologize at the outset because I did not get the questions before hand.

I must admit that at first I thought the title was quite controversial. It called to mind the long history of theory in anthropology and the heated debate between those who argued for the need for a more biological explanation over the cultural explanation of human behavior and the staunch culturalists. At some point, sociobiology received a lot of flak in anthropology, with critics picketing Wilson while he was delivering a paper in an international conference. Those were very interesting days.

Reflecting on the title, I would say that in anthropological theory there is a hierarchy of sorts in terms of dominance of one theory over the other. For instance because of the nature of anthropology as a discipline, being a four-field discipline with biological anthropology, or physical anthropology, cultural anthropology, linguistic anthropology, and archeology, a particular branch of the discipline, physical anthropology privileges the notion of adaptation. In contrast, cultural anthropologists would privilege the issues of meaning, of symbols, of interpretation. Archeology and Linguistic Anthropology, on the other hand, struggle between adaptationist and interpretive models. What appears to be a common denominator among proponents of the different fields is the agreement that when you do anthropology you have to adopt what they call the bio-cultural approach. Thus, anthropologists are called upon to incorporate biology in their formulations even if in practice it is difficult to apply to research problems that do not readily lend themselves to such approach.

In my field, medical anthropology, there is tacit agreement that you cannot do legitimate medical anthropology without bridging the biological and cultural or social sciences. But while this is the case, in practice there are those who would privilege either the cultural or the social biological. Interestingly, however, the tendency in my field is towards inter-disciplinary research practices in which biology is salient. For instance research on psycho-pathology is one arena where the biological cannot be ignored. Incidentally, I am working closely with a psychiatrist in exploring how Filipinos experience and express a depression, which has biological bases.

In answer to the question how Filipino social scientists view the biological nature of human beings, my answer is: they struggle to incorporate biology into their social analysis. This was clearly elucidated by Dr. Bautista. At the same time developments in the field of biology push social scientists to pay attention to genetics. On the other hand, I recall a lot of debate in the past. Social scientists then would, for example, view the emphasis on the biological nature of humans as another way of justifying the status quo. This raises the issue of ethical concerns being set aside. To illustrate, let me read to you excerpts from an article I downloaded from the International December 2004 issue of the Socialist Review. "The attempt to explain important features of society in evolutionary or genetic terms...biological determinism has two goals. First is it try to convince us that the social order is a consequence of unchanging human biology so inequality and injustice cannot be eliminated. Second, in the case of a problem that is impossible to ignore, it tells us to look...on the level of the individual and not on the level of social institutions. The problems lie not in the structure of the society but in some [feature] of individuals who make up society. The solution is to change or even eliminate individuals not to challenge existing social structures".

This is a very pointed observation coming from the Left. This article recalls a lot of the debates. Its position in these debates is reflected in its sub headings. Take, for instance, '**eugenics to genocides**'. What I found very interesting in our discussion of Pinker's ideas is that socio-biology has reinvented it self as Evolutionary Psychology. Unfortunately, I have not read Steve Pinker's book although I was able to down load his summer lecture way back in 1999, before he wrote the book.

I am quite ambivalent about the position he outlines clearly in this article because of the criticisms against it, among which is how inhuman its implications are on the issue of violence. Let me cite some passages in "Genes, Evolution, and Human Nature: Is Biology Destiny?" which reflect an going debate in the US among feminists. I was so overwhelmed by the kind of discourse Pinker generated that I even downloaded some stuff on his biography. [For instance, he defended the president of Harvard when he made a very sexist comment].

"Socio-biologists and evolutionary psychologists distort Darwin by adopting an ultra adaptationist view that tries to explain every significant aspect of human behavior or psychology as a biological adaptation shaped by natural selection.

But while human intelligence was surely the subject of natural selection, it is highly implausible to think that specific behavior or psychological characteristics are hard wired into our brains.

Quoting further from Stephen Gould[?], "The central feature of biological uniqueness also provides the major reason for doubting that our behaviors are...coated by specific genes...markedly increased brain in human evolution added enough neural connection to convert an inflexible

and rather rigidly programmed device. Endowed with sufficient logic memory to substitute non-program learning for direct specification as the ground of social behavior. Flexibility may well be the most important determinant of human consciousness”

Gould argues that there is no such thing as a programmed mind because precisely it is adaptive. He says it is flexibility that allows us to behave the way we do, I guess the subtext of this discussion is that on the one hand I would be sympathetic with the need to factor in biology [which, of course, is now an accepted view in anthropology. When anthropologists talk about evolution they always begin with the co-evolution of nature and culture]. However, it becomes a bit problematic if we privilege one over the other. This is my main message. The history of anthropology is punctuated by this debate because it is, [like the other social sciences], a moral practice.

Accd. Ledivina V. Cariño: Social science as a moral practice. Is this okay? Let us keep it this way for now. Let me now call Dean Antonio Contreras of La Salle.

Dr. Antonio Contreras: I am supposed to be the representative of the political science discipline in this RTD except that I may not be a typical political scientist. The focus of my research is not the state but institutions and processes [including everyday life politics] that are outside the concerns of mainstream political scientists.

Let me say at the outset that it is quite difficult to interest the Philippine political science community in reflecting on biology as destiny because [and my colleagues in this community might crucify me for saying this] most of my colleagues are very much engaged in what I call instrumentalist utilitarian vocations. Because of our practice as advisers to policy makers or consultants, very few of us go into metatheorizing.

Theorizing in political science may be categorized into three traditions: the behavioralists focus on political behavior; the institutionalists focus on system processes; and the constructivist. Philippine political science is dominated by behavioralists and institutionalists. And these are basically the two domains in which biology and biological metaphors figure. For example, we talk about political behavior and political cleavages. We bring in biology through our discussion of sex, gender, and race.

Now for the metaphors. In behavioralism and institutionalism, we talk about social systems [much like the human body] from the point of view of stability or equilibrium on one side, and conflict on the other. In the discursive analysis of constructivist Filipino political scientists, there are many allusions to biology [e.g. politicians as monkeys or crocodiles; their behavior as *balimbings*, politics as a dog-eat-dog world, diplomacy as hawkish or dovish]. Except for the metaphors and allusions,

however, the language of scholarship in my discipline reveals very little engagement with biology and the premises of our RTD.

Political scientists outside the mainstream behavioralist and institutional circles, are the ones more likely to be touched by the debate on biology as destiny. In my opinion, however, constructivist political scientists [poststructural/post-modern] which includes me, who argue that reality is socially constructed, would be uncomfortable dealing with biology as destiny. And yet it is in the construction of politics and the meanings attached to political phenomena that biological metaphors abound.

Beyond metaphors, however, biology as destiny figures in the practice of political activism. It can be used both by the politically marginalized as well as the politically powerful. For example, people who are struggling to create spaces for themselves like gays and lesbians use the argument to counter the position that they are committing a sin. Accordingly, their genetic makeup endows them with the right to carve a social space. Biology as destiny also gives further credence to what environmental activists now call the *land ethic* or *Gaea Hypothesis* which asserts that the earth is a living organism of which we are a part. Thus, it should be granted both biotic and abiotic rights that human enjoy. What I am saying here is that political activists draw on the ideas embedded in 'biology as destiny' to support their advocacies. On the other hand, the same source of arguments for political activists, carried to the extreme, may lead to an extremely conservative and immoral politics. It could justify fascist regimes and rigid social hierarchies,

I personally have mixed feelings about biology is destiny. As I mentioned earlier, it can be used to justify poverty, criminality and homosexuality, among others, in support of the advocacies of the marginalized [e.g the granting of rights for people whose behavior deviates from the norm because they cannot escape their genetic makeup—the gays, lesbians, niseual, transsexual]. It can also provide social scientists a comfortable zone for social theorizing and push positivist research to new heights. There are enormous possibilities in studying humans in the same way we now inquire into the behavior of social animals such as ants, bees, termites, apes, dolphins and whales and among others.

There is, however, a dark side that makes me uncomfortable as a social scientist and citizen. Arguing that biology is destiny may open the flood gates for another kind of social outcast, the genetically inferior. While genetic engineering and medical science can help improve their breed scientifically, there is also the danger that the same medical science can provide an easier way out, with complicity of course from states, to terminate fetuses that has been marked to possess problematic genes. It may be more cost effective for the state to terminate a fetus with criminal genes or with a gene of poverty. The only thing that could stand in the way of a draconian reincarnation of Hitler's purification of the Ariyn race,

given advances in the biological sciences and technologies, is moral outrage.

In a world where biology is destiny the salient question would be: how to locate ethics and morality when behavior is merely the result of genetic make up. There is no doubt that philosophical analysis and political social theory will continue to be relevant even for this new kind of science. However, armed with the genetic argument, some empiricist social scientists might completely disregard philosophical ideas because they are unscientific. The notion of human agency, morality and ethics and the very perspective that reality is socially constructed may be completely undermined by an even stronger positivist scientific culture that would privilege experiments and statistical investigations over all other ways of studying social life. The post-structural, phenomenological, constructivist, or post modern social scientists among us will be forced to join the Humanities Departments. But then again in a world where being human is genetically determined, even the humanities will become a site for the deployment of genetic predetermination. With the artist gene or the philosophers gene as markers, authentic artists would be separated from pretenders. In politics, character would no longer be judged in terms of discursive consistency with practice, but with the presence or absence of a genetic code.

As a political scientist who uses post modern approaches in my inquiry into political behavior and institutions, I am afraid I will be a candidate for consignment to another branch of knowledge. Kidding aside, I would argue that there may be an ideological agenda in bringing up this idea of Biology as Destiny. In fact, it may be doubly ideological because it justifies our state of existence and is projected as a scientific claim. This effectively hides the ideological character of 'biology as destiny', making it extremely powerful in reinforcing conservatism.

Against this backdrop, I will speculate on the impact of the biology as destiny argument to political science theorizing in the Philippines. I would think it would mobilize the postmodern, the feminist, the constructivist, the post structural social scientists to provide a more systematic challenge to this ideological frame. This will further deepen their praxis, considering that they might eventually reach out to social activists in the context of impending threats to marginalized populations borne out of an extremist political translation of the ideology behind biology as destiny.

Furthermore it will strengthen the affinity among social scientists marked by a shared **preference** for the humanities. It will be somewhat strange, however, that they will also find common ground with the social conservatives and the religious in challenging this argument.

Acd. Ledivina V. Cariño: Thank you Dr. Contreras. We are now finding out not only that the question is complex but there are different views

across and within the social sciences. Let us now move to demography and Dr. Corazon Raymundo.

Dr. Corazon Raymundo: Thank you, Acd. Cariño. I guess this is also the first time a demographer is joining the very interesting discussion on biology as destiny. I would like to start by saying that in demography we deal mostly with measurements of processes that are very biological in nature—death, mortality, fertility, maternity. In explaining these processes, the discipline tended to veer away from biology into biosocial explanations but in the process the arguments became heavily laden with ethical and moral considerations.

Demography is more of an applied rather than a theoretical discipline. Given its interdisciplinary character, its explanations are drawn from various perspectives in the social sciences and applied to particular biological processes. The biological limits of these processes are thus transcended. When we deal with death, for instance, we deal with mortality and inevitably with survival and longevity. A lot of our methods focus on survival. In fact, demographers have contributed hazards analysis or the life survival analysis to statistical methods. They have also helped quantify how particular determinants account for a phenomenon under investigation.

Understanding the biosocial aspects, particularly various events a person will go through at different ages [say 15 or 30], helps us predict how many years someone born today will be living. The demographers' sophisticated analysis of when life would begin or end opens a can of worms because we are also wont to confront issues such as those related to reproduction and maternity. Situating this analysis in a development context necessarily requires transcendence of biological limits.

Much of demography is concerned with health, both health challenges and medical science's advances in the face of health threats, i.e., kidney dialysis, heart transplants, and all kinds of organ transplants. These advances are important to the discipline because they tend to lengthen the life of individuals. Putting mortality and morbidity on hold and prolonging life represents humanity's conquest over biological limits.

Going against nature [or transcending biology], however, has run against deeply held cultural and religious values. Bloom, I think, put it very well. Taking the position that biology is destiny, he argues that nature should be the standard by which, we ought to judge our lives and even the lives of others. Any transgression against what nature is supposed to be is out of line, unacceptable or morally wrong. In straddling the biological and the social, demographers encounter this position and its counterargument often enough. Women, for instance, protest against religious tenets that assert the natural link between sexuality and child bearing. In the name of feminism, they have pro-actively sought freedom from the repetitive bind of maternity and the right to express their identity and sexuality.

The same tension between the law of nature and the need for biological transcendence is apparent in the phenomenon of rural marriages. Women who marry farmers are bound not only to the farm but to the role of breeding farm laborers. While this is natural in the context of a rural environment, it can be quite oppressive. The development of contraception is a way of breaking out of a purely procreative function for rural women. But contraception or any form of abortifacient is considered by particular groups, notably the Catholic Church as morally unacceptable. Thus, women's attempts to defy nature and control their reproductive functions through contraceptives are viewed not only as mortal sin but as contributing to the demise of the traditional family.

If one takes a feminist view, the call for women to return to their natural/biological role affects the longevity of women and constrains social development. Repetitive maternities, for instance, are cited as reason for poverty as well as infant deaths. Should gender inequities and unequal access to resources be tolerated because these are biologically destined? Interestingly, I read an author who also said that men can pursue activities that are otherwise not open to women because men are unencumbered by any biological limit or responsibility.

The tension between biology as destiny and transcendence of biological limits is also apparent in the controversies surrounding gender orientation and same sex marriages. Is homosexuality nature or nurture? What are its implications for maternity? What are its liberalizing effects on sex and sexuality? In this regard, the social sciences have to be at the forefront of clarifying complex issues such as these and in conceptualizing the link between biology, culture and the social environment.

Acad. Ledivina V. Cariño: After the presentations of speakers who represent different social sciences, Dr. Bernardo's work becomes even more complicated. The floor is now open for comments and discussion.

NS Gelia T. Castillo: I am so glad we got into this subject. The issues we have been talking about underlie our everyday life. People are beginning to say, for instance, that poverty will always be with us, that its reality is unavoidable. But this is a very dangerous view. It feeds a sense of hopelessness. Regarding the most biological of our social science concerns—the births and deaths studied by demographers, we have the issue of having tampered with death in this country while refusing to do something about the births. There are so many other issues to reflect upon. Hopefully our discussions will continue and a research program to tackle the issues in an innovative way, formulated.

Acad. Raul V. Fabella: Thank you for the wonderful set of ideas and things to ruminate over. Let me comment on some of the points raised.

First of all, I would like to say something about the broken window thesis. I know it is very popular but let me share a different view. I kind of agreed with it to a great extent because my brother-in-law and his wife are doing a great job at turning their school in Bohol around. Their work illustrates what Dr. Bautista was talking about. But the drop of criminality in the US is not only in New York. It was a well-documented trend in the 1990s. The great statistical work that showed this trend was done by a guy named David Lebit, a very famous young economist now at the University of Chicago. His surprising thesis, which is statistically robust, is that the fall in the number of unwanted babies after Wade and Rowe had a very significant impact on the criminality level in the 1990s. Given his finding, one has to temper the broken window evidence from New York, at least this was the assumption here, with this particular idea that sort of well maybe they came together and collaborated to create a reduction of criminality in New York. Note that criminality in these years has actually fallen.

My second point relates to Dr. Raymundo's presentation. Let me just say that the divorce between sex and procreation is based on more careful study of nature. Among the Manobos, the pigmogens, everyday sex has nothing to do with procreation but it had a lot to do with social cohesion. If a bunch of bananas is placed before a group of very hungry Manobos, they first have sex instead of jumping in, growling at each other and biting the fruit. When they are already a bit tired, they go to the bananas and eat in peace. So social cohesion as a function of sex is well documented.

The young have sex with the old and the old do it with males and females. But nature is not at all that great either. There is rape among the sea lions. There is such a thing as socially condoned rape just as there is nature-condoned rape. Life will be nasty, bitter and short according to Hobbes. But of course there is a counter view to that which is Rousseau's view that nature is actually paradise. I don't think we see that anymore. But this debate really goes a long way—from Hobbes to Rousseau, from Rousseau to the great divide between the French enlightenment and the Anglo Scottish enlightenment. The French enlightenment thought that human nature was perfectible. [Perfectible is an appropriative term today]. If the proper environment is provided, human beings can become perfect. The Anglo Scottish enlightenment, on the other hand, was very different. It accepted human nature as it is and decided to build on the basis of a flawed human nature. It accepted original sin and was not anti-Christian (anti-church) as the French enlightenment was. But of course the French enlightenment is the intellectual father of Marx, Engels, Lenin and all others. So this debate really goes a long way. But it does not mean that just because it is an old issue, it is not understood.

Dr. Agnes Rola: Thank you. I became more interested in the topic Biology as Destiny after a discussion with an older European who called himself a philosopher. We were talking about poverty, ruminating on the question: “Why do people remain poor?” His answer as a philosopher was “Oh its attitude.” This led me to reflect on the data that I have been collecting for the past ten years among upland farmers. I have analyzed data on households that experienced globalization and decentralization in 1996 and El Niño in 1997 and 1998 in search of determinants of pathways in and out of poverty. Indeed the terrible shocks influenced the pathways of these households. Among other variables I included were the biophysical environment of plots, the human indicators of households and the institutional indicators.

Relating my discussion with the European on poverty and Biology as Destiny, the only variable that I can think of as relating to biology is not age but rather education. In the absence of DNA analysis, the trajectories in or out of poverty of the cases of farmers I reviewed, which included migrants and non-migrants to the area, members of an indigenous tribe and of the mainstream population, education determined the outcomes. Those with poorly educated members remained at the margins of development. I am not sure about the links between education and biology. Perhaps learning and cognitive behavior are affected by biology. More research has to be done to shed light on this relationship. Such research should also guide the interventions (e.g. communications) that would enhance learning or even go beyond the limits of genetics.

NS Gelia T. Castillo: When we watch television programs, it is almost inevitable for someone to say: *nagkasala, kasi tao lang ako eh*. Such acceptance of human frailty can become an excuse for morally unacceptable acts in our cultural or public life.

Dr. Eufracio Abaya: I would view such an attitude as recognition of the limits of the human condition, the limits of human agency. For me, people who know their limits are knowledgeable or wise. In fact it connects with the thinking: *mortal din ako... Mamamatay din naman ako...* [I am mortal; I will die]. I think this is part of cultural adaptation to foster harmony and appeal to human emotions—*awa* [pity] and acceptance. Such expressions, while reflecting biological adaptation, are cultural products. How else could I construct that? I am not sure I can adopt Pinker’s frame, which translates into something like this: there is a module we call emotion and that particular idea, or pronouncement, *tao lang ako*, might have been triggered or shaped by that.

Dr. Cynthia Rose Bautista: Maybe the question is, what is human nature or what is naturally human? What does it mean to say biology is destiny? How to separate the culturally defined in what we call human nature and

the genetically determined is a challenge. We can say, for instance, that we have selfish genes, which lower our bar, but we can also say that people have altruistic genes that evolved as part of their adaptation to their environment. Maybe we are capable of something a bit more transcendent and our natural flexibility allows us to adopt to ways that are more sophisticated than those we generally associate with human nature. I think it is also crucial for us to say that Pinker's categories of what would be universal are not about specific behaviors that characterize human nature. The reference of the category 'selfish' or 'self-interested', for instance, might range from behaviors associated with selfish people to more sophisticated behavioral (and motivational) forms that are oriented toward a common good or a more collective spirit.

It is hard to talk about biology being our destiny, but I would agree that our genes set limits on the things we can do. Setting limits does not mean, however, that biology determines specific behaviors/motivations that correspond to particular genes. One's genetic make-up might set the limits but there are many possibilities within these limits. We can have all forms of behavior within a limited set of possibilities and we don't know the boundaries of these limits. There are also factors that mediate to broaden the limits or constrain its impact on human beings. This is why I think it is very difficult, except for extreme behaviors, to separate the social from the genetically determined in social phenomena when one accepts the paradox that biology/genes sets limits on human behavior, cognition, and affection. But that these limits can be moved/widened in the course of human adaptation.

Dr. Eufrazio Abaya: The phrase 'tao lamang, mayroon tayong limitasyon' has become socially accepted. In fact, it has increasingly become a plea to make light of things when something is wrong "Oops, tao lamang." Transgressions within this frame are to be excused.

I think we can situate "tao lamaag" in the context of social negotiation, social transaction, or implicated relations of power. To illustrate, the poor could also invoke the excuse "Mahirap lang kami." [we are only poor people]. But I could view this phrase as capitalizing on poorness. Poorness here is a social construct laden with power. It has a social value when situated in the context of a local moral world where the poor deserve pity or mercy. So the poor capitalize on this. Children would say, "Sir, kahit pambili ng bigas" dahil mahirap eh. And so they appeal to human emotion.

You can observe this among the Aetas. When asked why they do certain things, they would say "Paano Aeta kami eh. Ganun kami talaga."

Participant: There is a general feeling that Filipinos have a very weak capacity for collective action. Take for example three dams that were completed in China through the mobilization of thousands of people. The BBC came around to interview the people affected to observe possible

protest actions. They did not find protestors. Instead, their respondents were saying that constructing the dams was hard but they had to follow their government.” This clearly demonstrates a tremendous capacity for collective action in China.

If this happened in the Philippines, we would have gone to the United Nations to announce our problems. But I am not going to be theoretical about this because from where I sit I can see the spires of Iglesia ni Cristo. It is interesting to study the Iglesia ni Cristo because it is one group of Filipinos with great capacity for collective action. In this church they will never accept “Pinoy lang ako eh.” What has created this magic, [of course it is authoritarian]. The Iglesia ni Kristo is a small group but it is very cohesive. When Manalo speaks, every politician listens. This couldn’t be genetic because we are genetically the same as these guys. But clearly they are different.

Participant: I just want to react to the observation that Filipinos have a very weak sense of collective action. I think it depends on what kind of collective action we are talking about. Filipinos may have a lower sense of collective action from the top, i.e., collective action as compliance with institutions such as the state, when compared to the Chinese. But we have demonstrated collective action in replacing two presidents. With some measurable results we have collective action at the local level. We have collective action when people participate in community development activity. So it depends on what we consider collective action. It boils down to how people see the state. How people view power. This is why in western societies, the idea of volunteerism, the idea of social capital is very much part of participating in governance. In the case of people in Southeast Asia, say Thailand or the Philippines, the idea of freedom from, is very much associated with freedom from the state rather than a kind of citizenship wherein you have to volunteer. So NGOs are more confrontational, more oppositional because in their context, the state has been seen as an elitist institution. Of course when we talk about China, the political analysis is different there. The point is it is very difficult to compare western constructs of power, citizenship, and participation to what we have here. Now the question is, is behavior towards institutions of power biological or contextual? Would political and social histories have implications for such behavior or predisposition? How much of it is genetic? How much would be constrained by the fact that their IQ is limited by genetics? Or is it their poverty that prevented their IQs from developing? This is indeed very complex.

Dr. Eufracio Abaya: Which is why, at least among anthropologists, they argue for the notion of complementarity. The notion of a connection between the idea, mind and culture is always there. I guess that is the anthropologist’s response to this dualism that has sort of made our theorizing unproductive.

Acd. Ledivina V. Cariño: We really have gone beyond the point of whether it is biology or environment, nature or nurture. What we are really looking for now, among other questions is what is the proper mix or the appropriate frame. I think part of our problem is that we have not done research on this. So that we don't know the extent of the influence of environmental factors or nurture, parents and so forth on the way we behave and how our social institutions have developed. There is really a crying need for research. What we have seen today, I hope, is a growing consciousness to now take into consideration new findings in biology into our social science. Acd. Topacio, would you like to say something?

Acd. Teodulo M. Topacio: All I can say is I am happy that I am not a social scientist. We don't have that social science problem in my profession because I deal with animals and issues like euthanasia have been resolved in our profession. In fact to make a more accurate diagnosis when an animal is sick and is about to die, we usually put him to sleep and open him up to find out what killed him. I think we all know Will Rogers, the famous American cowboy. He said that the best doctor in the world is the veterinarian. Since he cannot talk to his patients, he just has to diagnose the problem well.

Let me now address the problem of birth control. We don't have this problem in the animal kingdom. In fact we promote birth to provide food to humans in contrast to demographers. This is why I said I am happy I am not a social scientist. This is the first time I heard social scientists say they will factor in biology. Now I can understand why it is not easy for them to do so.

I think the social scientist have a lot of responsibilities since many of our problems are human. As Dean Contreras noted earlier, we can learn a lot of things from animals. Of course politicians have been likened to crocodiles. But there are positive traits that can be adopted by social scientist group. For example the loyalty of a dog; the rumination of the cow while chewing grass; the wisdom of the owl; the cleverness of the fox; the capacity to work of the horse.

Participant: There is a practical side to the question of what is really genetic and what is cultural. I just came from the Autonomous Region of Muslim Mindanao. One of the challenges in ARMM is said to be the prevalence of culture. Someone told me they have the same culture as the Malays in Indonesia. But we are also Malays. Do we have the same genes? Could it be cultural? If yes, then delivering services such as education effectively to the population in ARMM would entail eroding patronage politics that prevents people on the ground from accessing these services.

Dr. Eufracio Abaya: There is a construct used among those who would valorize biology to look at culture. They call it Mene. In fact, I was really

surprised to find a columnist link the violence in Mindanao to the notion of mene. I was taken aback because in our search for explanation, we have been so desperate as to pin down and reduce a phenomenon like violence to Mene. I will not go that far in saying that the Muslims in Mindanao do have the mene for that kind of violence. After all, there is a mene for the biology side. There is also is a mene for the cultural side.

Acd. Lourdes J. Cruz: I think Pinker cautions us in his book to be careful about saying something that would legitimize its use by a racist. He said that the variations within a given group of people are much greater than the variations between races. Moreover, variations between races cannot explain what this particular race does, what that particular race does. These variations cannot be explained in terms of biology. The environment plays a very important role.

Dr. Eufracio Abaya: In anthropology, we have abandoned the concept of race. I think now the operative concept is cline. The boundaries of race are clear while clines defy boundaries in terms of genetic characteristics. Furthermore, the construct 'race' has a very dark history. Thus even physical anthropologists have become sensitive to its use.

Acd. Teodulo M. Topacio: I forgot to mention, that I think we have no problems as far as animals are concerned. What we have are human behavioral problems, problems with the owners of the animals. This is still social science.

Acd. Lourdes J. Cruz: In addition to thinking about various social science theories, I would like to reiterate the thesis of the book *Collapse*, how societies choose to succeed or go kaput. That is something we should look at carefully because, I am really afraid for the Philippines these days.

Acd. Raul V. Fabella: Incidentally, some of the cultures in the book *Collapse* did not choose to survive: they were just wiped out.

Dr. Allan Bernardo: I am not sure if this is going to be a summary because usually when I summarize, I create more issues than consensus. It seems that the discussions from the last roundtable to this one have addressed an important point which is defining how we understand biology/human nature. We have clearly positioned ourselves away from a deterministic interpretation of 'biology as destiny'. I think the social science group has clearly articulated why that type of explanation is limited particularly for social phenomenon. There are many arguments that we can pick up from that. However, in the latter part of today's discussion, the group seems to be appropriating the notion of biology as a limit or a

limiting factor. However, I think that the notion of biology as a limit is also culturally rooted. For example in Confucian heritage culture, human nature starts out as flawed but there is this notion of the perfectibility of human nature. In other words, biology might be limiting but there is a cultural notion that one can improve. Rather than using human frailty as an excuse, therefore, it is actually viewed as opportunity in this cultural heritage. I wonder if social scientists may be engaging the notion of biology in an unproductive way. As Dr. Bautista was suggesting, I look back at Pinker and he uses biology not in extreme terms as limit in destiny and determinism but as constraint. In terms of connotation, 'constraint' is more loose than 'limit'. Pinker looks at biology as, to use Ac. Cruz' term, a blue print but it is not a rigid blue print. The two roundtable discussions, particularly the first one, had many inputs as to how the blue print can be altered in the process of human development. I think we in the social science community, would have to reflect more deeply on how to engage the notion of biology, of human nature.

I think we also have to become more careful in engaging that notion of culture. Listening to the explanations being posed by this group and the previous group we do not seem to be looking at culture in the traditionalist, structuralist, functionalist view of social processes. What I seem to be hearing now is a lot of constructivist notions of culture. It seems to me, based on what I'm hearing, that culture is not viewed as something that is out there but is something here. It's how groups of people attach meaning to certain things including their own biological make up or biological nature. This reminds me of Dr. Rola's intriguing question about persons who are unable to mainstream even within their families.

