International Conference-Workshop on Biodiversity and Climate Change in Southeast Asia: Adaptation and Mitigation

19-20 February 2008
Sofitel Philippine Plaza, CCP Complex Manila

19 February 2008

THEME 1: Biodiversity: Impacts, Vulnerability, and Adaptation to Climate Change

THEMATIC PAPER 1
How dangerous is dangerous climate change?

Pak Sum Lo
Regional Adviser
UNESCAP-Bangkok

- IPCC data is 2-3 years behind. There is a need to be updated because "science moves every minute"
- Up to 50% of the Asia's total biodiversity is at risk
- Biodiversity and ecosystem services are priceless – ecosystem services provide services to humankind and regulate the climate
- Widespread warming – global average air temperature has warmed 0.74^{o}C
- Anthropogenic warming is likely discernible on all inhabited continents
- Microclimate affects the natural selection capacity of different species
- Melting of glaciers has profound implications on water resources – freshwater availability is likely to decrease due to climate change
- Precipitation has implications on water supply – more floods in some places
- Frequency of El Nino is increasing caused massive crop failures and water shortages and forest fires
- Forest fires – have enormous impacts on biodiversity (e.g. Indonesia forest fires threatened 19 biodiversity areas)
- Climate change has caused circulation change – e.g. tropical cyclone attacks, increased frequency of cycles/typhoons, etc.
- Warm nights are increasing, cold nights are decreasing
- Heat waves are increasing
- Ocean acidification – affects coral reef
- Coral reefs often called "rainforests of the sea"
- Biodiversity is more vulnerable than humans – humans who are most vulnerable are those that highly depend on biodiversity
- SEA – highly vulnerable to impacts of climate change

- Observed impacts – coral reef bleaching due to increase in water temperature (e.g. 1998 El Nino event destroyed 90% of coral in the central Indian Ocean)
- Marine biodiversity – SEA only has 5% healthy corals, lowest compared to other parts of Asia
- Ecological consequences of climate change:
    - shift in phenology (study of times of recurring natural phenomenon)
    - global warming in the last few decades has impacts on the life cycles of many species (e.g. leafing dates of oak)
    - changing species through shifting habitats
    - changing life cycles
    - development of new physical traits
    - changes in migration routes (“climate refugees”)
    - changes in feeding
    - changes in breeding, nesting and reproduction processes
    - resting, incidence of diseases and feminization
- For example – mismatch on the production of the moth and Pied Flycatcher
- Climate change leads to disrupted phenology in food chains, natural selection will lead to adaptation but on a slow rate, mistiming has population consequences
- Changes in insect outbreaks, growing season has lengthened, pole-ward and upward migration of plants, insects and animals, decline in body weight of polar bears (e.g. insects enjoying warmer UK climate)
- Climate change is threatening to redraw the world’s wine producing map, and the effects are already being seen in earlier harvest and coarser wines
- Future climate change – more warming could accompany more emissions; 20-30% of higher plants and animals face extinction if temperature increases by 1.5^{o}C to 2.5 ^{o}C; changes in ocean circulations
- Future indirect impacts – increase in tropical cyclones, rise sea-surface temperature
- Different biodiversity species may have different levels of tolerance, and so a single temperature parameter threshold may be inappropriate; not species-specific but ecosystem-specific
- Impacts of various drivers on biodiversity – climate change is one of them
- Multidimensional threshold – important if we want to assess, identify and capture the factors that cause the climate change impacts
- 2010 biodiversity targets – reduce current rate of biodiversity loss at all levels, protect and restore habitats and natural systems

  - Is this realistic? – not achievable in most countries that are most vulnerable to climate change
- Hazard (natural or human induced) x Vulnerability (social, economic, political factors) = Risk
- Hazard (climate change) x Vulnerability (depends on both biodiversity and human factors such as deforestation, pollution, biological adaptation and natural selection capacity) = Risk
- Climate change is a sustainable development issue

COUNTRY PAPER 1: Singapore
Anticipated impacts of climate change on marine biodiversity based on field situations simulating climate change scenarios in Singapore
Chou Loke Ming
Professor, Department of Biological Sciences
National University of Singapore

- Climate change will affect natural systems and cause significant impacts on biodiversity (IPCC, 2007)
- Elevated sea temperature, ocean acidification, changes in salinity, dissolved oxygen
- Existing field conditions (case studies) – natural colonization of newly formed habitats, heavy sedimentation, salinity depression, elevated sea temperature
- Natural colonization of newly created habitats
  - Originally 2 small islands – combined area of 2.4ha
  - Upon reclamation - increased combined area to 12.2ha
  - Flooding of low beaches
  - reef flats in between islands converted to sandy lagoon
  - benthic organisms – much better life cover in the deeper portion
  - hard corals recolonization: well distributed, low in abundance and commonly associated with rocks
  - main recolonizers: marcroalgae, seagrass and sponges
  - community structure similar to natural reef flats
  - Transects ran across the lagoon – 5.6% to 19% live coral cover; hard corals at 5.8%

  - Natural colonization after 17 years – 5.6-19% coral cover; main colonizers are macroalgae, seagrass, sponges, well-distributed hard corals, community structure is similar to natural reef flats

- Sedimentation
  - Problem in the past decades
  - Increased due to reclamation
  - Reef Profile: Reef flat > reef crest > reef slope = more vulnerable to sedimentation
  - Mass spawning first reported in 2002 – occurs in the higher latitudes
  - Reef flat and lower slope are most affected
  - Reef crest and upper slope (to 6m depth) still supports vigorous growth
  - Steady but gradual decline in live coral cover
  - No significant loss of hard coral diversity (250 species with 1 species extinct)
  - Sedimentation affected coral abundance but not biodiversity
  - Temporal variation in diversity of benthic communities – can be indicators of environmental change
- Salinity depression
  - Heavy rainfall over Southern Johor was the heaviest in many decades
  - Check Jawa – sedentary organisms suffered a lot because freshwater pushed into their bodies
  - Some marine organisms can regulate the concentration of their body fluid so they will not be affected by salinity
- Elevated sea temperature
  - 1998 ENSO – widespread bleaching at unprecedented scale, recovery occurred as SST returned to normal (20% mortality because warm temperature lasted for 2-3 weeks)
- Conclusions
  - Climate change impacts have direct and indirect impacts
  - Biodiversity response – species, community, habitat
  - Enhance ecosystem resilience – more effective management of natural habitats, innovative techniques and approaches, proactive rather than reactive
  - SEA – marine global center of biodiversity, biodiversity hotspot, largest concentration of richness of marine biodiversity, enjoying services of marine ecosystems so we need to preserve these and protect from CC impacts to continue to enjoy them

