Asia-Pacific Network for Global Change Research

Biodiversity measures in different biomes: the challenge for the next decade

Final report for APN project 2004-09-NSG-Muth

The following collaborators worked on this project:
PI Khieu Muth, Ministry of the Environment, Cambodia,
moe@online.com.kh
Somsanouk Phommakhoth, STEA, Lao PDR,
som_nouk@yahoo.com
Ninh Huu Hguyen, CERED, Vietnam,
cered@hn.vnn.vn
DIVERSITAS-bioSUSTAINABILITY
envr12@york.ac.uk

Biodiversity measures in different biomes: the challenge for the next decade

2004-09-NSG-Muth

Final Report submitted to APN

Overview of project work and outcomes

Non-technical summary

A two-day meeting was held in Phnom Penh, Cambodia, 16th-17th September 2004 to focus the proposal, "Biodiversity measures in different biomes: challenge for the next decade" that had been submitted to APN for funding in September 2003. The reviewers suggested that if the remit of the proposal was narrowed the application would be considered for funding on resubmission in November 2004. The meeting in Phnom Penh was hosted by the principle investigator Khieu Muth of the Ministry of Environment, Cambodia and the main collaborators from the original proposal were present. The opportunity was taken to include other biodiversity experts in the meeting from Cambodia, Lao PDR and Vietnam to gain a full understanding of the priority biodiversity change issues in the Indochina region. At the meeting it was decided that the new proposal would focus on one biome, the tropical forest of Indochina. This seemed appropriate given that the national borders (and hence policies and science approaches) of these countries cut across the natural boundaries of this forest ecosystem, and because there are diverse demands from different elements of those nations' societies on biodiversity.

Objectives

The main objective of the meeting was to focus the unsuccessful 2003 proposal "Biodiversity measures in different biomes: challenge for the next decade" for resubmission to APN in November 2004 by specifically:

(i) making the targets of the proposal clearer;
(ii) restricting the range of biomes on which the proposal focused;
(iii) orientating the project to be relevant to local people, policy-makers, managers, development and government agencies.

Amount received and number years supported

2004 USD 15,000

Activity undertaken

The proposal "Biodiversity measures in different biomes: challenge for the next decade" (see Appendix I) submitted in November 2003 to APN did not receive full funding. However, the principle investigator and collaborators of the proposal were awarded with a seed grant of $15,000 to hold a meeting to further focus the project proposal for resubmission in 2004. The meeting was held in Phnom Penh, Cambodia, 16th-17th September 2004. It enabled all involved in the original project, and additional biodiversity experts from the Indochina region, to discuss important biodiversity issues and refine the original project idea.

Results

The new proposal "Measuring biodiversity change in the Indochina region: implications for policy and sustainability" (see Appendix II) was drafted at the meeting, fully written in the following two months and was submitted for funding consideration to APN in November 2004.

The new proposal aimed to devise more effective measures of biodiversity change to evaluate conservation policy related to the tropical forest biome of Indochina, through two workshops to be held in the region. Invited participants would include scientists, decision makers, development agencies, government agencies and local people.

Relevance to APN scientific research framework and objectives

At the meeting the new proposal discussed covered many of the topics in the APN Research Framework. Central to the new proposal was the *Human Dimensions of Global Change* as natural and social science was to be used to develop a better understanding of (i) how biodiversity change can be measured incorporating not just the biological aspects but also the societal understanding and value of biodiversity, and (ii) the effectiveness of policies and understanding the socio-economic factors that may cause them to be less successful. The new proposal was also concerned with *Changes in Terrestrial Ecosystems and Biodiversity* by focusing on biodiversity change in tropical forests, and a declared aim of the proposal was to provide significant *Input to policy making and implementation.*

Synthesis and analysis of existing research to address knowledge gaps would be achieved through the activities of the first workshop, by drawing together the measures currently in use in each country and identifying those areas where more research is needed. The impact of the proposal on *capacity building and networking* within and between the three countries is high, through the involvement of young scientists and required collaboration of more established researchers who share a common border and biome.

The very basis of the proposal is to provide managers and policy makers with a means of evaluating the effectiveness of different conservation policies and the development of best-practice approaches. Thus, the *links to policy* are clear and unambiguous.

Self evaluation

The meeting was a success and extremely valuable. A new, more focused, proposal was drawn up which addressed all of the reviewers' comments. This new proposal was submitted to the APN for funding last November. Each collaborator had a clear idea of the aims of the proposal, what their responsibilities were in the submission of the proposal, and in the organisation of the workshops if the proposal is successful. Each participant was happy that the new proposal addressed issues that are of importance to their country and the Indochina region as a whole.

Potential for further work

If the new proposal is successful and the workshops funded there are additional areas of expansion:

- if the approach in this proposal can be validated using the tropical forest biome it is intended to apply it to all biomes in the region over the next decade;

- the group at the meeting were all interested in developing local outreach schemes for biodiversity education in the region, potential sources of funding were discussed.