In this connection, I think Dr. Abaya's comment is most valuable. Indeed we might be looking at culture and biology in a very positive sense as independent variables. While we have to ultimately account for outcomes, we may be defining the independent variable 'culture' inappropriately because it resides in the cognizers within the culture so that people who share the same culture can give different meanings to the same social processes; so that within the same culture, say a group like the Iglesia ni Cristo, members may give different meanings to the same political, social processes. Thus, recalling Dean Contreras' view, this perhaps makes taking a constructivist social science approach problematic for appropriating biological explanations. I am not sure about that however, because we can engage biological explanations in many different levels. There are evolutionary biologists like Pinker who claim that there are neurobiological bases for constructing meanings. So that the brain affords us certain capacities to give meaning to experience. At that level, appropriating biology as an explanatory system is not problematic. It becomes problematic if the biological endowment is used as the explanation for a more complex social phenomenon. At this level, biology can be viewed as a constraint.

If social scientists can rethink the usual dualism between biology and culture, then a much more productive engagement of both culture and biology might emerge. This would redound to more productive interventions as well in policy making and applied processes. I am not sure if that kind of synthesis will make social scientists happy.

Dr. Cynthia Rose Bautista: To my mind, Dr. Bernardo put it very well. Maybe the word 'limit' connotes limiting. On the other hand, constraints might also be closely associated with being bound in commonsense parlance. For me limits can refer to very, very broad limits which can be pushed. After all, the social sciences are in the area of change. How would this link to perfectibility?. The limits imposed on us are real in their consequence but they can be pushed and transcended to create a social order that would have another set of wide limits. But, this notion of limit may be difficult to grasp so we can drop the word. I was really using it earlier in a more philosophical sense as setting limits that are almost boundless because they can be pushed. A series of quantitative changes can push the limits to a tipping point when they become qualitative. In this regard, meanings might be socially constructed [constructivism] but the interpretations have real consequences that constrain people. The web of meanings or social constructions, would, to a succeeding generation, constitute reality that is deemed objective and limiting.

Participant: The problem has been framed for us by our intellectual ancestors. I think we should defy a kind of engagement of the problem that rejects biological explanations all together. The criticisms of Pinker's work are noticeably drawing from the vestiges of that kind of discourse. This is really unproductive because going to one extreme and taking up a purely cultural social science perspective would mean rejecting a lot of useful empirical data that are not easily refuted. I think it would be more productive to get out of the dualism and be more mindful of our methodologies.

Participant: The first round table discussion mentioned the need to engage in more multidisciplinary work. We need to go out of our comfort zones in terms of methodology. Our methodologies may make us blind to significant points. What I found fascinating in this discussion is that social scientists can actually be very metatheoretical if they want to be. It is so easy to do low level social science, the flora and fauna kind of research that does not engage these kinds of constructs. I hope the paper will try to influence the work of social scientists in the Philippines because we need to be grounded in contemporary discourses. .

Acd. Ledivina V. Cariño: That refers to the doable kind of research, the consultancy kind. But if we start asking questions that will be challenging, that will seek to push us to articulate the theory that we are really working

with [which we sometimes do not know fully until a later point in our research], then we might get more of the metatheory that you are looking for.

Dr. Allan Bernardo: But I also think that it is an artifact of the social science research culture in the country, which does not support long-term research projects. That doesn't allow you the luxury of the rumination that is required for big theorizing. Let's face it even in the most progressive academic setting, research grants are one year; the maximum is two years. And what kind of scholarship can come out of that? Consider the works of Diamond and Pinker. Theirs are long term research programs that are sustained. They don't look for the application of your theories after one year. These are ideas that percolate or ferment, depending upon your preference for coffee or wine over a very very long period. Our social science research community doesn't have that environment and thus, would research also differently compared to contemporaries in other countries. .

Acd. Raul V. Fabella: I just want to warn against being political about this. My concern is unraveling what is before talking about what it should be. There is always the danger in the Philippines that before we actually know what is, we are already talking about what it should be. And then we fall into the trap that NS Onofre Corpuz aptly describes as "these are the conclusions upon which I will base my facts". We also have this problem in economics. But I think if we are to stay scientific, if we are to stay in NAST at all, we have to be positive, it has to be that way.

Dr. Allan Bernardo: I don't think that is what the social scientists in the community are talking about. I think what I am getting from the discussion is that a purely positive approach to understanding social phenomenon will be limited. It might be unfortunate if there are constructs that we can appropriate and still ground in empiricist approaches. I don't think we are looking at floating ideas just to describe our utopia. I think what is coming out from the discussion is the need to go beyond the structures that we usually include in our theorizing. If we construct meanings, for example, I don't think we are necessarily denying the science route. It might be a worthy expansion of, [I don't know if people would call it], a new positivism when it comes to social science work. But I don't want to get into that. I think that maybe the reaction might be a bit severe because I don't think this group was talking about crossing the line in that way.

Dr. Cynthia Rose Bautista: The social science community has veered away from positivism in many ways. But it is important to note that it has also veered away from the very ideological perspectives of the 1960s and the 1970s. To a large extent, most of us are still grounded in empiricism even while we talk about constructing the constructs that we are using. A

favorable influence of constructivism is that you are sensitized to things that you could not see when you were just looking at categories in a very positivist way. In a sense, the constructivist frame broadens one's way of looking at phenomena and allows him or her to bring back the insights from the frame into his/her empirical analysis. I would just like to reassure Acad. Fabella that we are not moving away from science.

Dr. Eufracio Abaya: What we have been doing is characterize the practice of social science in the Philippines. I would start with the supposition that there is a multiplicity of social science practices in the country and I would not dare reduce it to just one kind, to one monolithic entity. I know for example that we are all positioned observers. We are socially situated and we always have intrinsic and political positions that we have to be aware of. I could understand for example how a group of social scientists would be positivist through and through. But other social scientists who have kindred ties with the humanities have different discourses and practices.

Dr. Cynthia Rose Bautista: That is a problem for NAST because the social sciences have a plurality of discourses. When we say sociology we may be talking about a very positivist sociology or interpretive/phenomenological sociology. Despite their differences, they are nevertheless social scientists.

Dr. Eufracio Abaya: In fact, there's a growing body of literature coming from the social sciences that examine the culture of science. In effect, the privileged position that's scientists have sort of embraced is being challenged by social scientists. The power relations within Academia is something for NAST to address.

NS Gelia T. Castillo: As I have said earlier, I am very happy we got into this discussion because this is not what we talk about everyday in our social science cubby holes. I am really very pleased that we are all opening up to new possibilities and tasks that we have not done but that we should be doing.

What are some of the things that we should be studying? With respect to the historical phenomenon of collapsing civilizations, I had a chance to visit Machu Pitchu. While atop it, I wondered what led to the complete desolation of the place. I don't know if we are headed in that direction but we seem to be on that path. I think this is a very serious business.

As you know, I have an American son-in-law who specializes in philosophy and Buddhist philosophy. In a recent visit, he gave me his new book on Buddhism. One paragraph attracted my attention, it contained two insights. One is that Buddhism is very empiricist. This was a surprise

to me because I have always imagined Buddhists as being meditative and up in the clouds.

The second insight is "Wisdom is purified by morality and morality if purified by wisdom". Where one is, so is the other. The moral person has wisdom. And the wise person has morality. The combination of morality and wisdom is the highest thing in the world." Clearly our leaders have wisdom but do not have morality on their side.

We talked about biology, bicultural, biosocial, biophysical, bioethics, and biotechnology. The public's response to biotechnology is the most puzzling to me. It welcomes very much the medical side of it. But why not its applications in agriculture? The answer is because the medical side is a matter of life and death while agriculture is not. In fact, there are many demonstrations against biotechnology in agriculture but not in medical science. When social scientists are asked to come in, they don't know yet where to start. At times, they succumb to the temptation of passing on dogma as science.

Two years ago, there was a group of 12 top molecular biologists in the world. They were all young, with Chinese or Japanese-sounding names. It was a very exclusive meeting so I became very curious about who organized it. I was told, the plant breeder. So I went to the plant breeder and said, "Can I sit in that meeting?" He said, "Of course, I will arrange it for you". I went to this meeting and the real guy in charge said "I understand you want to attend this meeting". I said, "Yes, if I could." And he said, "You may attend but you have to keep very quiet." So I raised my right hand and said, "I will keep quiet."

Why was I interested in this meeting? I wanted to find out whether these young and very bright guys were interested or concerned about the anti-biotechnology movement in agriculture. The issue did not come up at all on the first day. It did not come up either on the second day. I thought "My god they are wasting my time! I could not understand what they were talking about". Finally, I think on the third day, the issue came up. But I felt so sorry for them because they felt so helpless. They were so serious in what they were doing; they really believed in what they were doing and were very good at it. But they threw up their hands when it came to the demonstrations and its politics. If they turn to a social scientist, would we know how to deal with it? I don't know but I think we have a lot to learn.

And so I hope this roundtable discussion opens up a whole new world to explore and contribute to. I don't know where to find the money but I am dreaming of a bigger research program involving the best minds. I remember Dr. Rola's project in Bukidnon. I was there during the first meeting. There were three Talaandis who attended the meeting and at the end of the fourth day, they wanted compensation for attending the meeting. The organizers were flabbergasted. In reply to their reason for not paying honoraria, the representatives of the ethnic group said "you know we

spent four days here; we were not able to do farm, so when we go back, our wives will ask, what do you have for me?" and when you say, "well I attended the seminar on sustainability, the wives would say, "can you cook sustainability?" How did they resolve the issue? The organizer decided they were going to give compensation in kind, that is, in the form of corn to be given at a later time.

When the farmers explained their request for payment, I thought "My God why shouldn't they be compensated? All of us got our allowance. And these guys were there for four days". These are among the real issues that should concern us but my greatest concern is poverty. It is so palpable everytime you go out. And yet every blessed program now is pro-poor. I said, "every time we have a pro-poor program, those organizers get rich! And no body else does".

There are many things still to understand about poverty but for now, let us go back to the papers and produce a volume that will force everyone to rethink. Hopefully, we can develop a new research agenda. Acad. Emil Javier used to say "I cannot impose on these social scientists, they go ahead and do what they want to do anyway". He has had a hard time figuring us out. But I think people like him will appreciate a publication.

Part II

BIO-RESOURCE MANAGEMENT AND OUR COMMON FUTURE?¹

**Agnes C. Rola, Edgardo D. Gomez, Federico M. Macaranas,
Francisco A. Magno and Perry S. Ong²**

Abstract

Survival of societies largely depend on biological (bio) resources management, which is the responsible use of living resources—plants and animals, and the natural environment that support these, for both traditional and new applications. Bio-resources are of two levels—ecosystems and species. Bio-resources' utility also vary temporally and spatially. In the early times, when population growth was low and customary rules prevailed, bio-resources were not under threat. Collective action evolved in the villages to safeguard the land, water and the biological resources for sustainable use. As countries developed, the state became the more powerful steward of all resources. While protected areas in forests and marine sanctuaries were set up, the weak property rights, the lure of commercialism and the seeming lack of collective action to protect these resources have led to resource degradation in recent times.

It is hypothesized that governance through policies and institutions influence bio-resources conditions. At the ecosystem level, the four cases of best practices cited in the paper showed that community participation, external support and local government leadership were factors for sustainable bio-resource management. Species management practices have a dearth of documentation; and the paper poses some management strategies for this level. Among the recommendations is the critical role of science and technology in the development of bio-resource management plans and in monitoring desired outcomes.

¹ This paper is a synthesis of the discussions during the Roundtable Discussion (RTD) sponsored by the National Academy of Science and Technology (NAST) Social Science Division, March 23, 2006, Philippine Social Science Council, Quezon City. Contributions from the participants of the RTD are gratefully acknowledged.

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I. Introduction

The theory that explains the causes of extinction of biological species is still evolving. As a species, the dinosaurs were seen to have inhabited the earth for the longest time, more than 175 million years. Then about 65 million years ago, they became extinct. Scientists have many theories concerning this extinction, e.g., some cite climate change, others thought that a huge meteorite hit the earth about 65 million years ago and this had caused forest fires. So much smoke and dust filled the air that sunlight could not reach the earth's surface (The Golden Book Encyclopedia, 1988). But that was a “millions of years ago” story.

In the contemporary world, about 137 species of animals go extinct everyday, or about 50,000 species each year, a rate not seen since the age of the dinosaurs (Sevin, 2000). Habitat degradation and fragmentation, hunting, human and animal conflict, competition with domestic animals for food and water were the observed causes. To survive, *Homo sapiens*, became a cause of lower species extinction.

Current thinkers, however, remind us that societies survive or collapse depending upon how their inhabitants are able to manage the biological resources (or bio-resources)—plants, animals and the natural environment that support these (Diamond, 2005). Bio-resource management is at two levels: ecosystems and species. Ecosystems management focuses on habitats such as forest, coastal, marine, sloping lands, etc. Species management includes plant and animal species, such as rice and their wild relatives, tree species, animal species. There can also be management of microorganisms and genetic resources now used as inputs in biotechnology transformations.

In his book, Diamond (2005) identifies “failures of group decision-making on part of whole societies or other groups” as a major reason why societies collapsed. According to him, throughout recorded history, actions and inactions by self-absorbed kings, chiefs, and politicians have been the regular causes of societal collapses. As a result of lust for power, for instance, Easter Island chiefs and Maya kings acted so as to accelerate deforestation rather than prevent it.

There were four factors that contributed to this failure of group decision-making (Diamond, p.421). First, a group may fail to anticipate a problem before the problem actually arrives. But this is a constraint of illiterate societies with no writing skills and limited oral transmission. They did not anticipate the extinction problem because they had no prior experience of these problems and may not have thought about the possibilities.

Second, when the problem does arrive, the group may fail to perceive it. The most common situation under which societies may fail to perceive a problem is when it takes the form of a slow trend concealed by wide up-and-down fluctuations, such as global warming, in contemporary

times. According to Diamond, politicians call this “creeping normalcy”, as it takes “a few decades of a long sequence of such slight year- to- year changes before people realize, with a jolt, that conditions used to be so much better several decades ago, and that what is accepted as normalcy has crept downwards.” (p.425).

Third, after they perceive it, they may fail even to try to solve it. There are several reasons for these, which according to social scientists are driven by the theory of rational behaviour, arising from clashes of interests between people. Several of these concepts are well known in the economic and social science literature—“tragedy of the commons”³, the prisoners’ dilemma, and the “logic of collective action”. This was the stage that Diamond refers to as the ISEP—“it’s someone else’s problem”.

Finally, the fourth explanation for the failure in decision-making is that societies may try to solve it but may not succeed. The reasons given were quite obvious: the problem may be beyond their capacities to solve, a solution may exist but can be prohibitively expensive, or the efforts may be too little or too late.

On the flip side, Diamond also cites successful decision-making on the part of the whole that has brought about longer existence of other societies, and that included societies of current times. He attributed the survival⁴ to the attitudes of the leaders of these societies.

Contemporary literature has not really developed a theory that may have counter arguments to the point raised by Diamond (2005), but are mostly in support of this. These are studies about incentives of societies to manage their natural resources. The work of Rasmussen and Meinzen-Dick (1995) on roles of local organizations in natural resource management was supported by two major bodies of literature: empirical analysis of forestry, fisheries, grazing, and irrigation management and game theory. Resource management literature highlights the physical and technical characteristics of the resource, the characteristics of a group of users, and the attributes of institutional arrangements as key factors affecting the management capacity of organizations. Rasmussen and Meinzen-Dick (1995) further used the simplistic game theory to predict a tragedy of the commons for natural resources, although according to them, “more refined versions provide insights into the role of communication, group size, time horizons, trust, and social norms in supporting collective action”.

³The current solution to the tragedy of the commons will be for communities to design, obey and enforce their own rules.

⁴ Part of the reason why some societies succeed and other fail involves difference among environments rather than among societies. But while environmental conditions certainly make it more difficult to support human societies, in some environments than in others, that still leaves much scope for society to save or doom itself by its own actions (Diamond, p.438).

This paper derives motivation from Diamond's theory. It is hypothesized that governance through policies and institutions influence bio-resources conditions.

The paper is structured as follows: Part II discusses the evolution of bio-resources management strategies in the country from the economic and political development. Part III describes the status of bio-resources in the country, using a macro perspective. While the macro story appears discouraging, Part IV showcases four of the current best practices in ecosystem level bio-resource management. These evolving good practices on ecosystem management were influenced by participatory research studies and efforts of local development workers. Part V discusses species level bio-resource management and Part V tackles the challenges of designing a bio-resource management plan at the species level. The paper ends with a brief section (Part VI) on recommendations highlighting in particular, the role of science and technology in the development of bio-resource management plans and monitoring of desired outcomes.

II. Bio-resource Management in the Philippines

A. Bioresource management strategies in early times

Historically, institutions influence resource use and management (Rola and Coxhead, 2005). Prior to colonization, tribes and communities managed their communal resources by customary law. Collective action evolved in the villages to share responsibilities to safeguard the land, water and the biological resources for sustainable use. As examples, forest and catchment areas were protected to minimize the processes of erosion and sedimentation, hence, protecting soil microorganisms; maintenance of embankments and water channels leading to paddy lands was a shared responsibility. Riparian zones were observed and safeguarded. Both local knowledge systems and community-based practices may have, in the past, ensured the sustainable harvesting and conservation of bio-resources, which helped in the conservation of biological diversity over time. Long-rotation bush farming fallow systems were widely regarded as 'sustainable'.

Colonization created the elite and the masses' division in the Philippines, and the start of clashes of interests in resource use. Customary law could not accommodate such conflicts. The state assumed the lead role in controlling resource use and access, and new resource management institutions were imposed from outside the community. But even as local offices of national resource management agencies were established, these had no autonomy and little effective authority. Because state power was low at the frontier; the resource base became, in effect, open access. What followed was rapid deforestation, shortening of fallow periods and general degradation of soil and water resources (Rola and Coxhead, 2005).

In recent times, there was growing community demand for environmental quality and resource conservation. This trend was complemented by a more general decentralization of power and authority. In the best situations, decentralization plus local demands for more environment-friendly development were to be complemented by national laws and policies. In the best of outcomes, national agencies, local governments and community groups collaborated to design (and more importantly, to implement) resource management policies that were compatible with individual and community needs and aspirations.

B. Contemporary Bio-resource Management Strategies in the Philippines⁵

Structure of Management

Current initiatives for bio-resource management in the Philippines were a result of the global views about sustainable development. Sustainable development is meeting human needs of the current generation without endangering the ability of future generations to meet their needs (World Commission on Environment and Development, 1987). The Philippines response⁶ to the call for sustainable development was the creation of the Philippine Council for Sustainable Development (PCSD)⁷. The PCSD is mandated to oversee and monitor the implementation of the Philippine Agenda 21 (PA 21), the Philippines' blueprint for sustainable development, by providing the coordinating and monitoring mechanisms for its implementation. This arrangement was complicated by the fact that by law, the Department of Environment and Natural Resources remained the state's agency for overall management of the country's resources. It was facilitated when local governments began to have power over the resources within their jurisdiction. Several national departments manage resources; this responsibility is also given to local level institutions.

Governance of Resources

Governance of resources is characterized by a hierarchy of coverage of the institutions (national to local), multiplicity of state and non-state institutions, the different mandates or themes and the issues over its use (technical, social, economic, political) (Figure 1).

⁵ The discussion in this section refers to current elements of ecosystems management only, although this is also very important as ecosystems are habitats of the various species of flora and fauna.

⁶ As the government's commitment to the Agenda 21 agreed upon during the Earth Summit in Rio de Janeiro in 1992

⁷ This is headed by the Director-General of the National Economic and Development Authority (NEDA) as Chairperson, the Secretary of the DENR as the Vice-Chairperson and with membership coming from both government and non-government organizations.

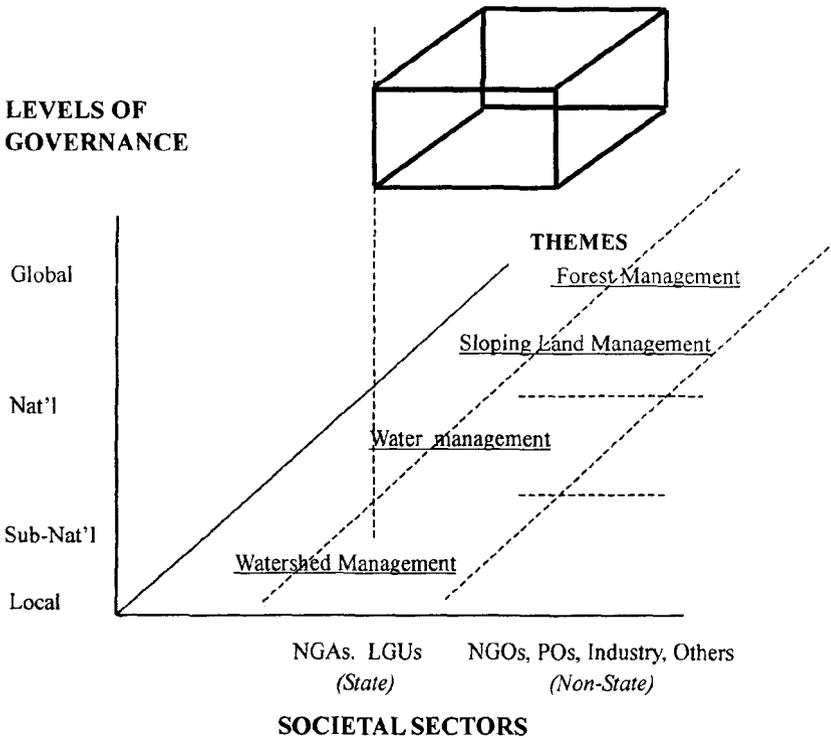


Figure 1. Three dimensions of resource governance (adapted from Malayang, 2004)

The Philippines' configuration of this governance space is in Figure 2. The national government and its agencies totaling at least six, still have the power over most bio-resources management decisions because of political clout and financial and technical capacities. The local governments are seen to be still weak in capacity and financial capability to manage resources; and devolution of this function has not been complete.

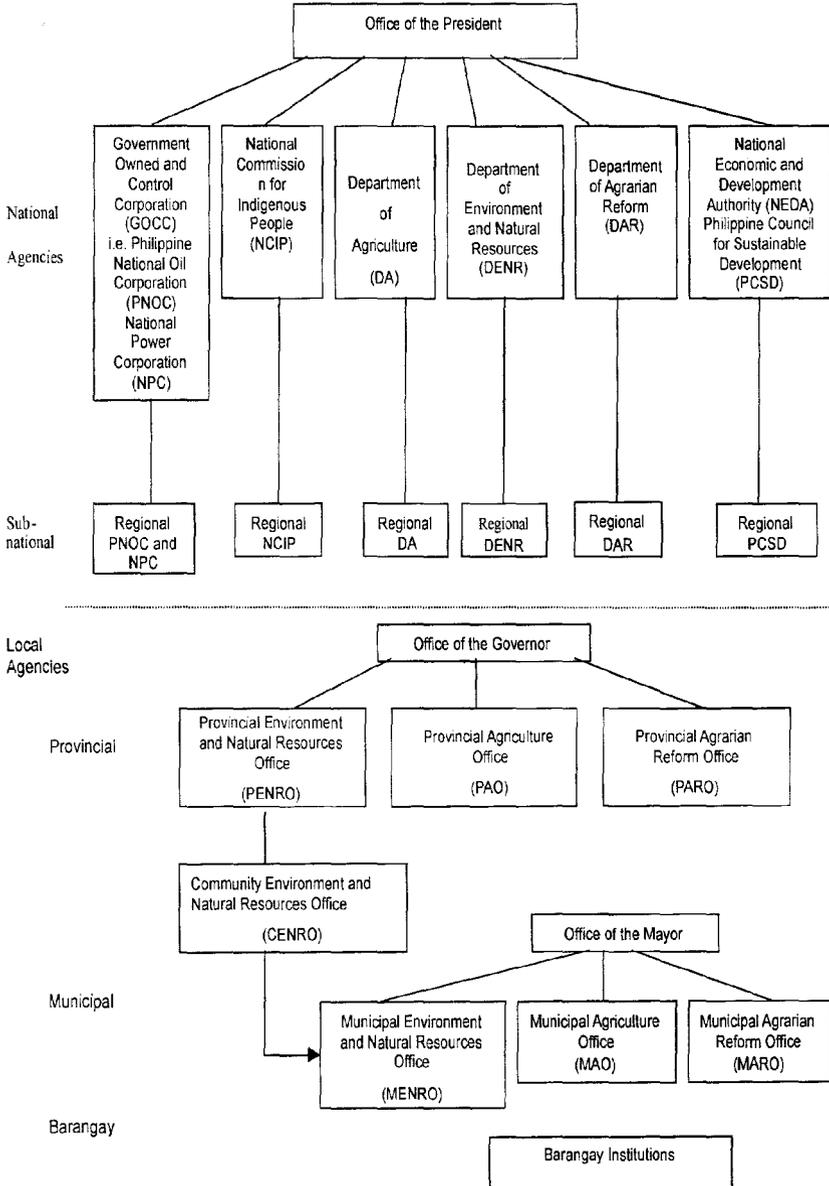


Figure 2. Resources governance in a decentralized system in the Philippines

Devolution of Resource Management Function

The *codal* provisions of the Local Government Code (LGC) strengthened the legal framework for attaining sustainability at the local level. With this power shift, local governments must assume accountability and responsibility in achieving the country's sustainable development goals. The local executives (mayors and governors) are given the mandate to "adopt measures to safeguard and conserve land, mineral, forest, marine and other resources of the municipality, city or province". The local legislative bodies are also mandated to protect the environment and impose appropriate sanctions/penalties for acts that endanger the environment. Even the village chiefs (*Barangay* captains) are given the responsibility to "enforce the laws related to population control and protection of the environment". The LGC also invoked the participation of civil society, and the involvement of the private sector in providing opportunities for financing and developing local enterprises, and provides for the due recognition of ancestral domains and other customary rights in protected areas.

In general, the resource management planning process—from budgeting to implementation, monitoring, and evaluation including the preparation of annual investment plan—originates from the lowest level to the highest levels of governance up to the management plan of the National Economic and Development Authority (NEDA).

Policy Instruments

The Philippines is one of the richest countries in terms of statutory instruments. There are policy instruments for forests, lands and water. There are laws such as the Clean Air Act, the Clean Water Act, the Waste Management and Disposal Law, and other environmental laws. Most of these are ecosystem level resource management instruments. The following discussion concerns three policy instruments that significantly influence bio-resource habitats:

1. National Integrated Protected Area System of 1992 (NIPAS)-Republic Act No. 7586

The NIPAS law recognizes the critical importance of protecting and maintaining the natural biological and physical diversity of the environment and declares it the policy of the state to secure for the Filipino people of present and future generations the "*perpetual existence of all native plants and animals through the establishment of a comprehensive system of integrated protected areas within the classification of national park and provided for in the Constitution*". It specifies areas with unique features for this purpose. It indeed sets the tone for bio-resource management in the country. It also recognizes that administration of these

protected areas is possible only through cooperation among national government, local government and concerned private organizations.

Protecting the country's natural parks (protected areas) was first recognized in 1932, when the US colonial government sponsored Republic Act 3915 establishing the Philippines' first national parks. The law declared all parks as game refuges and bird sanctuaries, created advisory committees that assisted forestry officials in managing each park and penalized illegal activities such as squatting and poaching.

Currently, for each protected area in the country, there is an assigned Protected Area Management Board (PAMB) that acts as the manager. This board is composed of members of different sectors and coordinated locally. The Chair of the Board is the regional director of the DENR. The PAMB also includes local government units, civil society, and indigenous communities since many of these protected areas are actually in places where there are indigenous communities. Funds for this management usually come from the national government. But resources are scarce, and most PAMB may not really be operational at the moment. The PAMB also illustrates the fact that because environment is porous, it is not practical to assign environmental management functions by political administrative units.

2. *Indigenous People's Right Act (IPRA)-Republic Act 8371*

Hand in hand with the NIPAS law is the IPRA law which recognizes and protects the rights of indigenous cultural communities to their ancestral lands to ensure their economic, social and cultural well-being. The main instrument provided is a certificate of ancestral domain title. Under this law, indigenous communities can secure titles to ancestral domains that can sometimes cover thousands of hectares, and include the so-called ancestral waters. This law has created a lot of conflicts between the local state agents and the Indigenous People (IP) communities, especially in the access to community resources. This brings us back to clashes of interest because the group is not homogeneous, and consensus decisions on proper resource use cannot be reached.