COUNTRY PAPER 2: Cambodia

Animal genetic resource conservation and climate change

Vathana Sann
Professor, Royal University of Agriculture
Phnom Penh, Cambodia

- The continuous scheme of AGR conservation is its integration in the functionality of farming activities
- CH^4 and CO^2 are the major CHG emitted from extensive livestock production system
- The change toward the intensive production system will threaten the existing AGR but alleviate GHG
- Different scenario to cope with this dilemma must be addressed in the same time
- Industrial revolution in the last 2 decades – released GHGs
- There is also the problem of monoculture
- Livestock and climate changes
    - Agriculture – most important sector of Cambodian economy (GDP contribution and livelihood dependency)
    - GHG emissions – come from sub-sectors including domestic livestock production
    - Methane – created to agricultural sources including storage of livestock wastes
    - Reducing methane emission – more effective in reducing global warming
- Situationer
    - Animal genetic resource - No defined conservation scheme, undefined breeding goal; Limited information
    - Characterized by mixed farming system integrated with rainfed crop production
    - Animal are fed on low quality feed
    - Research reveals that this feeding method will lead to the huge production of GHG gas (CO^2 and CH^4)
- Methane emission from cattle
    - Methane – by-product of anaerobic fermentation of rumen, known as “hydrogen sink”
    - Methane – has a role in 4-10% loss of energy intake
    - Types of rumen fermentation – cellulolytic (acetic acid and its end products) and amylolytic (propionic acid)
    - Production of acetate – loss of C and H^2

  - High fiber diets – more acetate and methane are produced in contrast to high grain diet
- Current situation of GHG
  - 48.1% domestic livestock
  - agriculture emission of GHG will increase to 27.5% by 2020
- Research implication
  - Dietary situation – inefficient rumen fermentation, maximized methane production
  - Minimize methane production - intensify ruminant production with high energy diets
  - Encourage intensive farming to maximize output per unit of land
- Take the risk, take the lead

COUNTRY PAPER 3: Philippines
Climate change and biodiversity in the Philippines: potential impacts and adaptation strategies
Florencia B. Pulhin
Researcher, College of Forestry and Natural Resources
University of the Philippines Los Banos

- Philippines
  - Covers 30M ha, almost equally divided between forest lands and A&D lands
  - 7.2M ha covered with forests
  - 4 Climatic types
  - mean annual rainfall range = 965 mm to 4,064 mm
  - relative humidity = 85% in September
- Climate change
  - 1995-2006 = occurrence of warming
  - ENSO – occurs every 5 years
  - Typhoons – 19-20 in a year, half makes landfall; increasing trend on the number of strong (<185 kph) typhoons that hit the Philippines
  - Annual mean sea level – increasing in Manila since the 1970s
- Impacts

  - Extreme drought (El Nino) – puts agricultural sector at risk; decreased production during these periods
  - Typhoons – cause damage to properties and lives
  - Climate projections (GCM model) – 2-3^{o}C increase in temperature for most regions; Eastern Mindanao will increase at 4^{o}C
- Philippine Biodiversity
  - Ranked 17th in terms of biodiversity
  - Ranked 15 in terms of endemism
  - IUCN ranks the Philippines as one of 17 megadiversity areas in the world
  - 60% endemic flora are now extinct
  - 35% endemic bird species
  - 3 species of reptiles are threatened and endangered
- Overpopulation
  - Most are poor
  - Have limited access to livelihood opportunities
  - Forced to migrate to forested areas
  - Expansion of areas devoted to settlement, economic activities, and transportation infrastructure
  - Policies promote conversion of forestlands into other land uses (e.g. Land for the landless, TLA, pasture lease agreement)
- Impacts of climate change on ecosystems and biodiversity
  - Expansion and migration of forests
  - Extinction of many species
  - Reduced diversity of ecosystems
- Holdridge Life Zone – ecological classification system based on precipitation, heat (biotemperature) and humidity (potential evapotranspiration ratio); used 3 climate scenarios - +25 precipitation, +50% precipitation, +100% precipitation
  - +25% - Disappearance of the dry forest with the increase in temperature to 1.5^{o}C; Moist forests increased
  - +50% – increase of the wet forest, and decrease
  - +100% - Rainforests has increased, wet forests has decreased
- Increases in temperature – very little drying effects on the life zones
- Dry forests – most vulnerable to climate change, disappears at 25% increase in rainfall

- Rainforests – favored with increase in rainfall
- Climate change impacts
    - reduced forested areas because of upward movement of lowland farmers
    - occurrence of pests and diseases – alter the species composition and structure
- Adaptation strategies
    - risk and vulnerability assessment – identify ecosystems and species that are at risk
    - enhance biodiversity management to reduce risk and vulnerability – protect remaining forests, rehabilitate degraded forestlands (e.g. through plantations, agroforestry), improve harvesting technology
    - potential options – differ with land use
    - mainstream climate change – policies and programs (need to be reassessed and refocused; integrate climate change strategies in current policies and programs); planning; monitoring; secure sustainable financing mechanisms
- key messages
    - Philippine biodiversity situation is alarming
    - many stressors – climate change is a main stressor
    - local communities – exert more pressure on forest resources
    - adaptation strategies – need to be undertaken

OPEN FORUM

- Strong missing link in assessing the impact of climate change is observed. The interconnectedness of ecosystems at all levels requires assessment using the systems approach. Availability of methodologies or approaches that can be used to address this missing link
    - UNFCC offers methodologies online (e.g. vulnerability assessment methodologies)
    - There are integrated assessment methodologies to determine impacts and vulnerability to climate change – able to assess impacts on water, lowland agriculture and forests
    - Integrated assessment modeling– best way to assess all aspects and levels of climate change impacts and vulnerability