Acknowledgments
Thanks to all the participants of the workshop (Khieu Muth, Ken Sereyrotha, Oum Pisey, Dave Raffaelli, Alison Holt, Ian Spellerberg, Nguyen Huu Ninh, Nguyen Hoang Nghia, Duong Duc Tien, Pauline Gerrard, Sitha Phouyavong, Somsanouk Phommakhoth and Linda Stevenson) for creating a stimulating meeting and interesting discussions on the important biodiversity issues in the Indochina region. The hosting of the meeting and the organisation of the meeting venue, food and accommodation in Phnom Penh was outstanding and could not have been so without the work of Khieu Muth, Nith Chhin, Yin Samray, Chhun Sophal and Sitha Chhinh. Thanks to Dave Raffaelli for chairing the meeting, to Linda Stevenson of APN for taking the time to attend the meeting and giving helpful advice, and Alison Holt of bioSUSTAINABILITY for organising the participants, the communication and editing the science writing.

Technical Report

Preface

This document is a report of an APN seed grant funded meeting. The aim of the meeting was to focus a proposal concerned with measuring biodiversity change and assessing the conservation policy in the tropical forest biome of Indochina. This publication outlines the aims, objectives and outputs of the meeting.

The individuals involved in the meeting were from the following institutions:

Ministry of the Environment, Phnom Penh, Cambodia
http://www.moe.gov.kh/

bioSUSTAINABILITY (a core project of DIVERISTAS), University of York, UK
www.biosustainability.org

Science Technology and Environment Agency (STEA), Vientiane, Lao PDR
http://www.stea.gov.la/

WWF-Lao , Vientiane, Lao PDR

Centre for Environment Research Education Development (CERED), Hanoi, Vietnam www.cru.uea.ac.uk/tiempo/annex/cered/

Forest Science Institute of Vietnam
http://www.apafri.org/fsiv/VKHLNdefaultEL.htm

Vietnam National University, Hanoi
http://www.vnu.edu.vn/dhqg/news/index.php?f_unit=Intro&ng=EN&iID=0

Isaac Centre for Nature Conservation, Lincoln University, Canterbury, New Zealand
http://www.lincoln.ac.nz/nature/.

Table of Contents

1.0 Introduction

1.1 Background

The proposal "Biodiversity measures in different biomes: challenge for the next decade" (see Appendix I) submitted in November 2003 to APN did not receive full funding. However, the principle investigators of the project were awarded with a seed grant of $15,000 to hold a meeting to further focus the proposal for resubmission in 2004.

The original proposal aimed to hold one major international workshop to develop a suite of biodiversity change measures, that are both taxon-orientated (e.g. species richness) and system-orientated (e.g. ecological goods and services, including cultural and spiritual values), and to hold a second international workshop to gain an understanding of the degree to which these various measures track each other across the range of biomes within the Indochina region, and the broader Asia-Pacific region. The participants involved were to be international biodiversity experts, policy advisors and young scientists.

The reviewers' main criticisms of the first proposal were (i) that the targets of the proposal were not clear enough, (ii) that looking at such a broad range of biomes may be a little ambitious for such a project and (iii) the outcomes were too orientated towards classical science.

Consequently a meeting was organised jointly by the Cambodian Principle Investigator and bioSUSTAINABILITY to discuss how to address these criticisms and to come up with a more focused proposal. This workshop was held at the Sunway Hotel, Phnom Penh, Cambodia, 16th-17th September 2004. The Principle Investigators and collaborators of the original proposal were present with additional biodiversity experts invited from Cambodia, Lao PDR and Vietnam (two from each country) to enable a broader understanding of the biodiversity change issues in the Indochina region.

The main objective of the meeting was to focus the unsuccessful 2003 proposal "Biodiversity measures in different biomes: challenge for the next decade" for resubmission to APN in November 2004 by specifically:

(i) making the targets of the proposal clearer;
(ii) restricting the range of biomes on which the proposal was focused;
(iii) orientating the project to be relevant to local people, policy-makers, managers, development and government agencies.

1.2 The meeting

After the formal address by the Principle Investigator of the original proposal an introduction to DIVERSITAS-bioSUSTAINABILITY was given which was followed by an outline of the meeting objectives. The project Principle Investigator and each collaborator gave a presentation of the important biodiversity change issues in their respective countries (Cambodia, Lao PDR, Vietnam). It became clear from the presentations that one of the main biodiversity priorities in the region is the conservation of biodiversity within the tropical forest system.

Cambodia, Lao PDR and Vietnam share common borders as well as a major biome, the tropical forest, which is under considerable threat. Deforestation of the tropical forest in this region is a major problem due to overharvesting of timber, dam construction, clearance for agriculture, road and tourism development, slash and burn cultivation and intensive illegal hunting.

The biodiversity priority issues for the forest system of the Indochina region were discussed in the context of the social problems that cause biodiversity loss and those that are created by it. A debate followed aiming to prioritise the objectives of the new proposal. It was thought that because national borders (and hence policies and science approaches) cut across the natural boundaries of this forest ecosystem, and there are diverse demands of different elements of those nation's societies on biodiversity, this region provided an ideal test bed for the development of biodiversity science tools for promoting the conservation and sustainable use of biodiversity in a transboundary context.

Discussion on the second day focused on the scientific issues that would be covered in the new proposal. It was decided that the main focus of the proposal would remain attempting to develop effective measures of biodiversity and to use these measures to assess how effective policies are in conserving and promoting the sustainable use of biodiversity. This would still be achieved by holding two workshops in the region but participation would include a small number of international biodiversity scientists and mainly local people, decision and policy makers, regional biodiversity experts and development agencies. This is a much broader range of participation than in the previous proposal.

