2015

THIRD STRATEGIC PHASE REPORT

2010-2015

This report documents the work of the APN during its Third Strategic Phase (2010-2015)

APN
Asia-Pacific Network for Global Change Research
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APN
ASIA-PACIFIC NETWORK FOR
GLOBAL CHANGE RESEARCH

20 YEARS
Bridging Science & Policy
for a Sustainable Asia-Pacific

MESSAGE FROM THE DIRECTOR AND THE STEERING COMMITTEE CHAIR

At the outset, we would like to express our heartfelt appreciation to all APN members, partner organisations, project leaders and collaborators, as well as all other stakeholder individuals and organisations in the global change community for their support that made possible APN's outcomes and achievements over the third Strategic Phase (2010–2015).

At this historical juncture as APN moves into its 20th year of operation towards a new strategic phase, it is our pleasure to present the APN Third Strategic Phase Report, which documents the accomplishments of the Network over the last five years, and outlines the challenges and opportunities ahead as it moves forward into the future.

The work on developing the Third Strategic Phase Report commenced in early 2013 upon the approval of a proposed work plan and timeline by APN's Inter-Governmental Meeting (IGM) at its 18th session held in Kobe, Japan in April 2013.

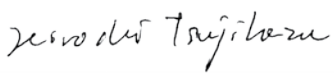
A task committee comprising members from APN's Steering Committee and Scientific Planning Group was subsequently formed to review both the institutional development component and the science, policy and capacity development component of the APN over the last five-year period.

Following the initial drafting, external reviewers were invited to evaluate the work of the APN as highlighted in the draft report. Their valuable feedback and comments were incorporated in to the draft report, which also provided insightful advice for the strategic planning exercise for APN's fourth Strategic Phase (2015–2020).

Before finalising into its present form, the draft report was circulated widely among APN members and key stakeholders in the global change community for additional feedback. This process has helped us further clarify and visualise the achievements of the Network in its third Strategic Phase.

Looking into the next Strategic Phase, it has become clearer than ever that science-based policy-making is the key to addressing future global change and sustainability challenges, and we sincerely hope that, with the continued support of all stakeholders, the APN will carry on with its increasingly important role in transforming global change and sustainability science into solution-oriented knowledge that informs decision- and policy-making in its upcoming 4th Strategic Phase.

Hiroshi Tsujihara



Director, APN Secretariat

Peldon Tshering, nFP Bhutan

Second Chair of APN Steering Committee

EXECUTIVE SUMMARY

The APN took stock of the work it undertook in its third strategic phase from 2010 to 2015 and tasked a committee comprising members from its Intergovernmental Meeting (IGM) Steering Committee (SC) and Scientific Planning Group (SPG) to provide a review of the work accomplished in the 5-year phase. The result of the work is presented in this "Third Strategic Phase Report" and takes into consideration not only where the APN has been and what it has accomplished; but outlines the challenges it faces as it strategically moves forward into the future, celebrating 20 years of achievement.

During the third Strategic Phase, the APN provided support for 132 projects through its competitive research and capacity development programmes. This number has quadrupled since the first open call for projects in 2008, and is an increase of over 25% since its second strategic phase (2005-2010). With over 250 peer-reviewed papers and the underlying philosophy that the regional research it undertakes engages at least two developing countries, the 3rd Strategic Phase is not only improving the research capabilities of nations in the region, but is engaging the developing country community in underpinning policy-relevant research. The extent to which science is contributing to policy is further evident in that 69% of the activities conducted had some form of science-policy mechanism built in to the project activities.

While actively implementing its core activities of the Annual Regional Call for Research Proposals (ARCP) and Scientific Capacity Building/Enhancement for Sustainable Development in Developing Countries (CAPaBLE) programmes, APN has also established three thematic frameworks in a specific response to internationally emerging issues and stakeholder needs. These are Biodiversity and Ecosystems Services Framework (B&ES), Low Carbon Initiatives Framework (LCI) and the Climate Adaptation Framework (CAF). The future of the Frameworks will depend on the outcomes, relevance and stakeholder interest in the thematic areas as well as strategic discussions for the fourth Strategic Phase. In order to continue these Frameworks as an integral part of APN's activities, there needs to be a mechanism whereby the Core Programmes and Frameworks co-exist in a financially stable equilibrium or to reconsider the core mechanisms in which APN operates in a dynamic and flexible way that would ensure that the needs of its stakeholders are being met.

APN members' sense of ownership of the network has grown. The rotation system of national Focal Points (nFPs) as elected Steering Committee (SC) Members, the increased number of nFPs on the SC, the closer communications between the nFPs and the SPG Members and Sub-Regional Cooperation (SRCs) Committees have helped to achieve this encouraging trend. The SRCs, in particular, have provided a unique platform for countries at the sub-regional level to address common problems, write proposals to address these problems and develop the capacity of young scientists through training workshops designed to increase their knowledge base and skills to compete effectively in proposals processes for funding. While membership development and ownership is moving in a positive direction, more work to realize full engagement of member countries remains a challenge.

Web-based connections are the "here and now" and APN is taking full advantage of the opportunities the World Wide Web provides to network and promote its activities. As a key tool for communications, APN has developed its strategies to ensure alignment with web-based developments and has adopted some dynamic approaches to keep abreast of the developments in this area. The APN has embarked on an ambitious communications strategy that has led to the advanced development of its website incorporating a metadata portal (E-Library), daily bulletins, and interactions with social media, including Twitter and Facebook. Outreach is bigger than ever, with over 2,000 email subscribers and almost 16,000 unique page views to the E-Lib system in the last year. The vision of growth in this area will be actively expanded in the next strategic phase through endeavours that ensure a robust e-platform for APN's growth and the community it serves.

Financially, the APN's budget has increased despite the hardships faced in the global economy during the timeframe of the present strategic phase. Some of the challenges remain at the forefront such as fluctuating exchange rates and budget cuts faced by some of APN's stakeholders. This said, the APN is growing exponentially in terms of the number of projects it undertakes, and discussions on how to attract other member countries to pledge direct financial

support to APN have formed the basis of a number of discrete discussions with stakeholders. While finances have been steadily increasing in the APN there are issues with regard to the management requirements to undertake activities. This is a challenge for the future that APN must tackle.

The period of the third Strategic Phase has been witness to significant changes in the make-up of the "conventional" global change arena, with the transition of some global change programmes into the new "Future Earth" initiative. At the same time, major events such as the Rio+20 Summit, the post-2015 Sustainable Development Goals, the establishment of an IPCC-related platform for biodiversity, i.e. IPBES, and the evolving engagement of science and policy communities has kept the APN busy at what it does best – networking and partnering with the international community. The APN has embraced these changes through its dynamism, allowing the APN to meet not only the needs of the scientists and decision makers its serves in the region but those of the international science communities as well. The challenge for the APN in its next two decades will be to ensure alignment with the transforming global change arena.

With key phrases such as "policy-relevant science" and "science-policy interactions" being adopted broadly by the community at large these days, the APN's niche in the global community has received considerable recognition, particularly as other institutions strive to adopt similar practices that the APN has been built over the last 20 years. The APN looks forward to serving the Asia-Pacific region and partnering with the global change community to strive towards a better and more sustainable future for the people it serves.

Moving into its third decade, the APN must continue to address the extent to which it has been effective. While this is clear in the scientific outputs of the present Strategic Phase through the number of peer-reviewed papers, there remains a challenge to ensure continuous monitoring of capacity building success and policy-relevance. It is clear that capacity building and policy-relevant work is being undertaken by the APN, but measures for future success need to be established. It is also important to ensure that the outputs of the work conducted under the Frameworks are preserved through continuous synthesis of what has been learned and provided to policy and decision makers.

The world is coming together with a consensus that we need to work together to take science-informed action, and the APN is part of that endeavour. APN has demonstrated its ability to contribute to this global effort and looks forward to contributing to support the citizens of the Asia-Pacific region in the future.

REVIEWER FOREWORD

It is my honour and pleasure to welcome readers to the Asia-Pacific Network for Global Change Research (APN) 3rd Strategic Phase Report. The Report provides an informative and useful summary of the significant contributions of the Asia-Pacific Network to enhancing the scientific understanding of global changes in the Asia-Pacific region and enhancing the capability of scientists, educators and decision-makers in the region to understand anticipate and respond to the critical global change-related challenges and opportunities being faced by the Region.

In the pages that follow, readers will learn how the types of research and capacity building supported by APN respond to regionally relevant issues and leverage regional, national and international scientific capabilities and resources. The highlighted projects provide great insights into how individual work supported by APN contributes both on its own merit and as part of an integrated approach to addressing Network objectives now and into the future.

The descriptions of the programmatic elements of APN in Chapter II provide some insights into what I see as some of the principles that have guided APN's resource investments during this successful, third Strategic Phase. These include, but are certainly not limited to:

- Using a participatory process to identify critical regional issues and monitor success towards addressing those issues as both natural and socio-economic conditions in the region change;
- Ensuring both high scientific quality and regional relevance of the work supported;
- Ensuring stakeholder engagement throughout a funded project, essentially making them partners in the work while ensuring that the work will meet their needs;
- Communicating project results through both scientific publications and information products intended for decision-makers and the public; and
- Providing opportunities for APN-funded scientists and educators to share and discuss their research results with one another and with a broader community of scientists and decision-makers through organized dialogues, workshops and associated reports.

In addition, this third Strategic Phase Report clearly articulates how the work conducted during this period has and will continue to inform future APN investments. Ensuring this kind of continuity while simultaneously reaching for new and broader horizons has always been a hallmark of APN. The success of APN's investments to date are clear and the potential for the future is exciting!

Eileen L. Shea, ELS and U.S. NOAA-Retired

REVIEWER FOREWORD

I would like to begin by congratulating the authors of the APN Third Strategic Phase Report for the very considerable time and effort dedicated to its preparation. The report provides a very valuable assessment of APN's activities during the Third Strategic Phase and lessons for the next phase.

In particular, the success of APN in scaling-up the level of funds disbursed, projects managed and the number of activities undertaken are to be commended. This is particularly so given the institutional constraints noted in the report, notably the small size of the secretariat, the difficulties in retaining experienced staff and the limited numbers of active national focal points. The report also makes evident the success of APN in expanding its outreach to the global climate change community as shown in its increasingly high profile within the community and growing participation in key workshops, seminars and other activities.

My review has highlighted two main areas of potential weakness, which I consider need to be addressed in the next strategic phase. The first is the problem of APN trying to 'do too much with too little'. The numbers of activities and projects are growing whilst resources are not. In particular, the introduction of new focused activities alongside the core ARCP and CAPaBLE programmes risks creating excessive numbers of calls on APN's attention and resources and should be avoided in future. The second is the apparently limited dissemination of the lessons from the valuable scientific research funded under the ARCP. One of APN's unique advantages is that it bridges the gap between research and policy-making. But, it is not clear how well this is working at present. I have suggested greater emphasis is placed on dissemination including making this an explicit element of evaluating proposals for funding under this program.