For instance, the IPRA stipulates a "Free and Prior Informed Consent" (FPIC) by the IP communities before anybody can access or use resources in the IP areas. This can be a potential instrument for bio-resource management, to wit, there should be prior consent of cultural communities to ensure that bio-prospecting does not result in bio-piracy, the most common sin of many multinationals prospecting in many places around the world. But we do not have a multitude of forest guards and *bantay-dagats* (sea-watchers) knowledgeable in the very resources that make money outside the world. Also, there is a possibility that the people who sign the FPIC can be bribed. And it is very risky socially if any official at the lowest level in charge of protecting the environment can be bribed.

3. *Riparian Laws— The Public Land Act and the Forestry Code*

The Public Land Act stipulates that applicants wishing to use the river banks would agree to maintain as permanent timberland a strip of forty meters wide starting from the bank on each side of any river or stream. This timberland is to be planted exclusively to trees of known economic value, and that the user shall not make any clearing thereon or utilize the same for ordinary farming purposes even after patent shall have been issued to him or a contract lease shall have been executed in his favor. The Forestry Code on the other hand, provides that twenty-meter strips of land along the edge of the normal high waterline of rivers and streams with channels of at least five meters wide should be devoted for forest purposes; and strips of mangrove or swamplands at least twenty meters wide, along shorelines facing oceans, lakes, and other bodies of water and strips of land at least twenty meters facing lakes should also be maintained.

Non-implementation of the riparian laws could have caused the death of rivers in the country (Rola and Tabien, 2001). In current times, most of these areas, which are by law public lands, have private titles. Will local governance be able to rescind these titles and save the riparian areas, thereby minimizing river pollution from agriculture or household sources? Currently, there are programs to mitigate environmental risks jointly managed by some local governments and the community members having properties along the river banks. One of these is the establishment of village nurseries for bamboo that can be planted along the river banks (Rola et al, 2004a).

The lack of or non-implementation of a bio-resources management policy has brought about the increasing degradation of the country's bio-resources as revealed by national level data, shown in the subsequent section.

III. State of Bioresources in the Philippines

Increased demand for food, clothing and shelter due to rapid population growth are the primary drivers of resource use. Depletion and extinction occur because many resources are non-renewable. Therefore, population management (the demand side) is directly related to bio-resource management (the supply side). Given the weaknesses of the institutions in the management of both sides of the equation, the future state of the country's bio-resources could be jeopardized. Recent global assessments concluded that extractive behaviour of the current generation is not sustainable (MA, 2005). The following is a discussion of the available evidences on the state of the Philippine bioresources such as forests, coastal and marine resources, and plant and animal life.

Forests

The land area of the country is about 300,000 square kilometers, most of which was originally forested. In the past, it supplied indigenous Philippine people food, drinks, spices, medicine and lumber. The forests yielded commercial products as well, including the Manila hemp (abaca), used for making ropes, textiles and hats. Bamboo, cinnamon, cloves, and pepper plants, formed a valuable part of the early economy.

When the Spaniards came, there was 90 percent forest cover. Colonialists found the forests lush, which were eventually used as a vehicle to attain economic progress. Deforestation became rampant as forest products were the primary motor of development. Most of these logs and lumber fed into the ship building of the Spanish colonialists. When the Americans came in 1900, the forest cover was down to 70 percent. Six (6) million hectares were lost during 300 years of Spanish rule.

The Americans (1901–1944) continued the regalian doctrine introduced by the Spaniards, maintaining the state-controlled management of the forest resources. The Americans' demand for cheap timber was a motivation for formulating policies during its colonial period. As a result of forest destruction, open access to the deforested lands ensued. Absence of institutional arrangements, settlement programs, and weak property rights accelerated the degradation of forest resources.

In 1944, during the Philippine independence from the Americans, another 6 million hectares were lost. There was a combined loss of 12 million hectares of forest cover during the Spanish and American periods. By 1990, about 40 years after American rule, 14.2 million hectares of forest cover were lost. More forest was lost under Filipino rule than the combined colonial rule (Ong, 2006). The immediate reasons for the drastic reduction of the primary forest area are large-scale logging and conversion to agriculture, and are strongly associated with the rapid increase in human population, reaching about 70 million in 1997. Over 15 million upland people (Ong, 2006) today threaten the survival of the remaining forests, despite government efforts at protection.

Preservation of the primary rain forest should be a high priority for the Filipino people to protect the remaining flora and fauna. The genes that these resources contain can be the source of future technological breakthroughs. The bad news is a large number of endemic species in the Philippine tropical rain forest and the forest itself are now threatened with complete destruction, making the country a "hot spot", that is, an area where there is a high probability of species extinctions (Bengwayan, 2002). Already some 52 native vertebrate species are in the critical or endangered categories, and a great many more are listed as threatened. Most endemic land vertebrates (including birds, small arboreal frogs, and many mammals) require primary forest habitats and fail to survive in highly disturbed and secondary forests.

Coastal and Marine Resources

The islands are surrounded by coral reefs and have one of the richest collection of coral reefs in the world, with about 500 species found in the surrounding coral reefs. Fish of all kinds, shellfish and mollusks, are common and the Sulu pearls are world famous. But the situation in our country as far as our marine bio-resources are concerned also looks rather grim. The coral reef ecosystem is a support ecosystem that produces a lot of bio-resources in terms of fish, invertebrates, seaweeds, and so on. But like any natural system, a coral reef ecosystem can only produce so much. If the pressure on the reefs is beyond its carrying capacity, then degradation occurs. But these ecosystems are resilient. If you release the pressure, then the resource is renewable although it takes a long time. A lot of pressure is now being placed on the marine bio-resources because of population pressure. Analysis of marine hot spots in the world revealed that among the ten top marine biodiversity hot spots in the world, the Philippines ranked as number one.

Plant and animals⁸

Both plant and animal species are abundant in the Philippines. The country ranks twenty-third in the world in terms of the numbers of plants to be found in these islands; one-fourth of the 13,500 plant species being endemic. Over one hundred and seventy thousand animal species can be found in the Philippines, ninety-eight of which are endemic. Rare species include the world's smallest monkey, the Philippine Tarsier, the white-winged flying fox, one of the world's rarest mammals, and the Philippine Eagle, the world's largest eagle. The islands have over one hundred ninety-six species of birds, including colorful parrots and many birds found nowhere else.

The number of plant and animal species in the Philippine rain forest is not completely known. There are an estimated 13,500 plant species, of which about 8,000 are flowering plants; about 3,200 of which are endemic. Plant genetic resources for instance, supply the raw materials that breeders and farmers need to attain food security. Once upon a time, corn was not corn and coffee was not coffee. Farmers created all our crops out of the wild plants. Many of these crops' wild relatives may still exist, but may also be disappearing fast.

Philippine land vertebrate species number about a thousand: approximately 80 amphibians, some 240 reptiles, 556 birds (resident and migratory), and 174 mammals. It is the exceptionally high level of endemism that is now attracting international attention. Experts say that Philippine mammals have the highest percentage of species endemism in

⁸ Source of data in this section is from Alcalá (2002).

the world on a hectare-for-hectare basis, and this could be true for other groups as well. Seventy-five percent of the amphibians, 70 percent of reptiles, 44 percent of birds, and 64 percent of mammals are not found elsewhere in the world. We have an estimated 11,000 species of wildlife. Half of these are found only in the country, and about 16 percent are endangered or threatened.

In summary, in terms of bio-resources status, the country is considered a “hot spot.” This is further underscored by the findings of the Yale’s 2005 Environmental Sustainability Index, which ranked the Philippines 125 out of 146 countries studied. It will be such an understatement to say that it is important to define strategies to identify, conserve, and sustainably and equitably use and manage bio-resources both at the ecosystem and at the species level.

IV. Initiatives for Bio-Resources Management at the Ecosystem Level: Four Cases in the Philippines

The following cases are examples of best practices for bio-resource management at the ecosystem level. These initiatives have several common elements including the development of an ecosystem management plan, use of data in the planning process, involvement of external groups in the plan intervention, and collective action by the various stakeholders. The institutional arrangements of decentralized governance and more secured property rights were also found to affect the behavior of stakeholders in bio-resource management.

We refer back to Diamond’s theory that societies fail to do group decision-making because they were an illiterate society and that community members may not have anticipated the extinction problem. Contemporary issues point to more modern and science-based management approaches, through management plan development, but with mostly external (to the community) support. These “observers” could serve as forecasts of future scenarios based on their own experiences, if no interventions were to take place in a particular community. The natural reaction by community members to solve the problem collectively once perceived, is also noticeable in these examples. Among the four cases presented below, a couple reveal that environmental degradation is reversible with good bio-resource management.

The first two cases are similar: they show that protected area management is important to further the goals of sustainability. The third example showcases community empowerment in monitoring its own bio-resource and how this effort can be integrated in local water governance. The last case refers to the role that community-based technology adoption had in bringing back to life aquatic bio-resources in the irrigated rice environment thus, improving the welfare especially of the poor rural folks. All of these cases revealed the importance of collective action and how

they sway institutions to achieve more sustainable bio-resource management at the ecosystem level. The relevance of the policy of decentralization in bio-resource management also becomes apparent.

1. Protected Area Management: The Mt. Kitanglad Range Natural Park⁹

Mt. Kitanglad Range Natural Park (MKRNP) is the headwater source of several major river systems draining North and Central Mindanao, including Cotabato province. Its creeks and rivers flow in a radial pattern and feed into three major rivers in Mindanao. One of these rivers, the Manupali River, is an important water source that drains into the Pulangi River, a source of irrigation and electric hydropower in Bukidnon. In turn, the Pulangi River drains into the Illana Bay, a major waterway for North and Central Mindanao. Therefore, any destruction in the Mt. Kitanglad area will affect to a great extent the downstream portion of Northern and Central Mindanao. The logging concessions grants that operated in the area from the 1970s through the 1990s resulting in significant deforestation had given impetus for a more proactive protection of the Park by the locals.

The Park, primarily located in the province of Bukidnon, encompasses 40,176 hectares. Seven municipalities and one city of the province share the boundaries at the summit. It is one of the country's priority protected areas as provided for in the National Integrated Protected Areas System Law (NIPAS). In following the processes of the NIPAS law, Mt. Kitanglad was proclaimed a protected area under the natural park category through Presidential Proclamation No. 896 dated October 24, 1996. Republic Act 8978 is its enabling law, signed on November 9, 2000.

The Mt. Kitanglad Protected Area Management Board (PAMB) started operations as early as 1993¹⁰, with the Protected Areas and Wildlife Bureau (PAWB) of the DENR spearheading the effort. The PAMB serves as the in-situ policy-making body of the park. It is composed of 59 members from government and non-government sectors, and from local communities. The Regional Executive Director of the DENR-Region 10 acts as the chair of the board, while the Provincial Planning and Development Coordinator of Bukidnon serves as an ex-officio member. Members of the board include the municipal mayors of the eight towns sharing the boundary, 28 barangay captains of the village centers of the buffer zone, 9 tribal leaders, 8 representatives from non-government organizations, three representatives from the media, 1 from other government agencies and 1 from the people's organization.

⁹ Source of data is from Rola et al. (2004a).

¹⁰This could have been spurred by the fact that this site was chosen as one of the ten priority protected areas that would later on have external funds to start developing its management plan.

The office of the Protected Area Superintendent (PASu) became functional in 1994, this office is directly accountable to the PAMB. The Provincial DENR supervises the day-to-day activities but the ground management is by indigenous communities, the local governments, and representatives of the PAMB. Other institutions involved in the management are the special interest groups such as the tenured migrants, industry sector (such as commercial banana, poultry, and relay communication operators) as well as voluntary organizations such as the mountaineering societies, research and academic institutions.

International organizations are also involved in conservation activities within the park. These external partners are generally not present in other protected areas of the country.

The MKRNP management plan

The Park's management plan completed in 2000 with the help of partners from the science community and the NGOs field workers, is now operational. Among its management strategies are the following: (a) adoption and implementation of an effective park protection, zoning, and resource management program; (b) formulation of an integrated policy and livelihood support and assistance framework for the conservation, sustainable use and economic development of protected area beneficiaries in partnership with the local communities; (c) ensuring biodiversity conservation awareness and information programs; and (d) institutionalization and strengthening of capacities for effective protected area management and supervision. A major part of the management is to ensure that water quality and quantity are maintained in the whole watershed, i.e., both upstream and downstream use.

Implementing the Plan

To make the plan workable for local officials, especially those located in the buffer zone, several seminars and training workshops were held to orient and familiarize them with the implementation procedures. At the buffer zone, 370 Kitanglad Guard Volunteers (KGV) administratively under the DENR, guard the forest and watch out for forest fires. These members of the local indigenous communities or the IPs promote biodiversity conservation in the protected area and do patrol activities within the park. They report illegal activities to the DENR and PASu aside from posing as escorts to DENR personnel during visits and are responsible in hauling apprehended logs within the park. They are annually deputized by the DENR to do community-based park protection.

Because the MKRNP was enacted through a national law and PAMB has a legal personality, enforcement and subsequent prosecution of violators of the park ordinances is possible. To illustrate, 79 cases had been filed against forest violators around the park. As a result, the

encroachment into the protected areas by those seeking agricultural and other economic opportunities had been minimized during the past decade (1994–2004).

Financing the Plan

Financial support for the development of the management plan to protect the MKRNP has had humble beginnings. In 1993, municipal mayors had to fund meetings from their own pockets. Having been chosen to be one of the country's 10 sites covered under the Conservation of Priority Protected Areas Project¹¹ (CPPAP), it was able to have funding for seven years starting in 1994.

During the life of CPPAP, funds amounting to Php6.9 million were provided to the indigenous peoples for non-destructive livelihood activities (NDLA), mostly in terms of agro-forestry related projects; and Php12 million for production-related livelihood activities¹². With the termination of the CPPAP in June 2002, the LGUs and their barangay counterparts took over the funding of the plan management. Other entities such as the DENR and the NGOs, the local indigenous and migrant communities who are directly dependent on the park continue to maintain their stake. In the later years, the local governments also increased their funding for watershed management activities to as much as Php2.6 million for Calendar Year 2002. In March 2004, PAMB, by organizing a water policy forum, solicited funds from the private companies who are resource users of the watershed services, especially water. One source of revenue of the Park comes from user fee charges for the environmental services that it offers.

Financing the plan was facilitated by several factors: (1) engagement of local communities in the activities and hence, some savings in the protection and guarding of the park; (2) local governments committed funds as a result of mutual trust among the membership of the management body, the PAMB; and (3) the trust and confidence given by the private sector to the PAMB in the management of the protected area.

The management process institutionalizes the sustainable management regime as exercised by the empowered communities (of both the IPs and the tenured migrants). These empowered communities enjoy

¹¹The grant is managed by the World Bank, in partnership with Philippine Government (represented by the DENR) and the NGOs for Integrated Protected Areas (NIPA). All of these three are bound in a tripartite agreement. The NIPA is a national consortium of NGOs that manage the local host-NGOs selected at the site coordinating the project together with its counterpart entity, the DENR-Park Superintendent's Office (PaSU), and its corresponding PAMB.

¹²The NDLAs rest on the principle of balancing sustainable development and biodiversity conservation to uplift the socio-economic conditions of the IPs and tenured migrants in order to mitigate human pressure on the protected watershed. A total of 79 POs are implementing NDLA Projects in the park and some of them became beneficiaries of CBFM Projects and are currently managing integrated livelihoods undertakings.

a firm tenure over the resources, who are actively involved in bio-diversity conservation and protection activities, and who are supported by the local government, the private sector, and other community members who have internalized conservation values and the respect for cultural integrity.

One lesson learned in this exercise is that the protected area management can be implemented successfully by changing the locus of decision-making from national to local agencies (Sumbalan, 2001). Decentralizing management does not merely mean devolving responsibilities previously concentrated with the national bureaucracy but also means accompanying devolution with decision-making authority to various stakeholders. The experience in Mt. Kitanglad demonstrated that sensitivity and recognition of cultural and local knowledge, as well as flexibility to negotiate with various stakeholders sustained MKRNP protection and development activities. Decentralization provided a venue for the participants such as the non-government organizations, local communities, indigenous peoples, and other related projects to come together for a common purpose, which is survival.

2. Protected Area Management: The Tubbataha Reef National Marine Park¹³

The Tubbataha Reef National Marine Park covers some 33,200 hectares and lies in the middle of the Sulu Sea, about 150 kilometers from Puerto Princesa, the capital city of Palawan. The reef structure consists of both fringing and atoll reefs and harbors a diversity of marine life equal to or greater than any other such area in the world. In 1983, 46 coral genera, 300 coral species and at least 40 families and 379 species of fish were recorded. In 2000, 448 species from 57 families of fish were recorded.

In the late 1980s, the conditions of the once pristine reefs of Tubbataha deteriorated due to the destructive fishing methods used by fishermen. These destructive fishing methods were carried out not only by local fishermen but also by migrant fishermen from South and Central Philippines and from Taiwan and China. Though these fishing activities were limited due to monsoon winds, the cover of living coral on the outer reef flats were surveyed to have decreased by 24 percent within 5 years. The introduction of seaweed farming in 1989 also threatened the reef but fortunately this was stopped in 1991.

The management issues in Tubbataha National Marine Park have evolved substantially since 1989 when reefs were at their lowest point and illegal fishing was rampant. In 1999, Tubbataha was managed and protected with the implementation of the management plan.

Just like Mt. Kitanglad, Tubbataha Reef management activity started with its declaration as a natural park through a Presidential Proclamation in 1988. The first draft of the management plan based on

¹³Source of data was from White and Ovenden (no date).

limited information was done in 1989. It was only in 1992 that a research expedition collected baseline data on the coral reefs and from there, the Park management plan was re-drafted, though illegal activities still increased. In 1994, the Park was elevated to World Heritage status, a UNESCO program. In 1996, the Coastal Resource Management Plan (CRMP) refined the management plan in collaboration with external donors and local agencies. The PAMB was formed in 1998; a year later, a Global Environment Facility (GEF) 5-year funding for park management based on the revised plan was approved.

Monitoring of the reef became a joint venture of various organizations, including local people. The fish abundance survey reflected the relative success of the new management since the abundance of fish per unit area was 26 percent higher on average than in 1996. While illegal activities such as use of explosives in fishing was contained, the current threat is the ability or inability of the Park managers to maintain constant surveillance in Tubbataha to deter the threat of illegal entry of fishermen from the Philippines and other Asian countries. The Park Navy personnel can take an active role in park management.

Whereas MKRNP was managed predominantly by the locals, the management model for the Tubbataha seems to be the predominance of external institutions in its protection and care. With its status as a UNESCO World Heritage Site, Tubbataha has acquired more sustained funding both from national and international sectors possibly because of its environmental services not only to the Philippines but also worldwide.

3. Community-based Water Monitoring in the Uplands¹⁴

Collective action by community members has made possible the monitoring of water quality in an environment of rapid agricultural growth and urbanization, and the perceived consequence— increased water degradation due to soil erosion and bacterial (*Escherichia coli*) contamination.

The Water Watch Group (*Tigbantay Wahig* in the Binukid dialect) started as a volunteer group in the early 1990s to support the community based water quality monitoring project under the SANREM-CRSP SEA¹⁵ that was being implemented in Lantapan, Bukidnon. The objectives of

¹⁴Source of data was from Rola et al (2004b).

¹⁵Sustainable Agriculture and Natural Resources Management Collaborative Research Support Program (SANREM CRSP), a USAID funded program, brings together researchers from universities and specialist institutes in the Philippines, the U.S., and other countries as well as the International Agricultural Research Centers (IARCs) to work with farmers and other natural resource managers, communities, civil society institutions, and government agencies at local and national levels in the search for the means by which upland communities will be enabled to make better natural resource management decisions. The project funded primarily by the US Agency for International Development was implemented in Bukidnon from 1994 to 2004. Field activities of the third phase (2006-2010) are ongoing.

the project were to facilitate the development of water quality and watershed assessments by local communities, and provide physicochemical data that would be used to improve water quality and policy (Deutsch et al., 2001; Rola et al., 2004b). Local citizens, including the native tribe (*Talaandig*) members and migrant farmers volunteered to receive training in water quality monitoring and principles of watershed management.

In 1995, the core group of water monitors proceeded to form a people's organization (The *Tigbantay Wahig*, Inc.) and incorporated themselves as an officially recognized non-government organization. The monitoring results of the *Tigbantay Wahig* were disseminated to community members, educators and local policy makers, resulting in more serious actions by the local government for the need to develop a municipal watershed management plan and its implementation strategies. The mandate of this group is ideal in the monitoring and evaluation scheme of the municipal level plan, as long as they can be recognized as such in the formal governance structure.

The group was able to generate support from the local government to continue with their water quality monitoring work making them formal partners in the management of natural resources at the municipal level. This move is also in consonance with the local government code provisions to involve communities in the management of resources. But in this case, civil society groups partnering with local governments could have been facilitated by their good mutual relations. This is of course true if the society is culturally and ethnically homogenous. Lantapan is populated by two groups: native Talaandigs and migrants mostly of Cebuano origin.

*4. Community-based pest management and the irrigated rice environment*¹⁶

To minimize the social costs to farmers' health and environment of too much pesticide use in rice, the technology called integrated pest management (IPM) was developed and launched in Asia in the 1980s. IPM is defined by the UN Food and Agriculture Organization (UNFAO) Panel of Experts as "a pest management system, that in the context of the associated environmental and population dynamics of the pest species, utilizes all suitable techniques and methods in as a compatible manner as possible and maintain the pest population at levels below the economic injury". IPM uses various techniques such as cultural control, plant resistance, biological and chemical control methods for the management of weeds, insects, rodents, and diseases. It uses pesticide as the last resort in preventing crop losses.

Adoption of IPM in the 1980s was not very quick. In the 1990s, IPM extension was transformed from (a) an individual to a community concern; (b) an insect pest control to an ecology wide concern, (c) a linear top down approach to a participatory method of technology delivery, and

¹⁶Source of case study data was from Palis (2002).

(d) a traditional lecture teaching method to experiential learning (Palis, 2002). This was done through the season-long farmer field school (FFS).

FFS is a non-formal education approach to IPM extension. It is referred to as “school without walls”, where farmers learn together by undergoing an intensive training on IPM over the entire life cycle of the crop. Farmers meet for 14–16 weeks, consisting of weekly meetings that last half a day and facilitated by the village agricultural technician. It also has an agro-ecosystem perspective where it builds on biological control as its ecological foundation and is anchored on four principles:

1. grow a healthy crop through the use of resistant varieties, better seed selection processes, and efficient nutrient, water and weed management;
2. conserve natural enemies--beneficial predators and parasites;
3. observe the field weekly to determine management actions necessary to produce a profitable crop; and
4. farmers become IPM experts and trainers.

Farmers who attended the FFS were found to improve their scientific knowledge of the rice ecosystem (Rola et al, 2002).

The study conducted by Palis (2002) in the village of Matingkis, Munoz, Nueva Ecija in both the wet and dry seasons of 1992–95 and 1999 aimed to determine the adoption and spread of IPM through the FFS, and assess the impact of IPM on farmer’s livelihood and on the development of the community as a whole. The study’s results showed that there was a dramatic decline in the proportion of the FFS farmers who were applying insecticides before and during the FFS and the seasons thereafter. Since then, the proportion of insecticide users had dropped considerably. Similarly, the proportion of non-FFS insecticide users dropped from more than 95 percent for both seasons in 1992 to 35 percent in the 1995 dry season and 29 percent in the 1995 wet season. It remained at 30 percent in both seasons of 1999.

Environmental impacts included the reappearance and perceived abundance of natural paddy foods—fish of different varieties, native frogs, native snails, and others. Farmers claimed that the government’s Masagana 99 program in the 1970s, which brought about intensive use of pesticides, had destroyed the aquatic life in the rice paddy ecosystem. Fishes, even in small streams, died. Fish such as the native *hito*, *dalag*, and *silap*, native shells, and shrimps disappeared shortly after the intensive use of pesticides in the 1970s until the early 1990s, before IPM was practiced. Farmers in the study mentioned that they did not eat previously few available foods like tilapia because of the belief that toxic elements from the pesticides may have accumulated in the fish. Dead fish floating in the irrigation canals was an ordinary sight.

Lately, farmers had generally observed increase in the paddy food since the introduction of IPM in the village. Some of the paddy foods that

disappeared during the 1970s and the 1980s — native snails, small crabs called talangka, and some native species such as *sulib*, *silap*, *ayungi*, *gurami* and *biya*—are now reappearing in increasing volumes especially during the wet season. Most of these foods, found in the irrigation canals and paddy fields, augment the village food supply and anyone can gather them freely. IPM when adopted by all community members has generated benefits for everyone. Without the farmers' collective action to minimize pesticide use in rice, the resurgence of native food species in the paddy fields may not have occurred.

The cases above demonstrated that it is possible to manage ecosystem level bioresources with local participation, with external support, and with local government leadership. The common thread is that the stakeholders agreed that the resource was an important one for the survival of communities and therefore, collective action was not difficult to attain.

IV. Challenges of bio-resource management at the species level¹⁷

So far, the subject of bio-resource management has focused on ecosystems management, mainly due to the available documentation of the cases. As a country, there is a need to look into the species level management needs.

Need for bio-resource management policy and plan of action at the species level

In an earlier section, data showed that the Philippines is in danger of losing its bio-resources diversity, and this loss is shared by the whole world, because of the large number of endemic species in the country. Initiatives for institutional and legislative framework for bio-resource management at the specie level have been very limited, if not nil.

The following may serve as a roadmap for developing management strategies for bio-resources at the species level:

Policy on bio-resources management at the species level

The Philippines needs a more aggressive bio-resource management policy. As a nation, we are party to international laws and treaties on bio-resources conservation and other related issues, but we do not have our own local initiatives.

In terms of plant resources, the International Treaty on Plant Genetic Resources for Food and Agriculture is a legally-binding Treaty covering all plant genetic resources relevant for food and agriculture. The Treaty is vital in ensuring the continued availability of the plant genetic resources that countries will need to feed their people.

¹⁷With contributions from Macaranas (2006).

Its objectives are the conservation and sustainable use of plant genetic resources for food and agriculture and the fair and equitable sharing of benefits derived from their use, in harmony with the Convention on Biological Diversity, for sustainable agriculture and food security. Through the Treaty, countries agree to establish an efficient and transparent Multilateral System to facilitate access to plant genetic resources for food and agriculture.

The trade related aspects of intellectual properties (TRIPS) agreement which was piggybacked with the Philippines signing the World Trade Organization Agreement. This means that we are now beholden to accept the trade-related aspect of Intellectual Property Rights (IPR). There are many tradable goods including bio-resources that have to abide by international norms. TRIPS noted that national governments have the sovereign right over the biological resources. But increasingly, many countries question the implementing rules and regulations that define these rights. So the debate really is in the implementation. The major concern for poor countries would be three: (1) access to genetic resources by both foreign and locals; (2) benefit sharing; and (3) traditional knowledge.

To address these concerns, the Philippines issued an Executive Order 247¹⁸ where the policy of the state is enunciated to be the regulation of prospecting of biological and genetic resources so that these resources are protected and conserved. Moreover, it requires the consent of indigenous cultural communities, so that prospecting will be allowed within ancestral lands and domains of indigenous cultural communities only with prior informed consent of those affected communities.

2. Developing a plan for bio-resource management

The second step in the roadmap is the development of a plan for bio-resource management in the country. Local development councils do local planning, but without bio-resource management components. Bio-resource planning can be integrated in these lower level plans. One needs to have capacities at all levels of management and governance. The Philippines is very proud to have its own pool of development managers and development studies courses are proliferating in this country. But policy makers have not really made use of these unique human resources. We can likewise tap our scientists abroad. In the long term, developing interdisciplinary university courses in bio-resources management could be a feasible option.

Plans need data and some forecasting exercises. The absolute figure for the bio-resource inventory is not known, therefore, having this inventory can be the first pre-planning activity. To start with, activities would involve the preparation of an inventory of flora and fauna wealth

¹⁸But implementation of these international laws at the local level has been constrained mainly by lack of capacities and resources.

and their genetic makeup, documenting community-based resource use and management and the traditional knowledge that accompany these. For it will be useless to plan if we do not know the stock, i.e., the number of species we have, and where they are located. In other areas, newly found organisms may be named after some wealthy persons who can provide the needed financial resources to manage the newly discovered species.

There is also a need for a scheme of monitoring and evaluation of the plan implementation; i.e., an evidence that there are improvements in the sustainability of bio-resources, by establishing indicators. Multidisciplinary research by biologists, governance and management experts, and social scientists will be needed in the monitoring of impacts.

Aside from data for planning, there are needs for maps. There are just few of these in our rural areas.