- Biodiversity is an insurance against climate change. We need to conserve, properly deploy, and encourage exchanges in germplasm. Way by which CBD can become more responsive to climate change

  - Making databases, methodologies and information free of charge so that this can be easily accessed by everyone even students
  - People need to convene again to address the issue of international ownership
  - Go to the CBD parties so that changes can be made, including sharing of information, IPR, knowledge management, etc.
  - CBD parties have the power to change

- Vulnerability needs to be brought up to the different zones, and bring it down to the species level. Ways to ensure that these sources of genetic materials of animals can be conserved
  - Climate change impacts – cause changes in community structure, species dominance. This will enable people to adapt to these changes. There is a need to learn from lessons especially in adapting or coping with changes due to climate change. Needs proper and enlightened kind of management.
  - There should also be good policies to ensure the safety of both people and biodiversity. Policies to change human behavior, socioeconomic factors should be included aside from changing the physical aspect.

- Examples in the countries where we have communities taking necessary actions against climate change (e.g. communication at the lower level)
  - Adaptation strategies are integrated in the farm plans of farmer beneficiaries of climate change project in Lantapan, Mindanao, Philippines
  - Awareness of climate change should come from the community level and not at the national level. The community should experience first-hand and be aware of the impacts of climate change.
  - Community should internalize the value of climate change mitigation and biodiversity conservation
  - Very few common people about climate change. However, awareness on climate change needs to be enhanced. We need to practice ways to mitigate climate change even in small ways – e.g. saving energy. Community education and public awareness is needed both at the community level, and for policy makers. Once they know about climate change, they can help develop and implement policies. However, good policies come first.

- We need to enhance ecological resilience or adaptation. Training should be done at all levels so that we can have more people specializing in CC.

- Inclusion of other factors (e.g. poverty) aside from precipitation to determine what happens to our forests

  - The model used only climatic factors. The challenge is to have a model that can include socioeconomic factors to have a true grasp on the impacts of climate change.
  - Poverty reduction should be reduced to ensure forest protection.

- Clarifications on - "Biodiversity is more vulnerable than humans." "Climate change is dangerous to both humans and biodiversity" – if humans are isolated from biodiversity
  - Biodiversity is part of ecosystems diversity, linked to humans. Biodiversity is also linked to social development. Humans are part of the whole ecosystem.
  - Biodiversity is more vulnerable than humans because they suffer the impacts of human activities and changes in nature.

- Need for a reliable monitoring system. Means to transfer strategies at the landscape level as there seems to be lack of a policy-sign interface.
  - IPCC – role is to develop the policy-sign interface. However, we need to publish the results ASAP for review by IPCC. Explore other ways to gather information from scientists in countries that cannot speak English.
  - In the Philippines, consultative workshops are conducted from local to national levels.
  - It is very easy to generate policies, but the problem is their implementation. We have a major role in integrating the policies in the major curriculum of students.
- Connection of policies at the local, national and global levels
  - National policies respond to the problems and constraints experienced at the national level. These are usually different from the policies developed at the global level. We need to develop policies on climate change that can help address the different development concerns. This is critical because there is no one solution that can address different problems. Moreover, problems are site-specific, so solutions may likewise be site-specific.
  - Not many countries are paying attention to climate change because they are more focused on livelihood for survival. They have more pressing and more immediate needs. They don't think of 100 years from now.
  - National situations have different receptiveness to the concept of climate change because of own experiences.
  - We can also mainstream development into environment or vice versa. They should be equally supportive. Mitigation and adaptation should also be supportive. They should be integrated into one entity.

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HIGHLIGHTS

20 February 2008

RECAP and Commentary for First Day

Angel C. Alcala
Director, Siliman University Angelo King Center for Resources and Environmental Management and Former DENR Secretary

- There were 10 paper presentations: 1 keynote, 1 pre-conference paper, 2 thematic papers, and 6 country papers
- Dr. Arsenio Balisacan (Welcome remarks) and H.E. The Netherlands Ambassador Robert Brinks (Message):
    - Emphasized the need to be aware of climate change impacts on biodiversity, people, and the economy
    - Discussed the BRP in Mt. Malindang as example of an integrated ecosystem approach
- Dr. Rodel Lasco (Conference overview) – presented the situationer (statistics and impacts) on climate change as caused by the release of large amounts of greenhouse gases especially CO_2
- Dr. Delfin Ganapin Jr. (Keynote address)
    - Reviewed the actual and potential impacts of climatic change on biodiversity and the environment.
    - Urged the need to develop an operational strategy and action programs at the local and regional levels to alleviate poverty and achieve the Millennium Development Goals (MDGs)
    - Three keywords of this review - biodiversity loss, climatic change and extinction.
- Dr. Wilfredo Uy (Pre-conference paper)
    - Showed the approaches used by the Biodiversity Research Program (BRP) for Development:
        - Location-derived and development-oriented
        - Multi-stakeholder participation
        - Systems-oriented and interdisciplinary
        - Landscape approach
    - Revealed the threatened biodiversity resources from the mountain to the sea that demonstrated the interconnectivity of different ecosystems
    - Emphasized that mitigation measures should achieve both short and long-term results through combined social and physical mechanisms

  - Described other social infrastructures to be developed to sustain the mitigations