In conclusion, I would again like to thank the authors for their work and to note the high quality of the report. My comments are intended to be constructive and to contribute to the debate on how to take APN forward into the next phase of its work with the APN including its hard-working and dedicated secretariat and its supporting network of volunteers.

Sovannara (Phil) Ieng
(Former APN national Focal Point for Cambodia)

Intergovernmental Platform on Biodiversity and Ecosystems Services

The 140 countries which met a few weeks ago at the third session of the Plenary of IPBES, the Intergovernmental science-policy Platform on Biodiversity and Ecosystem Services (January 2015, Bonn, Germany), approved a set of four regional assessments of biodiversity and ecosystem services to be performed over the period 2015-2017, including one for the Asia-Pacific region. A key policy challenge of many nations in Asia-Pacific, a highly biodiverse region, is to improve the standard of living in ways that provide equitable access to resources while maintaining the capacity of ecosystems to produce goods and services, and while not further degrading biodiversity.

APN is playing an important role in the Asia-Pacific region as a catalyser for the production of policy relevant new knowledge on global environmental change issues. I am delighted to see that biodiversity and ecosystem services were selected as a topic for one of the three frameworks of APN, and that much capacity building work on these topics has been funded. The work of IPBES, including its regional assessments, relies on available knowledge in the region, and thus on the work of partners like APN, which strengthen the production of this policy relevant scientific knowledge.

I congratulate colleagues at APN for the work presented in this third strategic phase report, and encourage them to continue their important work on biodiversity and ecosystem services, as a contribution to the future reports of IPBES.

Anne Larigauderie
Executive Secretary of IPBES Secretariat

Joint Global Change Research Institute

I congratulate APN team for outstanding progress in every aspect of the programs and projects they have undertook during the past decade and for an exciting and agile strategy for the future described in this document. The APN progress on research, capacity development, communication and networking during the past decade is very impressive. Beyond significant accomplishments, a notable and key factor is the flexibility and agility of APN in program and project planning, development and implementation. A combination of core programs together with emerging thematic frameworks, and open solicitations inviting best ideas and proposals provided significant opportunities for APN family to be in the forefront of environmental research, capacity development, and framing and facilitating policy dialogues in Asia-Pacific regions. The spirit of "whole being greater than sum of individual contributions" by the participating individuals, organizations and nations comes through the activities described in this document, for past, present and future.

I believe the future direction set by APN will be as bright as its past and present accomplishment, because of APN access to the extensive network of talent in Asia-Pacific region, the sustained support by its sponsors, and the global network of partnerships that APN has forged. These are the essential ingredients that any progressive organization dreams to have to secure their successful future. I congratulate the leadership and membership of APN family for their achievements, and this exciting plan for the third strategic phase. It is truly a great privilege and distinct honor to be affiliated with APN family of scholars.

Ghassem R. Asrar
Washington, DC

United Nations Framework Convention on Climate Change

The UNFCCC, in its Articles 4 and 5, stipulates that international cooperation on climate change research be promoted. To this end, the SBSTA has established a research dialogue, which was convened for the sixth time on 7 June 2014 in Bonn, Germany. The research dialogue has evolved into an important platform for sharing of information between science and policy communities on latest scientific developments and for facilitating communication on needs and priorities for future climate change research.

The Asia-Pacific Network for Global Change Research (APN), as a long-standing partner in this dialogue representing the Asia-Pacific region, has showcased many successful examples, projects and lessons learned from activities in the region that have fostered research, enhanced knowledge, built capacity, and engaged developing country scientists in international research.

APN's approach to foster communication through dialogue, to strengthen institutional arrangements and to enhance synergies provides a good example how regional collaboration can bridge science, policy and, ultimately, actions on the ground to help countries develop in a climate resilient way.

As the Chair of the SBSTA, I had the pleasure to work with APN and other global and regional scientific organizations, and I welcome and encourage APN to continue to be an active part of our science-policy interface under the Convention. This Report of the APN on its third Strategic Phase (2010-2015) will be an important contribution to this end. Scientific information on climate change continues to be of paramount importance for policy makers as they work towards the development of a global agreement to tackle climate change, in Paris in 2015.

Observer engagement is an important ingredient for the advancement and implementation of the Convention objectives. To this end, I encourage APN and other organizations to take advantage of opportunities to share information with SBSTA including through a recently launched pilot activity.[1]

Emmanuel Dumisani Dlamini,
Chair of the Subsidiary Body for Scientific and Technological Advice (SBSTA) of the United Framework Convention on Climate Change (UNFCCC)

[1] <http://unfccc.int/8499.php>.

CONTENTS

CHAPTER I:
INSTITUTIONAL STATUS REPORT

Introduction

The APN matured in the five years of the third Strategic Phase (3SP) in that it further strengthened its position in the global change research community. This has been in a number of ways including providing financial support to collaborative research and capacity development activities and being widely acknowledged as an entity that has a wealth of information related to global change research, environmental policies in the Asia-Pacific region, scientists, researchers and policy makers that are working in the arena of global environmental change issues, etc. This has been gathered in almost 20 years of work in a region that is home to more than half of the world population, and fastest economic growth rates.

With the high level of development and maturity of APN, expectations for this unique network have grown steadily. APN is no longer approached just for funding, but as an important contact point and partner for global environmental change issues in the Asia-Pacific region. Increasingly, the APN is requested to become actively involved in discussions around new, changing and evolving frameworks on global environmental change, such as the Intergovernmental science-policy Platform on Biodiversity and Ecosystem Services (IPBES) and Future Earth, among others.

In order to respond to the increasing expectations, the APN still needs to make efforts to develop further internally and institutionally. The present Institutional Status Report is to provide an overview of the institutional structure and functioning of the APN in its third Strategic Phase.

The APN has engaged researchers and the wider stakeholder community in its Core Programmes: ARCP and CAPaBLE. To make the information conducted under these programmes more accessible and in line with APN's "Open Access to Data Policy", the APN has, during the 3rd strategic phase (2010-2015), developed a metadata portal in which each project it has funded under the core programmes is able to disseminate its outputs to the APN Network and the larger international community. This metadata portal - APN's Electronic Library (E-Lib), on the APN website (http://www.apn-gcr.org/resources/), is discussed in more detail in the Communications Section of this report.

APN Core Programmes "Annual Regional Call for Research Proposal (ARCP)" and "Scientific Capacity Building/Enhancement for Sustainable Development in Developing Countries (CAPaBLE)"

The APN's **Annual Call for Proposals** is one of the main pillars of the APN to select activities on global change research and capacity development in the Asia-Pacific region. It is a highly competitive process, open to diverse global change community, ranging from researchers/scientists, practitioners, academia and government officials who are based in the Asia-Pacific region. In each strategic phase, the APN establishes a science agenda to guide the proposal selection process by specifying which areas of activity that APN will focus on or give high priority to. Generally, the APN Calls for Proposals consist of three basic stages: (i) Submission of summary proposals and Stage 1 review; (ii) Submission of full proposals (by invitation only) and Stage 2 review; and (iii) Approval stage. The length of the selection process generally takes 9 months. Proposals submitted each year are to request funding for activities in the next year. For review purpose, the APN has its own pool of reviewers, which consists of internal reviewers (SPG and CDC members) and external reviewers (from the international global change community). The internal reviewers are the Scientific Planning Group and Capacity Development Committee of the APN, while the external reviewers are individuals within the global change community who volunteer their time to review proposals.

Launched in April 1998 as a competitive process to select projects for funding under the Science Agenda of the APN, the Annual Regional Call for Research Proposals Programme (ARCP) is the main scientific pillar of the APN to encourage and promote global change research in the Asia-Pacific region that has potential, in addition to improving the understanding of global change and its implications in the region, to contribute to the establishment of a sound scientific basis for policy-making with regard to issues for which global change is an important factor.

The Scientific Capacity Building/Enhancement for Sustainable Development in Developing Countries programme (**CAPaBLE**) was launched in April 2003 as an initiative to realise parts 107-114 of the Johannesburg Plan of Implementation (JPOI), World Summit on Sustainable Development (WSSD) and was registered as a WSSD Type II Partnership Initiative at that time. The CAPaBLE programme is enhancing scientific capacity in developing countries to improve decision-making relating to issues that are directly linked to their sustainable development. This effort is being achieved through a two-track process of *capacity enhancement* for experienced leading scientists and *capacity development* for early-career scientists.

An evaluation of Phase One of CAPaBLE (2003-2006) was conducted in 2008, the results of which reaffirmed the urgency and need for a programme like CAPaBLE as an integrated pillar of APN activities focusing on scientific capacity development, particularly for developing countries. CAPaBLE became the second core programme of the APN next to the ARCP Programme in 2008 and is considered the capacity building arm of the APN.

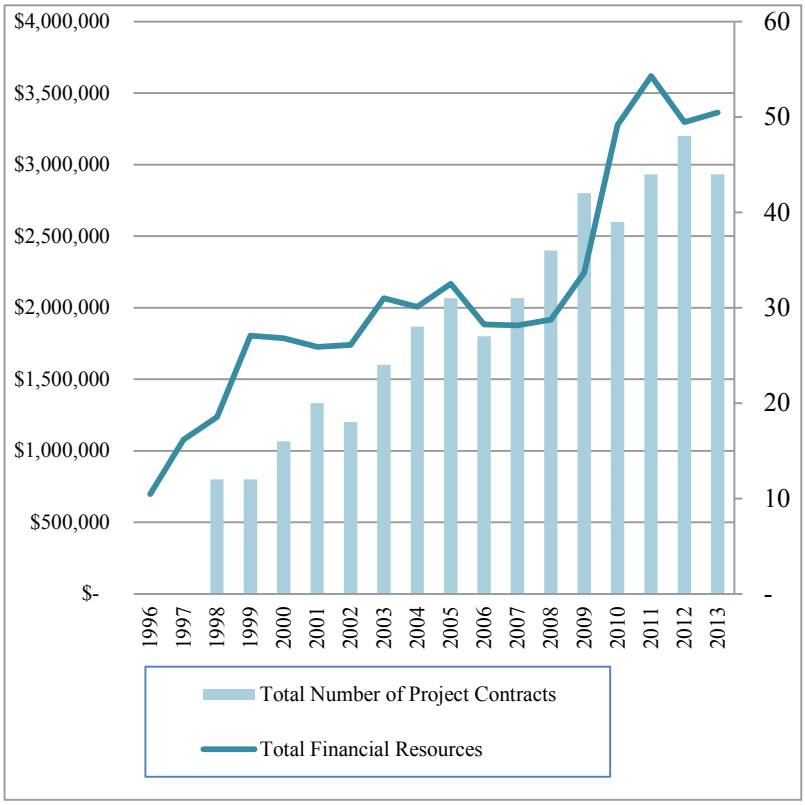


Figure 1: Financial contributions and their distribution (*note the drop in US$ finances in 2006 to 2008 is due to exchange rates; refer to Section 10).