3. Plan Implementation: Role of institutions and innovative partnerships

Communities have the starring role in the implementation of the bio-resources management plan. They can partner with the LGU in this activity. The private sector can also practice their corporate social responsibility by soliciting partnerships with the local communities. But despite some cases of best practices shown by the case studies, there is still fundamentally a lack of collaboration at the local level. This is caused by lack of trust among the stakeholders.

On the other hand, some of the community-based practices in bio-resource management have gone beyond the scope of what is statutory, as provided under the Local Government Code (LGC). For example, innovations like the *bantay dagat* or *bantay gubat* programs are not in the LGC. But they are actually being done. The cases above show that this cooperation is possible but with the right mix of elements. Therefore, there is a need to understand the incentives for communities to behave so that they become stewards and managers of their bio-resources. Maybe a study of the system of governance of the IPs can explain some of these differences in behavior.

4. Financing the Plan: Investment needs and fund generation strategies

The big question is, "How do we generate the kind of resources to manage our depleted bio-resources, conserve them, perhaps rehabilitate and grow the base from which our economic growth may come from?"

A couple of ideas come to light. One is to be familiar with how we can use intellectual property rights of the bio-resources, and thus, generate some benefits from its future commercial use. For instance, the ayahuasca plant used as medicine by the Amazon indigenous people, and anti-diabetic herbal concoction from India that had been known for centuries in that place, have been patented by the US and therefore,

deprived even the originators, the right to use them without having to pay for all the royalties. There are similar cases for the Neem tree, the Basmati rice, and the Andean root crop maca. Most recently, a Filipino found a wild plant that was allegedly helpful for anti-skin cancer and which was bought by a foreign group. So with that kind of information the big policy issue in resource management is, "how do we really share in the benefits of our own resources, and thus fund their management"?

Second, the traditional strategy, i.e., is to tap the various stakeholders inside and outside the country. Among these are the public sector, the private sector, the external donors, and the other communities of stakeholders. The public sector can allocate a percentage of our GDP for bio- resource management. Trust funds are needed for many of these protected areas.

On the private sector side, it is very clear that in terms of investments in conservation and in science and technology areas in general, our corporations have a very poor record. There are only very few corporations that make it to the list of those who have some ecological consciousness. Some Filipino corporations have made it despite the fact that through the years they may have declined in their performance. These corporations are convinced that we not only share a common future with them but their destiny is in the public's hands.

External donors have been actively supporting us in bio-resource management. From 1978 to 2003 or a total of 25 years, the available record of the inflow of funds for environment was \$1.2 billion. External donors can be tapped because the country holds species that are globally useful (as in Tubbataha Reef Marine Natural Park). One way to entice the rich donors or philanthropists will be to name new found organisms after these donors. Filipinos working abroad, roughly 10 percent of our population, can also be sponsors of bio-resources inventory, and conservation.

Some Complementary Measures for Bio-resource Management

Bio-resources management needs macro level policies, other sectoral initiatives and changes in society's attitudes and mindsets in resource use and conservation. The following ideas from the RTD participants are complementary measures for local level bio-resource management.

1. Structural changes

If the economy shifts to more industry- or service-oriented jobs, then perhaps there will be less damage to our natural ecosystem. Growth of industry and service sectors can relieve pressure in the use of natural resources. To do this, human capacities to do industrial or service type jobs will be needed. But "if we are to continually deprive our citizens of an economic livelihood because no professional, or educational service-

oriented type curriculum is offered them, then they will run to the mountains and the seas and damage the ecosystem”.

2. Use of Market instruments

Markets influence consumption behavior of people. Prices reflect scarcity. But currently, most bio-resources are non-market goods. Therefore, valuation, especially of genetic resources, will have to be done. Once there is scarcity, technological innovations can relax the resource use constraints.

The other market strategy is the conservation, protection and restorative (CPR) economics. Massive natural reforestation to restore the required 50 percent forest cover of the country's land mass and converting it into a business establishment; and a national network of marine sanctuaries to restore marine lives will showcase the wealth of the country and will be attractive for ecotourism. Other CPR- like activities include cleaning of rivers, restoring aquatic organisms, establishing urban vegetable farms and herbal gardens. This can be done with private sector participation.

3. Population management

The following is an illustration of the practical impact of population numbers alone on bio-resources as discussed by Ong (2006).

“If we use 1.2 billion as the number of people in China, with a one-child policy, then there are 400 million households in China. If one household will consume one chicken a night, that means 400 million chickens. So the first question is how big is the cage for 400 million chickens? The estimate is ten times the campus of Diliman, just to house the 400 million chickens for one night's consumption. And how much feed do you need for the chickens? So farms will have to produce for chickens, not just humans. And how big a farm do you need to produce feeds? How much waste will be produced? And how many feathers will be produced, in case you develop a pillow industry? And remember this is only for one night consumption; imagine how much China would need in one year.”

This point shows that population management is just as important as bio-resources management. Population programs have to be seen as complementary measures.

4. Changing MAPs and bridging GAPs

As discussed by Ong (2006):

“MAP refers to mind set, attitude and practices. GAP is Goal, aspiration, promise. No single individual or organization can be successful in the campaign to save the Philippines from being a biodiversity hotspot. To change mindsets, for instance, one can shift to CPR. Our attitude

towards consumer products and our practices will have to change. There is also a need to set goals that will serve as the target, something to aspire, a promise. Changing maps and bridging gaps could be the key to ensure our common future and survive as a people."

This needs group thinking, social structures and collective action. This means anticipating and working for the common good.

VI. Conclusions and Recommendations

Based on the empirical evidence at the ecosystem level, institutions such as the PAMB and policies such as decentralized governance could potentially have an important impact on bio-resource management. While the ecosystems serve as habitats of species, what is perceived to be urgently needed are measures to assure that species are themselves managed properly, inasmuch as loss of species qualifies the country as a "hot spot" in terms of internationally crafted biodiversity indicators. Participants to the roundtable discussion had several innovative ideas to make this happen as summarized in the previous section.

Some of these recommendations are as follows:

1. Bio-resource management plan- The major recommendation from the discussions was to make bio-resources management an integral part of the development plans. This planning exercise starts at the lowest level of governance.

2. Capacity building- The science community can build capacities at various levels, like introducing participatory approaches and good governance indicators. Fund management skills by local officials are also to be developed.

3. Role of Science- It was revealed that science contributed to the protected area management planning by supplying the necessary data to the decision makers. In ideal situations, scientists shall continue to work with the other sectors, including government - to help develop monitoring and evaluation methods, monitoring outcomes and evaluating the performance of these management strategies.

4. Multidisciplinary research- Bio-resource indicators are biological variables; management and governance concerns are social sciences, therefore, a multidisciplinary team is needed to work with the implementers of the management plan. Researchers and development workers can also help in evolving community-based institutions that would be relevant for bio-resource management.

5. Policy on benefit sharing- The question of benefit sharing in the commercial use of bio-resources should be studied rigorously, to have potential sources of funds for management.

6. Study indigenous peoples' governance and management practices, considered as having sustainable outcomes- Most of the studies in the

past focused on resource management practices, including anthropologic and cultural norms. Studies can also include governance sanctions, norms, and incentives.

7. Integrate information and communication technology in bio-resource governance- Maps will be needed, so use of GIS can be handy. Mapping will not only serve to identify and locate the species, but also to know its value or use.

8. Theory development will be needed for meso-level analysis of factors that condition governments, the private sector, local organizations and other stakeholders to work together to support a more sustainable, equitable and efficient bio-resources management decision.

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Bio-resource Management and
Our Common Future:
Changing MAPS,
Bridging GAPS

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Changing MAPS

Mindsets
Attitudes
Practices

Bridging GAPS

Goals
Aspirations
a Promise

WORLD

Earth can't meet human demand for resources

Ecological Footprint:
Marine fishing, timber harvesting, Building infrastructure, fossil fuel burning

In 1999 global average: each person consumed 2.3 hectares lower than US (9.6) or UK (5.3)

In 1961, only 70% of earth's regenerative capacity was used. In 2000, this rose to 129%

Title: Humanity's Resource Demand Exceeds the Earth's Capacity
Website: www.progress.org Article can be viewed on this website: www.pnat.org

1. To what extent
have we identified
bio-resources in the country

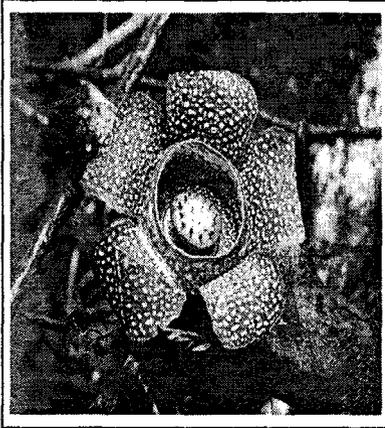
We are still finding new species
in the last 15 years

Rafflesia: from two species, now there are 4 species, with two new more species in publication, we will soon overtake Borneo as the most speciose country, as new specimens are currently being described.

A new genus of rodent found in the Mt. Banahaw in 2004

Panglao survey found new invertebrates (2004 -2005)

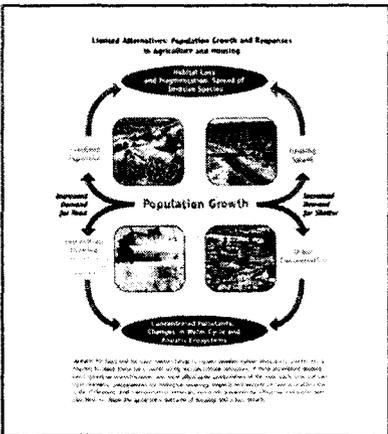
Calamianes Survey (2000) new species of corals



2. What are the management strategies for bioresources not currently used by humans? Do measurable parameters reveal that these strategies result in a sustainable and equitable use? If not, what management strategies could lead us to a less extractive future?

3. What are the conservation policies and strategies for bioresources not currently used by humans? But which certainly are important part of the ecology and maybe of great significance in the future?

4. What is the relationship of population and bio-resource management?



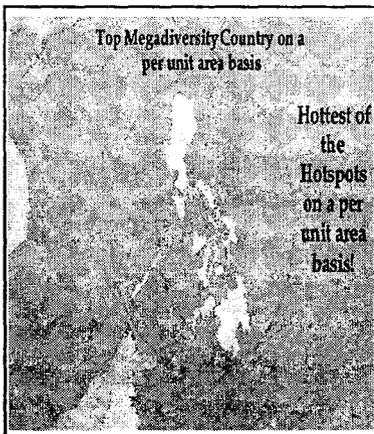
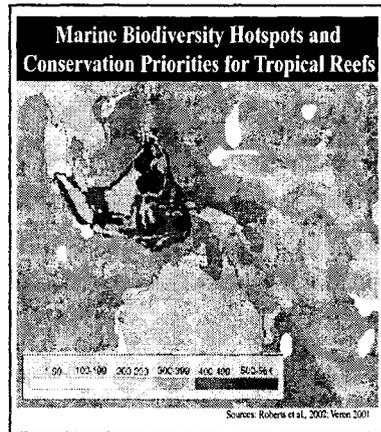
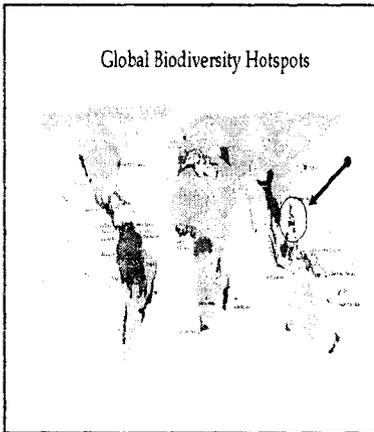
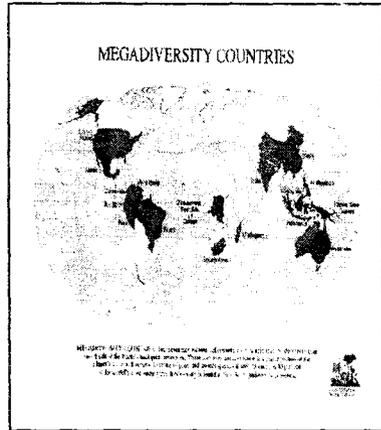
Impact of Population

1.2 Billion Chinese, with one child policy=
400 Million households

If each household eat, 1 chicken a day=
400 Million Chickens

How big a poultry would you construct & manage?
How much feeds do you need to produce to feed the chicken?
How big a farm do you need to produce the feeds?
How will you deal with the waste produced?
How much feathers are produced?

5. When we speak of bio-resources management, what spatial scale will be appropriate? (Global, National, Regional, Community-based?)



6. To what extent has the Philippine Government invested in bio-resources management, at all governance levels?

Some Responses

- RA 8749 Clean Air Act
- RA 9003 Ecological Solid Waste Management Act
- RA 9275 Clean Water Act
- Persistent Organic Pollutants Treaty
- RA 7586 National Integrated Protected Area System
- Good Start, a means to an end, not the end in itself

Some Points to Ponder

- Sets standards and procedures
- Assumes people (general public, enforcers, the judiciary) know these procedures and standards
- Becomes discretionary and selective in implementation
- Effect:
 - People lose respect in the law
 - becomes a source of corruption

Linking Development with the Environment

The WB-IMF Development Paradigm of the 20th century:

had neither eradicated nor alleviated poverty

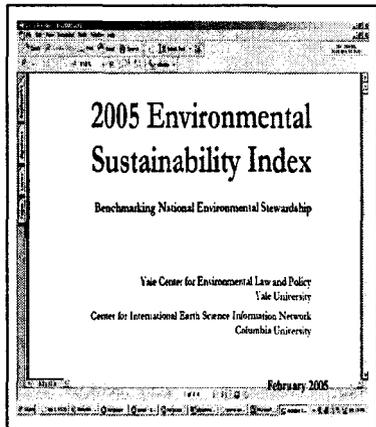
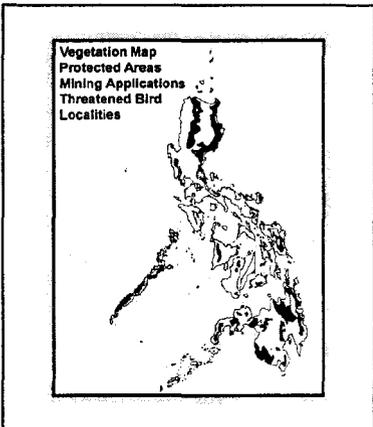
Led to massive destruction of the environment

Left us with an enormous debt burden!

Linking Development with the Environment

The poor ends up paying the cost of this destruction!

New Paradigm should make the protection of the environment an integral element of Development



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Blocks also shows, and reduce carbon emissions as well as institutional mechanisms and abilities to change future pollution and resource use trajectories.

... policy. The core components of the ESI have a great deal of overlap with the widely used Pressure-State-Response (PSR) indicator model, and especially its more recent

Table 9: 2005 Environmental Sustainability Index Building Blocks – Components

Component	Logic
Environmental Systems	A country is more likely to be environmentally sustainable to the extent that its vital environmental systems are maintained at healthy levels, and to the extent to which levels are improving rather than deteriorating.
Reducing Environmental Stresses	A country is more likely to be environmentally sustainable if the levels of anthropogenic stress are low enough to engender no demonstrable harm to its environmental systems.
Reducing Human Vulnerability	A country is more likely to be environmentally sustainable to the extent that people and social systems are not vulnerable to environmental disturbances that affect basic human wellbeing; becoming less vulnerable is a sign that a society is on a track to greater sustainability.
Social and Institutional Capacity	A country is more likely to be environmentally sustainable to the extent that it has in place institutions and underlying social patterns of skills, attitudes, and networks that foster effective responses to environmental challenges.
Global Stewardship	A country is more likely to be environmentally sustainable if it cooperates with other countries to manage common environmental problems, and if it reduces negative transboundary environmental impacts on other countries to levels that cause no serious harm.

11

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17 of 414

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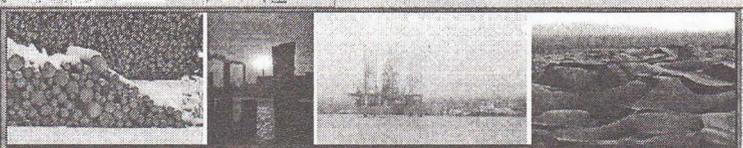
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Constructing the ESI

The ESI is the equally weighted average of these 11 indicators*

```

    graph LR
      A[76 Variables] --> B[21 Indicators]
      B --> C[5 components]
      C --> D[ESI Score]
      C --> E[Components group indicator values into five thematic categories]
      E --> D
      D --> F[The ESI is the equally weighted average of these 11 indicators*]
      F --> D
  
```

76 Variables → 21 Indicators → 5 components → ESI Score

Components group indicator values into five thematic categories

The ESI is the equally weighted average of these 11 indicators*

Environmental Sustainability Index

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Actual Size	76 Variables	21 Indicators	5 Components
<ul style="list-style-type: none"> Nitrogen dioxide concentration Sulfur dioxide concentration Ecosystems at risk Threatened birds Threatened mammals Wilderness area Dissolved oxygen Electrical conductivity Surface water availability Coal consumption Nitrogen oxide emissions Sulfur dioxide emissions Forest cover change Population growth Ecological Footprint Waste recycling rates Industrial organic effluents Fertilizer consumption Overfishing Sustainably managed forests Market distortions Deaths from Intestinal infectious diseases Child mortality rate Malnutrition Casualties due to environmental disasters 	<ul style="list-style-type: none"> Particulate concentration Indoor air quality Threatened amphibians National Biodiversity Index Developed area Suspended solids Phosphorus concentration Groundwater availability NOC emissions Vehicles in use Acidification Total fertility rates Hazardous waste generation Pesticide consumption Area under water stress Salinization due to irrigation Agricultural subsidies Child mortality due to respiratory infections Safe drinking water supply Environmental Hazard Exposure Index 	<ul style="list-style-type: none"> Air Quality Biodiversity Land Water Quality Water Quality Reducing Air Pollution Reducing Ecosystem Stresses Reducing Population Growth Reducing Waste & Consumption Pressures Reducing Water Stress Natural Resource Management Environmental Health Basic Human Sustenance Reducing Environment-Related Natural Disaster Vulnerability 	<ul style="list-style-type: none"> Environmental Systems Reducing Environmental Stresses Reducing Human Vulnerability

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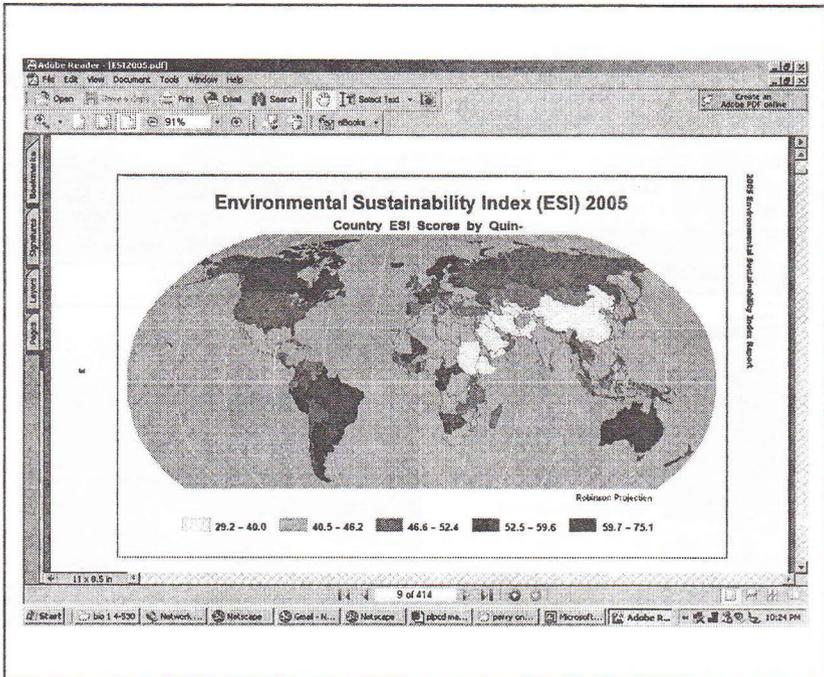
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<ul style="list-style-type: none"> Deaths from Intestinal infectious diseases Child mortality rate Malnutrition Casualties due to environmental disasters Greenline price Corruption Government effectiveness Protected land area Environmental governance Strength of rule of law Local Agenda 21 Initiatives Energy consumption / GDP Corporate sustainability (Dow Jones) Corporate sustainability (Innovation) ISO 14001 certified companies Innovation capacity Digital Access Index Female primary education Intergovernmental environmental activities Role in international environmental aid Greenhouse gas emissions / GDP Transboundary sulfur dioxide spillovers 	<ul style="list-style-type: none"> Child mortality due to respiratory infections Safe drinking water supply Environmental Hazard Exposure Index Child and political liberties Sustainable development data gaps International environmental engagement Environmental knowledge creation Democratic institutions Renewable energy production ISO 14001 certified companies Private sector environmental innovation Participation in Responsible Care Program University enrolment Research scientists Participation in international environmental agreements Greenhouse gas emissions / capita Polluting-goods imports 	<ul style="list-style-type: none"> Environmental Health Basic Human Sustenance Reducing Environment Related Natural Disaster Vulnerability Environmental Governance Eco-Efficiency Private Sector Responsiveness Science and Technology Participation in International Collaborative Efforts Greenhouse Gas Emissions Reducing Transboundary Environmental Pressures 	<ul style="list-style-type: none"> Reducing Human Vulnerability Social and Institutional Capacity Global Stewardship
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ESI Rank	Country Name	ESI Score	OECD Rank	Non-OECD Rank	Components	ESI Rank	Country Name	ESI Score	OECD Rank	Non-OECD Rank	Components
75	Indonesia	48.8		63		111	Togo	44.5		84	
76	Spain	48.8	23			112	Belgium	44.4	28		
77	Guinea-Bissau	48.6		54		113	Dem. Rep. Congo	44.1		85	
78	Kazakhstan	48.6		55		114	Bangladesh	44.1		86	
79	Sri Lanka	48.5		56		115	Egypt	44.0		87	
80	Kyrgyzstan	48.4		57		116	Guatemala	44.0		88	
81	Guinea	48.1		58		117	Syria	43.9		89	
82	Venezuela	48.1		59		118	El Salvador	43.8		90	
83	Oman	47.9		60		119	Dominican Rep.	43.7		91	
84	Jordan	47.8		61		120	Sierra Leone	43.4		92	
85	Nepal	47.7		62		121	Liberia	43.4		93	
86	Benin	47.5		63		122	South Korea	43.0	29		
87	Honduras	47.4		64		123	Angola	42.9		94	
88	Côte d'Ivoire	47.3		65		124	Mauritania	42.6		95	
89	Serbia & Montenegro	47.3		66		125	Philippines	42.3		96	
90	Macedonia	47.2		67		126	Libya	42.3		97	

The column labeled "components" contains bar charts for the five ESI core components – Systems, Stresses, Vulnerability, Capacity, and Global Stewardship – that shows the relative strengths and weaknesses for each country. Higher bars correspond to higher levels of sustainability. The relative heights are comparable across components and across countries.

CNN.com - Landslides toll tops 160 - Dec. 22, 2003 - Microsoft Internet Explorer

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Landslides toll tops 160

Monday, December 22, 2003 Posted: 1830 OMT (2:30 AM HKT)

MANILA, Philippines (CNN) -- Philippine President Gloria Macapagal Arroyo will travel Monday to the southern Leyte province, hit hard over the weekend by deadly landslides caused by days of flooding, officials in Manila said.



Defense Secretary Eduardo Ermita said the death toll had risen to 161 and 93 people remained missing and feared dead from the torrents of mud, rocks

Access to many hard hit areas has been difficult for rescue crews.

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CNN.com - Philippines storm kills 350 - Nov 30, 2004 - Netscape

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WORLD

Philippines storm kills 350

Tuesday, November 30, 2004 Posted: 6:26 PM EST (2228 GMT)

MANILA, Philippines -- A powerful storm has triggered landslides and flash floods that have killed as many as 380 people in the eastern Philippines, according to officials.

Rescuers are now racing to the region to try to save people stranded in three coastal towns before a new typhoon strikes the same area.

At least 150 people are missing in the eastern Philippines, which is largely cut off by landslides and floodwaters which have washed away bridges and roads, officials say.

Helicopter crews are struggling to find ground solid enough to land on and dropped food packages to residents huddled on rooftops or high ground.

Officials are arranging for a coast guard

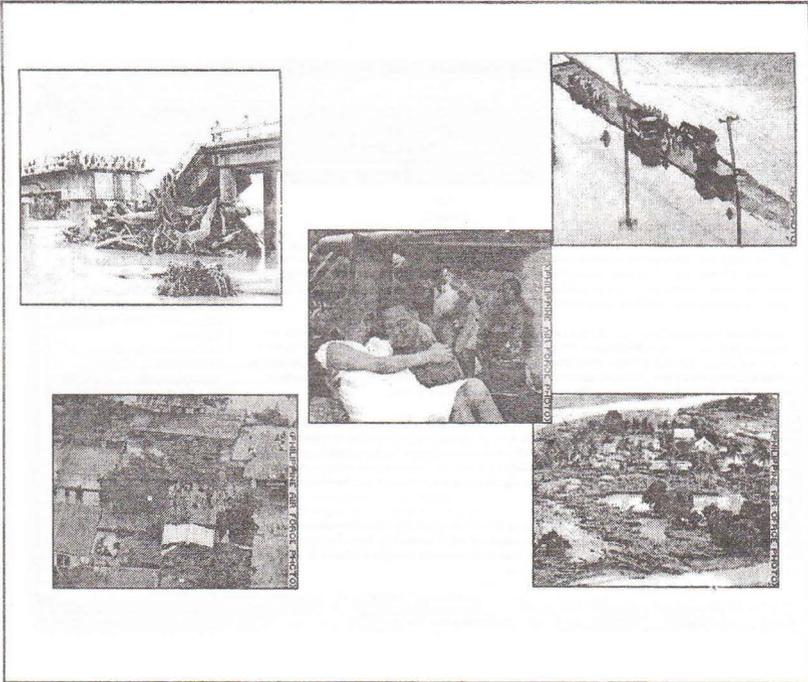
Upgraded trace litter a swollen river near Infanta town in Quezon province.

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Arroyo orders renewed crackdown on illegal logging - INQ7.net - Netcape

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BREAKING NEWS / NATION

Arroyo orders renewed crackdown on illegal logging

Updated 05:47pm (Mla time) Dec 01, 2004
By Lira Dalangin-Fernandez
INQ7.net

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Get INQ7 breaking news on your Smaas mobile phone in the Philippines.
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MANILA, Manila Metropolitan Area, Philippines -- PRESIDENT Gloria Macapagal-Arroyo ordered a renewed crackdown on illegal logging on Wednesday after a series of flashfloods and landslides spawned by a tropical storm left hundreds dead or missing.

"I am directing the PNP and the AFP to join forces in conducting a nationwide crackdown on illegal loggers and their financiers," the President said in a statement, a day after she arrived from Laos where she attended the 10th ASEAN (Association of Southeast Asian Nations) Summit.

She also called for stiffer penalties against those caught engaging in the illegal

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EDITORIAL - The cost of demudation

The Philippine Star 12/01/2004

As of early last night authorities counted over 300 people dead in the wake of flashfloods and landslides triggered by typhoon Winnie. Har-deet hit were Quezon, Aurora and Real, where days of incessant rains from previous weather disturbances had loosened the soil. The ground finally gave way during the daylong rains brought by Winnie. By early afternoon yesterday auto-rites in the Quezon town of Real alone counted over 100 residents dead.

Video footage and reports from people displaced by the typhoon quickly pointed to the cause of the flashfloods and mudslides: land picked clean by illegal loggers. Nueva Ecija Gov. Tomas Joson III, whose province was inundated by floods, and Quezon Rep. Rafael Nantez blamed illegal logging for the latest disaster. At least one senator three-tened to summon Environment Secretary Michael Defensor to a congressional hearing. Defensor in turn promised that heads would roll in an investigation he ordered into illegal logging activities in the worst hit areas.

It's not as if the nation has not had enough natural calamities to know the disastrous consequences of illegal logging. The freak flood that killed thousands of people in Ormoc, Leyte a decade ago was also blamed on the demudation of the city's watershed. No one was punished for the illegal logging, which was probably why the activity continued in many parts of the country. Since the tragedy in Ormoc, many other landslides have occurred in denuded areas, killing more people. The death toll from Winnie is the highest so far since Ormoc, prompting President Arroyo to cut short her visit to Laos and rush to the disaster areas.