The new content of the proposal was drafted during the meeting and it was agreed to rename the proposal "Measuring biodiversity change in the Indochina region: implications for policy and sustainability" (see appendix II).

2.0 Workshop Outputs

2.1 A more focused proposal

At the meeting it was decided that the methodology for measuring biodiversity change in the original proposal could be established focusing on the tropical forest biome, instead of on multiple biomes. Therefore, it was logical to restrict the scope of the proposed workshops to the Indochina region. The targets of the original proposal were then refined according to this new remit. As can be seen from the outputs below the main aim of the new proposal was to engage not just scientists but local people who use the forest resource, policy-makers, managers, development and government agencies. The outputs were therefore orientated towards these groups with policy documents and press releases to be translated into the language of each country so that information reached not only those that work in the field but locals whose existence depends on the forest biome. The full proposal was submitted to APN in November 2004.

2.2 The agreed outputs of the new proposal

- To set up a web site for the project;

• To develop an agreed set of biodiversity change measures for tropical forests (workshop 1) and recommend them to agencies within each country;
• Write a scientific synthesis paper (co-ordinated by bioSUSTAINABILITY);
• Communication of science-based recommendations to the community responsible for formulating policy in the form of a two-page policy brief, translated into the language of each region, and sent to government agencies and development agencies. Use this to create media interest in the region;
• To evaluate the effectiveness of current biodiversity policy instruments (workshop 2).

2.3 A new network established

A new network of scientists, government and NGO biodiversity experts was established for the meeting, who will continue to work together on further projects that stem from this proposal.

3.0 APN-Funded Participants

The seed grant covered the accommodation, daily subsistence allowance, travel and visa costs of each participant (See appendix III for a list of all funded participants). It covered the technology used in the meeting, for example, photocopier, printer, computer and projector. The funds were also used for hiring a meeting room, 2 buffet lunches, 4 coffee breaks, and a reception dinner.

3.1 Participant comments

(Representative of each country or organisation).

Cambodia (Mr Oum Pisey)

1) the meeting gave opportunity for Cambodia, Vietnam and Lao PDR to share ideas and an overview of the management and conservation of transboundary biodiversity;
2) it helped provide information toward establishing and shaping the biodiversity forum for Cambodia, Vietnam and Lao PDR held biannually;
3) provided understanding in environmental issues in the three countries and biosustainability in UK, the practices of traditional knowledge and biodiversity conservation in New Zealand.

Vietnam (Dr Nguyen Huu Ninh)

The APN workshop has strengthened local scientific capacity through a network of collaborative interdisciplinary case study research projects on the theme of biodiversity and management, addressing both scientific and policy issues. Vietnam is very rich in biodiversity including valuable and scarce trees.

The established network is co-operating with other organisations and farmers to:

- Investigate the population and distribution of these species
- Intact conservation
- Research genes of individual of scarce species
- Raice and germinate from genes of good original individuals
- Distribute nurseling to nation parks and farm to raise them.
- Havest and extract drugs, medicine etc.

Lao PDR (Mr Somsanouk Phommakhoth)
The APN workshop has strengthened local scientific capacity through a network of collaborative interdisciplinary case study research projects on the theme of biodiversity and management, addressing both scientific and policy issues.

A product of the meeting is a research network that will be supported by CERED, and led by local and international experts.

DIVERSITAS-bioSUSTAINABILITY (Dr Alison Holt and Prof David Raffaelli)
The meeting was an excellent opportunity to understand the biodiversity challenges that Cambodia, Lao PDR and Vietnam face, in both ecological terms and also the social and economic circumstances that have to be considered. It enabled discussions between individuals working in the biodiversity field from different sectors of biodiversity conservation, for example, government, university, international biodiversity science programme and non-government organisation. It demonstrated that co-operation on such matters as the conservation and sustainable use of biodiversity can be gained and individuals can work effectively to achieve common goals using a scientific approach.

The aim of bioSUSTAINABILITY is to build international networks of scientists, policy-makers and stakeholders and to deliver the interdisciplinary scientific expertise to enable these individuals and organisations to find solutions to effectively conserve and sustainably use biodiversity. Through holding this meeting and with the work proposed these aims have been met.

New Zealand (Prof Ian Spellerberg)

My professional research interests include sustainability and the role of the different elements of biological diversity for sustainability. The most fundamental basis of sustainability are the many elements of biological diversity. However, biological diversity has many different interpretations depending on culture, background and education. I have students working in this area - looking at the implications of the different interpretations of biological diversity.

The meeting in Phnom Penh was extremely valuable for several reasons. One of these was the first hand opportunity to talk face to face about perceptions of biological diversity and the relevance of biological diversity to sustainability. There is no substitute for meeting face to face in order to discuss these important matters.

Following that meeting, I am pleased to say that my research network has now extended to Cambodia and neighbouring countries. I am continuing to liaise with the people I met and this is having benefits not only for me but also for my students - particularly those working in Southeast Asia.

That Meeting was a very significant milestone.

4.0 Conclusions

The meeting was very successful. The objectives of the meeting were met and a new proposal “Measuring biodiversity change in the Indochina region: implications for policy and sustainability” was written and submitted to APN in November 2004. The meeting was valuable not only in order to focus an existing proposal but was extremely useful to gain experience of the challenges that are faced when dealing with biodiversity change in the Indochina region. The participants felt that it was a valuable experience for their specific interests and many collaborations have stemmed from the meeting within the countries of Southeast Asia and outside with New Zealand. Further outreach and capacity building project ideas are being developed with this network.