In APN's efforts to achieve its goals of supporting collaborative global change research in the Asia-Pacific region and improving the scientific capabilities of nations in that region, its core programmes of ARCP and CAPaBLE have remained its flagship activities. Thanks to the confidence of the donating member countries of the APN, the network has been in the fortunate position of sustaining its strategic and qualitative level of ARCP and CAPaBLE core activities, even in the years of decreased revenue. Refer to **Figure 1** on the distribution of finances until 2013, noting that the investment is not only for CAPaBLE and ARCP activities, but for focused activities and frameworks as well.

The **Annual Regional Call for Research Proposals (ARCP)** programme, the main pillar of APN's scientific activities, fosters regional collaborative research and the international research community acknowledges ARCP as a successful and effective tool in producing scientific knowledge and narrowing existing gaps in global environmental change. While the average amount of its financial support per annum is modest, the financial support has, as evidenced in the present report, efficiently helped strengthen collaborative research of developing-country scientists from different countries and, in doing so, has improved scientific capacity in the region.

The APN's core programme **"Scientific Capacity Building/Enhancement for Sustainable Development in Developing Countries (CAPaBLE)"**, that is aimed to enhance scientific capacity in developing countries of the Asia-Pacific region, is a well-received programme. The interest of the scientific community in this programme is high. The positive feedback from researchers, in particular from young and early-career scientists, who have benefited from the CAPaBLE programme, justifies its presence in the APN in that it well meets the needs for scientific capacity development, particularly in developing countries, which is one of the core goals of the APN.

As many CAPaBLE projects' lifespan is one year, and often consist of training workshops, etc., more sophisticated tools may need to be developed to evaluate the success of the projects under the CAPaBLE programme. Some clear methodology was used in the present report via a logical framework analysis approach, but more work needs to be done at the project level during actual implementation. It is also important to follow up and analyse the career paths and development of those who received capacity building and, for this reason, APN is establishing an ALUMNI (Friends of the APN) of scientists to mark its 20th anniversary in 2015.

The financial foundation, and with that the future of both ARCP and CAPaBLE Core Programmes, heavily depend on the direct financial contributions from APN's two major donors, i.e. Ministry of the Environment of Japan (MOEJ) and the U.S. Global Change Research Program (USGCRP), through the U.S. National Science Foundation (NSF). While the APN is grateful for their continuous support of APN's Core Programmes, discussions on how to attract other member countries who are in a position to pledge direct financial support to APN have been discretely undertaken. While finances have been increasing in the APN as seen in **Figure 1**, there are issues with regard to the levels appropriate to undertake activities. This is evidenced in one questionnaire response - *"….the cost of doing business at the global level has increased significantly, while available resources per project are still at, essentially, 1990 levels."*

APN Frameworks

During its third strategic phase, APN developed and is implementing three Frameworks. In order to make clear the difference between Frameworks and Core Programmes, currently, Core Programmes are integrated into the core structure of the APN. This differs from frameworks in that the latter tend to run for a specific period. The fate of the Frameworks will depend on the outcomes, relevance and stakeholder interest in the thematic areas as well as strategic discussions for the fourth strategic planning of the APN for the phase 2015-2020. The two mechanisms are shown in **Figure 2**.

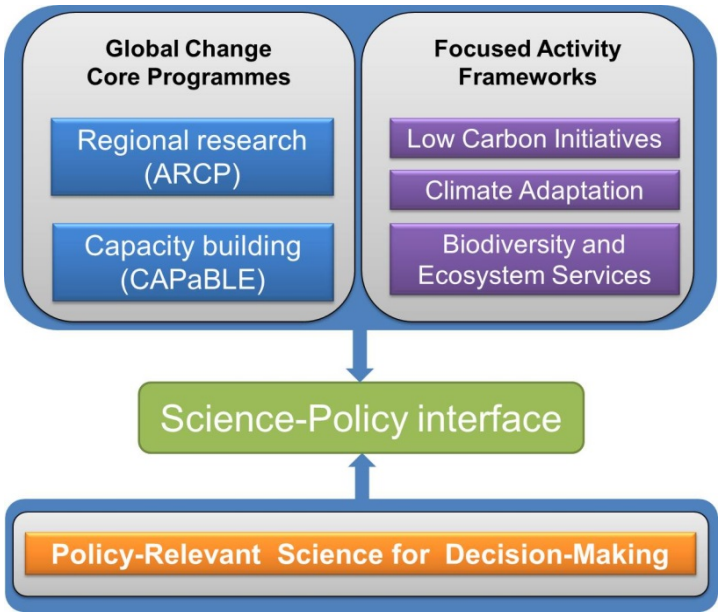


Figure 2: Chart depicting APN's Core Programmes (left) and Frameworks (right)

There are presently three Frameworks:

- **From 2012 - Low Carbon Initiatives Framework** (links to UNCSD, UNFCCC) http://www.apn-gcr.org/programmes-and-activities/focused-activities/low-carbon-initiatives-framework/
- The APN launched its Low Carbon Initiatives (LCI) framework with a view to enhancing mitigation actions across countries in the region to help achieve the global vision for a low carbon, sustainable future. Since 2012, the LCI has been supporting regional research, capacity development and networking activities related to low carbon development.

- **From 2013 - Climate Adaptation Framework** (links to UNFCCC) http://www.apn-gcr.org/programmes-and-activities/focused-activities/climate-adaptation-framework/
- The APN conducted a scoping workshop in August 2012 to explore opportunities to enhance action and develop the capacity of APN developing country members on adaptation in the Asia-Pacific region. The framework identified needs, gaps and lessons for climate adaptation and a needs-oriented and user-centred approach emerged as key to implementing the framework.
- **From 2013 - Biodiversity and Ecosystems Services Framework** (refer to the Opportunity Paper at http://www.apn-gcr.org/programmes-and-activities/focused-activities/biodiversity-and-ecosystem-services-framework/. Links to IPBES and UNCBD).
- A series of APN-led meetings and workshops identified important existing gaps for the Asia-Pacific region requiring attention through comprehensive scientific research, capacity building and science-policy mechanisms. Four thematic gaps identified as important under the framework include identifying drivers and pressures for biodiversity change that influence ecosystem services; assessing the impacts of biodiversity loss and vulnerability to the shrinking of ecosystem services; adaptation, response and mitigation of depletion of B&ES; and prediction of changes in B&ES through mode-based scenarios.

The Frameworks were established to improve the input of sound scientific knowledge into policy- and decision-making processes and all three frameworks adopt partnership approaches, considered crucial for success. In addition, these frameworks are APN's response to stakeholders' requests to enhance the dialogue between science and policy in the respective areas that are relevant to the APN and the Asia-Pacific region. Activities conducted under the Frameworks follow similar approaches to the core programmes of the APN:

- Regional-based research activities;
- Capacity building activities;
- Science-policy interfacing; and
- Communications and networking activities.

FUTURE KEY STRATEGY: Strategic discussions are needed in order to confirm the importance of, and our commitment to, the two main pillars of APN's global change activities, i.e. ARCP and CAPaBLE, on the one hand; and the focused activities around the three frameworks, on the other.

APN Focused Activities

Policy- and decision-making must be based on sound scientific knowledge. Responding to particular topics of interest and high priority of the member country Governments APN started to support projects that are related to specific themes with the following special calls for proposals under **"Focused Activities"**:

- **Scientific Capacity Building for Climate Impact and Vulnerability Assessments** (SCBCIA; 2009);
- **Ecosystems, Biodiversity and Land Use** (EBLU; 2010 and 2011)
- **Resources Utilisation and Pathways for Sustainable Development** (RUSD; 2010 and 2011);

The high interest in these focused activities and the results from the projects concluded clearly document that the offer of supporting research and capacity development activities on specific topics is well received (refer to Chapter II for more details). Obviously, there is an urgent need for such focused mechanisms of funding research and capacity development, in particular in the developing countries among the APN members.

In 2013 post-award management, funds accumulated so that APN was able to strategically provide funding for sub-regional cooperation activities, including networking and science-policy dialogues. Some of the funds were also set aside for activities that linked with Future Earth (scoping workshop in the Asia-Pacific region) and an IPBES-related workshop whose results were presented at the IPBES Second Plenary in Turkey, December 2013.

While the basic scheme of the Focused Activities is well established and fits under the Science Agenda of the APN, their funding basis is highly dependent on additional contributions of one member country, Japan. The APN is very grateful for this support, but in terms of jointly sharing the ideas of what are those areas of common interest and making them to topics of APN's future activities, ideally the financial resources should come from as many member countries as possible.

FUTURE KEY STRATEGY: Develop a more robust funding strategy for Frameworks if they are to play an important role in the APN's future by way of responding to stakeholders' needs. It is important, too, to ensure that the outputs of the work conducted under the frameworks are preserved through synthesis (such as the recent Climate synthesis of the APN in 2011) of what has been learned and provided to policy and decision makers.

APN Organs/Sub-Organs

In the history of APN, the number of its bodies has increased, reflecting the steady growth in the range of activities the network undertakes. The duties assigned to the organs and sub-organs have changed as well. The current institutional structure of APN depends heavily on the commitment and work of its national Focal Points (nFPs), Scientific Planning Group (SPG) country members and invited expert members, whose work for the APN is undertaken on a voluntary basis. The APN is very grateful for their dedication and much of APN's success can be attributed to their commitment.

a. Inter-Governmental Meeting (IGM)

The sense of ownership among national Focal Points (nFPs) that comprise the IGM has grown in the past five years. The rotation system of nFPs as elected Steering Committee (SC) Members, increased number of nFPs sitting on the SC, closer communications between the nFPs and the SPG Members, mechanisms of improved possibilities of exchanging opinions, e.g. through the Sub-Regional Cooperation (SRCs) Committees have helped to achieve this encouraging trend. Indeed, while most nFPs are active in and supportive of APN, there are some countries where there are no nFPs and in some cases although there is nominally an nFP, he/she is inactive. The practice of transferring governmental officials to new positions after a couple of years in many Member Countries (which means more frequent changes in nFPs) is, perhaps, an obstacle in that the IGM, who are represented by government members, has not yet reached its full potential because of, again perhaps, a lack of institutional memory in who the APN is and what it is trying to do. This is being addressed via the roles and responsibilities of nFPs in the Framework Document (http://www.apn-gcr.org/wp-content/uploads/2014/03/APN-Framework-Document-v1April2014.pdf). More dialogue is needed among Member Governments. **Perhaps the development of a toolkit for succeeding nFPs would help in the transition of nFPs in a member country.**

b. Steering Committee (SC)

While all nFPs meet once every year at the Inter-Governmental Meetings (IGMs) the SC acts, on behalf of the IGM, as its sub-organ, and makes decisions on important questions between the annual IGMs. During the 3SP, when APN succeeded in improving and strengthening its institutional structure, the SC also developed further and reinforced its important position in APN. The SC has matured as the lead "think tank" of APN. By having increased the total number of elected nFPs serving on the SC from three to five in 2013 an important signal was sent that it is built upon the expectations of the active participation and leadership of Member Governments.

By having both Co-Chairs of the Scientific Planning Group (SPG) as ex-officio Members in the SC, it is guaranteed that the voice of the scientific representatives of APN Member Countries is integrated in all SC discussions and decisions.