Those enforcing the logging ban have blamed the lack of manpower and resources. There are other ways, however, of improving enforcement of the ban. Local governments, the military and police, and residents themselves must work together for effective enforcement of the ban. As this latest tragedy has shown, this is not just a campaign to save the nation's rapidly dwindling forests. It is a campaign to save lives.

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Department of Environment and Natural Resources - Defensor Declares Logging Ban, Sacks Penros In Quezon, Aurora And Nueva Ecija - Netscape

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Defensor Declares Logging Ban, Sacks Penros In Quezon, Aurora And Nueva Ecija

ENVIRONMENT and Natural Resources Secretary Michael T. Defensor today banned all logging activities in Real, Infanta and General Nakar in Quezon and the towns of Dingalan and San Luis in Aurora following the deadly flashfloods that buried several communities in the two provinces and killed hundreds of people.

At the same time, Defensor relieved all of DENR's Provincial Environment and Natural Resources Officers (PENROs) for Aurora and Quezon as well as Nueva Ecija amid complaints from the public that some DENR officers are conniving with illegal loggers.

"With the ban, any timber cutting activity in those areas is illegal. Violators will face the full force of the law," Defensor said.

Defensor likewise tasked an eight-man investigation team, which he formed today (December 2), to submit a report "within 10 days" on the illegal logging activities within the provinces and recommend actions to be taken "to avoid and/or minimize similar incidents in the future."

Defensor said the relief of PENROs in the three provinces would serve notice to all DENR personnel to be on their toes in performing their jobs and in enforcing forestry regulations.

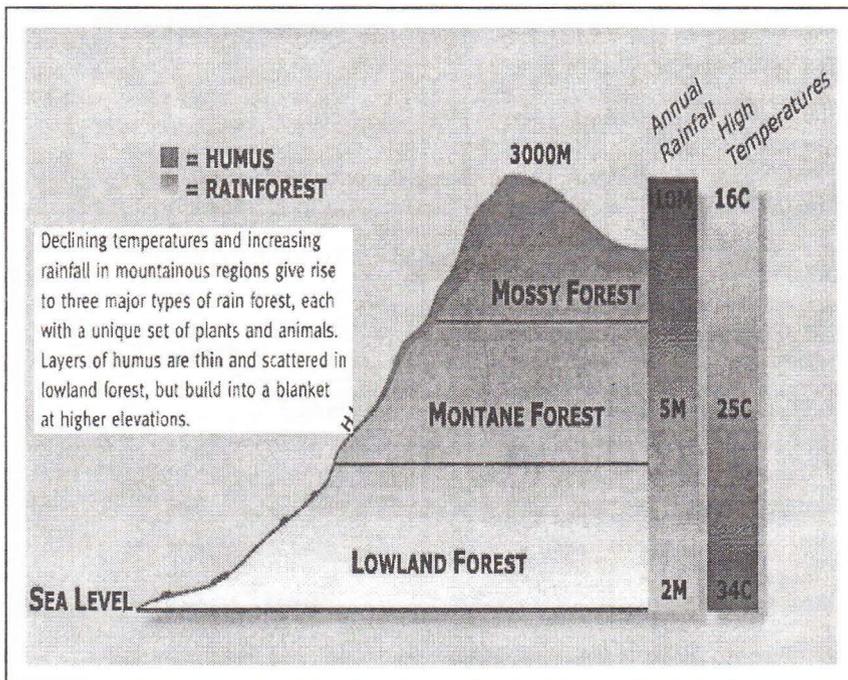
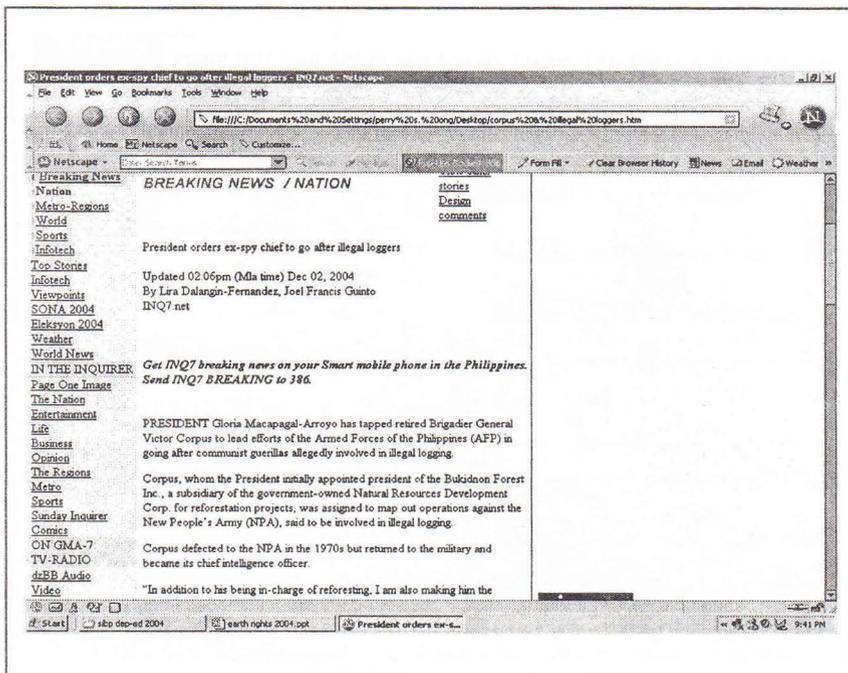
He said more heads will roll, especially after the investigation has completed its probe.

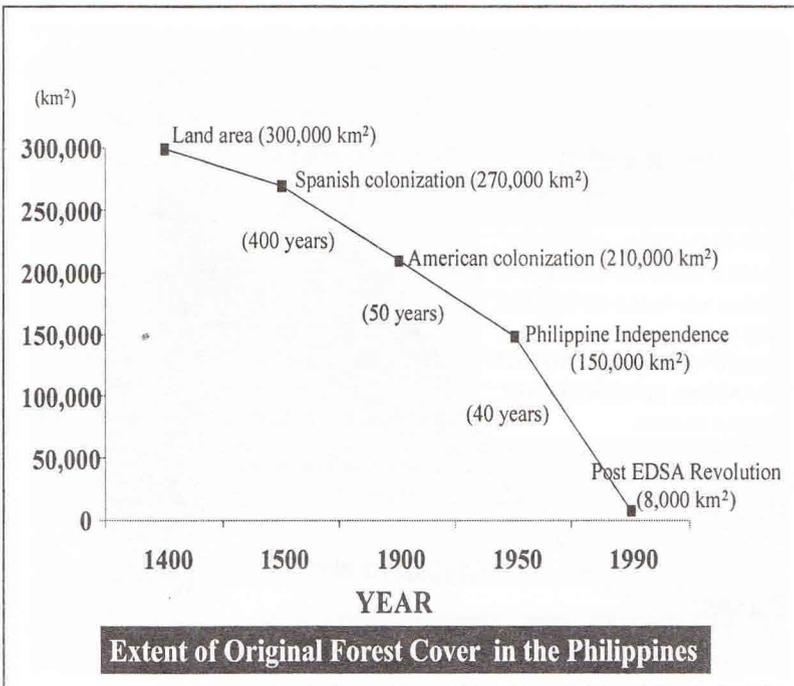
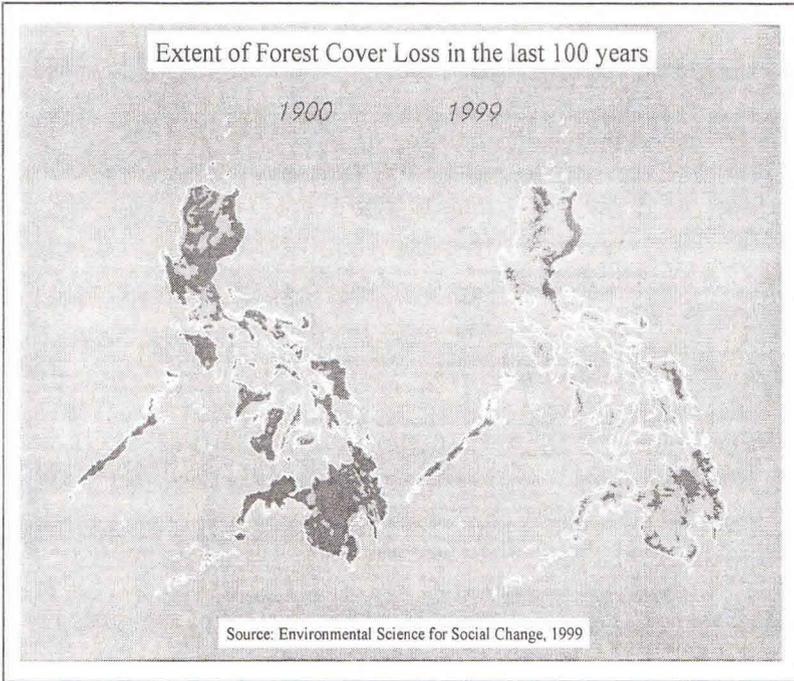
The log ban covers the transport of all forest products and operation of all sawmills in the three Quezon towns and two Aurora towns.

The flashfloods triggered by typhoons Winnie and Violeta had uprooted precious forest cover and sent logs tumbling down from the mountains and into the homes of residents of the two provinces. This was also the scene in Nueva Ecija where the ban on cutting of forest trees already exists.

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Diversity, endemism and conservation status of Philippine wildlife

Major Taxa	No. of Species	Endemic Species	Threatened Species
Amphibians	101+	79+ (78%)	24 (24)
Reptiles	258+	170+ (66%)	8 (4)
Birds	576+ ¹	195+ ¹ (34%)	74 (59)
Mammals	204+ ^{1,2}	111+ ^{1,2} (54%)	51 (41)
Total	1139+ ^{1,2}	555+ ^{1,2} (49%)	157 (128)

+ includes new species (20 for amp, 18 for reptiles, 3 birds, 16 for mammals)

¹ includes rediscovered species

² 25 species of dolphins, whales and dugong

Status of Marine Ecosystems in the Philippines

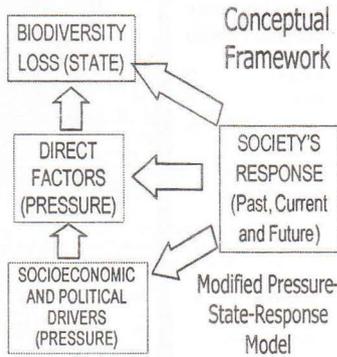
Coral Reefs - 5% in excellent condition

Mangroves - 80% lost in the last 75 years

Sea grass beds - 30-30% lost in the last 50 years

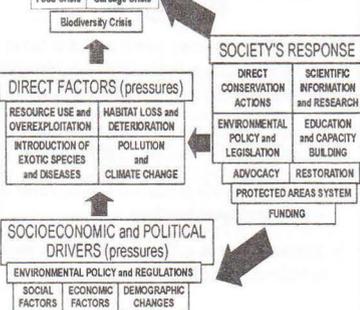
Biodiversity in an Urban Environment

Birds of UP Diliman, Quezon City



ENVIRONMENT Crisis (state)

Conceptual Framework



THE PHILIPPINE BIODIVERSITY CONSERVATION PRIORITIES



CONVENORS





PARTNERS AND DONORS





































300 INDIVIDUALS

100 LOCAL AND INTERNATIONAL INSTITUTIONS



(GOVERNMENT, CIVIL SOCIETY, ACADEME, DONORS AND PRIVATE SECTOR)

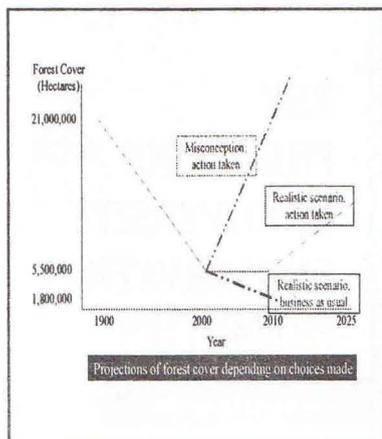
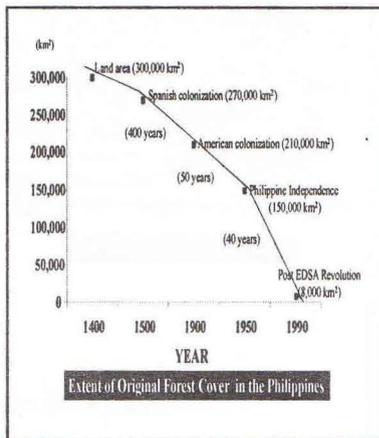
Philippine Biodiversity Conservation Priorities

Terrestrial	170
Marine	36
TOTAL	206

Summary Priorities:

Extremely High	= 186
Very High	= 72
High	= 13
Inufficient Data*	= 15

* No data on action-course

POINTS TO PONDER

- ✧ Most of the remaining 18+% (or 5.5 M ha) of forests are mostly montane and mossy forests (6-7%) and secondary forests (11-12+%)
- ✧ Lowland forests have disappeared in most parts of the country and are the most threatened
- ✧ Each island needs at least 40% forest cover to sustain ecological functions.
- ✧ Smaller islands (e. g. Camiguin) are more prone to extinction than larger islands (Luzon)

Challenges

- Protection at a landscape/regional level
- Local successes are not enough
- Necessary but insufficient actions
- Not commensurate to the scale of the problem
- Might end up tending the garden while our house is on fire!

Challenges

- More assertive, be ready to engage other stakeholders in a dialogue
- Utilize all tools available
- Strengthen alliances and partnerships
- If our adversaries are ruthless in destroying our biodiversity, we should be equally as grim and determined to defend it

CPR vs Extractive Economics

CPR Economics (Tony Oposa, 2003)

- Conservation
- Protection
- Restorative

CPR Economics (Tony Oposa, 2003)

- Massive natural reforestation - to restore the required 50% forest cover of the country's land mass. (To restore the balance of ecology in our lands, and prevent floods, siltation)
- Establishment of a national network of marine sanctuaries. (To restore the marine life and showcase the marine wealth of the country. Also attractive for eco-tourism)

CPR Economics (Tony Oposa, 2003)

- Recovery and cleaning of rivers, waterways and water bodies (lakes, lagoons, etc) (To cleanse the waters, restore aquatic organisms for food and recreation, and prevent floods. This activity will include, among others, the making of biological/natural sewage treatment plants to clean up pollution sources, putting up river/seaside tree-shaded walkways, etc.)
- Establishment of urban vegetable 'farms', herbal and flower gardens. (To ensure a cheap supply of vegetables in the city).

CPR Economics (Tony Oposa, 2003)

- Converting concrete roads into vegetation and locomotion corridors to be devoted to shady fruit trees, bike paths, and walkways, especially along the water ways. (This will not only cool down the heat of the city and add more oxygen, it will also restore a healthy lifestyle with more people walking and biking or riding in pedaled railbased collective locomotion systems)
- Harness Filipino ingenuity and creativity to construct and operate a Filipino-designed, non-motorized mass transit system.
- Values education for the youth - instill respect and love of nature, love of country, and reverse the brain drain. There is much to do, and we need all the help we can get.

CPR Economics (Tony Oposa, 2003)

- Responsible, better than world-class "mining" industry. However, this 'mining industry' will be the opposite of the mining industry now practiced by the world of conventional economics - of extracting virgin minerals, using them and then throwing them away. This Filipino "mining industry" will emphasize on the recovery, reuse and recycling of mineralized materials.
- Eco-tourism. While this is generally already accepted, it must be well regulated in order not to destroy the very ecological qualities of the object of attraction. (E.g., beaches must not be over-developed, proper land use planning and zoning enforced, etc.)

CPR Economics (Tony Oposa, 2003)

- Textile and paper making from exotic fibers like abaca, banana, pineapple, rice straws, etc.
- Promotion of the restorative arts, where we excel -- music, painting, sculpture, literature, landscape design, etc. Also promote the natural sciences - such as forest ecology, marine sciences, archeology, anthropology, etc.
- Promote natural sports -- sailing, swimming, scuba-diving, surfing, whitewater rafting, and other water sports, mountain climbing, bird-watching, terrestrial and marine flora and fauna research. Filipinos are naturals in the water. (Yet 80% of the Filipinos do not know how to swim!)

**Nobody said that Saving
the Hottest of the
Biodiversity Hotspots is
going to be easy!**

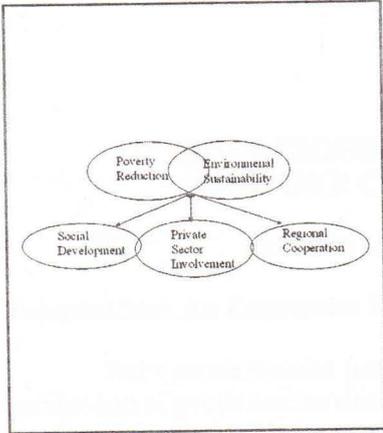
**No single individual or
organization is going to
make the campaign to save
the Philippine Biodiversity
Hotspot a success!!!**

Bridging GAPS

Goals
Aspirations
a Promise

Changing MAPs

Mindsets
Attitudes
Practices



Food for Thought

It is better to have fought and lost for the environment than never to have fought at all, not knowing if you could have made a difference!

We should have:

the courage to change the things that needs to be changed;

the serenity to accept the things that could not be changed;

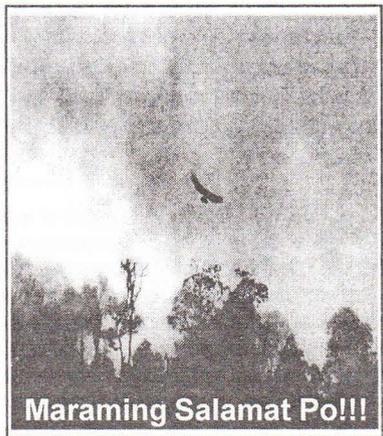
and the wisdom to know the difference!

Every Species...

Every second...

Every hectare ...

In our fight to save Philippine biodiversity everything counts!



BIO-RESOURCE MANAGEMENT AND OUR COMMON FUTURE

Federico M. Macaranas, PhD

Introduction: An Economics Framework

From an economics perspective, bio-resources are inputs to the production of goods and services for the satisfaction of human wants and needs which presumably increase their well-being. Further, that perspective posits that the optimal strategies for bio-resource management for a sustainable future deal with global public goods (goods whose benefits are indivisibly spread among the entire community, whether or not particular individuals desire to consume that good¹ where markets fail (for example, in providing the same goods and services for future generations) because there are no incentives for individuals alone to produce them while governments have the natural role to undertake such task/ responsibility.

That bio-resources are indeed public goods rather than individually expropriable private goods lies at the heart of the debate between many developing countries and the advanced nations which have taken an intellectual property approach on the subject (intellectual property law covers patents, trade marks, industrial designs and geographic indications). The situation is much different today from the time when population pressures were relatively less demanding for meeting the material needs of the human species. Hence, there is a need to move from the concept of global commons to one that is strictly less global, i.e., regional or country-specific – but the standards of good management remain the same. Are we wisely managing “our” bio-resources for “our” common good, “our” being alternatively Filipino or homo sapiens in general?

¹Samuleson, Paul A. and William D. Nordhaus, *Economics*, 17th edition, p.774. Regional public goods like the environment are discussed in an Asian context by Matthew E. Kahn, Chapter 10, *Environmental Regional Public Goods in Asia and Latin America*, in Estevadeordal, Antoni, Brian Frantz and Tam Robert Nguyen, eds., *Regional Public Goods: From Theory to Practice*. 2000 Washington, D.C.: Inter-American Development Bank, 2002). Kahn identified three major regional public goods in Asia — the air pollution problem from the Indonesian haze (originating from man-made forest fires), acid rain from China and Indian coal-fired power plants, and the Greater Mekong Subregion hydroelectricity generation impact on irrigation systems downstream in Vietnam and Cambodia.

Based on those premises, it is argued that the management of bio-resources (plants, animal and the environment that support them) involves both the *real and financial* sides of the global and local economies, and that the Philippines must examine international treaties and conventions it has signed related to the subject from a viewpoint of a poor developing country that has to balance its development needs with environmental concerns which partake of the nature of global public goods. Moreover, an economic system requires the financing of the activities that not only transform natural resources into goods satisfying human wants through different technologies, labor productivity and management processes, but also conserve, preserve and sustain the bio-resources to meet the changing welfare standards of humankind.

Economics is about both real resources as well as the financial aspect of the allocation of such scarce resources; it is for the latter aspect, many developing country policy makers perceive, that advanced industrial countries are keen in shaping the global bio-resources management for their narrow self interests. But poor countries have to catch up with their own people's aspirations for the quality of life that many human beings are enjoying in countries that have better managed their economies as most recently demonstrated by China and India at the turn of the millennium – yet at what price for their future citizens and those of the rest of the world?

Basic Management Concerns

1. Inputs – What are we managing?

One cannot manage properly a system when one does not even know what exists in the bio-resources inventory of the country. For example, the Philippines lacks a comprehensive updated reference on its plant diversity in the manner that Java, Peninsular Malaysia, Sabah, Sarawak, Taiwan and Japan have². The Flora of the Philippines Project, engaging 70 specialists from around 20 countries around the world, given that we are among the most biodiverse places on this planet and one of the ten hotspots for conservationists—needs another 12-15 years to help the 10 active Filipino taxonomists complete the processing of newly collected specimens, and the writing of a book that is expected to be several volumes. The Philippines hosts more than 8,000 flowering plants

² http://members.tripod.com/bic_plantsunit/Flora.htm reports on The Flora of the Philippines Project in the 1990s, which I supported while serving as Assistant Secretary for International Cooperation in Science and Technology at the Department of Foreign Affairs. The Bishop Museum and the Botanical Research Institute in Fort Worth, Texas collaborated with the National Museum of the Philippines on the collection, processing, documentation, identification, and dissemination of specimens in the Plant Inventory and Collections Management phases, with funding from the U.S. National Science Foundation, U.S. Agency for International Development, and the Catherine T. MacArthur Foundation.

distributed in some 1,600 genera and 191 families, and another 6,490 species of non-flowering plants which combined with vascular plants total 14,490+ species of which 30 percent – 40 percent are believed to be endemic to the Philippines and found nowhere else around the world³.

What is true of terrestrial flora and fauna is true of Philippine aquatic bio-resources inventory⁴. Without such basic data, one is left basically with information on reported bio-resource losses through time as the forest cover and marine environment are degraded with mounting population pressures. The more important information for management is the existing inventory rather than the losses of the past because this is where action can be initiated. In fact this is what the Philippines must bear in mind as it promotes its interest in the face of international agreements it has signed.

Neither do we have good updated rosters or database on the worldwide network of Filipino scientists in biology, botany, chemistry (especially of natural products), food technologists, marine and related sciences to enable us to harness their collective knowledge for the common good of the country. The Philippine government Balik Scientist Program 1970s- and 80s and the Science and Technology Advisory Councils in the 1990s, the United Nations Project on the Transfer of Know-how Through Expatriate Nationals (TOKTEN) and the International Organization on Migration (IOM) Return of Talent Programme at some point started these databases but it seems that no one is continuously collecting and updating these. The contributions of many of these scientists deployed overseas have vastly improved the state of art knowledge in many disciplines, the financing options for research and faculty development, and the know-how of markets for particular goods and services.⁵

Finally, the knowledge connected to our bio-resources (their origins and uses) is continuously uncovered or developed by various scientists and are transformed into goods and services through indigenous or imported technologies by businesses, yet we seem unable to manage

³ Ibid, p.2 See also <http://www.pnh.com.ph/category/4-Articles/24>

⁴ The Smithsonian Institution has been engaged in summer expeditions in Philippine waters to collect seagrasses from the Philippines and catalogues them for research purposes. Dr. Ernani Menez, Philippine-born Curator and Botanist Emeritus, Department of Botany, National Museum of Natural History, Smithsonian Institution, spearheaded the efforts in the 1990s. However, there seems to be no equivalent project as in the terrestrial flora noted in {3} and {4} above. Barut, et al., Philippine Coastal Fisheries Situation (Worldfish Center Contribution No. 1713) contains a review of the fisheries resource potential of the country (pelagic and demersal resources, invertebrates, sharks and rays, endangered marine species). The MTPDP 2004-2010 provides for a survey and mapping of maritime zones starting in 2005 but it is not clear if sufficient funding can be made available for its faithful implementation.

⁵Caoyonan-Tible, Cecille

this knowledge base for our own development. Whether such knowledge generation and utilization ought to be the common heritage of all humanity, to be freely shared or appropriately compensated, is one of the major world concerns today over which the Philippine government and civil society are concerned.

2. Processes: What appropriate bio-resource management practices do we have to adopt/ adapt for sustainable development?

Other than the three major inputs above where benchmark data are deficient, (natural and human resources inventories and an inventory of indigenous knowledge generation and utilization of our bio-resources), the management system should be concerned with the vision/mission of *what* it is we wish to be known for in the area of bio-resources for sustainable development and *how* we intend to go about achieving that — given our place in the community of nations as one of the, if not the leading, biodiversity hotspots of the world, i.e., the most severely threatened of the megadiverse countries.

The Philippines has signed many multilateral environmental agreements and conventions that ultimately shape our responses to the issues of bio-resources management at the global and national levels (See Annex A). It has supported UN General Assembly Resolutions on permanent sovereignty over natural resources (1962) and the world charter for nature (1982), and the two major UN Conference on Environment and Development (1992) documents, namely Agenda 21 (Chapters 38 and 39) and the Rio de Janeiro Declaration on Environment and Development.

Beyond signing international agreements, the Philippines is already known for legislating national laws and developing excellent plans to implement the commitments, crafting programs where civil society plays central roles, and devising some management processes that are recognized as best practices, albeit not properly scaled up or implemented on a wider basis to make any dent on the severe environment problems facing the country.

a. Participatory models

The Philippines is known among global environmental groups to have produced notable management practices for sustainable development especially in the area of participatory paradigms. Community-driven project management of natural resources, an alternative to top-down approach in economic planning and implementation, take various forms in the Philippines — from environment-watch (Bantay Dagat, Bantay Gubat) to ecotourism (Olango Bird Sanctuary, Donsol dolphins) to social enterprise models. This brand of management takes off from the idea of popular participation in the design and execution of projects and has thus been variously called community-based management, stakeholder participation, people-centered management and community-driven initiative. However, this does not always work out well.

A dynamic fit model with six variables (community needs, strategy, capacity, leadership, inputs, and sense of ownership by the community) has been developed by Bagadion (19__)⁶ to show when these participatory approaches may be effective in sustainable development. He cites examples of community-based projects that failed because of the loose fit of the variables, e.g., forest and coastal dwellers livelihood objectives that do not mesh with those of resource protecting agencies and donors; people's organizations that do not have competence in ecotourism projects but which have succeeded in other areas; failure of project leaders to immerse themselves in the customs, traditions and mores of the community for creating trust and confidence; no capacity for communications, monitoring or evaluation; no community ownership of psychic and material rewards; etc.

This management approach arose from the redirection of focus to institutional factors (governance structures, transparency and accountability issues) and away from macroeconomic policies typical of the agricultural development experience of the 1980s and 1990s which stressed the power of such policies in stimulating growth of both agriculture and the national economy. In the agricultural development arena, the redirection has been towards "an *institutional environment* conducive to mobilizing the energy and capability of the majority of rural people" (MTPDP) Hence, the community based resource management model has become an important part of the Philippine development literature in the past decade and may become even more important as the economics profession revisits the role of institutions in economic growth. This calls for the reexamination of how the social sciences for example are integrated into national science and technology policy bodies; the Filipino-American Silicon Valley experience in integrating financial management principles into the research and commercialization phases of technology development may be instructive in this regard.

Consonant with the international conventions signed by the Philippines and its status as an environment hotspot, the Medium Term Philippine Development Plan (MTPDP) 2004-2010 focuses on five thrusts one of which deals with the protection of vulnerable and ecologically fragile areas especially where biodiversity is highly threatened. Under this thrust, 6.336 million hectares are to be delineated for biodiversity protection. Another 77 Protected Areas will be zoned and be governed by

⁶Republic of the Philippines, Office of the President, Executive Order No. 247: 2005. Prescribing guidelines and establishing a regulatory framework for the prospecting of biological and genetic resources, their by-products and derivatives, for scientific and commercial purposes, and for other purposes. Biological resources are defined as including "genetic resources, organisms or parts thereof, populations or any other biotic component of ecosystems, with actual or potential use or value for humanity. It shall include, but not limited to, all biological specimens such as plants, seeds, tissues and other propagation materials, animals, microorganisms, live or preserved, whether whole or in part thereof."

Protected Areas Management Boards (PAMB) which will be partly funded by money generated from within the Protected Areas (possibly water user fees) and the transfer of the Integrated Protected Areas Fund.