- Comments
  - Animal extinctions at Mt. Malindang from the late 1950s to 2000s? Compare with SW Negros and SE Asia (20-30%) in 50-60 years
  - Low fish biomass in Bohol sea is not due to climate change
  - Loss of biodiversity in Mt. Malindang is not due to climate change alone but to non-climate change stressors
  - Baseline study is important to determine if changes in biodiversity are due to climate change
- Dr. Pak Sum Low (Thematic paper 1)
  - Value of biodiversity and ecosystems services to humans
  - Climate-induced changes and events have impacted on both humans and ecosystems
  - Biodiversity is more vulnerable to climate change because of other human – induced activities
  - Asked the question to what or whom climate change is dangerous? To human being, biodiversity or both?
    - Requires multi-dimensional threshold in measuring impacts of climate change
    - Risk has to be measured by factoring in hazard (climate change) and vulnerability (both biodiversity and human factors)
  - People that are most dependent on biodiversity are those that are most vulnerable
- Comments
  - Climate change to impact oceanographic processes e.g. upwellings, mixed layer (where productivity occurs), fish behavior, with dire consequences to fishery production
- Dr. Chou Loke Ming (Singapore)
  - Anticipated impacts of climate change on marine biodiversity based on field situations simulating climate change scenarios in Singapore
  - Demonstrated that climate change impacts are varied
  - There is a need to improve the resilience of ecosystems to ensure against impacts of climate change
  - Need to look into innovative technologies
  - Let's be proactive rather than reactive when dealing with climate change problems

  - Develop more effective management of natural habitats
  - Responses have to cover the range of species and habitats
- Comment
  - This case study implies coral resilience, needed to determine vulnerability
  - Disturbances of human beings are difficult to control
  - Marine protected areas can be venue for more effective management of habitats
- Dr. Vathana Sann (Cambodia)
  - Domestic livestock produces 48% of GHG compared to rice production
  - Emphasized that:
    - Low quality feed leads to the production of GHG (CO_2 and CH_4)
    - High fiber diet produces more methane in contrast to high grain diet
  - In Cambodia, domestic livestock produced 48% GHG, as opposed to rice production
  - Wild ruminants (local species) and other herbivores are more efficient than imported cattle which produce more CH_4
  - Move to change the feeding regimen of livestock in Cambodia to mixed feed types
- Dr. Florencia Pulhin (Philippines)
  - Showed the causes of biodiversity loss, further threats to biodiversity and adaptation strategies
    - Overpopulation – migration of poor people to forested, expansion for settlements and infrastructure
    - Forestry policies – allowed conversion of (forest) lands for landless, timber license agreements, pasture lease agreements
  - Other threats to biodiversity - climate change, pressure on forest resources
  - Need to sustain financing of projects on climate change mitigation
  - Need to undertake adaptation strategies:
    - Assessment of risk and vulnerability
    - Enhance biodiversity management to reduce
    - Risk and vulnerability
    - Mainstream climate change to biodiversity management
    - Sustainable financing mechanism
- Dr. Meine van Noordwijk (Thematic paper 2)

  - Showed the sequence in the loss of agro-biodiversity: initial use, degradation, rehabilitation, critical loss of ecological functions
  - Introduced concept of *sustainagility* along with sustainability:
    - *Sustainagility* - ability of the system to stay; adapt to climate change
  - Defined functional diversity: How diverse is an ecosystem to be considered good?
  - Generic agrobiodiversity as part of climate change adaptation is still conceptual
  - Resolved the issue of planned diversity and the need to prepare for diversity of plans (don't trust your leader)
- Comment
  - Diversity and productivity – are they related?
  - When biodiversity is diverse, production is also high. There are cases when biodiversity is low but productivity is low
  - Fishing down the food webs result in top carnivore loss
  - To sustain one species of fish, you need to sustain also the species down its food chain
- Ms. Alona Linatoc (Malaysia)
  - Malaysia is committed in protecting its biodiversity through policies and programs
  - Governments adapt policies to maintain the harmony between environmental sustainability and economic development
  - Consultations with governments and other relevant institutions need to be done to avoid conflicts in implementing environmental and adaptation strategies
  - Clean development mechanism (CDM) – energy-based projects
  - Criteria: support sustainable policies, involve participation of sectors
  - Avoiding deforestation initiatives
  - Forest destruction - great loss of carbon sinks
  - More release of carbon dioxide - exacerbate global warming and climate change
  - Rehabilitate degraded forests - enrichment planting, reduced impact logging , working on logged-over areas, incorporated biodiversity issues
  - Suggested studies on impacts of climate change on biodiversity, volatile organic compounds, and plants' physiological responses
- Dr. Nguyen Huu Ninh (Vietnam)
  - Showed climate projections based on changes on the different aspects of the climate
    - Temperature rise

        - Sea-level rise
        - Increase in the strength, duration and frequency of El Niño and La Niña events
        - IOD (Indian Ocean Dipole)
        - Increased intensity of tropical cyclones
        - Increased storm surges, precipitation and flooding
        - Increased risk of drought
        - Increased heat waves
    - Illustrated impacts of climate change – on livelihood, national development and economy, agriculture, water supply, health conditions
    - Projected what policy for natural resources management can do:
        - Policy intervention to increase resilience
        - Poverty reduction
        - Creation of local employment
        - Denial of benefits to locals due to loss of common property resources
    - Recommended provisions of legal framework and change in perception on climate change on every level
- Dr. Amnat Chidthaisong (Thailand)
    - Showed various experiences on climate change - increase in temperature and precipitation, droughts, tropical storms, sea level rise
    - Impacts - forest species composition change, flooding increase, shoreline change, seawater intrusions, coastal erosion, mangrove quality
    - one impact of climate change may not be the same in other areas
    - Described impacts of climate change
    - We need more research on the ability of organisms to recover from climate change impacts
- Comment
    - We still have a long way to go in terms of biodiversity conservation halting the loss of biodiversity
    - We should not just be preoccupied with climate change adaptation but also on how to save biodiversity
    - At the end of the day, in a more democrat world, it will be the ethics and desires of the people, not their leaders, who give power to government and the NGOs or take it away. They will decide if there are to be more or fewer reserves, and choose whether particular species will live or die (EO Wilson, The Future of Life, 2002)

- Clarification (Pak Sum Low)
    - For the same impacts on climate change applied to animal and plant biodiversity, during or after the climate change event, humans can still eat the animals and plants, and plants and animals. Humans can adapt to the impacts, but animals and plants will have difficulty adapting to it.
    - Risk assessment – Hazard x Vulnerability = Risk
    - Biodiversity is more vulnerable because of the human factors

DONORS' PERSPECTIVE

European Union Perspective: in supporting development efforts on biodiversity and climate change in SEA
Juan Jose Echanove
European Union (EU) Representative