The Co-Opted Members are considered not only as experts in their field and have a long history with APN (through former nFP and/or SPG status, for example) and are crucial to the work of the SC. These members are in the best position to wisely contribute to the work of the SC and support the elected nFPs serving on the SC.

Donor countries are represented on the Steering Committee at their own discretion to provide advice and ensure that planning, management and future of the APN is in accordance with their interests. This unique arrangement ensures the full transparency of the work undertaken by APN to its stakeholders'.

c. Scientific Planning Group (SPG)

The Scientific Planning Group is the scientific brain of the network, and guarantor of the widely acknowledged scientific credibility and integrity. In particular, the calls for proposals and the review and selection processes of proposals for APN funding heavily depend on the work of the SPG Members. As SPG Members tend to stay in office longer than their nFPs, their sense of ownership and commitment of APN is more distinct; some of the SPG Members have been with the APN since the very early days of its foundation in mid-1990s.

While the SPG generally share the role of the heavy work involved among its members, APN is faced with some SPG member inactivity. While this is not a severe situation, it does place unfair proportions of work on other SPG members, for example, in ensuring the integrity and robustness of the APN's review process. APN is painfully aware that the workload of the SPG is very high. Thorough discussions on strategies to ease the increasing workload of its SPG members is needed, and it may be time to think of engaging early-career scientists as SPG members and/or external reviewers. The point of election of country SPG members is the responsibility of nFPs and this would be a discussion required at the IGM-level. Presently, for those SPG members who do retire, they generally continue as invited expert members to the SPG or as external experts. This is an increasing trend in the APN, showing its unique family characteristics.

One way to mitigate losing experienced SPG Members is to invite external experts as members of the SPG. Currently, our invited experts are renowned scientists in different disciplines of the global change research community. In their special capacity as Invited Members to the SPG, they are able to contribute independently from policies and interests of the Member Countries.

d. SPG Sub-Committee (SPG-SC)

The SPG-SC is a sub-organ of the SPG. With the two SPG Co-Chairs and three additional experienced SPG Members, the SPG-SC is an efficient body that helps the SPG in formulating the Science-Policy agenda of APN. In particular, it discusses the development strategies of the ARCP, by also taking into consideration the emerging scientific topics of high priority to Member Countries. One of its most important tasks is to screen the reviewers' results on proposals for funding under ARCP before its recommendations are discussed within the whole SPG. The SPG-SC is fundamental to the work of the APN throughout the year as they evaluate project progress and provide advice to Project Leaders and to the Secretariat in implementing APN's science agenda.

e. Capacity Development Committee (CDC)

The Capacity Development Committee (CDC) oversees the processes related to the operation of the CAPaBLE Programme and develops strategies for the future of this programme. The committee, consisting of scientists (two of them are invited from outside of APN), policy makers and representatives of the donor countries, is an important organ that is instrumentally involved in the discussions of reviewed proposals for funding under the CAPaBLE programme. It also provides IGM with guidance in the overall capacity development strategy.

CAPaBLE is growing at a rapid pace and sits next to the ARCP as a core programme. With CAPaBLE having been integrated into the APN as a core pillar, APN feels there is much more work needed to develop this important capacity development programme. In particular, policy-making bodies such as UNFCCC, IPCC and IPBES, among others, are increasingly seeing capacity building as one of the most important areas, particularly for developing countries to undertake meaningful research in global change. For this reason, in the next strategic phase, APN needs to place more importance in this area, refine the roles of the CDC, and determine the key capacity building needs and metrics for success. This has already been noted in this report, and underlines that this area cannot be underestimated in terms of its importance to the developing member countries in APN.

f. Sub-Regional Committees (SRCs)

Strengthening interactions among scientists and policy-makers is one of goal of APN in order to develop scientific evidence based policy options to response global change issues. The idea of establishing Sub-Regional Cooperation Committees (SRC) was born as an attempt to improve the dialogue and networking on global change research and policy among the APN Members at the sub-regional level. This was initiated in 2006 with a trial model (replacing a sub-regional liaison model) and became operational in 2007 with the establishment of the first SRC in Southeast Asia.

With this ambition, APN has provided opportunities for members to meet and cooperate via meetings at the sub-regional level in the sub-region itself. APN now has three functioning SRCs Southeast Asia (established on 2007), South Asia (2009) and Temperate East Asia (2012). During the third Strategic phrase, Southeast Asia (SEA) SRC has conducted five meetings; South Asia (SA) SRC four meetings; and Temperate East Asia (TEA) one meeting. There is currently no SRC for Oceania and the Pacific. As part of a growing agenda at the sub-regional level, the committees have also met during the annual IGM/SPG meeting as parallel session at the IGM/SPG. In addition to the SRC meetings, the sub-regions have also conducted Proposal Development Training Workshops and are working to have three Science-Policy Dialogues, the first of which was conducted by SEA in 2012.

To evaluate the effectiveness of the SRC committees, committees requested to conduct a self-evaluation based on the original objectives of the SRC committees and produced evaluation reports. As the TEA committee is young with one meeting under its wing at the time of writing, the committee did not undertake a self-evaluation at this stage. Evaluation reports for SEA and SA are available in **Appendix 1: Sub-Regional Cooperation** attached to the report, with some of the highlights from the reports included here:

- Conducted Southeast Asia Science-Policy Dialogue in collaboration with START. A South Asia Science-Policy Dialogue will be held in Bhutan, January 2015.
- Produced three proposals that address global environmental change issues at the sub regional level: two proposals were submitted under the 2014 APN call for proposals and one proposal will be submitted under the 2015 ARCP call for proposals.
- Provided opportunities for knowledge sharing through country reports during the committee meetings.
- Contributed to the growth of APN through engaging Myanmar and Maldives as approved countries.
- Enhanced capacity of young scientists to write good proposals and compete more effectively for funds under the APN's annual calls for proposals in the area of global environmental change via APN's Proposal Development Training Workshops.
- Succeeded in becoming formal organs of the APN, with inclusion in the APN Framework Document.

Considering the above outcomes there is a clear indication that Sub-Regional committees have enhanced cooperation and communications within their respective sub-regions and those members are actively engaged and committed to APN activities. This said, during the third strategic phrase, committees have not yet achieved a level of self-management or self-sustainability. Some of the challenges facing SEA and SA SRCs are that they make up a body of developing countries, which places barriers in terms of stronger financial support to self-sustain. Therefore, the SRCs remain heavily dependent on financial support from APN's core budget. This said there have been in-kind contributions for committee meetings through provision of hosting meetings and logistical support.

FUTURE KEY STRATEGY: To become self-sustainable, SRCs need to explore other sources of financial support for sub-regional activities; establish partnerships with other sub-regional networks (for example, ASEAN, SAARC, etc.) and maintain regular communication among members.

g. Secretariat

The Secretariat facilitates the day-to-day operations of the APN; provides support to the organs and sub-organs of the APN; and implements IGM and SC decisions on behalf of these organs. Resources and support for the

Secretariat are provided by the host country, including the Central and Local Governments. In addition, the host country provides the services of a senior expert in global change issues, seconded as the Director of the Secretariat. The Secretariat operates under the administrative arrangements of an institution based in the host country.

The APN's full time Secretariat is hosted by Hyogo Prefectural Government in Japan and is the main administrative organ of the APN that runs the day-to-day operations of the network. Some observations in the present strategic phase include:

- As APN has evolved, the scope of its activities has steadily expanded. In order to respond to the needs of this expanded work additional staff are needed to undertake the growing work in science (both project-based and Secretariat-led), communication, development and institutional affairs.
- The network is growing (as shown in the number of projects being funded - **Figure 1**) and therefore the expectations of APN Members to engage more in APN activities is inevitable and crucial for the future success of the APN. By carefully observing the possible development of APN in the future, the landscape and structure of its organs may need to be expanded to suit the growing needs of the APN as a network. For the Secretariat to sustain as an effectively functioning organ of the APN, more human resources are needed.
- While having young and enthusiastic professionals as secretariat staff is a large asset, the Secretariat needs to think of a new arrangement to allow it to retain its young and dynamic staff by offering more attractive conditions including opportunities for professional development. During the 3rd Strategic phase, APN employed 8 young scientists in various positions; many who have stayed on and a number of whom have gone on to further their careers in their own country. They have contributed significantly to the success of APN.

FUTURE KEY STRATEGY: Seek and encourage more financial investment from members and other stakeholders. As the APN grows, invest more in the Secretariat in terms of size and professional development.

Mitra Award

Following the death of one of APN's long-serving SPG members from India, the APN decided to honour his contributions to the APN by introducing the **Mitra Award for Young Scientists**. The first was held in 2010 in Busan, Republic of Korea during the 15th IGM. Under this award, young scientists from the host country of the Inter-Governmental Meeting share their work via Poster Presentations, which are judged by the APN nFPs and SPG members. The winner receives the APN Mitra Award and an opportunity to give an oral presentation to the IGM was provided. During the Third Strategic Phase, 64 young scientists participated in the Mitra Award Competition and five Mitra Awards were presented to awardees from Republic of Korea (2010), Sri Lanka (2011), Indonesia (2012), Japan (2013) and Cambodia (2014). More details are included under Chapter II of the present report.

Communications and Outreach

Communicating the findings and outcomes of APN activities is at the heart of APN's mission to contribute to the development of policy options for responding to global change and finding pathways to global sustainability. Starting from the beginning of the Third Strategic Phase, APN communication and outreach activities have been guided by a Communication Strategy (http://www.apn-gcr.org/resources/items/show/1854) endorsed by the IGM

at its 14th Meeting in 2009. Below is a summary of major developments in communication and outreach, organised according to the structure of the APN Communication Strategy.

a) Improved Production and Dissemination of APN Publications

The Science Bulletin, APN's flagship publication for the Third Strategic Phase, has steadily improved since its first launch in 2011. An enhanced workflow ensures the quality of content and presentation, and makes it an important source of information for researchers and policy makers in the community.

Synthesis reports continued to serve as a powerful knowledge management tool for outputs generated by APN activities. The latest synthesis report "Climate in Asia and the Pacific: A Synthesis of APN Activities" launched on the eve of UNFCCC COP17 at Durban, South Africa, 2011, has received significant amount of interest and demonstrates how APN's work has contributed to the global understanding of climate change and its impacts.

Over the Third Strategic Phase, a range of new publications were produced to highlight our work, communicate outputs and learning, and to inform the research and policy-making communities. These include newsletters, policy briefs, brochures, posters and leaflets that are distributed on various occasions.

b) Increased Access to APN's Websites and Digital Resources

A redesigned website, one of the four components of the APN Information System planned for the strategic phase, was launched in 2011 and received ever-increasing attention by the international community. The restructured website improves usability and, as a result, has raised the profile of the APN as an organisation actively promoting collaboration in the region.

The second component, an electronic mailing list (EML) system was launched in late 2011. Since then, APN's subscriber community has increased to around 2100 users, who can choose to provide information about their interests and background, hence creating the possibility for APN to provide well-targeted email messages to specific subsets of subscribers.