Appendix I Original proposal

1. ***Project title***
Biodiversity measures in different biomes: the challenge for the next decade

2. ***Detailed proposal***
At the Johannesburg Earth Summit in 2002, the world's nations pledged to halt the present rate of biodiversity loss by 2010 (COP6 Decision VI/26, Strategic Plan for the Convention on Biological Diversity). Meeting this challenge will not be easy, not least because biodiversity means all things to all people: species, comunities, ecosystems, genetic information, landscape, cultural and spiritual aspects are all valid definitions of biodiversity that reflect the different concerns and cultural backgrounds of indiginous peoples, scientists, policy makers and managers (http://www.millenniumassessment.org/en/publications/cf.2.pdf). It is vital, therefore, that consensus is reached on which measures of biodiversity are most appropriate for particular biomes, and which measures resonate best with the needs and perceptions of different stakeholders. This will be a major challenge for all nations formulating policies intended to reduce biodiversity loss, whether or not such policies are stimulated by World Summit or local and regional initiatives.

These issues can be clearly seen in, and appropriately explored within the APN states of Cambodia, Lao PDR (Laos) and Vietnam. These countries share a common border as well as major biomes, such as tropical forests, coral reefs, and the Mekong river basin. Policies aimed at reducing biodiversity loss should therefore be set in an international context within the region. Furthermore, national policies which promote the sustainable use of biodiversity within the different states are unlikely to succeed in the long term if different policies focus on different biodiversity measures, unless the different measures track each other. If different biodiversity measures valued by the various groups in society do not consistently track each other, then policies designed to reduce and halt biodiversity loss will not satisfy the concerns and aspirations of all groups. Similarly, not all biodiversity measures may be appropriate for particular biomes.

Sustainable biodiversity management for these three focal APN countries will thus require:

- the development of a suite of biodiversity measures that are both taxon-orientated (e.g. number of species richness) and system-orientated (e.g. ecological goods and services, including cultural and spiritual values);
- an understanding of the degree to which these various measures track each other across the range of biomes within this sub-region and the broader Asia-Pacific region.

We believe that the most effective way to develop these tools for the sustainable management of biodiversity in the region is through two major international workshops. These workshops would bring together key researchers from the natural, social, economic and political sciences working on biodiversity issues relevant to the APN region, as well as those responsible for advising on and constructing policy. The first workshop would be held in Phnom Penh, Cambodia, October 2004, and concern itself with identifying the most effective measures of biodiversity and the development of an appropriate suite of biodiversity measures for sustainable development. The outputs from this workshop will be synthesised and communicated in time for a second workshop in the following year, September 2005, to be held in Hanoi, Vietnam. This second workshop would examine how the agreed suite of measures could be best applied to specific biomes in which the region has a prime interest, for instance, tropical forest, coral reefs, wetlands, ocean fisheries, agro-forestry systems, montane grasslands.

Each workshop would comprise of about 40 individuals drawn from the following mix:

- international experts in biodiversity for each of the biome types listed above, with a track record of ability to work across the ecological and social science disciplines. The emphasis will be on inter-disciplinarity, rather than knowledge within a single discipline;

- policy advisors and policy makers in the region who will ultimately be responsible for translating the outputs from the two workshops into policy;

- young scientists at post-graduate level and above from the APN region. It is our intention to build sustainable biodiversity management capacity within the region.

Each workshop will have the following structure: presentations by keynote speakers on the relevant issues, followed by break-out sessions where the key issues identified by the speakers will be discussed and consensus opinion reached on those issues. A major output of the workshops will be a *consensus on appropriate measures of biodiversity and identification of those areas where improved data, measures and communication between decision-makers, ecologists and social scientists are needed.* The main deliverables from the meeting will be *a synthesis review and specific recommendations to managers and policy makers in the region,* with particular emphasis on sustainable development and the implications of the Johannesburg World Summit outputs.

3. *Relationship to priority topics in the APN Research Framework*

The theme of the proposed workshops cover many of the topics in the APN Research Framework. The workshops aim to specifically develop measures of biodiversity change across biomes that will encompass coastal zones, inland waters and terrestrial ecosystems. The workshops will integrate the natural sciences with social and economic factors through considering not only the ecological value of the services provided by biodiversity, but also economic and cultural values. The outcome of the workshops is to inform and improve policy. Overall, this proposal links to APN's priority topic "Human Dimensions of Global Change" since the research proposed here is paramount to underpinning the sustainable management of biodiversity which is essential to maintain human welfare.

4. *Regional collaboration*

Regional collaboration will be developed as the P.I., Cambodia, and major collaborators, Lao PDR and Vietnam will be working closely together to set up the workshops. As discussed above they share a common border and major biomes. Bringing together the key researchers from these areas will ensure that policies aimed at reducing biodiversity loss will be set in an international context within the region. New Zealand is also a member of the APN and shares similar biomes and issues to the three focal countries. In addition, Professor Spellerberg is an international authority with much experience and links in capacity building within the region in this area of biodiversity management.

5. *Capacity building*

The workshops will allow the region to improve their capacity for global change research through consensus on appropriate measures of biodiversity and identification of areas where improved data, measures and communication between decision-makers, ecologists and social scientists are needed. Importantly post-graduate level students from across the APN region will be invited and encouraged to take part in the workshops.