- EU policies on climate change and biodiversity
    - At the forefront of international efforts on combat climate change– UNFCC, 1992 and Kyoto Protocol, 1997, 2008-2012 EU – 8% below 1990 levels
    - 2020 – to reduce GHG emissions by 20%, ready to step up to 20% if international agreements are in place, increase use of renewable energies by 20%, increase the use of biofuels in transportation by 10%
    - Objective: to halt biodiversity loss within EU countries by 2010 – main instruments is the Natura 2000 network is the largest coherent network of protected areas in the world
    - Biodiversity can limit atmospheric GHG concentrations
    - Biodiversity protection can limit GHG emissions
    - Policies are needed for biodiversity to adapt to impacts of climate change
- EU development cooperation policies on climate change
    - Action Plan on climate change and Development, 2004 – assist EU countries and developing countries to help implement UNFCC and Kyoto Protocol
    - Strategic priorities
        - Raising the policy profile
        - Support for adaptation
        - Support for mitigation
        - Support for capacity development
- EC biodiversity and climate change related in SEA
    - ARCBC and ACB

- Although governments have actions on biodiversity loss, there are issues that can be addressed at the regional level (e.g. Trans-border protected areas, Wildlife trafficking, International and regional agreements, Policy and legislation standardization, Invasive alien species, etc.)
- Database management and information sharing, research and development
- Achieved – habitat classification, ASEAN Heritage parks, competence standards for protected area jobs, biodiversity information sharing systems, 113 new flora and fauna discovered, etc.
- Sustained the institution to continue the initiatives

- SGP PTF
  - To promote tropical forests in SEA
  - To promote CBFM
  - To draw lessons from local experiences
  - To build grassroots capacity
  - Sample small grants – conservation of tropical forest of Barake, livelihood, capacity building, agroforestry, NTFP
  - Publishes lessons learned – e.g. Forest Lives
- Tropical forests and climate change adaptation
  - Rural development projects
  - Conducts regional policy dialogues implemented through workshops
  - Mainstreaming adaptation into development policies
  - Innovative ways to finance adaptation: role of the private sector
  - Other forest-related projects in SEA – leveling the playing field on local partnerships to improve forest sustainability, improving governance, sharing and promotion of awareness and regional knowledge, community based forest management project, etc.
  - These projects directly and indirectly addressing climate change impacts in SEA
  - Implements rural development projects – watershed rehabilitation, agroforestry promotion, adapting environmentally sustainable farming practices
- Way forward
  - Environment and Sustainable Management of NR Programme (ENRTP) - to help SEA and developing countries to help promote climate change mitigation, biodiversity, sustainable development, etc.
  - Global Climate Change Alliance – to assist countries in the preparation of natural disasters as impacts of climate change; focuses on reducing

emissions from deforestation, preparation for natural disasters, integration climate change preparation in the development policies of countries, encourage participation of stakeholders

Climate change and biodiversity: risks, vulnerabilities and responses

Urooj S. Malik (ADB)
Director, Agriculture, Environment and Natural Resources, SE Asia Dept.

- ADB works at areas where collective action is being undertaken
- Global warming is unequivocal – consistent changes in temperature, sea level rise
- GHG concentrations – continue to increase further in the 20th century
- Climate change – slowing tropical deforestation can help mitigate climate change
- Biodiversity – tropical forests harbor over half of all plants and animals
- Land degradation – tropical forests provide livelihoods and vital environmental services to people
- Vulnerability of Asia-Pacific to climate change – losses in coastal communities; loss of biodiversity and ecosystems; infections, disease and heat related mortality water resources; agriculture and forestry
- There are links between biodiversity, climate change and human well being
- Over half of the species have changed their distribution or have advanced phonologically due to climate change
- Projected temperature increases – 4-6°C
- Risks – sea level rise, storm surges, sea temperatures, sea acidity, hydrological conditions, higher silt loads, flooding, increased rainfall, extreme weather events causing landslides
- It is important to protect biodiversity corridors
- Vulnerabilities – communities, food and livelihood security
- Responses – mitigation (lowering carbon intensity), adaptation for safeguarding ecosystem functions
- Investments on – GHG emissions, mitigation measures, helping communities to adapt to changes caused by climate change, help those who are dependent on agriculture, support industries but should be balanced
- Responses – Greater Mekong Subregion – protect biodiversity, support through infrastructure development, expansion to include other ecosystems, implement climate change mitigation measures:
    - Connecting areas through roads to facilitate trade
    - Connecting areas through communication
    - Carbon sequestration through reforestation, replacing grass and shrubby vegetation to allow for more forest tree cover, and offset CO2 emissions yearly, use of biofuels – have to balance these with food production

- Adaptation to safeguard ecosystem functions – agroecological networks and conservation corridors (early warning systems, adjustments in rainfall and temperature rises)

US Agency for International Development (USAID)
Aurelia Micko
Deputy Chief, Office of Energy and Environment

- USAID don't usually support research
- Has background on climate variability and adaptation strategies for 10-15 years
- Challenge is huge – address the massive impacts of climate change, including the responses.
- We lack in responses as compared to the impacts
- Adaptation strategies – very piecemeal; still just the beginning; lack of holistic policies and plans to integrate all the things being done
- Climate change – will cause serious disruptions in the development of progress; can arrest development in some areas and set these areas a bit back
- Huge consensus – development cannot proceed without adaptation
- Response
  - US government is involved in mitigation but there are increasing efforts in terms of adaptation
  - Lessons can be applied in many development countries
  - Not many adaptation studies that can be shared with US government
  - Support for climate change and biodiversity is many – financing, technology sharing, information sharing (e.g. 1960s projects in the Philippines which focused on land and green biodiversity, water and coastal resources management, livelihood, poverty alleviation)
  - Climate change portfolio is in the process of expanding
  - Different ways to approach climate change adaptation
  - Real challenge for the Philippines is adaptation
- Plans
  - Clean energy projects
  - Pollution control
  - Climate change mitigation projects
  - Natural resources management