Box 1: Communication and Outreach by Numbers

13.5%
More users reached through APN website, FY2013 vs. FY2012

17.6%
More visits generated by email campaigns, FY2013 vs. FY2012

2,062
Active email subscribers

5,655
Total number of downloads of the APN Climate Synthesis Report

15,979
Unique page views to E-Lib, July 2013 to August 2014

The third component, the APN electronic library (E-Lib), was launched in 2012 and is a dynamic service, which is continuously being updated and improved. It houses project-based metadata and outputs, in addition to all of APN's in-house publications. The E-Lib interface (http://www.apn-gcr.org/resources/) offers multiple search options that allow easy access to information.

The fourth component of the information system is scheduled to be launched to celebrate APN's 20th Anniversary. It comprises an online alumni site where scientists, researchers, practitioners and decision makers associated with APN are able to post articles, updates and announcements, and interact with each other on issues of common interest via a blog service.

c) Outreach and Visibility

APN continues to promote the network at various national, regional and international events through presentations, side events/workshops and/or exhibits. Posters, publications, CD-ROMs, USB flash drives and other materials are prepared and displayed/disseminated at these events to promote APN visibility and networking and at side events organised at major international gatherings such as APAN, UNFCCC COP meetings, Planet Under Pressure, Rio+20.

With a growing number of ways of reaching out to targeted audiences, especially digitally, there has been a rising need for APN to be more engaged in social media outreach. Over the period under this report, APN has been steadily building its "owned media" platforms, now expanding from Facebook to Twitter and LinkedIn. As of August 2014, APN's Facebook page has earned over 640 followers with significantly increased engagement, especially from young scientists and researchers.

d) Cooperation with the International Global Change Research Programmes

APN maintains close partnership with international global change programmes and their core projects. As they are gradually evolving and integrating into the new Future Earth initiative, the APN also actively maintains close communication and partnership with Future Earth, particularly including its projects and partners in the Asia-Pacific region. Although it is still early (at the time of writing Future Earth is operating at the Interim level), APN fully expects the same, if not increased, level of engagement it has with the GC Programmes and projects who are merging into Future Earth.

e) Improving Interaction and Communication with Member Countries

In 2013, the Secretariat introduced an electronic mailing list service to encourage and facilitate easier electronic communication among members. Members are encouraged to represent the APN in international events, thus increasing their sense of ownership and engagement. As the APN approaches its 20th anniversary, a number of member countries have become increasingly active in promoting APN through close collaboration with the Secretariat. The information in **Box 1** indicates the wide outreach to member countries via various electronic media.

Membership Development (Member Countries, Approved Countries)

Twelve countries were represented at the first Inter-Governmental Meeting that was held in Chiang Mai, Thailand, in March 1996. Since then, the number of APN "Member Countries" has increased to twenty two with the Kingdom of Bhutan being the newest Member Country that officially joined APN in March 2010. It is important to note that Pacific Island States have had "Approved Country" status since 1996. In addition to Singapore, Maldives and Myanmar recently obtained "Approved Country" status, thus providing eligibility of their researchers to submit proposals to the APN.

However, one of the measures of success of the APN is the commitment and engagement of its government representatives of its Member Countries.

Over the period of the third strategic phase, it is evident that several member states have been less engaged than in former periods. For example, they have been unable to fulfil the obligations under the Framework Document; for example review of proposals. Efforts at various levels have been undertaken in order to reengage *all* member countries in APN activities.

FUTURE KEY STRATEGY: Greater effort to reengage all member countries in APN activities.

Donors and Stakeholders

The APN is grateful for the direct financial contributions, i.e. Ministry of the Environment of Japan and Hyogo Prefectural Government (Japan), U.S. Global Change Research Program through the U.S. National Science Foundation (U.S.A.), Ministry of Environment (Republic of Korea) and Ministry for the Environment (New Zealand), for the strong support through their direct financial contributions. They have remained committed to APN, despite economic obstacles and financial crises. With their support, the amount that was made available to APN per annum increased to US$ 3.6 Million in Fiscal Year 2011 (the highest resources recorded in APN's history).

There is also a high level of in-kind support that APN receives from its Members and those participating in its programmes. In this respect, APN's resources are much larger than the "dollar" figures presented. The APN appreciates every effort of Member Countries providing it with in-kind support. In particular at times of big meetings, etc., APN is very much dependent on, and grateful to, the in-kind support of the host country.

Indeed, many APN funded projects receive in-kind support through the host organisations of the Project Leaders and their Collaborators, in form of salary support of the scientific staff involved in the project, administration and management support, as well as the provision of office space and equipment, etc.

Since APN was officially launched in 1996, the Ministry of the Environment[2] of Japan has been the biggest donor to the APN and stayed fully committed to this network over the last two decades and supported the work of the APN and all members are extremely grateful to MOEJ for its ongoing commitment.

The direct financial contributions, as well as the in-kind support APN has receives from Hyogo Prefectural Government, serves to show the continued commitment of this prefectural government to the APN since the APN Secretariat was relocated to Kobe in August 1999. Hyogo's continuing support has underpinned the success of APN's work.

In 2013 APN received the status of an entity that is eligible to receive grants from the United States NSF directly. This is a great step forward compared to the past when NSF support was either entirely managed in the US without any funds being transferred to APN's bank account in Japan (until 2008) or when the funds of the NSF grant were transferred through the International START Secretariat (until 2011). The two years following that (2012 and 2013) presented a large learning curve for APN due to the nature in which it applies for and receives funds from its US donors.

The APN is very grateful to the support to date of the Ministry for the Environment, New Zealand; Ministry of Environment, Republic of Korea; and the United States Global Change Research Program through the National Science Foundation of the USA. The direct financial contributions from these two countries provides great encouragement to other financially-contributing Member Countries, as well as an invitation to potential new donors as it clearly shows that the successful work of APN is built on the foundation of the financial support of more than one or two Member Countries. This is an entry point that can be used to discuss with nFPs and their Governments about direct financial support to APN.

Resources Development

In order to increase the ownership and involvement of APN among the Member Countries they are all encouraged to support APN through more direct and in-direct financial contributions. Currently, APN's budget is dependent

[2] Until 2001: Environmental Agency of Japan.

on the direct financial contributions from four Member Countries. The main barriers for receiving financial aid from member governments needs to be addressed. In doing so, some areas may require exploring further such as:

- an APN official treaty that guarantees the status of APN as a legally binding entity of common interests of the Member Countries;
- encouraging member countries to support collaborative research and/or capacity development activities;
- effective strategy for increasing resources;

As a new way of encouraging more Member Countries to financially participate in APN activities, initial discussions have started to engage them in co-financing schemes that support research projects and capacity development activities. Memoranda of Understanding are under preparation for such partnership approaches, to be signed between a Member Country Government and the APN. In this partnership, a Member Country financially contributes to the grant of a research and/or capacity development proposal that is submitted by a researcher from that Member Country and approved by IGM for funding. To date, discussions have been held with three of APN's developing country members.

Management of Financial Resources

The Institute for Global Environmental Strategies (IGES) having been officially certified as a "Public Interest Incorporated Foundation" under the new Japanese *Act on Authorization of Public Interest Incorporated Associations and Public Interest Incorporated Foundations* in April 2012, the APN Secretariat, operating with the administrative support of IGES, was instructed to reorganise its accounting system to increase the transparency of its finances. The work is in progress and APN Secretariat receives guidance from both IGES headquarters and its external auditors. This exercise is also important in terms of providing confidence to stakeholders that APN is well capable in properly administering its finances along international rules. Every year, APN's financial reports are incorporated in the financial statements of IGES and then externally audited by Shin Nihon LLC, the Japanese member firm of Ernst & Young Global, Ltd.

A positive effect of the efforts of reorganising the accounting structure of APN is that the communication channel between the accounting sections of APN Secretariat and IGES were improved. This is an important step forward to further strengthen the credibility of APN and its financial management system.

Adopting administrative standards that are in line with practices of regional entities would provide the flexibility that is often needed by an internationally operating network such as the APN.

The management of APN's financial resources has entered a new phase in its history, largely due to erratic currency fluctuation in recent years. APN's budget is devised, presented and, for project awards, implemented in US Dollars. However, as APN receives contributions in different currencies, this can sometimes present an unrealistic picture of actual donor contributions from one year to the next depending on the exchange rate at the time. Under these circumstances, APN needs to be more strategic about budgeting and handling funds over the coming years by observing the exchange rate balances.

Activities with Hyogo Prefecture Government

The Hyogo Prefectural Government, since it became the host of APN Secretariat in 1999, has remained a strong supporter of APN, both in terms of direct financial contributions and in-kind support. As part of the strong partnership with Hyogo Prefectural Government, APN conducts a number of Hyogo-sponsored events that, in general, are targeted for the citizens of the prefecture. By focusing on topics that are of interest to local audiences, as well as relevant to the environmental policies of Hyogo Prefectural Government, these activities raise the

profile of APN and are well accepted within the community of Kobe City and beyond. Importantly, too, Hyogo contributes a large portion of funds for projects under the APN core programmes.

APN is not the only international organisations hosted by Hyogo Prefectural Government. Kobe is also home to a number of national and international organisations that are engaged in areas of health (WHO Kobe Centre), disaster management and prevention (Disaster Deduction and Human Renovation Institution) and environment; International EMECS (Environmental Management of Enclosed Coastal Seas) Centre), among others.

Some of the financial support APN receives from the Hyogo Prefectural Government is partly used to support international events of some of these organisations. For example, since 2001 APN has been engaged in six International EMECS Conferences (2 in the present strategic phase); not only through financial contributions but also by holding Asia-Pacific sessions at which APN invited experts give presentations about the preservation and sustainable use and management of enclosed seas in the world.

A list of 'Hyogo Activities' that APN has conducted during its 3rd Strategic Phase is shown in **Figure 2** under Project Sets 124-132.

Changes in the Global Change Community

In its history of almost 20 years of taking a leading role in fostering collaborative global change research and capacity development activities in the Asia-Pacific region APN has steadily evolved and is still evolving. It matured from a small inter-governmental organisation that provided small grants to projects of collaborative research in the region to a strategic partner, with a strong network of policy makers and scientists, covering all areas of global change research and other related topics. Accordingly, APN's participation in many fora of the international global change community is sought and expected. A number of international and Asia-Pacific based organisations have started seeking possibilities of collaboration with the APN. With its network of very diverse and wide range of experts, as well as through its data base of 400 funded projects, APN is in an excellent position to contribute to the discussions of global environmental change related questions, both from global dimension, as well as from the Asia-Pacific perspective.

Having had good relationships with the four global change research programmes DIVERSITAS, IGBP, IHDP and WCRP, APN's active involvement in the discussion around the implementation of Future Earth, in particular in the Asia-Pacific region, is well acknowledged. APN attended three meetings and scoping workshops to help design Future Earth, band shared its experiences in enhancing and supporting global change research and capacity development activities, as well as fostering science-policy interactions, in the Asia-Pacific region.
APN's relationship with START (global change SysTem for Analysis, Research & Training) entered a new phase: since APN Fiscal Year 2012 the direct financial contributions from the U.S.A., provided to APN by the U.S. Global Change Research Program (USGCRP) through U.S. National Science Foundation (NSF), are coming to APN directly. In the past, the International START Secretariat assisted the APN Secretariat in the administration of USGCRP/NSF grants to APN. Having evolved from a relationship around the NSF contributions, APN and START are now strategic partners in activities related to research, capacity development and science-policy linkages in the area of global change research in the Asia-Pacific region.