6. *Scientific contribution of each participating country*

A consortium of countries has been involved in the writing of this proposal, Cambodia, Lao PDR, Vietnam, New Zealand and the DIVERSITAS Bio-Sustainability Office UK. The proposal has been a joint effort, arrived at in an iterative fashion. Cambodia and Vietnam will organise and host the two workshops and all the named countries will decide on content, speakers and contribute to the resultant publications. The UK DIVERSITAS office undertakes to provide administrative support for the workshops and to drive and ensure the delivery of the outputs.

7. *Links to policy*

As described in section 2, institutions responsible for advising on and constructing policy will be involved in the workshops. This is important for a realistic usable output : synthesis review and specific recommendations to managers and policy makers in the APN region, with particular emphasis on sustainable development and the implications of the Johannesburg World Summit recommendations.

8. Relationship between Global Change Research Programmes and Networks

The workshops would be vigorously supported by DIVERSITAS, especially the UK office. The research described here is directly related to Foci 1.1 and 1.2 of the DIVERSITAS *Bio-Sustainability* Science Plan. DIWPA also supports the overall goals of the proposal.

9. ***Related research work***

The individuals involved have a range of experience and expertise that they can contribute to this proposal. Khieu Muth (Cambodia) provideslinks to environmental policy in Cambodia and has considerable experience of sustainable management of biodiversity through his work in the Environmental Protection and Natural Resources Management Department. Phetsavang Sounnalath (Lao PDR) has extensive experience of capacity building and social issues in the global change arena. Ninh Huu Nguyen (Vietnam) is a highly experienced researcher involved in sustainable development in Vietnam. He has knowledge of ecological and socio-economic issues involved in sustainable management of biodiversity in wetlands and coastal zones of the APN region. He has also organised regional workshops and co-ordinated global environment research programmes. Ian Spellerberg (New Zealand) is an international leader in biodiversity research and has expertise in using an interdisciplinary approach to sustainable biodiversity management as well as capacity building. Dave Raffaelli is an international scientist working in the area of ecosystem function, community ecology and large scale biodiversity management issues, as well as driving the DIVERSITAS *Bio-Sustainability* Science PlanAlison Holt has expertise in macroecological issues and their application to biodiversity conservation, and is the secretariat for the DIVERSITAS *Bio-Sustainability* Science Plan.

Appendix II New proposal

1. ***Project title***
Measuring biodiversity change in the Indochina region: implications for policy and sustainability

2. ***Detailed proposal***
At the World Summit on Sustainable Development (Johannesburg, December 2002), the world's nations pledged to halt the present rate of biodiversity loss by 2010. Meeting this challenge will not be easy. Policy instruments exist for ensuring the conservation and sustainable use of biodiversity, ranging from international conventions, protected areas, to local incentive-based payment schemes. However, the effectiveness of these instruments is rarely assessed, despite the fact that they are often undermined locally by inadequate resources for monitoring and enforcement, poverty, societal disruption and transboundary impacts (the mismatch of politico-economic boundaries to those of natural systems). In order to evaluate the effectiveness of different policies and to identify best practise, robust measures of biodiversity change need to be identifed that are relevant to society. Furthermore, in regions where several countries have different policy instruments and different measures for the same shared resource, such as a forest or a large catchment, there is significant potential for confounding and contradictory impressions about the rate and direction of biodiversity change. In such situations, there needs to be co-operation between adjoining states about which measures to use for monitoring. Only then can the effectiveness of different policy instruments be judged and best policy formulated.

However, it is also important to recognise and acknowledge that different groups in society define biodiversity and perceive its value in very different ways (Raffaelli & Holt 2004). Ecological scientists, economists, lay-people and policy makers may recognise biodiversity as biological (genes, species, ecosystems), or as landscape or the ecological goods and services that the biological system provides. These are all valid definitions of biodiversity and they reflect the different concerns and cultural backgrounds of indigenous peoples, scientists, policy makers and managers. It is important, therefore, that consensus is reached on which measures of biodiversity change are most appropriate for particular biomes, and which measures resonate best with the needs and perceptions of different stakeholders, if the effectiveness of different policy instruments is to be evaluated and best policy formulated.

We intend to explore these issues within Cambodia, Lao PDR and Vietnam. These countries share a common border as well as a major biome, the tropical forest, which is under considerable threat. The deforestation of tropical forest in this region is a major problem due to overharvesting of timber, dam construction, clearance for agriculture, road and tourism development, slash and burn cultivation and intensive illegal hunting. National borders (and hence policies and science approaches) cut across the natural boundaries of this forest ecosystem, and there are diverse demands of different elements of those nation's societies on biodiversity. The region thus provides a prime test bed for the development of biodiversity science tools for promoting the conservation and sustainable use of biodiversity in the transboundary context. Attempts to address such issues in the region so far have only focussed on the freshwater system (the Mekong River Commission).

Sustainable biodiversity management for forests in this region will thus require:

(i) An appraisal and development of measures of biodiversity change that are both taxon-orientated (e.g. number of species) and system-orientated (e.g. ecological goods and services, including cultural and spiritual values) for the forest biome.