A thrust on the promotion of investment and entrepreneurship in sustainable and productive utilization of natural resources includes the completion of a land classification system by December 2010, the acceleration of titling of alienable and disposable land, integration of agencies involved in land titling, lease/rental of open forestlands and foreshore areas, and the creation of a more conducive climate for sustainable development which include community-based arrangements (8.4 million hectares of delineated agro-forestry land, Community Based Forest Management Agreement covering 1.8 million hectares, Industrial Forestry Management Agreement covering 36,365 hectares, Socialized Industrial Forest Management Agreement covering 39,350 hectares, and establishment of 15 wildlife farms and zoos), among others.

b. Financial and technical assistance agreements

There are two other MTPDP thrusts on healthier environment (air, water, waste management) and natural disasters management (geohazard mapping, soil stability measures, and disaster preparedness strategies). But what has gained recent prominence is the thrust on mining in the context of creating broad-based prosperity for the Filipino people. The MTPDP is embarking on the approval of 18-23 large-scale mining projects that adhere to sustainable development principles of economic growth, environmental protection and social equity. This will involve large-scale foreign mining firms that have been precluded from investing in the Philippines after the Mining Law was challenged during the administration of Pres. Fidel V. Ramos.

Recently, the Supreme Court ruled in *La Bugal-B'Laan Tribal Association v. Ramos* that 100-per cent foreign owned companies (FOCs) may enter into financial and technical assistance agreements (FTAAs), and the accompanying management component, with the President of the Republic of the Philippines, and not with individuals, for large-scale exploration, development and utilization of Philippine mineral resources. Under the Philippine Constitution, such activities may be undertaken by the State through coproduction, joint venture, or production sharing agreements only with corporations whose capital is at least 60 percent owned by Filipino citizens; the FTAA approach enables FOCs to come into the picture without violating the Constitution.

However, the FTAAs with FOCs do not cover forests and fisheries, are subject to full control and supervision of the State through the DENR Secretary, and are also constrained by the Presidential prerogative to specify terms and conditions of the contracts especially "the sharing of the net mining revenues between the contractor and the State." Justice Artemio Panganiban stressed that the four dissenters out of 15 in the Supreme Court *en banc* decision emphasized the "need to assure maximum

financial advantages for our people... a minimum of 60 percent of the net mining revenues ... (but) there was no specific constitutional authority that empowered it (the Supreme Court) to fix those benefits to a minimum of 60 percent.” The Supreme Court also issued the reminder that “if it should later be found that the share [of profits] agreed upon is grossly disadvantageous to the government, the officials responsible for entering into such contract on its behalf will have to answer to the courts for their malfeasance. And the contract provision [will have to be] voided” (Panganiban, 2005)⁷. On the issue of the environment, the Supreme Court argued that such socially important considerations were policy concerns outside the prerogative of the judiciary, and can be covered by the residual powers of the State which can demand “the use of best mining practices to produce maximum benefits, to protect the rights of indigenous communities, and to prevent environmental degradation.” Affected barangays and municipalities are supposed to receive 20 percent each of financial benefits, with the remaining 10 percent to provincial and 50 percent to national government, from any FTAA.

c. Global trade and bio-resource management

When the Philippines acceded to the World Trade Organization, with its constitutionality upheld by the Philippines Supreme Court (Tañada vs. Angara) , it effectively signed on to the Trade-related Aspects of Intellectual Property Rights (TRIPS) Agreement and not only to the multilateral free trade regime of the 36-volume Uruguay Round of Multilateral Negotiations. . This TRIPS Agreement is the major policy area that bears watching since global markets for bio-resources will grow increasingly and it is not clear how the poor countries of the world may share equitably as their own bio-resources are accessed by both domestic and outside businesses, and traditional knowledge-holders may not be properly recognized, issues at the heart of its implementation. Rural livelihoods, biotechnology for new products, and intellectual property rights (IPRs) eventually converge from these issues.

These global markets are considerable, e.g., the annual use of genetic resources for the pharmaceutical industry alone is estimated at US \$300 billion, for commercial seeds at \$30 billion, and horticulture at \$20 billion, while the traditional therapeutic market is estimated at \$60 billion (Bagadion, 19__). However, biological genetic resources are no longer considered as common heritage of mankind and are now politically apportioned according to the sovereignty of States to control these resources and hence their transformation into goods and services have become national as well as diplomatic policy concerns.

⁷Robert Paarlberg, “The Global Food Fight,” *Foreign Affairs*, May/June 2000, pp. 24-38, notes that by 1999 American farmers got more than the patent-holders and consumers after the US Environment Protection Agency, the Food and Drug Administration, and the US Department of Agriculture approved new GM seeds in 1996.

Indeed, Executive Order 247 signed by President Fidel V. Ramos on 18 May 1995 stipulates that it is State policy to “regulate the prospecting of biological and genetic resources so that these resources are protected and conserved and put to sustainable use and benefit of the national interest.” This is in pursuance of Articles Three and Fifteen of the United National Convention on Biological Diversity (CBD) whereby all contracting parties recognize that individual countries have the sovereignty over their biological and genetic resources, a clear delimitation of the “publicness” of bio-resources as global public goods without reference to natural boundaries or those habitats defined by ecosystems that may cross borders or are beyond national frontiers.

EO 247 as the pioneering effort to put CBD and the access and benefit sharing principles (ABS) as well as informed prior consent (PIC) into practice has been praised and alternatively “condemned by others as unrealistic and unworkable, and is viewed by many others in the commercial sector as the bete noir of the international ABS debate” (Lasen Diaz, 2005).

Whether prospecting is under an Academic Research Agreement (ARA) or a Commercial Research Agreement (CRA), EO 247 mandates that “access to collected specimens and relevant data shall be allowed to all Filipino citizens and the Philippine governmental entities whenever these specimens are deposited in depositaries abroad. Moreover, the prospecting of biological and genetic resources within ancestral lands and domains of indigenous cultural communities shall be conducted with the prior informed consent of such communities.”⁷

The main concern that must be raised on bio-resource management is whether the Philippines has enough skilled human and financial resources to properly implement for its own benefits the WTO and its TRIPS Agreement, the CBD, and for that matter the World Intellectual Property Organization (WIPO), the International Union for the Protection of New Varieties of Plants (UPOV), and the Food and Agriculture Organization (FAO) International Treaty on Plant Genetic Resources for Food and Agriculture. This involves both external and domestic aspects of the implementation of these international commitments as market forces (and those behind or beyond it) shape the prospecting of bio-resources for meeting the various needs of human beings in both developed and especially the developing world as they attempt to meet the Millennium Challenges.

3. Outputs and outcomes – How do we share in the benefits and costs of bioresources exploitation, development and utilization?

1. Benefits vs. costs of standardized IPR regimes

Will the Philippines derive a net benefit from adhering to certain IPR regimes more than others? Bio-resources are just some of the

considerations in a national assessment of the matter and it is in fact people with intimate connection to such resources to which IPR attaches. For example, there is the view that the debate on genetically modified food crops (initially for pest control, weed control, soil protection in advanced countries) really concerns the welfare of poor farmers in poor countries to whom the gains of technology holds the most promise, at the same time that there are issues on the economic benefits sharing among patent-holders, farmers, and consumers.⁸

Technology transfer is one of the potential benefits to farmers of an IPR regime. However, based on her study of industrial patent protection from the 14th C. to the later cross-border applications in the 18th and 19th C., Lasen Diaz (2005) notes that “tight and uniform IPR were not the only way technologies were transferred between industrial countries” given that IPRs are to “provide incentives to promote and reward technical and technological innovation and artistic developments.” The flexibility in excluding areas of technology from patenting and the length of patent lives themselves were allowed by the 1883 Paris Convention for the Protection of Industrial Property, and in fact national IPR regimes were the rule prior to this convention {Lasen Diaz, 2005}. Ironically, developed countries have expanded the reach of IP today by covering life-forms, cell lines and DNA sequences, the creation of new rights, e.g., plant breeders; and progressively standardized basic features of IPR such as 20-year protection terms, prior art searches, and the requirement to examine applications for their novelty, inventive step and industrial applications, etc. (Laird, 2002). Indeed the very countries that first developed IPRs were the ones instrumental in positioning IPRs at the core of the international trade agenda when the WTO was crafted in the mid-1990s, despite the fact that wisdom keepers of bio-resources and traditional knowledge are shaped by different customs, institutions and needs. In fact, the UNDP in its 2001 Human Development Report argues that the new IPR regimes can in fact hamper innovation and unfairly distribute the ownership of knowledge as it shifts to private hands, and that the TRIPS Agreement rider on the WTO may be difficult to implement fairly since it inflexibly harmonizes IPR standards based on Western legal concepts, frameworks, culture and values. {Lasen-Diaz, 2005}

As a member of the Group of Like-Minded Megadiverse Countries formed in February 2002, the Philippines is keen in setting up a consultation and cooperation mechanism to promote common interests and priorities regarding biodiversity protection and sustainable use with countries such as Bolivia, China, Colombia, Costa Rica, Ecuador, India, Indonesia, Kenya, Malaysia, Mexico, Peru, South Africa and Venezuela. This Group has been successful in getting a mandate for an international regime on benefitsharing for the WSSD, and further discussion on the subject of access and benefit sharing in international negotiations. (Laird, 2002)

Prior informed consent:

This is a problem faced in the implementation of the CBD and the TRIPS Agreement. The latter requires that micro-organisms must be subject to patents for WTO members while leaving room for flexibility in determining patents on plants and animals. Advanced countries have granted patents on genetic resources or traditional knowledge from poor countries well outside their sovereign political boundaries. The U.S. has granted patents for the ayahuasca plant used as medicine by Amazonian indigenous people, for the Andean root crop maca, for Indian herbal concoctions for anti-diabetes, for tumeric with its known healing properties known in India for centuries, for the neem tree, basmati rice, etc. The San people of South Africa experience shows that benefits can be shared if properly negotiated, as it experienced with its hoodia plant used for suppressing appetite.

Acquiring prior informed consent (PIC) of states and local or indigenous communities in the Philippines through EO 247 is claimed to be “ a major obstacle to scientific research by Philippine academic and research institutions, and has dampened commercial bioprospecting as well... (with) the procedures mandated by the 1995 regulation (as) overly bureaucratic, time consuming, costly and do not take into account the realities of scientific research or field and transportation conditions in the rural Philippines... (with the) general level of awareness of bioprospecting and what Philippine law says about it ... so low among local officials and community members... and many NGOs in the Philippines working on biodiversity prospecting... view(ing) ‘all bioprospecting as biopiracy’ urging communities in all cases to withhold consent “ (Lasen Diaz, 2005)

Best practices to make benefit sharing work include trust funds which distribute financial benefits that serve wider national interests and stakeholders over time (Suriname, Nigeria, Fiji, Panama), innovative partnerships that allow greater local capture of benefits including IPR, and provision of training, laboratory equipment and wider capacity building together with fees, royalties and milestone payments.

Intermediary institutions such as Costa Rica’s InBio can maintain genetic resource “libraries” that prepare extracts and screen preliminary samples. Integrity and competence issues should not be overlooked when governments promote these intermediaries as guided by benchmarks, transparent and accountable policies and objectively verifiable standards. (Laird, 2002)

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Roundtable Discussion on Bio-resource Management and Our Common Future?

Acad. Mercedes B. Concepcion: Thank you very much NS Gelia Castillo. Good Morning to everyone. The National Academy of Science and Technology, particularly our Social Sciences Division is very happy to see familiar faces here. I wish, on behalf of our division, to thank the discussants and convenors of this particular round table. The PSSC does not seem to have round tables. In refurbishing this building it failed to think of round table arrangements. However, despite the lack of round tables, we are counting on you to make it a fruitful discussion. Last week we held the first of these round tables in support of the theme the **Century of Biology**, which is the theme of our Annual Scientific Meeting (ASM) in July. The executive council has decided that all divisions should support this theme in all their activities throughout this year. Since the Social Sciences Division has been allocated one plenary session during the ASM, we decided to hold this round table in preparation for this plenary session. The first topic that was discussed last week was on **Biology as Destiny?** The topic was objected to by our discussants but there was a provocative discussion and a very enjoyable one. According to Dr. Allan Bernardo whom we have assigned to be one of the plenary session speakers for July 'bitin daw ang discussion' so we are going to have a sequel to that round table before July to enable Dr. Bernardo to present a very comprehensive picture of the topic. This time our topic is on **Bio-resource Management and Our Common Future**. We have called on our fellow Acad. Edgardo Gomez and invited Dr. Agnes Rola to serve as co-convenors of this particular round table. We have called upon four of our OYSs and non-OYS to serve as discussants for this topic. Unfortunately, Dr. Dindo Campilan who is listed as our first discussant is in India, having failed to catch the return flight yesterday.

Thank you very much Acad. Gomez and Dr. Rola for serving as convenors of this particular round table. Just as we assigned and invited Dr. Allan Bernardo to be the plenary session speaker, we are also going to have Dr. Agnes Rola to serve as the second plenary session speaker for July.

In addition, we are expecting the discussants to have prepared a written paper. We intend to publish the results of these discussions. Our first deadline is July so the convenors' statements and the discussants' contributions will all be put together in a monograph on this and the first topic. Please do not forget to submit your written comments before the end of this morning. I hope all of you will stay for lunch. Thank you very much.

NS Gelia T. Castillo: To open our round table discussion we have Acd. Edgardo Gomez who all of you know as the illustrious Director of the Marine Science Institute. I think a mark of institutes in the University is when a unit is not striving to be a college. But in reverse snobbery they maintain the institute or a school. For example, I think the School of Economics (SE) will never be a college. The SE takes pride in being a school, and I think the Marine Science Institute will remain the same. Acd. Gomez has been responsible for the production and nurturing of very bright young scientists in the Institute. He is involved in so many activities relevant to the subject of our roundtable. He is currently a member of the Executive Committee of the International Union of Biological Sciences and Coordinator of the Philippine Center of Excellence GEF World Bank Coral Reef targeted research. He is also Chair of the Restoration and Remediation working group for GEF World Bank Coral Reef Targeted research and is also a board member of the UP Press.

Acd. Edgardo D. Gomez: Thank you very much, NS Castillo! For the people in the audience I think you are aware that this year's Annual Scientific Meeting of the NAST is being sponsored by the Biological Science Division. However, the Social Sciences Division, a most active or if not the most active division of the NAST, has taken the initiative to have this round table discussion as their contribution to the ASM. Because the second topic was chosen to focus on Bio-resources and their management, the organizers deemed it useful to have a biologist to be one of the convenors for this round table. So when I was actually approached I said I should not be doing it alone because I was not in the Social Sciences Division and sure enough, Dr. Rola to my left here was kind enough to be my co-convenor since she is a social scientist. But I have a confession to make, we had a couple of exchanges by e-mail before visiting her in Los Banos. She has done most of the work. My role here is to give more biological flavor and maybe since NS Castillo mentioned that I have been responsible for some marine activities I will give it a little bit more of a marine biological twist. I will also give some insights in terms of what is happening to marine resources in particular. Since the partial presentation was essentially prepared by Dr. Rola following our discussion in Los Banos, what I will do this morning is to ask her to make the presentation first. Then I will just add a little bit on the marine biological side of things.

NS Gelia T. Castillo: Our co-convenor of this roundtable, Dr. Agnes Rola, is the director of the Institute of Planning and Policy Studies UPLB, but that is not the reason why we invited her. I think sometime in 1993, Dr. Rola was given the most outstanding monograph award for her publication for the book entitled, **Pesticides, Rice Productivity and Farmers Health**. This is one of the first inter-disciplinary projects on the impact of pesticides. Recently, Dr. Rola published a book **Winning the**

Water Wars. For the past 12 years, she has been involved on a project in Bukidnon. I think to have someone nowadays follow a project for more than twelve years is quite a feat. Social scientists are very mobile, they go from one place to another, they are in great demand but Dr. Rola had stayed on.

Dr. Agnes C. Rola: Thank you! First, I would like to thank the NAST Social Sciences Division for this one great invitation to co-convene this Round Table Discussion. It is a nice feeling to be around the illustrious Academicians so what I am going to do is to walk you through the framework that both Dr. Gomez and I agreed on for this morning topic. This is a very brief power point presentation. I would like to define what is bio-resource management based on some Internet search. Why is it important to manage bio-resources? What are the management strategies for bio-resources? I would also like to talk on the evidence of the impact on species and changes on ecosystem brought about by the current management strategies. I will enumerate the issues and concerns toward a more sustainable bio-resource management.

What is bio-resource management? The literature tells us that it involves the responsible use of our living resources – plants and animals, both terrestrial and aquatic, and the natural environment that supports this. Bio-resource utility varies in time and space and this should be recognized by the resource managers. The reasons why I highlight the bio-resource variability and utility is because species that are not in use today, would be of great utility in the future. Species that are not in use in other countries may in particular be used in some other places.

Why is it very important to manage bio-resources? In the concept paper we cited a book called **Collapse** by Jared Diamond that really shows the influence of societies on the management of their resources and how that kind of management has led to the survival or the collapse of those societies. I encourage you all to look at and read the book. Society's survival or collapse depends on whether the inhabitants are able to manage their bio-resources. For instance, plant genetic resources supply the raw material that breeders and farmers need to attain food security. Farmers created this wild crop out of the wild plants and many of its wild relatives are fast disappearing. We do not know the rate and we do not know these wild relatives. When we log into a forest, we have a lot of species getting lost.

What have been the management strategies for bio-resources? We could look at it at the phases of economic development in the pre-development period. I could consider like the pre-WW II as our pre-development period. Customary rules and traditional knowledge systems, which are rooted in religious beliefs, myths, legends, and cultural norms would affect the ways in which the bio-resources are managed and the community collective action in terms of shared responsibilities to safeguard the land, water and the biological resources for sustainable use. While

population growth was so slow, sustainability of these resources was really achieved. What happened during the development period? From the end of WW II to the mid-1980s or 1990s, the state came over and really made its presence felt, not only in the political arena but also in the management of our bio-resources. So state laws were governing our bio-resources with population growth and increasing commercialization it became the most powerful steward of bio-resources. Although at the frontier, at the community level, the cultural norms and the customary rules still prevailed. Initiatives for institutional and legislative activities to manage the bio-resources are limited or in most species are absent. And in the late development period which would be nowadays we had the return of the community base management —forest community base system, fisheries, coastal resources, etc. So we went back to more community, more communal and we now need to have a complementation of state laws to our community customary laws. That is the challenge I guess, for this period in terms of bio-resources management. And in terms of the governance issues, there have been some initiatives from the international community. International treaties such as the international treaty of plant genetic resources for food and agriculture are also good, help us influence our in-country management of our bio-resources. And this treaty is vital in ensuring the continued availability of plant genetic resources that countries need to feed their people. In this treaty there should be fair and equitable sharing of benefits derived from plant genetic resources. However, how this treaty is being articulated in our country for instance is still not clear. Evidence of impact on bio-resources of the ecosystem change and also indirectly on management has been documented in a global study called Millennium Ecosystem Assessment. Some of you might be participants in this study. This is a global assessment of the types of activities and their rates of destruction. That particular study showed that we at the moment are not really sustainable in terms of the extractive nature of our bio-resources. What I am saying is that some of the evidence, the report cited is that the distribution of species on earth is becoming homogeneous. There is less biodiversity in some parts of the world. Another finding that between 10 to 30 percent of the mammal, birds and amphibian species are currently threatened with extinction. And humans have increased fishes extinction rate by as much as 1000 times. Another finding is that genetic diversity has declined globally, particularly among cultivated species. Those are the significant findings of this Millennium Ecosystem Assessment.

What have been the indirect drivers of the ecosystem change? We are not the direct driver of the extinction of species. We are indeed the indirect drivers to those direct drivers. Indirect drivers would be population change, change in economic activity, social-political factors basically governance, cultural factor as well, and technological change. The direct driver would be decline in land or in forest cover, for instance. That decline

in forest cover will now affect our species. These indirect drivers affect the ecosystem changes that would again affect our bio-resources.

What are the strategies of bio-resources management? These are taken from experiences of other countries. Their genetic make up would be an important activity towards trying to understand what we are managing. Another strategy is the conservation of wild species. I found out that in Ontario, Canada they offer Bachelor of Science degree in bio-resources management. Canada has already recognized that the youth can already be educated on bio-resources management. Hence, development of inter-disciplinary university courses in bio-resources management could be another strategy. We have listed at least six issues and concerns for discussion. So the first issue or question that we raise is, to what extent have we in the Philippines identified bio-resources, both terrestrial and aquatic? What are the management strategies for bio-resources that are currently in use by humans? And do they promote sustainability? Are there parameters to tell us that we are not extracting or we are not killing this species? Another issue: what is the conservation policy and strategy for bio-resources that are not currently used? Although not currently used, are there resources that may be of great significance in the future? What is the relationship of the population to bio-resources management? And the last set of questions, when you speak of bio-resources management what is the scale? Will it be global, national, regional, or at the community level? To what extent is the Philippine government's investment in bio-resources management? I now turn over the floor to Dr. Gomez.

Acd. Edgardo D. Gomez: Thank you very much, Dr. Rola, for your comprehensive presentation. I told Dr. Rola his morning that I will just add a few things to her outline. I would like to bring out the fact that my familiarity is more with the marine or aquatic side of bio-resources. In NS Castillo's introduction mention was made about this coral reef research program that I am involved in. I just came back from Bolinao, Pangasinan where we have our marine station. What we are trying to do there now is to repair our bio-resources. The situation in our country as far as our marine bio-resources are concerned is rather grim. If I were to focus in the coral ecosystems which are support ecosystems to a lot of coastal fisheries, I would say that most of these ecosystems are now in bad shape. And our project aims to look at ways and means, first to conserve and preserve whatever is left; prevent further damage to what we have. On the other, is what can we do to repair and hasten the natural recovery processes of these coral reefs? We need to focus more on the human side of things, why they are in that situation. In this outline, one of the points that I brought out when Dr. Rola and I discussed this is the role of population pressure on these resources. Whenever I go to the coastal areas of the country, particularly Luzon, (this might not be a true, for example in Mindanao). But I think it is also true in many parts of the Visayas because

even in Bolinao, I am told that there are many Visayans who are working and fishing there. It is not just the native Pangasinenses who are there but also Visayans. Bolinao is 275 km north of Metro Manila. Because of the inadequate resources on land, bio-resources on land which Dr. Perry Ong will talk about a little bit later, a lot of pressure is now being placed on the marine bio-resources. There are just not enough bio-resources to support all of the mouths that have to be fed. You have this situation of killing the goose that lays the golden egg, so to speak. The coral reef ecosystem is a support ecosystem that produces a lot of bio-resources in terms of fish, invertebrates, seaweeds, and so on. But like any natural system, a coral reef ecosystem can only produce so much. There is a carrying capacity. If the pressure on these reefs goes beyond the carrying capacity then you go into a degradation mode. You can go into slight degradation mode but if you release it perhaps the ecosystem can recover. This is the resilience of the ecosystem. Unfortunately, in some cases that threshold is exceeded therefore, the ecosystems slide into sort of destruction if you will. It will take forever in some cases, or a very, very long time in other cases for these ecosystems that have been damaged to get back into a productive mode. We are trying to see at what point human intervention can come in to bring these ecosystems back into productive mode. This is the balancing we do, we need to figure out and then how we can influence the communities so that they become stewards and managers of their marine bio-resources. I think this example can be repeated in many situations on land and freshwaters ecosystems. Where can we educated human beings come in and get in to the proper management mode so that we can have a positive productive common future. Thank you.

NS Gelia T. Castillo: Because Dr. Campilan is not here, we would like to call on Dr. Federico Macaranas, I think most of you know him. He is the executive director of the AIM Policy Center, the Institute's think-tank on public policy. Take note, he holds the Fidel V. Ramos Chair of Public Policy studies. Is that a good or a bad thing nowadays? He is also executive director of the ARMM World Bank Development Resource Center, the Global Distance Learning Network in the region. In 2001 he received the Gawad Mabini Dakilang Kamanong Award, the highest award given by the Philippine Government for Diplomatic service. This is one of the reasons why we invited him for this kind of activity, but probably also for the Fidel Ramos impact.

Dr. Federico Macaranas: Good morning to the Academicians and National Scientists, the members of the NAST. I am very pleased to be back here. I think the last time I presented something was a few years back. But I am very honored to be invited to this forum, the least perhaps as Fidel Ramos Chair. I am most grateful to people who put money in the name of those who might at some point in time be less honored by the

circumstances but the fate of many of our international agreements, I think, lies not only on the kind of leaders that we produce but on the kind of followers that eventually make governance a two-way street. We always blame leaders but we never look at ourselves. So, we think corruption, which is part of the damaged coral reefs system of this country is only a leadership issue. It is not. It is also a followership issue.

My main comments on the presentation of Dr. Rola and Academician Gomez, will concentrate on three points. One is the issue of management. What it is. What can we as professional management scientist contribute to the framework. Second, the role of a nation which is composed of scientists and technologists not only who live here but who are also abroad. Because in a global age, we transcend borders when we talk of nationhood. And finally, on the issue of international interface with local concerns.

On the first, I note that in bio-resource management, we try to focus on natural resources first and foremost and how people through technology and traditional knowledge systems impact on the welfare of people. That is well put because natural resources indeed are the source of our managing the common future. However, I note that as management scientists, we have to finance many of these activities that make for solutions to the problems that we find. It is evident that while the issues, not finance, global markets have already developed in genetic resources. For example, traditional therapists are around US\$ 60 billion market globally. Pharmaceuticals that rely on genetic resources, US\$ 300 US annually; Horticulture, US\$ 20 billion dollars annually; commercial seed production, US\$ 30 billion. So, it is a sizeable amount of markets that are developed through bio-resources and it is important that the developing countries be given a chance to share in the benefits of their own indigenous bio-resources, a point that I will come to in the third part.

In this issue of managing the bio-resources of the country, governance comes into the picture because financing can be through public or private means. On the private side, it is very clear, that in terms of investments in conservation and in science and technology areas in general, our corporations have a very poor record. There are only very few corporations that make it to the list of those who have some ecological consciousness, and you can really count them by the fingers of your hands. We know this, because in Wall Street, there are analysts who track companies all over the world who are quite responsible for the environment, and for that matter bio-resources management. I am very pleased to know that indeed some of our corporations have made it despite the fact of course that through the years they may have declined in their performance, but at some point in time, they were well educated because there are many of us who try to convince them that indeed we share not only a common future with them but their destiny is in our hands as well as consumers. So it is very important that we recognize the role of private

financing and of course in an era where public financing is very difficult because of the budgetary situation, the big question is, "How do we indeed generate the kind of resources to manage our depleted bio-resources, conserve them, and in fact, as Acd. Gomez says, perhaps rehabilitate and grow the base from which our economic growth may come from.

Several ideas come to light. One is that, already, the global debate on intellectual property rights have encroached on the bio-resources, and this is one area where I think has been least discussed in the diplomatic circle of the Department of Foreign Affairs but which eventually may have some bearing on our own generation of financing for our own management of bio-resources. Of course, countries like the United States have attempted, many bio-resources that are legitimately those of the poorer countries. Cases in point are turmeric from India, known for its healing property patented by the US in 1995; the ayahuasca plant used as medicine by the Amazon indigenous people, and anti-diabetic herbal concoction from India that had been known for centuries in that place, that have been patented by the US and therefore deprived even the originators the right to use them without having to pay for all the royalties, and etc. And more recently the Neem tree, the Basmati rice, the Andean root crop maca and may I note most recently a Filipino found a wild plant that was allegedly helpful for anti-skin cancer and which was bought by a foreign group. So with that kind of information the big policy issue in resource management is, how do we really share in the benefits of our own resources?

Of course, the Philippines has its own way of answering that and we have an Executive Order 247 where the policy of the state is enunciated to be the regulation of prospecting of biological and genetic resources so that these resources are protected and conserved. Moreover, it requires the consent of indigenous cultural communities, so that prospecting will be allowed within ancestral lands and domains of indigenous cultural communities only with prior informed consent of those affected communities.

Now this is well and good because the debate internationally today is really on this so-called "prior informed consent" because traditional knowledge as it is generated in communities is questioned by industrial countries. The so-called "state of prior art" is an issue when it comes to asking whether indeed something is uniquely the property of the community or it is shared with the rest of mankind. Such issues of commerce of course, come to the negotiating table and it is important that we train our own negotiators in international fora because the way we manage our own bio-resource is really through scanty financial resources that could be supplemented with the kind of money that can be generated from compensation by foreigners on the use of indigenous resources.