Increased APN Involvement in the Global Change International Arena

The APN participated in the Research Dialogues of the even-numbered SBSTA Meetings of UNFCCC in the last five years. The APN representative showcased the work of APN by pointing out the wide range of the activities APN was engaged with – activities that were always tailored to strategically meet those topic areas of high priorities, particularly those of the developing countries among its Members, e.g. climate change impacts on agriculture and food production. These top priority areas may change. SBSTA Meetings are excellent fora to

inform the international community on the issues that are relevant for APN Member Countries, to demonstrate to policy makers from APN member states the relevance of APN's activities and, at the same time, learn about the global change areas of high interest in other parts of the world.

While the APN has been contributing to the work of UNFCCC, UNCSD and UNCBD over the years, its involvement with IPCC and the newly formed IPBES are other important bodies that require APN involvement. It is pleasing to note that APN has continued to input to IPCC not only through citations of its published work, but also through authorship. **Fifty one (51)** Project Leaders and APN members authored or reviewed the 5th IPCC Assessment Report. APN is also engaged with IPBES and is recognized by IPBES as an important network that can assist in the first assessment report. At the time of writing, for example, the APN Director was engaged in an expert scoping meeting in Paris to discuss specific deliverables under the first IPBES assessment. These results will be highlighted at the 3rd IPBES plenary in January 2015.

CHAPTER II:
SCIENCE, POLICY AND CAPACITY DEVELOPMENT REPORT

Introduction

The APN has grown in the past five years to the extent that the present report goes beyond the Core Programmes of the APN. The chapter provides a more detailed overview of the work conducted in the third strategic phase and how it is relevant to the four goals of the APN and the Core Strategies to achieve these four goals, as outlined in the Third Strategic Plan. It is divided into two main sections: **Project-Based Activities** and **In-House Activities.**

Project-Based Activities:

a) Core Programmes
b) Project Awards via Competitive Proposals Process and Award Demographics with 10 ARCP and 10 CAPaBLE highlighted projects (according to their accumulative outputs and impacts against, mainly, the four goals of the APN and its mission statement)
c) Focused Activities and Frameworks
    a. Project Awards
    b. Highlighted Projects
d) Communication and Dissemination of (Ongoing and Completed) Project Activities via the Science Bulletins;
e) Project-based Science-Policy Linkages

In-House Science Activities:

a) Proposals Process
b) Project Management
c) Climate Synthesis and Book
d) Science and Policy Dialogues
e) Proposal Development Training Workshops
f) Mitra Award

Project-Based Activities

Of the 132 projects completed in the third Strategic Phase (in which 123 were awarded from competitive calls for proposals), 20 are highlighted in the report in terms of their activities, outputs and impacts. Another two activities are highlighted as outstanding; the work conducted under CAPaBLE and ARCP projects by the Asia Water Cycle Imitative (AWCI) and one focused activity, which effectively engaged science, policy (local decision makers) and communities in understanding and implementing vulnerability and adaptation tools that applied both science and traditional knowledge that produced custom-made models.

All 132 Project Sets are tabulated in **Appendix 2**.

The APN fosters the understanding of global environmental change by conducting regional research through regional collaboration and capacity development. APN's activities promote research that improves understanding of the physical, biological and human dimensions of change in Earth system and science that informs adaptation and mitigation decision-making in the following specific areas that make up the APN Science Agenda:

- Climate Change and Climate Variability;

- Ecosystems, Biodiversity and Land Use;
- Changes in the Atmospheric, Terrestrial and Marine Domains; and
- Resources Utilisation and Pathways for Sustainable development

The above themes are interrelated and involve the interface of natural, social and political sciences. Thus, APN will also support research on crosscutting issues, science-policy linkages and the human dimensions of global change. The APN defines Global Change Research as "Research regarding global change (the set of natural and human-induced changes in the Earth's physical and biological systems that, when aggregated, are significant at a global scale) and its implications for sustainable development in the Asia-Pacific region.

In the period 2009-2013, the APN has launched 2 calls for proposals annually (10 total in the period) under its CAPaBLE and ARCP Programmes and 5 calls for expressions of focused interest for activities on Scientific Capacity Building for Climate Vulnerability and Impact Assessments (**SCBCIA**); Ecosystems, Biodiversity and Land-Use (**EBLU**); Resources Utilisation and Pathways for Sustainable Development (**RUSD**); Low Carbon Initiatives (**LCI**); and Climate Change Adaptation, Disaster Risk Reduction and Loss and Damage. (**CCA-DRR-LDD**).

During the present strategic phase APN has completed **132** project activities (**Appendix 2**), with **80** ongoing at the time of writing (78 from competitive calls for proposals and 2 Hyogo-based activities).

a) Core Programmes: Project Activities

Annual Regional Call for Research Proposals (ARCP) Programme

The Annual Regional Call for Research Proposals (ARCP) is one of the scientific pillars of the APN to encourage and promote global change research in the Asia-Pacific region that has potential, in addition to improving the understanding of global change and its implications in the region, to contribute to the establishment of a sound scientific basis for policy-making with regard to issues for which global change is an important factor. The ARCP is a competitive process launched in April 1998 for the first time to select projects for funding under the Science Agenda of the APN. Those ARCP proposals submitted and awarded, with other proposal demographics are shown in **Figure 3**.

Activities of Interest under the ARCP Programme

- New research which addresses knowledge gaps in key scientific areas
- Synthesis and analysis of existing research
- Research planning/scoping activities

Box 2: ARCP Regional-based Research by Numbers

47
Regional research projects completed

218
Collaborators engaged in 47 research projects

182
Peer-reviewed publications (See Appendix 3)

641
Project outputs (reports, proceedings, papers, toolkits, etc.)

2,627
People engaged (scientists, policy makers, and practitioners) in 47 projects

81%
Of 47 projects engaged in capacity building

66%
Of 47 projects engaged policy makers at various levels and/or produced policy-relevant outputs

47%
Of 47 projects directly engaged in networking, partnerships and other activities with the Global Change Research Programmes (IHDP, IGBP, DIVERSITAS, WCRP)

64%
Of 47 projects sustained their activities through partnerships, networking and financial awards

– The development of policy products such as integrated assessments, impact assessments, climate models, etc.

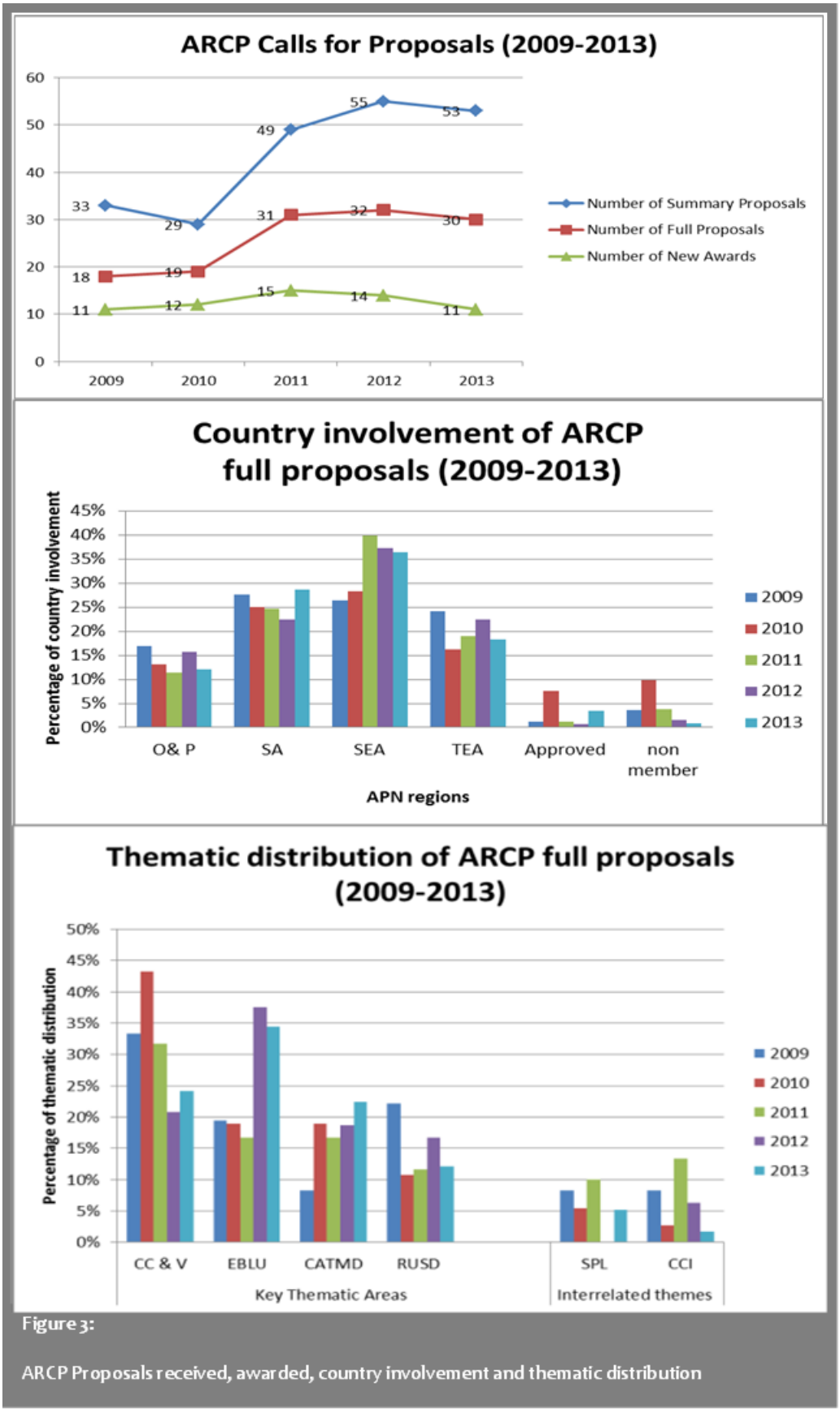
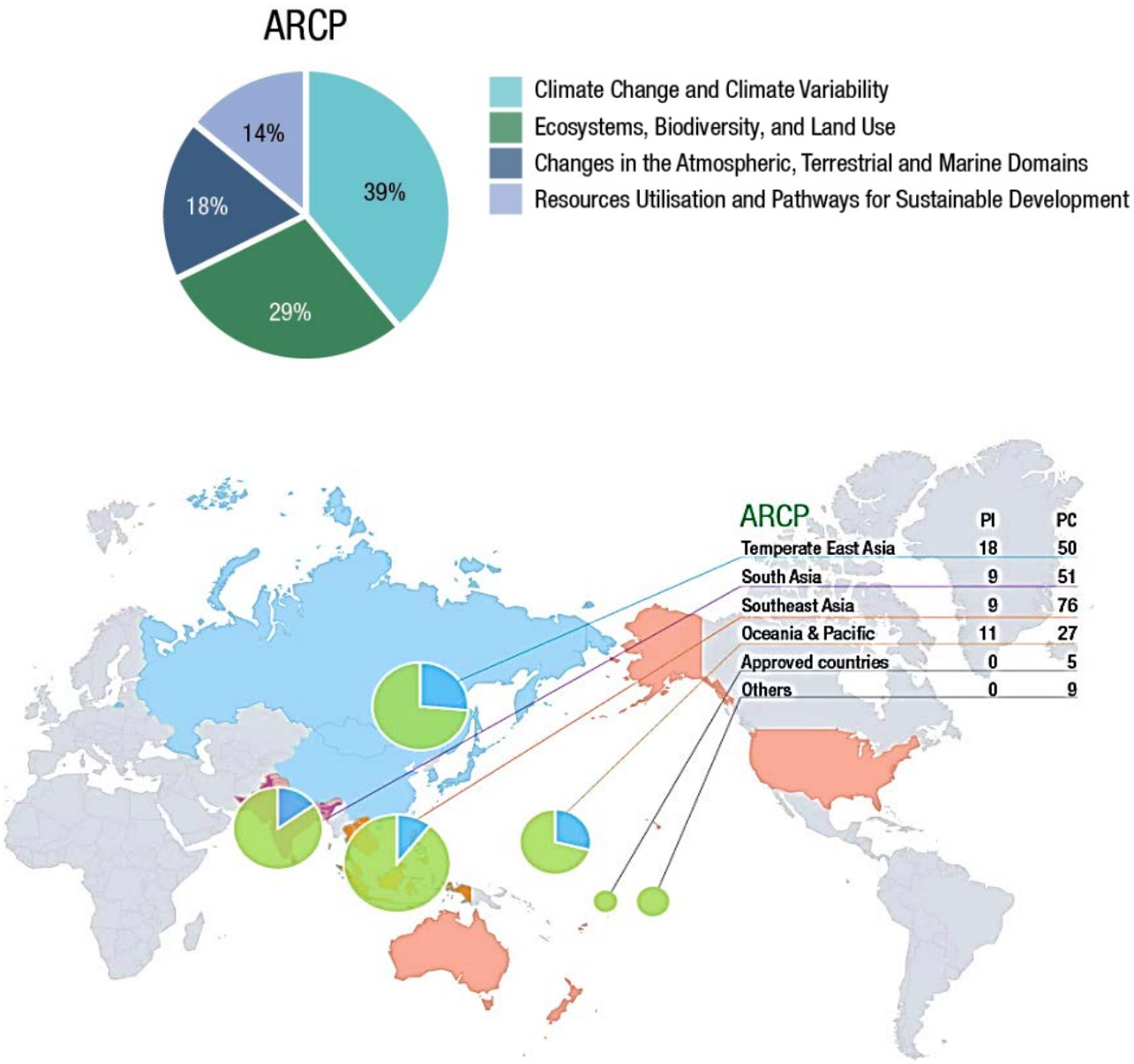