No single measure of biodiversity can capture all of the relevant dimensions, or represent the different perceptions held by different sectors of society. Evaluating the basis and effectiveness of conservation instruments will thus require the identification of a suite of different biodiversity measures. Each measure within this suite should respond to environmental impacts in a consistent and predicatable manner, although they may not necessarily exhibit the same behaviours: some might increase, some might decrease. A variety of such measures exist in the science and policy

literature, some in current usage in the region. What is required is a consensus amongst those working in forest biodiversity in the region about which measures best capture the important dimensions of biodiversity change recognised by society.

This consensus will be achieved through a three day workshop in year one of the project (Siem Reap, Cambodia, January 2006), which will bring together key biodiversity scientists and those responsible for formulating policy, to present and critically discuss the approaches that are currently in place in each of the three countries. It is anticipated that the measures discussed will include biological, economic, social and cultural aspects of biodiversity and include indicators such as those developed by the National Biodiversity Strategies and Action Plans of each of the three countries (Royal Government of Cambodia (2002) Cambodia's National Biodiversity Strategy and Action Plan; Ministry for Agriculture and Forestry (MAF) and Science, Technology and Environment Agency (STEA) (2003) Biodiversity Country Report, Lao PDR; Vietnam Environmental Protection Agency (2001) Environmental Action Plan 2001-2005).

Participants will include national biodiversity and policy experts, as well as a limited number of international speakers whose research is based in the region. Participants will present their experience of using particular measures of biodiversity change for forest ecosystems, as well as the strengths and weaknesses of such measures in relation to the policies they address. Break-out groups will critically review and debate these measures and present their conclusions to the overall workshop. Young scientists at post-graduate level and voluntary biodiversity conservation workers from the region will be an important addition. It is our intention to build sustainable national and transboundary biodiversity management capacity within the region. Specific outputs from this meeting will be an agreed suite of measures which would be recommended to agencies within each country, a scientific synthesis paper (co-ordinated by DIVERSITAS), and, most importantly, communication of science-based recommendations to the community responsible for formulating policy in this area. This communication will be in the form of a two-page policy brief, translated into the language of each region, and sent to government and development agencies, for example, ADB, UNDP, UNEP, World Bank, FAO, WWF, IUCN, CARE, WCS, National Universities foreign embassies and donor agencies. This would be the basis for generating interest within the region and communicating the importance of incorporating aspects of global change into development plans. It will also facilitate networking within the region. Press releases will also be written and released in English and the local language of each country. In addition a web site will be constructed prior to the workshops for disseminating information between collaborators and participants in the workshops. This site will be maintained after the workshops as a general information source on the project and how it is developing, and for specific information for policy makers and other stakeholders.

It is our intention to involve the policy community in this initiative right from the start, so that they and the biodiversity science community can cross-inform one another and develop the policy and the science hand-in-hand. Only through such close collaboration can effective solutions be reached which are acceptable to all.

(ii) Assessing the effectiveness of policy instruments operating from international to local scales and identifying elements of those instruments which perform best in this respect, along with those factors that mitigate against successful policy and likely impacts on society.

This will be achieved through a follow-up three day workshop in year two of the project (Pakse, Lao PDR, September 2006). Details of this workshop are contingent on the outcomes from the first, but it is anticipated that we will be able to evaluate the effectiveness of different policy instruments and identify elements of best practise in policy formulation. The main findings and conclusions of the first workshop will be presented by lead individuals identified at that workshop. The practicality and implementation of those measures of biodiversity change will be the main focus of this second workshop. The impact of biodiversity change and its governance for different groups in society and an appraisal of factors which mitigate against successful implementation and policy instruments will be explored. Through a series of parallel breakout groups each dealing with different issues. Such factors that may reduce the effectiveness of policies may be lack of capacity or resources, the problem of poverty and weak law enforcement. National

planning meetings will be held in each country prior to this workshop to decide on which issues take priority for discussion. Workshop attendees will include the same range of participants as in the first workshop, with an increase in representation of policy makers and the major stakeholders in the forest biome (e.g. timber producers and conservation agencies). Specific outputs will be communication to the policy community as well as scientific publications. This workshop would also be the basis for developing further projects in the region to direct communities on biodiversity use through education. Direct stakeholder meetings will be held in association with community outreach organisations, such as the Strengthening of the Environment (SIDA) project, and the National Adaptation Program of Action (GEF) project in Lao PDR; Mlup Baitong and the Community Forest Project in Cambodia; the Woman's Association, Youth Association and Peasant Association in Vietnam. This would also include NGOs with field based projects such as WCS, WWF, IUCN, and CARE. Our intention is to seek funds for such follow up work from other organisations such as the Darwin Initiative. A resource development team will be established to explore the options and ensure sustained follow-up on completion of the project. Potential funders (for example, Asia 2000) will also be invited to this workshop.

The overall aim of these workshops is to validate the approach for this biome and to apply it to all biomes in the region over the next decade.

It should be noted that APN funded a scoping workshop in Phnom Penh, 16-17 September 2004 (2004-09-NSG), where the project team worked together closely to re-focus and strengthen a previous proposal (2003-11-Muth).