  - Integrating climate change adaptation into individual projects
  - Putting together regional plans for climate change adaptation programs
  - Has specific plans for climate change adaptation – Coral Triangle Research
  - Climate change adaptation efforts can be integrated in existing biodiversity and conservation projects, and can develop new projects
  - We have yet to talk support for research agenda
  - Need to put ourselves in the larger picture in terms of research support on climate change adaptation
  - Need to look beyond NRM, biodiversity and coastal resources management as climate change impacts on different sectors
  - Reaching the poor and safeguarding their development potential is our main concern – so we need to integrate our efforts on climate change and biodiversity conservation
- We support plans and programs of Philippine government especially on climate change adaptation – however, research agenda is missing. Donors can pick up and invest on this as long as they are holistic
- Priorities for the Philippines
  - Adaptation programs
  - Good governance programs to help adaptation
  - Climate proofing
  - Need to plan in different scales
  - Need to pay attention to the community level, national, regional and multinational
  - Look at many sectors that have not been involved in the debate – agriculture, energy, human health, coastal resources management
  - Strategies – what are we investing in? where are the other sectors like PAGASA when we speak of climate changes? How can we link the other concerned sectors? These are important in planning for climate change adaptation
  - Need for public awareness at all levels – how can these be integrated in national plans?
- Take the lead for the donors to follow

Earth System Science Partnership
Dr. Lijbert Brussaard
DIVERSITAS

- Consists of the International Programme of Biodiversity Science, International Human Dimensions Programme, World Climate Research Programme, and International Geosphere-Biosphere Programme
- URL – www.ess-p.org
- Formed the network to address the problems on climate change together
- We should encourage scientists to think globally and integrate all efforts at the regional and global levels
- We need to coordinate efforts
- DIVERSITAS
    - Link biological, ecological and social disciplines
    - Produce socially relevant new knowledge
    - Provide scientific bases for the conservation and sustainable use of biodiversity
    - Interrelated goals – biodiversity changes, ecosystems goods and services, human activities, drivers
- agroBIODIVERSITY Science Plan
    - bioDISCOVERY
    - ecoSERVICES
    - bioSUSTAINABILITY
- Millennium Ecosystem Assessment
    - Role of Science – understanding functions, services and value of biodiversity
    - Hyphotheses:
        - High-input intensification of agriculture builds pressure on biodiversity and environmental quality
        - Biodiversity based practices can reduce pressure by providing ecosystem services – traditional management practices, adoption of new uses of biodiversity
        - Reducing the pressure from agricultural intensification- extend habitats of wild species, enhance ecosystem services at the landscape level, provide resilience and risk mitigation
        - Rewards, recognition, and PES will build social capital and public support for biodiversity conservation

- To address hypotheses
  - Topics – Indicator measures of biodiversity in and outside protected areas, functions, services, and value of agroBIODIVERSITY; impacts of agroBIODIVERSITY on neighboring protected areas; participatory approaches for BD use & conservation; Potential for PES & other incentives
  - Strategies for assessing the value of biodiversity as natural capital for human well-being, and engaging society for biodiversity conservation in agricultural landscapes

GTZ Representative

- We are not a donor but works with other donors
- Issues – healthy ecosystem and disaster and risk management
  - Ecosystems have to cope with climate change impacts
  - Healthy ecosystems are more capable to cope with stress
  - Health ecosystems can be found in reserves – they can function to support other ecosystems
  - However, we cannot just cluster the whole coastline as marine reserves. We need to get permission from communities
  - Disaster and risk management - to achieve impacts on local and community level that are sustainable, and with the governments because donors can go away
  - Coastal resources protection - This is a big and dangerous job so it is good if politicians are pressured

WORKSHOP DISCUSSION GUIDE

Three Questions on **GAPS IN KNOWLEDGE** and **ACTIONS ON CLIMATE CHANGE AND BIODIVERSITY INTERACTIONS**

1. What do we still need to **KNOW** and **DO <u>together</u>** about climate change and biodiversity interactions in Southeast Asia?
2. How are we going to fill the gaps in knowledge and in actions on climate change and biodiversity interactions in Southeast Asia?
3. With whom shall we do #2?

B. One Question on **PRIORITIZATION**

4. Of the actions identified in A, which ones comprise the first 3 priorities to be done?

WORKSHOP GROUP 1

- Gaps
    - Standardization of buffer zones
    - Village Level
    - Government and international org allocation of funds for advocacy programs
    - Governance
    - Integration of biophysical economics, communities, (indigenous knowledge)
    - Capacity Building Activities on climate change and biodiversity
    - Identification of Critical Areas (to maximize limited funding) e.g. hottest hotspot
        - Standardize priority areas
        - Identify specific areas (e.g. Tonle Sab Lake in Cambodia where agrobiodiversity needs more focused)
    - National Capacity Self-Assessment
        - Biodiversity and desertification but still in document form
        - What else do we need to do?
        - Push governments into acting out from the info in these documents (assessments), to promote programs, policies etc.
        - Link between biodiversity and climate change
    - Really identify Climate change impacts: We need to know what we are facing; reduce uncertainties in climate change
    - Acting while being faced with uncertainties
    - Climate change and biodiversity (we need to narrow down on the specific species and use them as indicators)
    - Local-level action based on more assessments and mobilization
    - Look for known harmful reactions (find win-win activities but account for some risks too)
    - Identifying the variables and harmonization of the methods

- Filling in the gaps
    - We have to localize the system of IEC

- Get lessons learned at the local level and bring it up to the policy level (2-way exchange)
    - Local learning exchanges of info, experiences, etc (e.g. Negros experience is learning from Albay)
- Establishing a national network of expertise (similar to the global network)
- To promote partnership s (within grassroots, national levels, with donors, and other countries)
    - Mobilize the private sectors, business sector, (all sectors)
- Data Mining is needed data is available for analysis
    - Update information and management system for more convenient data acquisition
- Scaling up and moving across disciplines (e.g. demographics (population issues, health, etc.)
- Code of ethics for environmental management
- At the regional level:
    - Strengthen linkages among the countries
    - Come up with a regional program (among countries)
    - Institutional strengthening (at the ASEAN level)
    - Come up with a proposal (climate change and Biodiversity to the ASEAN secretariat--Jakarta)
    - Policy at the regional level
    - Consider species extinction, migration, etc. at the trans-regional level