A case in point is the Sun people of South Africa who have used a certain plant, "hudia" to suppress appetite. You know what it means for obese, industrial countries denizens. A big amount of money was paid by

the pharmaceutical firm for that kind of plant. So it generates money. However, to show you that the politics is quite tricky in negotiation the country of origin of the multinational said the Sun people were extinct. They were saying, to whom do we pay these royalties and all the compensation when the people who originated this idea were already extinct. So the debate became cultural, anthropological, and so the social sciences come in. Thankfully, the end result was, it was proved that the Sun people were not extinct, that they still do live in South Africa and the proper compensation must be paid.

So if properly negotiated, it is possible that there is a benefit-sharing in bio-resources.

The BT corn case in India suggests also that the multinationals will pressure government not to pay. But our own negotiators must be trained well especially those who do not understand the focal need for resources in economic development.

The UK had issued a very important report on the management of bio-resources which bears watching in the Philippines. The report has some provisions that really help understand why poor countries have to be assisted in order for them to assert their rights in the area of bio-resources.

One of the main findings of the report is that the evolution of property rights has really been from the industrial age protecting only the developed countries who wanted the protection for their own people and not to share it with mankind in general. So the key question is, "Whether indeed the IPO regimes of the industrial age should be applied" as Dr. Rola suggests, a new economic phase when the world is no longer industrial but in fact a mix of phases of economic development within one country. For example, the Philippines is not really just agricultural. There are pockets of industry. But more importantly, the trend is for the country to be services-oriented. In fact most of our economic activities are now in the services area. And this is one thought for the bio-resource management of the country. If our economic production is more on services rather than on natural-based resources, then perhaps there is less damage to our natural ecosystem. And this is perhaps where broad thinking on how our own condition in the physical environment can be alleviated by a change in economic policy making. Focus on services area rather than on resource-depleting agri-based. Planners must really consciously debate. Because if we are to continually deprive our citizens of an economic livelihood because no professional, or educational service-oriented type curriculum is offered them, then we will always run to the mountains and the seas and damage our ecosystem. So we hope, that kind of thinking makes for good governance in the country.

Now this brings me to the role of Filipino scientists abroad. Since I have been associated with the program that brought Filipino scientists abroad, I note that one of the areas where we are strongest is in our links

to our overseas communities of scientists and technologists. Since science transcends national borders it is imperative that we recognize the possible contribution that our own fellow Filipinos abroad can make. I am pleased that Dr. Cordero here, called my attention to the fact that we used to have a Science and Technology Advisory Council all over the world. We had at least four dozen countries hosting them. And what this Science and Technology Advisory Council did was to make sure that our overseas talents contributed to our own national programs not only in terms of intellectual content, but also in generating resources. It is quite sad that the program after I left government was cut off. And when the United Nations volunteers called my attention to this. They said, "you know after the experience of your country, dozens of countries followed you." And so they asked me to visit three of these countries. One of which was Uganda. I was surprised that Uganda has benefited from our repatriation of overseas talents. The other one was Turkey, which is a very big user of its own expat talents. And the other one was China. China had repatriated ten times more the number of scientists.

The idea is very simple. We do not have to permanently relocate our talents abroad in the country. All we have to do is to ask them to be linked to some institution here, so that they will connect to us in a manner that makes for long- term sustainable ties. And among others, generating financial resources is in the agenda for this relationship. I am very pleased to know that one of the most successful is the one in Silicon Valley. Already, the Silicon Valley Science and Technology Advisory Council had generated more than 80 million US dollars for investments in this country.

And we might be able to do the same with some of our people based in biology, because we know that they were quite spread all over the world. If an inventory of Philippine scientists especially in biology were to be conducted for your July conference, I bet that you will find many surprising links to the key institutions around the industrial countries. This is quite important because in the end, it is these linkages that will help explain to the industrial powers what the abiding of the poor countries have been.

Today, many of the issues in international treaties go beyond what Dr. Rola suggested. In fact, it is not only the FAO, the Food and Agricultural Organization, that will be the source of many of our thinking for the management of bio-resources. The most evident to managers would be the trade related aspects of intellectual properties. The TRIPS Agreement, which was piggybacked back with the Philippines signing the World Trade Organization Agreement. This means that we are now beholden to accept that trade-related aspect of IPR.

What does that imply for the Philippines? There are many tradable goods including bio-resources that have to abide by international norms. However, TRIPS noted that national governments have the sovereign right

over the biological resources. But increasingly, the implementing rules and regulations that defined these rights are questioned by many countries. So the debate really is in the implementation. And today, there is a whole literature on the debate over this trade-related aspect of intellectual property, especially over bio-resources.

The major concern for poor countries would be three. One is access to genetic resources by both foreigners and locals, and this, I note that the Philippines has an E.O. on that. However, may I note because of the lack of scientists for example, especially marine scientists, I fear that the ships that gather specimen around Philippine waters are not really tracked by the government.

When I was working with the Department of Foreign Affairs and when the Smithsonian came with an agreement on prospecting in the Visayan waters, my basic question was "Are the DOST people knowledgeable about the things that Smithsonian people get in drums?" And Dr. Manias, the Filipino scientist in Smithsonian said that "Well when we give one drum to the Philippines, it is exactly the same content as the drum given to the Americans." And my question was, "But we do not have the research money that you guys have." So the materials rot in the Philippines. What is needed is not sharing of what you find in the Visayan waters but having ties with our scientists so that you upgrade their know-how in exploiting our own resources." This is quite important because without our overseas links, we may not be able to benefit from our very own bio-resources.

The second area of TRIPS is on benefit-sharing. I read earlier the need for prior consent of cultural communities to make sure that bio-prospecting does not result to bio-piracy, most common sin of many multinationals prospecting in many places around the world. Again the question is, because we do not have the forest guards and the *bantay-dagats* knowledgeable in the very resources that make for money outside the world, so it is useless to redesign agreement where we cannot enforce them. We still need the people who are knowledgeable in the kind of resources taken out by foreigners, so that even we have prior informed consent, it would be difficult because the people who signed can be bribed. And it is one of the dangers of our society if any official at the lowest level in charge of protecting the environment can be bribed; then you know that's the end of all our implementing rules and regulations. So governance has a deep impact on how we manage our bio-resources.

And finally of course, the third issue is traditional knowledge. The UK Commission insists on the right of poor countries to determine their need for appropriate laws that are unique to their countries. Case in point, if it indeed we find that, HIV AIDS can be in a way alleviated by Virgin Coconut oil, the research of Dr. Dayrit, then there must be recognition of the coconut communities of the world, having some claims on the traditional knowledge that went into the research. Again, minus

the experts who are available to implement the rules on what is traditional and what might be new knowledge, it would be difficult for any country to argue against with stronger, more moneyed, and more high-powered industrial researchers of the first world.

So finally, I note that contrary to the view that business is all anti-ecology and all anti-biodiversity. There is a world business council for sustainable development and that world council has been working with biologists and ecologists, marine scientists, and other scientists in the hope that they will make a difference in solving the problem of economic growth, ecological balance, and social progress. By being adversarial, some groups may benefit less from the business perspective because it is quite true that businesses can be educated in the very essence of what we believed in. And it is in this light that development management programs around the country can make a contribution. And just as Ontario has its own unique course. I think the Philippines is very proud that we have our own development management and development studies courses proliferating in this country. The problem as I see it is that our policy makers have not really made use of this unique human resources. And again the entire governance issue is at the heart of our bio-resource management. Thank you very much.

Dr. Francisco Magno: Good morning and I am very pleased to be here! I have a different designation from the one in your program. I became an OYS when I was director of the Social Development Center. It is also partly my fault because I have not been attending the activities in NAST. Now the problem is that I am also a member of the international society for sector research and Acd. Ledivina Cariño is my boss there, where some of the activities coincide with these activities.

This is very close to my heart since I did my study on environmental management focusing on the role of indigenous communities. I did my fieldwork in Caraballo Sur, Nueva Vizcaya with the Kalanguya community. But over the last few years the focus of my research is really on local governance. So my discussion would really be on the role of decentralized bio-resource governance or broadly I would say environmental governance. Considering that the decentralization in the Philippines has been institutionalized like in our neighboring countries in Southeast Asia.

Listening to the discussions of Acd. Gomez and Dr. Rola, when they mentioned the two types of management strategies, or three types of management strategies, probably levels of customary laws, statutory instrument, and international treaties. These are really governing instruments, and when it comes to statutory instruments we can say that the Philippines is one of the richest countries in terms of laws perhaps because our policy makers are lawyers. They like laws. It is part of their job. But our problem is implementation so we are rich on laws and poor in implementation and the impact is poor bio-resource management.

But let me begin by stating the policies that govern our resource management landscape, especially concerning decentralization. I cite three major laws or policies. First is the National Integrated Protected Areas Systems or NIPAS which was passed in 1992. The second is the Indigenous People's Rights Act passed in 1997. The third is the 1991 Local Government Code.

Let me begin with the NIPAS Act because the Local Government Code is a broader application under the national integrated protected areas act. There is a provision for the establishment of a protected areas management board. These laws provide for this kind of interface between national agencies and local government units as well as with civil society and non-government organizations.

This shifts towards governance is a big difference between what the law is and what is actually practiced. So in the laws we see a provision for the need for this kind of interaction and interface between government and non-government organizations under the Indigenous Peoples Right Act. Before I move to that as mentioned in the protected management areas board would consist of a representative from the Department of Environment and Natural Resources, local government units, civil society, and indigenous communities since many of these protected areas are actually in places where there are indigenous communities. Under the Indigenous Peoples Right Act or IPRA the main instrument provided is a certificate of ancestral domain title. Of course there is a lot of discussion about this because of the rights base approach of this ancestral domain law. Because under this law indigenous communities can get titles to ancestral domains and ancestral domains can really cover a lot of land area and even so-called ancestral waters that is being pushed by people. For example, in Palawan, the main management instrument here is the ancestral domain management plan.

The third legal document is the Local Government Code. Under the Code, local government units have jurisdictions, they have responsibility covering environmental management and function-related environmental management.

Yung hindi lang sinama dito yung may provision na yung foreign-assisted projects of the DENR because the budget of the DENR is very small but it increases because of the support from donor agencies. What I think is relevant under the Local Government Code is the promotion of participatory local governance that is under the code. Let us differentiate between what is in the code and what is practiced. Under the Local Government Code all local government units should convene local government councils where civil society participants can be part of the planning process. It is a total planning process of local government, from budgeting to implementation, monitoring, and evaluation including the preparation of an annual investment plan from the lowest level to the highest levels of governance up to the plan of NEDA. Although in most

cases that does not happen because many of the local development plans are actually copied from previous development plans so they just change the year. So it is a cut and paste situation in the absence of real development units. They actually convene local environmental councils. I think in Palawan there are local environmental councils because under the Local Government Code you are not just limited to the convening of local development councils but you can in fact establish a specific management council where you invite citizen participation.

In fact, some of the practices have gone beyond the scope of what is provided under the Local Government Code. For example, it was never mentioned in the Code that you have to establish *Bantay-Dagat* or *Bantay-Gubat* programs or watershed governance boards. Actually, they are being done and these are the so-called innovative practices which are products of the so-called stars or the innovative local government officials. And there are very few of them mostly those who get awards from the Ang Galing Pook Awards Foundation. Later on, I will discuss why there is a need to go beyond best practices towards mainstreaming strategies. I think there are opportunities for doing that and the main barriers are capacity building and the resources coin stream. Also there are a lot of practices now, showing inter-LGU collaboration that is also provided under the Local Government Code. Of course there is no penalty for not convening the local government council again. I think that the key issue is between customary and statutory provisions because we always assume that if there are laws these are deemed suggestions. As I was driving to PSSC I could very well see that many of our rules are operating in this country are merely suggestions specially when it comes to traffic laws and rules. Although here at Commonwealth Avenue, tinangal na nga ang mga traffic lights no! But in other places where there are traffic lights, you know Manila is the most dangerous specially on Sundays or holidays to drive in. I have had near accidents driving on a Sunday because people are actually not obeying the traffic signs so it is one evidence that the state is not very strict in implementing the laws.

Just imagine in a short span we lost forty percent of our forest cover. Let us say in a span of forty years because right now there are very few license agreements left. But after the 2nd World War, timber license agreements were given left and right and it was really the use of state instruments to ravage our bio-resources, I think it also connects with the first question of our esteemed colleagues "do we have identified bio-resources management in the country?" I think the relationship here between policies and bio-resources is the fact that while we have policies in many resource-rich areas; we have a national land use and water policy so just imagine our country without them. I there is a very big policy gap in terms of managing our bio-resources.

I remember former Undersecretary Defin Ganapin emphasizing in a forum on how we can manage our resources if we have maps. So if

you go to local areas and you ask for maps, you will not find any since people do not have maps. So it is difficult to plan without those types of instrument. I was mentioning that there were practices that have been developed. For example, the Galing Pook Awards, given to outstanding programs and projects of local government. There have been a number of awards given for forest, marine and fresh water resources management involving inter-LGU collaboration, and there have been a lot of that. But there have not been a lot of studies assessing the need of these governance practices because many of these awards are actually based on the submission of local government officials. Sometimes when you submit something there is a very good marketing strategy involved a very good way of writing and supporting the nomination of a certain local government program. I guess this can be an area of research for biologists and governance people or management people, social scientists and biological scientists because in the area of governance what we see is a lot of advocacy and a lot of best practices. But there is a need to really produce evidence that there are improvements in the sustainability of bio-resources.

Let me go now to the governance and resource management challenges. I am talking a lot of governance but you see many of our government officials are still in the 'mode of government'. Even at the local level because when they provide participation it is really on a token basis. They invite civil society participants. Sometimes, they form their own civil society organizations. Especially for implementing projects and that is evident in the contract reforestation program of the Asian Development Bank. During that time there was a lot of non-government organizations that were formed. Actually, Acd. Cariño is doing an inventory of NGOs. I am sure she had a hard time during that period because this was the period from the late 1980s to early 1990s when a lot of so-called fly-by-night NGOs appeared. Basically you see the husband and wife tandem that you often find in showbusiness but in politics you see a lot of that. So, the governor can get or the Mayor can get a reforestation contract and the implementor would be an NGO run by the husband or the wife. It might be good to inquire where these NGOs are right now.

So I am now moving to the challenges. I was talking about governance in practice or the lack of practice. Despite some of these best practices, fundamentally there is still a lack of collaboration at the local level. Because in a lot of ways, elected officials see NGOs as potential opponents at a future election.

But I think that is a reality because that actually happened. In the case of Bolinao, Pangasinan. The opponent of the Mayor became the Mayor. That was an NGO that fought the proposed cement plant in Bolinao. There is another case in Governor Generoso, Davao where Barug Gov. Generoso, a civil society organization, was opposing the local officials and promoting environmental programs. The leader became or is now the Mayor, who is on his second term. But that is a kind of reality that has to

be confronted because this is a democracy. And civil society can provide good counterparts for local elite democracy.

The second challenge is overlapping management responsibility. In a lot of ways the national government is at a loss on how to deal with this conflict of jurisdiction. Creating more offices under the Office of the President does not help in any way. Whenever there is a new President, new offices are created and there is a tendency to disregard the policies that are in place. Then, there are the budget and resource constraints that are very real. Of course we have to consider Congressional priorities, the need for trust funds for many of these protected areas management projects but as Dr. Macaranas mentioned, why do we not mobilize our residents, as 10 percent of our citizens are actually living outside the country. And in many local governments, we see how OFW remittances are being channeled to the local governments, not just for festivals, Santa Cruzan or church beautification or basketball tournament, but now they are actually donating for development projects because many Filipinos abroad have the intention to return to the country, when they retire.

Is there a possibility of harnessing remittances and using them for bio- resource activities? That will provide livelihood opportunities and bio-resource management strategies aside from overlapping responsibilities. There is a need to address these multiplicity of 10 years instruments. There are number of government departments that issue ten years instruments such as the DENR, DAR, and now NCIP. However, there is no unified instrument. There is a need to look at the possibility of simplifying these instruments Because if there is multiplicity there is room for discretion. I would also support Dr. Macaranas' view that we need to integrate local knowledge system and practices in environmental government

In fact there is a need not only to consider resource management practices but also governance practices as part of a project to monitor or to prepare an inventory of indigenous peoples governance practices. This is also part of DLSU's partnership with NCPAG with Acd. Cariño and Dr. Alex Andres. Most of the studies made in the past were focused on resource practices, anthropologic and cultural norms. Another area of challenge would be how to integrate information and communication technology. This is most important in bio-resource governance. For example, geographical information systems are being used to map local resource areas. And even in terms of the rule of law of identifying people who are involved in transgressing bio-resource rules and policies. Use of SMS or texting can also be used. There is a menu that uses ICT that can actually be used for bio-resource management. My final point is about capacity building for strengthening local environmental governance. I was talking about the role of local development councils in local planning. If you look at many local development plans, they do not have bio-resource component, management components. That is why there is a real gap in

terms of development planning. You know a lot of our local government officials are rich actually. The problem is that, many of the mayors say they are only able to collect 40 percent of real property taxes. Why can they not collect? I think your guess is as good as mine because they are local executives. Many of the people around them are their relatives, friends, and they do not want to alienate people because they represent votes. I think even at the national level that kind of thinking exists. They do not want to collect taxes from friends and campaign contributors.

There is a need for capacity building. I was talking with Asst. Sec. Panadero of DILG. It seems that less than 50 percent of local government units are actually covering this local government councils so it has very slow compliance rate. But if they do call a meeting there is no real discussion happening. What I propose is a kind of training for local chief executives, including local legislative and planning officers that involves some kind of peer mentoring. We have all these training activities spearheaded by national government agencies. And much of the time when we get into these training activities, the trainor just simply reads the provision of the Local Government Code. It is not based on real practices and real challenges; a kind of peer mentoring that would involve practitioners, maybe those who have won awards. Of course the multi awarded mayor of this country is Jessie Robredo who has not only won the Galing Pook Award but also the Ramon Magsaysay Award and other international awards. He is a kind of person who could be good mayor and mentor. But he has already taken a sabbatical. I think he is in his 1st term or again 2nd term. But I am talking about others mayors. Perhaps a mayor like Mayor Mamaril of Manalag, Davao Del Sur, a very efficient and good mayor. And this is his 3rd term in office. Because some mayors cannot be congressmen precisely because of the number of votes they need to become congressmen. I am thinking of this mayor, Dr. Eddie Dorotan, who could have been a three-term mayor. But he chose to run for congress and he soon realized that his municipality is good for only this number of votes, not enough to be a congressman. So part of the discussion with the league of municipalities was to establish a mayor's academy or a mayor's development center. Also involved in this effort are top universities. The idea is to hold a joint capacity-building program involving mayors, former mayors, and academics. As I was listening to Acd. Gomez and Dr. Rola about the challenges, about the importance of bio-resources management, I thought that this is something that elected local officials should understand; not because they will be looking at the nitty-gritty of biographical scientific concept but on how to exercise leadership in bio-resource management. Because at the end of the day you really look at the type of leadership. The other side of local government is more often neglected and seems not to be part of the local government. And finally when you look at capacity building by good governance, by good bio-resource management, the other side of the coin is the citizenship.

And I would say there is a training need for environmental citizenship. We always talk about participatory local government bodies. Citizenship requires good heart, not only proper values but knowledge and skill. So thank you very much and good day.

Perry Ong: Magandang umaga po sa inyong lahat. Isa pong karangalan na maimbita na maging diskasant sa round table discussion na ito. I prepared my topic in response to the six questions contained in the concept paper. My presentation can be summarized as changing maps and bridging gaps. So maps refer to mind set, attitude and practices. They might seem similar but they are different. Mind set is about how one thinks. Attitude is our attitude towards certain things and how we do things. And I think this is key if we are to manage our bio-resources and ensure our common future as we survive as a people. And bridging gaps is about goals, aspirations and a promise.

Anyway I will discuss some more on that. Almost four years ago, World News headlined that the earth cannot meet human demand for resources, yet not many people took notice or even got worried. If I come to this room and tell you that the merienda that you had is your last meal. What would you do? And everybody would panic but that is exactly what the headline is telling us. That the earth cannot feed us anymore. It just said that in 1961 only 70 percent of the earth's generative capacity was used. But by year 2000 this grew to 120 percent. To simplify, if in 1961 you had one peso you were only spending seventy centavos. By 2000, you were spending one hundred twenty centavos more than the one peso in your pocket. So you were into deficit spending. And even our current budget reflects this figure, this year our budget is about 1.3 trillion pesos; more that 200 billion will be debts. About 20 to 30 percent of our budget is from borrowings so we are reflecting the international trends. And just to give you an idea how they measured this in terms of level of marine fishing, timber harvesting, infrastructures, and fossils burning. In 1999 the global average for each person's consumption of resources was about 2.3 hectares whereas in the United States it was 9.6 and in the United Kingdom 5.3, two times to three times the global average. In short, some people got zero. This study is still on the website. And if you are interested I can share this with you. To what extent have we identified the biodiversity resources in the country? The answer is we are still finding new species in the last fifteen years. For example, *Rafflesia*, the world's largest flower, is from two species in the Philippines. Now there are four more, with two species in publication which should make it six and two new ones being currently described, since we are starting to look for it, we are finding more. And in a few years, we will overtake Borneo as the most fistulous holder of *Rafflesia* in the world. In 2004 in Mount Banahaw a new genus of rodent was found, not just a species but a genus. And in Tanglaw the surveys in 2002, 2004, 2005 found new species of invertebrates. In the

Calamianes in 2000 new species of corals were identified. So we are still finding species from all realms of biology despite the destruction. Imagine if we were doing this when we were still in the pre-extinct state.

As I was telling my students, if Darwin came here he would have gone mad by the diversity of life he might find here. What are the management strategies for bio-resources not currently used? There are and I think Dr. Magno had discussed this and I would like to add that there is a wildlife management act for community based forest resources. But to answer the second part of the question, I think we would get failing marks. Then what are the conservation policies and strategies not currently being used by humans. Because in my dealings with the protected areas wildlife bureaus. If you apply for a permit then you are faced with a lot of requirements. But if you do not tell them, they are not aware so that you are not bound by regulations. Dr. Magno said, the laws become merely suggestion.

What is the relationship of population with bio-resources? I think the answer is obvious. I would like to share with you the slide on population growth. There are two impacts measured — increased demands of shelter and increased demand for food which can impact on the urban environment. It has an impact on the natural environment in terms of habitat loss, fragmentation, and spread of endangered species. And in the urban environment you have concentration of pollutants, changes in water cycle, and aquatic ecosystem. Now just to give an illustration on the practical impact of population numbers alone. If we used 1.2 billion as the number of people in China with a one-child policy, there will be an estimated 400 millions households in China. If we assume that a Chinese household will consume one chicken a night, how many chickens would we need in just one day? 400 hundred million chickens. I estimated that we would need ten times the size of Diliman campus, just to house the 400 million chickens required for one night. And how much feed do you need to produce these chickens? You are now thinking of farms producing these feeds and not for human consumption but for chicken feed. And this is only for one night, and how big a farm would you need to produce feeds and how will the waste be reduced. And how many feathers are produced? You could set up an industry making pillows. And remember this is only for one night; imagine how much you would need in one year, etc. so the impact just escalates.

When we speak of bio-resources what special skills will be appropriate – will it be global, national, regional, or communities? The Philippines is largely oceanic in origin and we have a high level of endemism, so this question becomes tricky when you talk of conserving endemic species. When you talk of conserving the tamaraw, conserving a tamaraw in Mindoro is a global action. Because that is the only place where you could find the tamaraw, so you cut across that scale. And the problem is in Mindoro you can find the tamaraw only in the Occidental

Mindoro no longer in Oriental Mindoro. So you are only talking about conserving the tamaraw in half of the island.

Yet it is global in scale or an impact. On the international level, we are one of the seventeen-mega diversity sites countries. They measured the amount of bio-diversity each country contains and the result was that seventeen countries that contain 75 percent of global diversity. This is at country level. We cannot conserve whole countries, so try to refine your analysis and the next level of analysis is identifying specific areas in the world that are important for the bio-diversity conservation.

The Philippines is one of the bio-diversity hot spots compared to other countries except for Madagascar. The whole country is a hot spot. By the way the mega diversity and the bio-diversity hot spot analysis used terrestrial data. The next analysis used marine, and they identified the ten top marine bio-diversity hot spots in the world. The top ten, the top one guess what? The Philippines tops the ten hot spots. We are now considered the center of the coral triangle that extends from Okinawa down to Indonesia to Papua New Guinea. So we have the distinctions of being the top of the mega diversity countries on a per unit area basis. Meaning if you compute the ratio of the number of species we have to the size of land are, compared to Indonesia, China and Brazil which have higher absolute numbers of species, then we come out on top. But at the same time we are considered hottest on the hot spots. If burning “naglalagablab ang ating buong bansa” conflagration ang nangyari dyan. So to what extent has the Philippine government invested in bio-resources management? I was doing a study of how much money has gone to the Philippines not just for bio-diversity. For environment in general from 1978 to 2003, a 25-year period – US\$1.2 billion, an average of about 40 to 50 million dollars a year. And there is nothing to show for that money. As an aside the environment movement is about 30 to 40 years old in this country. The thing is the environment has deteriorated, even in the presence of environmentalists, and with the money invested it has worsened. So what went wrong?

If you go to Congress now the legislators would say we have done our part — we passed the legislation, implement it. But what they did not tell us is that they did not put in the money to implement it. So all of these laws are unfunded on one hand they could with the environment but on the other hand lying because they did not put money where their mouth is. So another thing to remember is that these laws set standards and procedures on how to meet them, it assumes that people the general public enforces. The judiciary knows this is not a correct assumption and what happen to the laws as Dr. Magno has clearly stated become suggestive, become selective in implementation

And what is the impact of this? The effect is that we lose respect for the law and it becomes the source of corruption. “naging pakiusapan ang batas, kaya nga sabi ko sa mga tao” if somebody arrests you for traffic

violation you challenge the arresting officer. Please cite the specific provision, and they will let you go. Because they do not know the Republic Act, etc. As a part of that study that I was doing is to link development to environment as Director Macaranas suggested. The World Bank of the twentieth century has neither alleviated nor eradicated poverty. In the 21st century their key slogan is poverty alleviation. They did not achieve it. But it leads to the massive destruction of the environment and left us with an enormous debt burden. We are now 60 billion dollars in the red and increasing. So it ends up with a bad level of poverty, a destroyed environment, and a debt burden. And the poor ends up paying the cause of this destruction. How could that be the poor have no money but they are still paying. The thing is in practical terms fisherman can fish using a 'sagwan' or to the ocean and catch fish in the past. But now because of the exhaustion of resources he has now to travel several kilometers using gasoline, using motorboats just to get there. So that is adding cost to them, just to maintain the same level of poverty. Not to become rich but just to maintain themselves in poverty. So the new paradigm in the bio-resources management is that if we are to have a common future we should make the protection of environment an integral element of development. And to stop paying lip service to this, just do it.

I think another way to integrate in the socio-political environmental sustainability index which ranks 146 countries. This index was measured using the components — environmental system, capacity to reduce environmental stress, inducing human vulnerability, social and institutional capacity and global stewardship. They identified 76 variables, 21 indicators under those five components and arrived at the PSI score. This is just to show you the details but I will not discuss it, just to show you the links and the level of integration that they did. And this is the map and the Philippines ranks 125 out of 146, 146 is North Korea. So there are columns here that will show you how we score in relation to the five components. Anyway I have files of the report if you are interested I can share it with you.

The thing is that the geologist would say this is geo-hazard, but remember that the whole country is a geo-hazard. There is no safe place to live in the Philippines, but the places where the landslides are happening have been sites where logging has taken place. The problem is that we are blindsided. There has not been any for the last 20 to 30 years in their area, so we cannot blame logging for these landslides. But if you look at the historical data, it is logging that loosened up the soil which has accumulated through the years. By the way, this is in Southern Leyte in 2003 "hindi pa ito yung bago" the last one was just last February. Then the one in Sierra Madre, a lot of destruction has gone on. So the first question is? Who benefited from the logging? Few people. But who is going to pay for the cost? The taxpayers. So the money that could have been spent for education and research had to be diverted to restore and rehabilitate these areas.

Then of course immediate reaction from the government, orders to crack down on illegal logging, then the press comes in the cost of the denudation. DENR Sec. Defensor banned logging, so I went back to the book and check where the logging bans are. All these areas where he is asking the ban to be implemented has already been banned for the last 25 years. So how can you impose another ban? It's just like saying we have to impose another anti jaywalking regulation. Now just to give an idea, we are rich in forest. But when you say forest, a rule of thumb just to distinguish is to use elevation. From 0, sea levels to 1000 meters you are talking about lowland rainforests. From 1000 to 2000 meters you are talking about mountain forests and 2000 above you are talking about mossy forest. And it has been the lowland rainforests that have been destroyed.