3. *Relationship to priority topics in the APN Research Framework*

The proposal covers many of the topics in the APN Research Framework. Central to this proposal is the *Human Dimensions of Global Change* as natural and social sciences will be used to develop a better understanding of (i) how biodiversity change can be measured incorporating not just the biological aspects but also the societal understanding and value of biodiversity, and (ii) the effectiveness of policies and understanding the socio-economic factors that may cause them to be less successful. The proposal is also concerned with *Changes in Terrestrial Ecosystems and Biodiversity* by focusing on biodiversity change in tropical forests, and a declared aim of the proposal is to provide significant *Input to policy making and implementation.*

Synthesis and analysis of existing research to address knowledge gaps will be achieved through the activities of the first workshop, by drawing together the measures currently in use in each country and identifying those areas where more research is needed. The impact of the proposal on *capacity building and networking* within and between the three countries will be high, through the involvement of young scientists and required collaboration of more established researchers who share a common border and biome. The proposal has been thoroughly planned and developed through a *scoping workshop* in Phnom Penh, September 2004 (APN Project 2004-09-NSG). **The very basis of the proposal is to provide managers and policy makers with a means of evaluating the effectiveness of different policies and the development of best-practise approaches. Thus, the *links to policy* are clear and unambiguous.**

4. Regional collaboration

Regional collaboration will be developed as the P.I., Cambodia, and Major Collaborators, Lao PDR and Vietnam, will be working closely together to set up the workshops. They also share a common border and major biome, the forest. Bringing together the key researchers from these areas will ensure that policies aimed at reducing biodiversity loss will be set in an international context within the region.

5. *Capacity building*

The workshops will allow the region to improve their capacity for global change research through consensus on appropriate measures of biodiversity change and identification of areas where improved data, measures and communication between decision-makers, ecologists and social scientists are needed. Importantly post-graduate level students from across the APN region will be invited and encouraged to take part in the workshops.

6. *Scientific contribution of each participating country*

The bioSUSTAINABILITY International Project Office of DIVERSITAS, has as its remit to provide administrative support and facilitate science activities such as this which fall squarely within its own science plan. A consortium of countries has been involved in the writing of this proposal, Cambodia, Lao PDR, Vietnam and the international office of the DIVERSITAS programme, bioSUSTAINABILITY. The proposal has been planned, revised and written jointly at scoping workshop held in Phnom Penn, September 2004, attended by all of major contributors. Cambodia and Lao PDR will organise and host the two workshops and all the named countries will decide on content, speakers and contribute to the resultant publications.

7. *Links to policy*

A major aim of this proposal is to evaluate and improve where required biodiversity policy through evaluating the effectiveness of current instruments. This will require the involvement of institutions responsible for advising on and constructing policy. This is important for a realistic usable output: synthesis review and specific recommendations to managers and policy makers in the APN region, with particular emphasis on sustainable development and the implications of the Johannesburg World Summit recommendations.

8. Relationship between Global Change Research Programmes and Networks

The workshops would be vigorously supported by DIVERSITAS, especially the bioSUSTAINABILITY International Project Office. The research described here is directly related to Foci 1.1 and 1.2 of the DIVERSITAS bioSUSTAINABILITY Science Plan. DIWPA also supports the overall goals of the proposal.

9. *Related research work*

There are many initiatives ongoing in the Indochina region that complement this proposal. However, none of these proposals specifically address the science in the current proposal. These projects are:

- Biodiversity forum for Cambodia, Lao PDR and Vietnam.
- Strategic Planning Meeting on Environment for Cambodia, Lao PDR and Vietnam.
- ASEAN projects and connections with University of Malaysia at Sarawak.
- Enhance Management of Nature Reserves System in Vietnam Project (SPAM) supported by the Government of Denmark, 2000 – 2003.
- Truong Son Range Conservation Project (Vietnam) supported by WWF, started in 2001.
- Creating Protected Areas for Resource Conservation using Landscape Ecology (PARC), Forest Protection Department of Vietnam Ministry of Agriculture and Rural Development and Ministry of Agriculture and Rural Development, 1998-2003.
- Earth Systems Lao.
- Implementation and monitoring of the National Biodiversity Strategy and Action Plan and the Saiphou Louang Conservation Plan (Lao).
- Development of the National Adaptation Program of Action in response to Climate Change (Lao).
- The ‘Strengthening Environmental Management Project’ funded by SIDA and examining promoting improved environmental education and natural resource management throughout the country (Lao).
- The National Capacity for Self Assessment Project building capacity in environmental monitoring and adaptation (Lao).
- CBD implementation and local community empowerment to achieve biological diversity conservation and sustainable livelihood goals in Indonesia. PhD project, Lincoln University at Canterbury, New Zealand.

Appendix III

Meeting agenda

Biodiversity measures in different biomes: challenge for the next decade 16-17 September 2004, Sunway Hotel, Phnom Penh, Cambodia

Day 1: 16 September 2004

8:30-9:00	Registration	
9:00 – 9:15	APN Official Opening.	Khieu Muth (Principle Investigator)
9:15-10.15	Presentation 1.:Introduction to DIVERSITAS-bioSUSTAINABILITY, and objectives of the meeting.	Dave Raffaelli
10:15-10.45	Presentation 2.: Biodiversity issues in Cambodia	Oum Pisey
10:45-11:15	**Tea/Coffee Break**	
11:15-11:45	Presentation 3.: Biodiversity issues in Laos	Somsanouk Phommakhoth
11:45-12:15	Presentation 4.: Biodiversity issues in VN	Duong Duc Tien
12.15-12.45	Presentation 5: Biodiversity issues in New Zealand and internationally	Ian Spellerberg
12:45-1:45	**Lunch Break**	
1:45-3:15	Discussions on biodiversity priority issues for the Indochina region	
3:15-3:45	**Tea Break**	
3:45-5:00	Discussions on prioritising objectives for the new proposal	
5:00-5:30	Summary of the meeting and day 2 objectives	David Raffaelli