Figure 3:

ARCP Proposals received, awarded, country involvement and thematic distribution

Project Demographics (for projects completed during the third strategic phase)



Regional distribution of Project Leaders (PL) and Project Collaborators (PC)

Project Outputs

The cumulative outputs of the ARCP projects are significant and the majority of activities contributed to some or all of the four APN goals (see Box 1 on page 19). The ten highlighted projects of the 47 completed (see pp29-pp38) provided key outputs for science, decision-making and the public. In addition, they contributed to the transfer of knowledge and developed capacity through training and awareness programmes. The projects also produced significant peer-reviewed publications. Most demonstrated strong regional partnerships among stakeholders and engaged in multi-disciplinary science. Interestingly, projects had 47% involvement with the Global Change (GC) Programmes. This could be an indicator of the changing structure of the GC programmes, with the close of ESSP in 2012, IHDP in 2013, DIVERSITAS in 2014 and the emergence of Future Earth.

ARCP HIGHLIGHTED PROJECT 1:
REDUCING WATER INSECURITY THROUGH STAKEHOLDER PARTICIPATION IN RIVER BASIN MANAGEMENT INTHE ASIA-PACIFIC REGION

More information: *http://www.apn-gcr.org/resources/items/show/1554*

Project Reference: ARCP2008-15NMY-Nikitina; ARCP2009-03CMY-Nikitina
Project Leader: Dr. Elena Nikitina, EcoPolicy Research and Consulting, Moscow, **Russian Federation**
Countries engaged: Australia, China, Russian Federation, Thailand, Viet Nam
Project Summary: Water-related risks are attributed not only to escalating global and local changes, but to a high extent to failures in good water governance in river basins or their sub-basins. The key finding is that river basins in the Asia-Pacific region vividly demonstrate the emerging trend of state-centric governance evolving towards encompassing multi-stakeholder approaches. Broadening engagement, interaction and consolidating partnerships between public, private and civil society actors appears to be among the effective tools in good water governance. One of the messages is that stakeholder participation, related opportunities and barriers is a very 'context' oriented issue being dependent on existing specific national and local socio-economic, cultural, political and sustainability priorities. The project explored and compared stakeholder involvement and partnerships in water management in river basins in Australia, China, Russia, Thailand and Viet Nam, and findings are aggregated and contrasted to worldwide trends.

Activities

- Assessments in 4 countries and results and synthesis at 3 workshops
- 2 Policy and stakeholder roundtable dialogues
- 1 Policy Dialogue
- Networking, dissemination and interaction with many partners, including IHDP and GECHS

Outputs

- 20 peer-reviewed papers and 1 book
- Establishment of network "REWIND"
- Series of REWIND working papers
- Key messages for stakeholders on roles and best practices as well as conceptual framework engaging business, people and government stakeholders

Impacts

- Contributed to the APN science and policy agendas and provided policy-relevant information for stakeholders
- Sustained partnerships and networking activities with other relevant institutions
- Developed the capacity of all stakeholders in river basin management from local communities to national and regional levels

WHY IT'S HIGHLIGHTED (STRENGTHS)

- Engaged stakeholders from the beginning of the project activities, leading to a conceptual framework incorporating stakeholders from private sector, public and governments on river basin management.
- Project activities went beyond the initial objectives and produced tangible outputs for science, policy, private sector and the public
- Impacted both research and stakeholder communities through peer-reviewed publications and stakeholder dialogues.
- Good example of multi- and trans-disciplinary approaches to global change research

ARCP HIGHLIGHTED PROJECT 2:
VULNERABILITY OF HOMEGARDEN SYSTEMS TOCLIMATE CHANGE AND ITS IMPACTS ON FOOD SECURITY IN SOUTH ASIA

More information: *http://www.apn-gcr.org/resources/items/show/1566*

Project Reference: ARCP2009-15NMY-Marambe; ARCP2010-03CMY-Marambe
Project Leader: Prof. Buddhi Marambe, University of Peradeniya, **Sri Lanka**
Countries engaged: Bangladesh, India, Sri Lanka.
Project Summary: The changes in temperature and rainfall, current status of the diversity in homegardens, socio-economic characteristics of homegardeners, and the extent to which climate shocks have influenced the usage of adaptation strategies by the homegardeners under changing climate were studied in three sites in Sri Lanka and one site each in India and Bangladesh. All study sites experienced increased variability of seasonal rains over the past five decades (1961-2010). The minimum and maximum temperatures showed an increasing trend. The analysis of plant, tree and animal composition of homegardens over past two decades (1991-2010) revealed that they have not changed substantially despite the climatic variations. Studies homegardens showed resilience to climate change and considerable contribution to household food security. The type of employment, age, sex, education level of household head, experience in farming, homegarden size, diversity of homegardens, and perceptions towards climate change have influenced the decision of homegardeners to adopt different strategies such as, changes in planting dates, agronomic practices, and technology (use of new varieties and irrigation equipment, use of soil and water conservation measures), to cope up with climate change. Development programs to promote adaptation to climate change should be designed taking the above determinants into consideration.

Activities

- Research and analysis of 5 study sites in 3 countries
- Development of scenarios for climate change impacts
- Workshop to discuss final results and drafting of Policy Recommendations
- Dissemination Seminars, Debates, quizzes, at local and national levels in 3 countries

Outputs

- 6 peer-reviewed papers, book chapter and 6 conference papers
- detailed analysis on adaptation practices and level of resilience of homegardens to climate change impacts
- generated information for raising awareness and interest of stakeholders in 3 countries on the impacts of climate change on household food security

Impacts

- raised awareness of homegarden vulnerability and filled gaps in the understanding of resilience of homegardens & their contribution to food and nutrition security in households
- project scientists were called upon to serve in many national level committees that deal with food security and climate change issues
- received new funds and developed partnerships to sustain the project activities

WHY IT'S HIGHLIGHTED (STRENGTHS)

- Effectively interacted with decision makers and communities to assess vulnerability of home gardens
- Addressed gap analysis in climate adaptation strategies, particularly at local levels, and raised awareness on strategies for resilience
- Succeeded in developing long-term relationships with homegardeners and with decision makers, particularly in terms of assisting governments to develop effective adaptation strategies

ARCP HIGHLIGHTED PROJECT 3:
IMPACT OF CLIMATE CHANGE ON FOOD SECURITY AND BIOSECURITY OF CROP PRODUCTION SYSTEMS IN SMALL PACIFIC NATIONS

More information: *http://www.apn-gcr.org/resources/items/show/1571*

Project Reference: ARCP2010-08NSY-Freeman

Project Leader: Dr. Angela Freeman, Dept. of Primary Industries, Victoria, **Australia**

Countries engaged: Australia, Kiribati, Tonga, Tuvalu, Vanuatu

Project Summary: Climate change is impacting on food security and biosecurity in the Pacific region by degradation of food production areas (sea level rise, salinity, drought), devastation caused by extreme weather events (cyclones, flooding) and impacts on recovery time such as replacement of lost crop germplasm and the need to import food substitutes. The aim of this project was to identify the key impacts of climate change on the unique cropping systems in four small Pacific nations (Tonga, Vanuatu, Kiribati and Tuvalu). Information was collected by the development of a questionnaire which was completed by Senior Agricultural Administrators, Biosecurity/Quarantine scientists, agricultural research and extension officers and farmers. Personal interviews, field trips and information sessions were also held in each country. Key issues examined included: country information; quarantine/biosecurity policy; quarantine/biosecurity practice; impacts of climate change on pests and diseases of crops; impacts of climate change on crop production; and country capacity and needs. The data was used to develop country reports (containing a summary of the data collected, key findings, priorities for future research and training), which provide solid data to enable development of strategies/policies to minimise these risks and to identify future research and training priorities and opportunities. At the final workshop, regional priorities shared by Australia and the Pacific countries were identified. The real need for such networks has to be seen within the context of the CROP agencies and their mandate in the Pacific. Working with them would be more cost effective than developing and maintaining new networks.