- Priority actions
    - Local Action (across ecosystems and across sectors) – main target
        - Governance and Institutional Strengthening - strengthen partnerships and collaborations
        - Learning by doing
        - Pilot testing
        - Local initiatives (farmers rights and agrobiodiversity)
        - Ecosystems level (agrobiodiversity, coastal ecosystems, forest biodiversity)—come up with different actions at the different ecosystems
    - Enhancing Knowledge Management (IEC) at the local level including the link with the Policies (including public awareness, local perception and advocacy)

        - Do not make CC as an excuse to first do what we have to do (e.g. account for immediate threats like biodiversity conservation) and add the additional risk of CC
        - Role of the university in IEC (formal education and curriculum)
    - Development/Validation and Implementation of Methodologies, Approaches, Tools on Biodiversity Conservation and Climate change Adaptation and Mitigation (Participatory Research on CC and Biodiversities to support CC Adaptation and Mitigation Strategies)
        - Facing uncertainty --Clarify data on the impacts of CC to biodiversity;
        - Use ecosystem approach (more holistic approach)
        - Development of methodologies
        - Trans-regional methodology/ies implementation
    - Do something now, adapt now – we need to have something on the ground so we need tools, knowledge
    - All sectors should be involved and collaborate with one another

WORKSHOP GROUP 2

- Gaps
    - Knowledge/integration links: biophysical, cultural knowledge (how do you measure biodiversity resources, from the valuation and markets standpoint), interactions, market drivers (commoditizing ES) across levels
    - What is necessary is to bring down the understanding from the global level and have it translated for the regional, national and local levels
    - Bottom line of markets – you can value it through the different aspects of culture (alternative valuation system – how other communities look at the valuation process, and how this can be done to come up with a bigger picture to present the information and knowledge and biodiversity conservation and climate change)
    - Policies – political ecologists (ecologists who know political nuances, for better development and enforcement of policies), enforcement, science-policy link
    - Tools, methods and protocols – measuring, accounting biodiversity resources. We have to develop tools to measure the linkages between biodiversity and climate change
    - Sustainable financing mechanisms – continuing gap; trying to find out what is there and how it can be optimized and maximized, rechanneled for it to become more effective; there are responsibilities between donors and recipients of funds – they should be responsible that these funds are used properly and sustainably.

- Communication – information access should be made available to everyone and cut across all levels that could help global, regional, national and local levels; there should be no exclusiveness on the information being generated; a lot of information but they cannot be accessed due to restrictions and other impediments

- What can be done
  - Build on existing networks – undertake mapping or what are the activities being done to address biodiversity conservation and climate change; make these available or initiate efforts to make these available; establish links to these networks
  - Establish links with organizations involved in climate change mitigation and adaptation

WORKSHOP GROUP 3

- Gaps
  - Hotspots or priority areas where biodiversity and climate change are interacting – community level, forest and coastal systems
    - "Hotspots" – lack of common understanding; may mean communities that have less understanding on biodiversity and climate change (Vietnam)
  - What people know about biodiversity and climate change– understanding on the interaction between biodiversity and climate change
    - Interaction of biodiversity and climate change – complexity and nuances of this interface
    - People who are involved in the planning at the community level (they are at the forefront)
  - Awareness of people involved in governance about the problem which is a necessary input in planning – appropriate matching of K needed at particular level and scale
  - Appropriate standard indicators and methodology to quantify and compare data across sites
    - Measure biodiversity loss and climate change and corresponding social impacts
- What can be done
  - Undertake interdisciplinary research to improve understanding of interconnectivity
  - Undertake IEC at all levels

- Group countries according typology of threats or risks of climate change to formulate adaptive measures for enhancing biodiversity
  - Focus on specific cases or areas where climate change are manifesting itself
  - For example: countries that are affected by precipitation, countries affected by temperature – use these as sites to better gain understanding of biodiversity and climate change
- Include in the academic curriculum
  - Integration of concepts in the curricula

- With whom?
  - Multisectoral/multilevel involvement (i.e. use persons represented in this conference as focal point for collaboration)
    - Focus on the interactivity of biodiversity and climate change

- Priority actions
  - Interdisciplinary research to improve understanding of interconnectivity
  - IEC at all levels
  - Group countries according to typology of threats or risks
  - Integrate into the academic curricula

CONFERENCE SYNTHESIS/REFLECTION

Dr. Ben S. Malayang III

- We discussed:
  - Climate change – biodiversity in SEA
    - Interactivity between biodiversity and climate change
    - Derived information from science with focus on SEA
  - What we still need to KNOW
  - What we must DO, together
  - With whom (among ourselves and with others)

- Need to continue thinking about 3 issues
  - Climate change <> Biodiversity, and/or global change? – Larger than climate change and biodiversity

  - Certainty and uncertainty: how much to expect from science, lore (indigenous knowledge)?
    - Looking at science and lore – to tell us what to do, in each place and time?
    - Looking at science and lore – to give us general principles for basing specific actions?
  - Science – ethics – politics
    - No definitive answer on how to combine these 3
    - These 3 continue to affect what and how we must do

- 10 difficult questions
  - Scale – problem handling, planning, and acting; how much adaptation and/or mitigation should we be doing? Not clear
  - "Decision rules" on scaling
  - Sustainability or sustainagility? – Sustain conditions or present state of affairs because it is convenient or we sustain our flexibility and adaptability
  - Problem-identification and action-taking across gradients of social organization from local to global – something changes when we go up or down
  - What should be our major focus – supply or demand side? Focus on capability building on those that can do something about it? Or build capacities of local communities? Or both?
  - SEA is a high-risk area – how high? Where?
  - Donors need to understand need, science, and urgency of acting on climate change and biodiversity conservation
  - People and communities are lynchpin stakeholders, but how do we communicate and mobilize them?
  - How much is climate change < > biodiversity a science or a political issue?
  - How much is democracy – "people participating" - really a key element in addressing human risks due to climate change < > biodiversity? – How do we translate these into actions or interventions?