Almost 90 percent of our lowland rainforests have been destroyed. The remaining rainforest is to be found in the Sierra Madre, Samar, Palawan and some parts of Mindanao. The forests that remain in other island are mostly mountain and mossy. The purple column you see the annual rainfall it can contain up to 10 meter of rainfall and in Mount Isarog it went up to 12 meters of rain and that was recorded in that area. And that rain was one fall and that caused floods because of the removal of forest cover. And another important thing to look at here is the amount of humus, the topsoil that is lost when forests were removed. By the way the reason why we have mossy forests left is that it is hard to get to, second the quality is not that good. It is not because of the kindness of the heart of loggers but because it is not profitable. Anyway, this is the extent of the forest cover in the last one hundred years. In 1900 we had about 70 percent of forest cover. By the turn of the century we were down to 18 percent, about 5.5 million hectares. The DENR is now saying that we have forest cover increased by 2 million hectares. Wow that's good news "di ba" but when we looked at the data, they changed the definition of forest cover to include new trees of the two million hectares. And we are trying to figure out how come they come out with this thinking again? It appears that it is related to the reforestation program, lending program that ADB started. They have to present pictures that the situation is bad to justify a massive reforestation program. Now that the money is gone, we have to move to get other money from foreign donors. So we have to change the picture that we have improved. That the program is successful but on the ground of course it tells a different story. Again, just to link biological data with historical data, if we assumed before our forefathers came, the whole country was covered with forest. I think this is about 8 thousand years ago. Our land area is about 300,000 square kilometers. By the time the Spaniards came we were 90 percent forest covered, that is about 270,000 square kilometers. By the time the Americans came in 1900, we were down to 70 percent. So we lost 6 million hectares during 300 years of Spanish rule. By the time the Philippines gained independence we lost another 6 million hectares, a combined loss of 12 million hectares.

By 1990, between independence and the first EDSA, 40 years, we lost 14.2 million hectares. We lost more forest under Filipino rule than the combined colonial rules. And this is what Quezon said. I'd rather see the Philippines run like hell by the Filipinos than like heaven by the Americans. This is the hell that we gave ourselves. And within those forests, we have an estimated 11,000 species of wildlife, half of which are found only in the country, about 16 percent are endangered or threatened. But the important number is 128. This is the number of threatened species found only in the country.

So 1 in the 3 wildlife species found in the country is threatened with extinction. Coral reefs, not much better. The worrying thing about these data is the survey done by the MSI in 1980. so this is more than 25 years data. And the reason we could not update is that we do not have resources to survey all of those individual areas covered in the researches undertaken by various groups. The good news is that where conservation work has been done, its condition has improved. And where it has not, it has gotten worse.

Also, if I will have the time, I will show you that even in an urban environment like the campus of UP Diliman, we have found hundreds of species of birds on campus. So even in a degraded environment, like the campus we are still finding hundreds of species. One fourth of birds found in the country can be found on the campus and it is still rising. When I started the study it was only about 45 species. In five years time, because people are getting interested; it has increased to about a hundred, 99 as of last count and rising. Later, I will show you these birds. Anyway, as I have said, the idea is to change maps, bridge gaps to integrate the social with the biological. And biodiversity and bio-resources management clearly has strong biological basis. But it cannot be solved by a biological solution alone. Because the problem that confronts the survival of our bio-resources requires human actions.

I think Dr. Rola has mentioned direct and indirect factors, and here you can see where the social comes in to address all environmental questions. And for biodiversity, we have undertaken a process of trying to involve as many as possible to come up with a map to show where priorities are. We identified 176 terrestrial priority areas and 36 marine priority areas. Also, this is a slide that I showed earlier just to remove the misconception that if we do something now we will not increase immediately. But if we do not do anything the prediction that is that we might be able to expand the time of destruction, stabilize and hopefully increase within that 10-year period. Lowland forest has disappeared in most part of the country and are most threatened. Each island needs at least 40 percent of forest cover to sustain ecological functions and the map that I have shown is an aggregate of 18 percent. Cebu has less than 1 percent, Negros has 4 percent, and Panay has 4 percent, so clearly the amount of work that needs to be done by themselves. That is the reason

why the Visayans are going up to Bolinao. The Visayas are the most overfished, so they have run out of fish, they have run out of forests, where will they go? To Bolinao sadly. Smaller islands are more prone to extinction than larger islands because of the process of colonization. So the challenge for us is to look at the protection at the landscape at regional level. Ito na yung sinasabi kong changing mind sets, maps and bridging gaps because local successes are not enough. They are necessary but insufficient actions in themselves because they are not commensurate to the scale of the problem. We might end up tending the garden while our house is on fire. Ang saya-saya natin na, I think the example of Bolinao, they are happy that they are able to protect it. Then the cement plant came in, so it expands the equation that we cannot be happy just to sit with our local successes. We have to look at integration and looking at the regional scales, national scales. We should be more assertive in engaging other stakeholders in the dialogue. This roundtable is one such dialogue and utilizes all tools available, strengthens alliances and partnerships because clearly environmentalists have been here for almost 30 to 40 years and the thinking is they are the ones attending to this problem. Clearly it was not sufficient. So if our adversaries are ruthless in destroying our biodiversity, we should be equally determined to defend it, to manage it.

Now, for some solutions, one question is how can we get away from extractive economics. CPR, this is the idea I got from Tony Oposa, the environmental loyalist. CPR means conservation, protection and restorative economics. Massive natural reforestation to restore the required 50 percent forest cover of the country's land mass so he is thinking of converting it into a business instead of a dole out. Making it a business requires the establishment of a national network of marine sanctuaries to restore marine lives, showcase the wealth of the country attractive for ecotourism. Recovering and cleaning of rivers, wastewater bodies to clean water, restore aquatic organisms, etc, establishment of urban vegetable farms, herbal gardens, converting concrete roads. He thought about this, we just need to talk with industry, the private sector on how to implement this. The problem is nobody is taking it up because he published it in a book. Responsible better-than-world class mining industry. This mining is the opposite of mining now being practiced by the world convention economics of extracting virgin minerals. The Filipino mining industry will emphasize the recovery, reuse, and recycling of mineralized materials. Ecotourism while this is generally accepted must be well regulated in order not to destroy the very ecological qualities of the object of attraction. Beaches must not be overdeveloped, there should be proper land use planning and zoning. Paper making from exotic fibers, promotion of restorative arts, promoting of natural sports, a whole package. Nobody said that saving the hot spots is going to be easy. No single individual, organization is going to wage a campaign to save the Philippine hotspots. As I have said, we have to bridge gaps, we have to set goals. Goal is a

target, aspiration, pangarap natin yan e. Pangarap natin bilang isang lahi. Mapaganda ang ating bayan, ang ating lipunan. At kailangang mangako tayo sa ating sarili na gagawin natin ito. Then of course changing mindsets, shifting from extractive to CPR as a first step. Our attitude towards consumer products, practices. Also, a way to look at the relationship of poverty reduction and environmental sustainability. There is a big overlap and to solve it, we have to work on social development, involvement of private sector, and regional cooperation. Because some of the issues are trans-boundary. Food for thought, "It is better to have fought and lost the environment and never to have fought at all. Not knowing if we could have made a difference. Taking off from St. Francis of Assisi, we should have the courage to change the things that need to be changed, the serenity to accept the things that cannot be changed, and the wisdom to know the difference. Our problem as a people is we get mixed up with these three. We tend to change the things that do not need to be changed. Every species, every second, every hectare, everything counts. Maraming salamat po.

NS Gelia T. Castillo: Thank you Dr. Perry Ong, I think we are now ready for questions. Please identify yourself.

Andrew Prime para sa Kaisa para sa Kaunlaran: I have a question from the talk of Dr. Macaranas and Dr. Ong. In my meetings with management groups like IMDM Institute of Development Managers that is based in AIM and Management Association of the Philippines, in groups wherein social scientists are also part of the working group. I experienced many differences in work ethics. To cite an example, the people from management groups and IMDM, they are based on goals, time, and accomplishments. Now, the people from the social sciences, they are more on what is the current customs, traditions in a place. They take time to analyze, correct me if I am wrong, they take time to seek in. I consider myself not in any field but more of a natural scientist. I bring in another concept, sometimes not in terms of time nor social to seek with this culture and tradition and respect for the reasons. I find this a very big problem where blending or working with this group. Can somebody provide an answer or a meaning of what is ethical and what should and should not be done. Because I do not feel that anything will go forward. The IMDM people will say, "hey, why is this moving so slowly?" Then the social science will say that, "well we have to understand". And now the physical sciences, we say, "well this is the truth". What will you do? They tend to not work effectively bringing important issues/things forward. I want an answer. Thank you.

NS Gelia T. Castillo: I think we should ask Acd. Cariño to answer that one.

Acd. Ledivina V. Cariño: I am in management and in social science. And I agree with you that there are some people who really like to take

more time to understand the issues. Although, I think Dr. Perry Ong has a map that tells us about the things as they are and the urgency with which we should act. We already mentioned that there are a number of strategies but there are suggestions other than the things that we need to move forward. I missed Acd. Follosco, because if he would be here, kasi ang sasabihin niya, “kasi kasalanan yan ng social scientists, alam na naming ang gagawin, hindi pa ginagawa ng social scientists. I think for us, the reason we have this roundtable is to maybe to tell the social scientist the sense of urgency with which these issues have to be met and not just discussed.

Participant: Maybe to add a thought here, listening to the presentation and the question of Andrew Prime, and the lady’s comment, as I seem to think that the jump between how fast the social sciences and how fast intellectual capacities moved and how slow nature moves. I think we expect the biological systems Perry mentioned to respond as fast as the investors would like them as social science would like them. Since, we cannot force nature to go faster, I think what we have to do is we have to slow down in terms of what we demand or how much we want, what we would aspire for until we have this balance between nature and society. Thank you.

NS Gelia T. Castillo: Thank you, Herd for saving us.

Participant: I attended this roundtable conference because I was asked by my printer to revise the book that I have written. You know, news and current issues and from here, I think I have profited a lot. My discipline is Philosophy of Education and we would like to inspire students and professors to have a wide perspective about things. By listening to the dialogues of scientists and specialists in other disciplines, they will get the sort of perspective. Question: On benefit sharing of bio-resources, have you heard about Iriga mountain? It is a beautiful mountain in our town and I think it is more beautiful than Mayon. Because it is ours. When it erupted centuries ago, it formed a lake but it did not put a lake in our town but in our neighboring town, Buhi. So my question is, Since it is our mountain that formed the lake, should we not share resources, benefits from the lake? Wait until I become a Mayor of Iriga city. That is the first question. Second, what is Professor Gomez and his colleagues doing to solve the problem of this smallest fish in the world found only in Lake Buhi? That is being threatened by the introduction of other species of fish in lake Buhi.

NS Gelia T. Castillo: Thank you. Who would like to answer that?

Dr. Perry Ong: About the boundary, I think it should be negotiated between you and lake Buhi. Nobody put it that way. So the first thing is hey, we should start sharing now. The responsibility of protecting it would be from both towns, not just from one.

Participant: On social scientists working with others. It is very clear that Silicon Valley provides a very good example. Pure scientists are able to produce things that benefit mankind immediately. Because scientists would work with professional managers who cannot understand scientists. If our managers would not understand social scientists, they will fail. That is why there must be a clear distinction between the different sciences. A good manager must accept the value system of the social scientist. When Ad. Follosco headed a science and technology coordinating council, I advised the group that we needed the social scientist but they turned me down. My simple plea as a social scientist, I know that the management of technology requires social scientists and so now, we are wondering why our technology is not properly managed? Because the social scientist who helps understand the system is not present. That is why if there is a division among sciences in this country, I do not think we will ever see the fasttracking of solutions. I use Silicon Valley because there are Filipinos who succeeded in Silicon valley who tell us that the problem with our own engineers, is that they do not work with the managers who are supposed to set the systems to make things gel together for most of them is finance. If you do not have money and you do not understand where money is sourced, you will never get the project in Silicon Valley. That is why it is important for social scientists to also recognize that generating money is not easy. It takes some good proposal that adheres to certain tenets that will be vetted by other experts and so money is not like manna from heaven.

Participant: My second question, this is “sinarapan”, “tabios”, the smallest commercial species of fish in the world. It is endemic to the Philippines and as she mentioned the problem with the introduction of tilapia and other cultured fish to these lakes, it’s being out competed and actually being fed upon by finger fish. Fortunately, it is a miraculous fish that apparently has been able to survive and what is happening now is there is an effort to reduce the amount of introduction of cultured fish being introduced in some of the lakes. However, I agree with you perhaps that either the Bureau of Fisheries and Aquatic Resources or the Philippine Council for Aquatic and Marine Research and Development should perhaps study the biology and reproduction of this species so it can be cultured artificially much like says animals induced are brought to place to conserve the species but if it is to be maintained as a commercial species I think more management has to be brought to the lakes where it is naturally found. Without that management, I am afraid that the catch of the “sinarapan” or “tabios” will decline because of the competition from the other species.

Prof. Aguilar: Yes, I would just like to make a comment why the social scientists have never played an active role. I think ever since there have been negative views about the social scientists that have not been involved

in policymaking. Even our Department of Science and Technology has not looked on the role of the social scientist for a long time. While the social science analysis on the problems of society is oftentimes accurate, the policymakers see this as a hindrance.

A group has been trying to look into the possibility of professionalizing the social scientist's role. Give them professional recognition, just like the other practitioners. However, the effort was not given that much importance, and therefore, the social scientists are really lagging behind. They have not been part of policymaking, they have been suspected of obstructing policymaking. Another comment that I would like to make is, I think this is the time now that there must be some kind of active advocacy role for the social scientist and the natural scientist. Soon our constitution will be revised and there will be more access to official investment and all of that. There are many things that have to be protected aside from the management of our biodiversity. As of now, for instance, our partylist representatives in Congress are exerting efforts to reexamine or maybe examine the present Philippine-Japanese economic agreement. That is still pending, because the contention is that there will be more violation of the biodiversity and other resources in the Philippines. Another thing is the social scientist and natural scientist are not giving attention to this kind. It is the partylist representatives in Congress who are opposing the treaty. They are always suspect of being obstructionist in policymaking. But maybe a group of professionals, like the Academy, the social scientist, the natural scientist will take the position in this. I think this matter will be taken more seriously by our policymakers. So I think we have to be aware all the time of the pending legislation that needs to be corrected properly in terms of bio-resources management. But scientists are slow to act which is another weakness.

Dr. Patalinhug: This morning session is about the balance between the supply and demand of bio-resources in this country. Now I like to suggest more emphasis on Dr. Rola's representation during the plenary session at the ASM on sustainable strategies about managing this imbalance. This is about how managing this imbalance would have some supporting documents. I was very much disappointed by the presentation of Dr. Ong. At the beginning of his presentation, he was saying that there was a lot of people outstripping food resources. But in 1970s, the MIT group at Cambridge, Massachusetts, presented a research about the Club of Rome. It is a Malthusian study which said that the population growth is running faster than resources could support. Later on, it was proved to be wrong because the role of prices were not taken into consideration. So people go into substitution. There are some alterations of human behavior in the face of scarcity. If you have just a linear extrapolation of these ones, you say that is a Malthusian rate. But that's the role of science and technology to present substitution in the light of scarcity. Dr. Ong made a good

presentation on the link between poverty reduction in this country and environmental impact. That kind of work I like to see. This subject is so broad, I hope there will be some supporting papers during the July meeting on narrow topics like poverty reduction and environmental impact.

Dr. Virginia Miralao: I just have three points to make. One is that, currently the Philippine Social Science Council manages or administers the Ford foundation International fellowships programs. We are on our third round calls for applications. We have had applicants from the sciences, marine sciences as well as from PhilRice. Always the question that comes up during the deliberations is rather the absorptive capacity of the Philippines to retain scientists because we send these people for advance degrees, MAs, PhDs and there's always a question whether we would be able to lure them back. The thing is that with the Ford foundation scholarships, there is no legal contract. There is nothing that binds them to come back. It is like the moral situation kind of thing that you expect them to return. But always at the back of the mind of our panel of judges is always this question on whether there will be enough placements, institutions that would hire them when they return. Most of our applicants at the time they apply are like on a contract project. They wonder whether it will serve them better if they could put an institutional affiliation because that means that when they return, the chances that they would work as scientists is enhanced. That is one point that I would like to raise.

The second point is following up what Dr. Aguilar mentioned. It has always been said that the social scientist does not play much of a role in policy making. Maybe we need to think about that again. If you look at it, the social scientist's advice may not be followed by policymakers or may not be listened to all the time partly because the role of a social scientist in some ways is to be critical, right? And if you are critical, then of course, policymakers will not like you all the time. There is that part of being a social scientist that may be critical of things that may not always be accepted by the policymakers. If you were to review it, many of our social scientists and scientists are consultants to our government projects, World Bank projects and to policymakers and in that sense we cannot say that we have not been influencing policy making or program formulation in this country. Because I think that the influence of the social scientist in this area is very great. And then, the third comment I would like to make is that I think we need and actually recognize that there is a tension between economic development and environmental protection. It is actually that part that we need to manage all the time because things that you do to protect the environment would result in economic stagnation. If you promote these things on the economy it is also antithetical to the environment and that is precisely, I think the role that you have to manage these things all the time; and that there is no one simple solution to this kind of tension.

Dr. Paciente Cordero Jr.: I have some points to raise here. In fact, they are culled from the presentation of the three discussants. I will try to narrow them down to the more salient. Dr. Macaranas made a very good point about the STAC or the Science and Technology Advisory Council which is espoused by the DFA. I was then in the Middle East, Sultanate of Oman, I chaired the council, and what we did not understand very well was that we were supposed to be helping our country in Oman not helping our temporary host country. We were made to believe that we were more of the second case so what was my contribution there as chairman? I undertook that project without any funding from the university I was affiliated with. On my own, I tried to assess the marine resources of the Sultanate of Oman. This was narrowed down to seaweeds which is my specialization. That technical paper turned out to be the very first assessment on the resources of that part of the Middle East. I presented this paper in the international forum and when I returned to Oman, I received a very special call from the Minister of the Industry of that sultanate. Taking notice of the publication that came out in the popularized version about the one single seaweed, a brown seaweed which could be the potential source of revenue once the reserves will be used up. That is one product of this STAC. I am very sorry because it has been inactive now with the departure of Dr. Macaranas from the DFA. Only in one point I am going to tell you is because one is the price that is required for somebody who would like to do some **bio-prospecting**, collection, for example. It runs into several thousands, of course smaller but it is easy for foreigners who would have the edge over us applying for such a permit to do some collection for example. I think this is one point where NAST would be very strong. In the NRCP where I am connected we could probably go tandem with NAST in doing something about this ad. It was mentioned that this ad was framed by nonscientist. These were lawyers were talking about very stringent with the provision of the law with regard to the natural scientist. As I said I was noisy about this in one of the meetings because we wanted the injection of ideas from the natural scientists.

And to the presentation of Dr. Magno, I now pardon him from being absent for the past three years while he was the president of the OYSI. You mentioned about forming management councils at provincial levels. I was invited by the DTI of Eastern Samar and my purpose in going there, joining that group was to really move for the establishment of the provincial seaweed councils because seaweed is now becoming an alternative source of livelihood in that part of my region. I did my best to make them realize how rich the resources are but the council did not materialize. That is why Visayans are invading Bolinao to fish. Follow-up of what I have been thinking about putting up their council, they would have probably been taking up seaweed farming as their alternative source of livelihood so there would be no need for them to go up to Bolinao just

to fish. Because during months when the weather is bad for fishing, they could have done seaweed farming, employing other methods which would also be useful, adaptable in exposed areas. We already have known technologies.

As to Dr. Ong's presentation, I was very happy when he mentioned about new species that means you were recognizing the contribution of taxonomies and I am happy assisting with this. I have had my share of describing new species of algae, one of these I might mention to you, I named after former President Marcos. We found that seaweed is a proliates to the Ilocanos, nori to the Japanese, liber to the English that can only be found in the northeast part of the country. There are only three species and one of these is a new species I named after the president. It has been listed in the endangered species because it has failed to migrate to the southern part of the country because of the water temperature differences.

NS Gelia T. Castillo: We love to hear a quick synthesis from Dr. Rola.

Dr. Agnes Rola: It will be a quick synthesis. I would like to focus on three things in this synthesis. Given the information and data that we have had from the discussants as well as from the open forum discussions, I would like to point to three things. One, to have a conclusion on the current situations of bio-resources in the Philippines that was articulated by Dr. Ong and then look at the current management strategies that were discussed by both Drs. Macaranas and Magno. And then, the important question of where do we go from here.

We were really giving a grim picture by Dr. Ong. 125 over 149, that is a very low passing mark; that is a failure. But again, Dr. Patalinhug told us that in terms of consumption, we are still meeting the demand of the increasing population through substitution. I guess I need to have more information about those substitution materials, not just the natural capital that we are degrading as we consume things but also what kinds of substitution and their effects to meet the demand of the growing population. Indeed, the data, the statistics will tell us globally and nationally that we are not in fact sustainable for bio-resources utilization. All the three discussants told us that governance is the issue. The crisis of the environment is the crisis of governance. If I may respond more to the discussions it could also be due to the institutions that we have. DENR cuts across the sphere of our life so DENR should be ideally under the Office of President, ditto for the DOST. Why not put it where it can transcend powers across the different sectors. So maybe not just in government but also on the political side of it, but the institutional side is what needs to be done. These are some of the loopholes in the governance issues.

We were given a lot of information about decentralization and the effects of decentralization on environmental management. I have found a reviewer in Dr. Magno, because I am writing a book on the effect of decentralization in sustainable agriculture and sustainable development.

I hope I can solicit your ideas on this. Your comments on the same types of issues that I have seen, in this one particular village that I have been monitoring for the past 10-12 years. I do agree with your suggestions on how to go from here. Where are we going and how do we go from here? First thing is the constitutional reforms. Second thing is a suggestion that we need to make environmental planning an integral part of development planning. NEDA has to work with DENR. All of these, the economic planning, the microlevel planning should have the environment as integral part of their plans. In terms of, one of the advocacies that we have in our current work is using the watershed, as the unit of planning. It is not that Iriga or the Buhi but rather the boundaries of the watershed that cuts across all of these political boundaries. According to the DENR, that is the law since 1990. It's in our law that watersheds should be the unit of planning but again we are not implementing that law. We are rich in laws but poor in implementation. Where do we go from here? We need to implement those laws. The third one is the process from going from here to there is in terms of definitions of partnerships and alliances that Dr. Macaranas mentioned. Maybe we need to strengthen our institutional links not only with foreigners but with Filipino scientists who are also working abroad. These partnerships with the private sector in terms of environmental management will be another big move. But there will be a lot of challenges talking about IPR (intellectual property rights) issues, what has been raised since about 10-15 years ago. But if you ask policymakers or even the people on the nitty-gritty of how to assign IPR, I think it is still a challenge. It is still vague so that benefit-sharing, what is the benefit from local communities in "owning" that particular thing when that is commercialized? Those benefit-sharing scheme or arrangements have not been really put down into something that can be handled. In the Philippines, we have the farmer's rights to the genetic resources. That is on paper and I do not have any evidence on how that is being implemented in reality. The innovative strategies that were mentioned especially by Dr. Ong — privatization, ecotourism, responsible mining industries, etc. But I like what you said about changing attitudes, the map in order to bridge the gaps. I think that is also the bottom line. Thank you very much and that was a very exciting and intellectually stimulating discussion. Thank you.

NS Gelia T. Castillo: Let me make my closing remarks first. I think the issue of common future did not come out very well. The past three days I have been attending a very high level meeting of scientists on climate change and rice. Very exciting because it says that the scientists are all on the cutting edge, they are devising ways of measuring methane, carbon dioxide, what is the impact of these on the genes. Anyway, it was very exciting science but I am saying this to respond also to the lament of the social scientists that they are not given importance. I do not agree with that. It is our fault. You see social scientists are not prepared to learn

about the biophysical factors. I will tell you a secret. All my professional life that is what I have done. Also, I had been prepared to work with the biophysical scientists rather than social scientists precisely for the same reasons that have been cited. Every social scientist that comes to IRRI I worked with but I also try to mentor them. This is what I find because I want them to succeed for the sake of social science but many of them when they come, they think that they are God's self-appointed critics. You have to have the right to be a critic. These social scientists who come, they read about what the other scientists are doing. And then they say what you are doing is wrong. How do you think they will succeed if they start with something like that? You have to learn and appreciate what they are doing so you know where your social science will come in. After all these years, I think I know some of the roles the social scientist can play. From the time you define the problem but unfortunately it is very difficult to get other social scientists and believe me I have tried because if you are going to work with the biophysical scientists, you must be prepared to do field work, you must be prepared to join them because how can you talk about Bolinao when you have never been to Bolinao. We have many such people, armchair. You do not know how much energy I consumed going to all of these fields. There was a time when the scientists at IRRI brought me along. They are not contented to talk to the farmers, they want to go to the exact field. You need a lot of energy and you also need a lot of observation and review. If you want to change your mindset, you cannot do it being in an airconditioned room, You have to go out there with Dr. Gomez, with Perry Ong so that you will see what they are talking about. The moment you see that they will bridge you here and here. Therefore, people always ask me what do you do at the IRRI, I always have a hard time answering that. Three years ago, somebody in IRRI gave me a task. Every year, they have an annual research program review. This is a research program of IRRI, I listened 2-3 days, I lost sleep learning about this and at the end they gave me 10-15 minutes to sum up what I think they are doing. So, it is not easy but I have a lot of fun. Every day I learn something new. Let me go back to our common future. The aggregate welfare effects of global climate change, the beneficial effects are expected predominantly in the developed world. The negative effects are expected for many developing countries so you see, mahirap maging mahirap whether it is climate change or all of these disasters, yung mahirap talaga ang mas nagsu-suffer. I do not think we have a common future, I think we have a divided future even when we have the same common events. But there is a new question, they call it the new science that is emerging in terms of climatic change. They are moving together, the social scientists, policies, etc. and the biophysical scientist but measurement is the tremendous pre-challenging problem. How can they measure this and listening to them, a lot of the things they are saying is beyond me. But I think I always understand what they are for which is very important. I invest a lot of

time and energy and this is good for me. This is the thing that keeps me going and I concentrate in the few things, rice is one of them because rice is much simpler than *Acid. Gomez's* corals. If I am going to corals, I have to learn diving and I cannot even swim so this is my plea to social scientists. Let us not keep on saying we are second-class, we are making ourselves second-class by not making the additional effort. That is the reason why I chose this subject. I want the social scientists to be involved. Let us go back to *Acid. Follosco*, what I don't like is when the technologies are doing well, it's the bureau where they don't work it is the social scientist work. That is what I cannot take. Unless we are prepared to do that, we must be resigned to be second-class. If you want to be first-class, you exert the necessary efforts. I love to go with Perry Ong, I just came from a trip from Davao City to Butuan City. At my age, that's not a joke. I was all right because of the adrenalin when I see all those things that I see but when I get home, I am grounded for a couple of weeks. It is a very exciting field and you can ask NS Lourdes Cruz. She is always, is she the one learning social science? She is a biochemist. Because she is in the field. I was in Myanmar a couple of months ago and when people ask me, where did you come from, they are horrified. Imagine all those generals at you. But when you look at the people who are in the working level, it is very inspiring, they have literally a taste, a hunger for knowledge. Let me end with my simple hypothesis, the state of our bio-resources is mirrored by the state of our institutions. That is where you bring the two together. If your institutions do not work, then you can be sure your bio-resources are in a sad state. So the two must come together. Thank you.

Acid. Mercedes B. Concepcion: Thank you very much NS Gelia Castillo for those glimpses of why the social sciences have become second place to the other sciences. In fact, I remember when I was still in UP that then Dean Roger Posadas of the College of Science was always saying to us, social sciences is not science, it is art. Because it lacks a theory, framework, etc. Fortunately, after sometime he began to accept that we in the social sciences could also be considered scientists. It is now my pleasant duty to thank the convenors of this roundtable discussion which I think would provide enough food for not only thought but for the paper that Dr. Agnes Rola will be delivering in July I hope that the discussants will also submit their written statements, convert the powerpoint to written material because it is very difficult to put the powerpoint presentation into a monograph. I would like to thank the discussants. Dr. Macaranas had some place to go that is why he said he had to leave by 11 a.m. but actually he left 45 minutes later because he was interested in the discussion. We already gave him a certificate and a little gift from NAST. So I will ask our Vice President because *Acid. Emil Javier* had to attend to some Japanese visitors who were here this morning. May I request our vice-president, *Acid. Cariño* to distribute our little gift to each one. Thank you very much.

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