Day 2: 17 September 2004

9:00-9:10	Agenda for the day	Dave Raffaelli
9:10-11:10	Focused discussion on scientific issues to cover in the new proposal as well as collaborator duties and responsibilities	
11:10-11:40	**Tea/Coffee Break**	
11:40-12:00	2004 New Proposal Guidelines - overview	Linda Stevenson
12:00-1:30	**Lunch Break**	
1:30-3:00	Discussion on content of the new proposal	
3:00-3:30	**Tea Break**	
3:30-5:00	Initial draft: writing of new proposal coversheet.	
5:00-5:20	Main collaborator roles from Sep-Nov 2004 in completing the proposal; communications confirmed (e-mail, tel; fax; etc…)	
5:20– 5:30	Closing Remarks	Khieu Muth
7:00	Reception Dinner	

Post Meeting agenda

From the fourth week of September, the new required proposal was processed and finalised for APN submission in consultation with Linda Stevenson.

Subsequent work was according to the following plan:

	September	October	November
Focus meeting	←——→		
Redrafting of original proposal		←——→	
Submit new proposal			**Deadline: 10th November**
APN reporting			←——→

List of participants with contact details

Name	Organisation and Address	Tel/fax	e-mail
HE Khieu Muth	Ministry of Environment, 48 Samdech Preah, Sihanouk, Phnom Penh, Cambodia	Tel: (855) 23 219 287 Fax: (855) 23 219 287	moe@online.com.kh
Mr Ken Sereyrotha	Ministry of Environment, 48 Samdech Preah, Sihanouk, Phnom Penh, Cambodia	Tel: (855) 23 721 073 Fax: (855) 23 212 540	sereyrotha@everyday.com.kh
Mr Oum Pisey	Ministry of Environment, 48 Samdech Preah, Sihanouk, Phnom Penh, Cambodia	Tel: (855) 23 217 560 Fax: (855) 217 560	cambio_coor@online.com.kh piseyoum@hotmail.com
Dr. Nguyen Huu Ninh	Centre for Environment Research, Education and Development (CERED), 279/24 Giagvo, Hanoi, Vietnam	Tel: 84 4 5141550 Fax: 84 4 5141550	cered@hn.vnn.vn
Dr Nguyen Hoang Nghia	Forest Science Institute of Vietnam, Dong Ngac, Tuliem, Hanoi	Tel: 84 4 8389923 Fax: 84 4 8389722	nhnghia@netnam.vn
Prof Duong Duc Tien	Vietnam National University, Hanoi Centre of biotechnology, E2 Building, 144 Xuan Thuy Road,	Tel: 84 4 7683488 Fax: 84 4 7680907	duongductien_vn@yahoo.com

	Caugiay-Hanoi, Vietnam		
Ms Pauline Gerrard	WWF Lao Program PO Box 7871, Vientiane, Lao PDR	Tel: 856 21 216080 Fax: 856 21 251883	pauline.gerrard@wwflaos.org
Dr Sitha Phouyavong	Science Technology and Environment Agency (STEA) PO Box 2279, Vientiane, Lao PDR	Tel: 856 21 213470 Fax: 856 21 213472	sitha@stea.gov.la
Mr Somsanouk Phommakhoth	Science Technology and Environment Agency (STEA) PO Box 2279, Vientiane, Lao PDR	Tel: 856 21 213470 Fax: 856 21 213472	som_nouk@yahoo.com som_nouk@hotmail.com
Prof Dave Raffaelli	bioSUSTAINABILITY International Project Office Environment Department, University of York, YO10 5DD, UK	Tel: +44 (0) 1904 434789 Fax: +44 (0) 1904 432998	dr3@york.ac.uk
Dr Alison Holt	bioSUSTAINABILITY International Project Office Environment Department, University of York, YO10 5DD, UK	Tel: +44 (0) 1904 434789 Fax: +44 (0) 1904 432998	envr12@york.ac.uk
Prof Ian Spellerberg	Isaac Centre for Nature Conservation, PO Box 84, Lincoln University, Canterbury, New Zealand	Tel: 00 643 325 2811 Fax: 00 643 325 3841	spelleri@lincoln.ac.nz
Mr Yin Samray	Ministry of Environment, 48 Samdech Preah, Sihanouk, Phnom Penh, Cambodia	Tel: (855) 23 216 982 Fax: (855) 23 212 540	yinsamray@ncdprojecr.com yinsamray@yahoo.com
Mr Nith Chhin	Ministry of Environment, 48 Samdech Preah, Sihanouk, Phnom Penh, Cambodia	Tel: (855) 23 214 108 Fax: (855) 23 214 108	chhinhnith@yahoo.com.au pmmr@online.com.kh
Mr Chhun Sophal	Ministry of Environment, 48 Samdech Preah, Sihanouk, Phnom Penh, Cambodia	Tel: (855) 23 219 287 Fax: (855) 23 219 287	moegef@hotmail.com
Mr Sitha Chhinh	Royal University of Phnom Penh		sithachhinh@hotmail.com