- Need to:
  - Climate change is indeed a pressing reality
  - Humans have changed ecosystems more rapidly and extensively
  - Implications of climate change on SEA are projected to be serious – appreciate seriousness because of the interplay of poverty alleviation, and other factors become critical

- Limited research on the close link between climate change and biodiversity in SEA – recognize all are still grappling with impacts of biodiversity and climate change in the region
- Put up a project to enhance understanding of impacts on biodiversity resources of SEA, how to correct management of biodiversity conservation and climate change
- To develop a climate change alliance in SEA starting with present participants

TASKING/ROAD MAPPING – The Road Map or How do we go forward

Dr. Percy Sajise (Bioversity International)

Regional Director for Asia and Oceania

- Concerns for IPR, transformation is still taking place – development process
- Biodiversity and climate change– how we can cope with these changes to sustain life on earth
- There is a road – one of major stations in the road is to come up with a regional collaborative work to see how Biodiversity and climate change links, and how climate change impacts on biodiversity because both are interacting
- Countries can come together – added value: outputs are shared among countries; lessons learned on the use of better technologies, communication strategies, handling the different contexts per country and in the region
- Step 1
  - Consolidation of regional priority activities identified by the participants including possible key institutions and individuals; scoping possible donor interests and integration of their concerns and priorities - technical inputs of donors must come in at the beginning
  - Responsible: steering committee of the workshop – SEARCA to provide support, collaboration of ACB, SEARCA, Siliman
  - Time table: March 2008 – don't let things cool down because this is just a consolidation; somebody must put all things together
- Step 2
  - Follow up of collaborators' feedbacks on priority activities, firm up commitments and contributions and draft regional proposal
  - Responsible: steering committee of workshop with support of SEARCA, ACB, ICRAF and Bioversity
  - Major support – SEARCA and ACB
  - Time table: April 2008

  - There can be 3 proposals – Mekong, countries affected by typhoons and cyclones, countries affected with precipitation

- Step 3
  - Distribute draft and obtain feedbacks from collaborators; finalize proposals with inputs from possible donors
  - Responsible: steering committee with support from SEARCA, ACB, ICRAF and Bioversity International
  - Timetable: May-June 2008
- Step 4
  - Solicit funding and final proposal approval from donors
  - Responsible: SEARCA and ACB, collaborators
  - Should be a negotiation process between all institutions
  - Timetable: June-August 2008
- Step 5
  - Funding approval and implementation of regional project
  - Responsible: SEARCA and ACB
  - Time: Last quarter 2008
  - By the end of this year, we will be able to implement 1-2 regional projects

OPEN FORUM

- SEARCA is pleased to lead the follow-up activities very soon so as not to lose the momentum
  - Come up with a solid proposal to market with potential donors
  - We can reconvene a small group to put flesh in this proposal
- Focus of these 1-2 regional projects – research? Policy? Other aspects? Must measure also the donors' interests
- We can link up with UN agencies through the UN Foundation (e.g. FAO, UNDP – there is a window for climate change (energy and mitigation, impact studies) and biodiversity
- Climate Change Convention – can quickly operationalize adaptation funds coming from 2% proceeds from CBFM projects and special climate change funds; we can tap funds for research as long as the focus can be linked to adaptation; can explore regional projects that are cost-effective
- GEF – can also be tapped for funds for linkages and regional projects
- ACB – will likewise continue the commitment; still new but we would like to mobilize resources to maintain sustainagility

- This is our initiative for all participants to identify ourselves that this is a regional initiative – we will consider all the voices, try to capture all perspectives; conference outputs can be presented as a collective position to be presented to ASEAN countries for possible guidance; ACB is committed to the process and see our dreams come into fruition
- SEA – will come up with an internal arrangement to develop its own sustainable funding mechanisms (internal capital for the region) rather than rely on external donors; reliance on external donors can only be for a certain extent - this is the best measure on how committed we are to solve our problems; this should be thought of seriously because climate change and biodiversity loss is a continuous and permanent problem for us; together with donors but not dependent on donors
- ICRAF – our concern is small farmers; looking at how small farmers can benefit from biodiversity, or how they can adapt to climate change through biodiversity; signifying our commitment to this process
- Take small steps first because it is not easy to cover all countries – we must identify what is common interest, then make steps; donors will have to see what we want to do first – we can have different donors for the whole Mekong delta
- We must undertake compilation of impact studies
- Be realistic with our negotiations with our donors
- Road map – can be realistic if we 1) identify the first practical and manageable steps that we can move along with, 2) build on it to have a more comprehensive regional approach
    - Local action – ICRAF and SGP can provide funds and then move on to bigger funds
    - Those that will provide bigger funds – wants to see the track record first so local actions are more feasible to do first (e.g. GEF – however it takes 18 months to be approved)
    - Links to CBD Secretariat, Secretariat UNFCC, UN agencies – critical to show that this regional effort is worth funding and gaining bigger funds
- To make financing mechanisms sustainable – we cant always rely on donors; we have to self reliant
- The private sector can also be tapped – e.g. Unilever, Society for the Conservation of Philippine Wetlands
- Seek new options, treat, teach each other, change before the change becomes too deep

CLOSING REMARKS
Gil C. Saguiguit, Jr.
Deputy Director, SEARCA

- Gained a better understanding of how climate change affects biodiversity and vice versa – interface of climate change and biodiversity

- This will guide us on how to mitigate on the climate change impacts
- Global concepts of climate change must filter down to all levels for better adaptation and action – must have equal considerations of biophysical, institutions, political etc., need for a systems approach or a holistic approach
- Through this conference – taken a bold step, breaking new grounds, serve as regional response to the twin concerns of climate change and biodiversity conservation
- Alludes to a research program – elements have been laid out by this conference
- Thanks were given to all supporters (including DIVERSITAS)
- We intend to continue our collaboration beyond this conference – donors that align with the same interests as ours are welcome to join us
- We must keep this informal network going through communications
- We must put together a concrete program to respond to climate change and biodiversity loss
- Thanks to the organizers, secretariat and collaborators
- We may meet somewhere down the road to help adapt and mitigate climate change