Activities

- Conducted surveys in 4 PICs to identify critical impacts of climate change on food- and bio-security in agricultural systems, analysed data and identified risks
- Held workshop with invited experts from governments and FAO, SPC, ACIAR etc
- Documented outcomes in country reports for policy and strategy development and future investors

Outputs/Results

- Food security is impacted due to slow-onset and extreme events in all countries studied.
- There is a lack of individual and institutional capacity to deal with food security and biosecurity
- Future strategies to form regional networks and engage wide level of stakeholders, including communities, governments and investors

Impacts

- Countries recognised the value of developing regional networks between neighbouring and like countries as a feasible, low cost and sustainable way of acquiring assistance to deal with the impacts of climate change
- Countries demonstrated that they are ill equipped and lack scientific networks for seeking information and advice to ensure rapid response to incursions.

WHY IT'S HIGHLIGHTED (STRENGTHS)

- Strong engagement among decision makers and communities, which was evident from the onset from country-level data collection and analysis and final workshop that brought all countries together
- Country-specific and regional research themes (addressing gaps) were identified including approaches to address lack of capacity (staff, finances, etc.) and capability (training, equipment, networks, etc.) to deal climate impacts on crop production systems
- Recognized the importance of regional networking for more effective responses
- Good outputs for a one-year regional, research project

ARCP HIGHLIGHTED PROJECT 4:
COMMUNITY-BASED FORESTRY AND LIVELIHOODS IN THE CONTEXT OF CLIMATE CHANGE ADAPTATION

More information: *http://www.apn-gcr.org/resources/items/show/1585*

Project Reference: ARCP2010-12NMY-Uprety; ARCP2011-04CMY-Uprety (Paudel)
Project Leader: Dr. Naya Sharma Paudel, ForestAction Nepal, **Nepal**
Countries engaged: Bangladesh, Nepal, Viet Nam and Thailand
Project Summary: In Bangladesh, Nepal, Thailand and Viet Nam climate variability and extremes has been given little attention with a more reactive rather proactive approach. This study was undertaken in the rural agrarian villages depending on the forest resources of Bangladesh, Nepal, Thailand and Viet Nam with a view to understanding and documenting the trends of climate change and the adaptation measures to cope with adverse situations that might arise. The study was accomplished through intensive household surveys and analysis of long term meteorological data (up to 30 years). The results showed that resources, particularly natural resources and agriculture have been reduced or there has been change in patterns. Increasing trend of climate change along with anthropogenic activities are the main reasons for decreasing the natural resources and livelihood options of the community. The results of the analysis of long term climatic data particularly the changing trend of temperature and rainfall has strongly been supported by perceptions/opinions of the community people. Communities, based on their experiences, have already been adopting adaptation measures (anticipated) like changing planting time, using new technologies, etc. In the face of challenges of climate change and livelihoods, communities have strongly suggested to undertake new adaptation measures like construction of water reservoirs, strengthening afforestation programmes through community approaches, developing strong institutional mechanisms, introducing pest and disease resistant crop varieties, etc. for conservation of resources and their better livelihoods, which need strong support from the public and private sectors.

Activities

- Field-based research at 4 country sites using a multiple-research approach that combined natural and social sciences and conducted risk assessments
- Regional- and local-based workshops (analaysis/synthesis)
- Multi-stakeholder seminars and workshops
- Local community training and awareness in rural agrarian villages

Outputs

- 5 peer-reviewed papers and 4 policy briefs (2 in local language)
- Provided 4 fellowships for master students
- Documented traditional knowledge of rural people in relation to climate change adaptation
- Developed training manuals and trained local communities

Impacts

- Impacted local communities and raised awareness on emerging practices on REDD+ and PES.
- Sustained activities through follow-up grant
- Outcomes acknowledged by policy makers and agencies working together on climate change issues

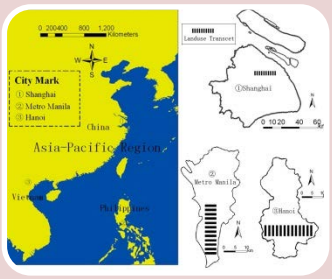
WHY IT'S HIGHLIGHTED (STRENGTHS)

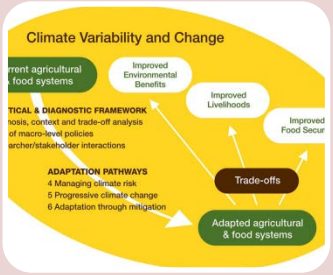
- Engaged researchers (both natural and social science), local communities, policy makers and masters students effectively throughout the project activities
- Raised awareness among stakeholders and trained scientists and local communities on climate impacts and adaptation, including emerging practices
- Documented details of 'traditional knowledge' and sustained activities beyond the period of APN funding

ARCP HIGHLIGHTED PROJECT 5:
ANALYSIS ON URBAN LAND-USE CHANGES AND ITS IMPACTS ON FOOD SECURITY IN DIFFERENT ASIAN CITIES OF THREE DEVELOPING COUNTRIES USING MODIFIED CA MODEL

More information: *http://www.apn-gcr.org/resources/items/show/1587*

Project Reference: ARCP2010-14NMY-Li; ARCP2011-06CMY-Li
Project Leader: Prof. Jianlong Li, Global Change Research Institute, Nanjing University, **China**
Countries engaged: China, India, Viet Nam
Project Summary: Urbanisation - a significant factor in global change - has led to conflicts between peoples' needs and sustainable development in the agriculturally important precincts of large Asian cities. Under this background, ecological problems in urban areas have arisen. The project developed and evaluated options for adapting to a changing climate to inform agricultural development, food security policy and donor investment strategies. The focus was to build and enhance scientific capacity and explore the quantifying urbanization level from the aspect of land use and connecting land use patterns with urbanization processes. The project adopted new approaches that integrated natural and social sciences in land use and cover change studies in order to overcome critical gaps in knowledge, such as how to enhance and manage trade-offs between agricultural production, food security, and environmental goals in the face of a changing climate. The project built an integrated technical review system model to green, healthy and sustainable low-carbon high-efficiency agriculture, which was highlighted in an integrated technical report for policy makers and the international community.





Activities

- Collected ecological field data and GIS data in 3 cities and 4 countries
- Built an integrated assessment automated system
- Held two project workshops
- Held two training workshops on GIS and remote sensing techniques

Outputs

- 2 computer models; patent of invention of digital monitoring software for forest and grassland in China in Jan. 4, 2012
- provided 3 fellowships and trained 20 young scientists in RS and GIS techniques
- published 4 peer-reviewed papers, 18 conference papers
- developed a database of land use, ecological, social and economic data and information on urban and peri-urban environments

Impacts

- Models developed can be modified for other sectors such as animal husbandry and agriculture.
- knowledge of urbanization characteristics for Asia's large cities and small cities in the view of landscape ecology has been promoted.
- The study has important theoretical and practical significance in urban planning and decision-making in eco-city construction

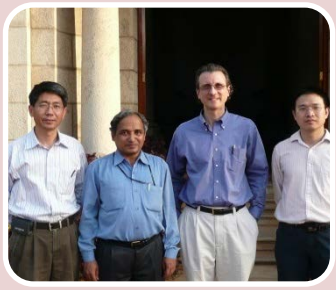
WHY IT'S HIGHLIGHTED (STRENGTHS)

- Engaged with CCAFS programme to highlight the impacts of urban and peri-urban development on ecological systems
- Sustained its activities beyond the period of APN funding with 3 follow-up grants
- Produced models and other technical systems that can be used in other countries and sectors

ARCP HIGHLIGHTED PROJECT 6:
PERI-URBAN DEVELOPMENT AND ENVIRONMENTAL SUSTAINABILITY: EXAMPLES FROM CHINA AND INDIA

More information: *http://www.apn-gcr.org/resources/items/show/1556*

Project Reference: ARCP2008-17NMY-Sellers; ARCP2009-05CMY-Sellers
Project Leader: Dr. Jefferey M. Sellers, Univ. of Southern California, **USA**
Countries engaged: Australia, China, India, USA
Project Summary: Large-scale urban development is likely to be one of the primary sources of environmental change in Asia over the next decades. Understanding the dynamics and the ecological consequences of urban expansion is critical to crafting policies and institutions to manage it properly. Comparative analysis of these processes within and between different countries is an indispensable prerequisite to such an understanding. This study has assembled remote sensing, demographic, environmental and other data over forty years for a systematic comparison of urbanizing regions in China and India. The analysis has revealed strikingly different transformations of urban form in Chinese and Indian urban regions. In China peri-urban expansion has proceeded consistently regardless of city size in coastal regions with strong external investment, but less systematically in some inland regions and little in others. In India, peri-urban expansion has been less dramatic and has varied less between regions with higher and lower external investment. Indian patterns of peri-urban expansion also differ systematically from corresponding Chinese patterns.



Activities

- comparative mapping of peri-urban development
- comparative explanation of the local, regional and national variation in peri-urban dynamics
- examination of the effects from urban developmental pathways on environmental degradation
- policy-relevant findings, and local and international capacity-building workshops

Outputs

- 23 peer-reviewed papers and 6 conference papers
- meetings with stakeholders in both countries have provided lessons for policy and aided the analysis
- results presented at the IHDP Conference on Urbanization and Global Environmental Change and other international scientific conferences

Impacts

- policy: As a member of a number of advisory bodies, Indian collaborator was able to pass on the study outcomes to the government
- policy: report submitted in 2013 (in Chinese) to the Wuhan Development and Reform Commission, about the problem, policy, mechanism of development zones
- generated six further related projects by collaborators, including two APN-funded projects

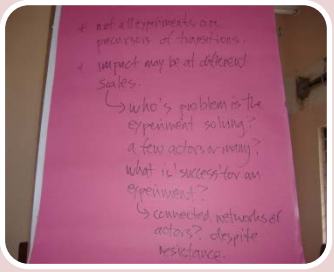
WHY IT'S HIGHLIGHTED (STRENGTHS)

- Built a research team and database for the study of urban development and its environmental consequences in Asia-Pacific countries
- Project activities went beyond the initial objectives and produced tangible outputs for science and policy
- Impacted both research and stakeholder communities through peer-reviewed publications and stakeholder dialogues

ARCP HIGHLIGHTED PROJECT 7:
ROLE OF EXPERIMENTS IN SUSTAINABILITY TRANSITIONS IN ASIA

More information: *http://www.apn-gcr.org/resources/items/show/1562*

Project Reference: ARCP2009-11NSY-Roy
Project Leader: Dr. Joyashree Roy, Department of Economics, Jadavpur University, **India**
Countries engaged: China, India, Malaysia, Thailand and the Netherlands
Project Summary: The project involved organizing scoping workshops to develop an international research programme on the role of innovative development project-level experiments in 'sustainability transitions' in Asia. Two such workshops organized were "Role of Sustainability Transition in Asia" held in January 2010 at Jadavpur University, Kolkata, India and "Innovation and Sustainability Transition in Asia" held in January 2011 at University of Malaya, Kuala Lumpur, Malaysia. The process included preparation of a background paper setting the stage for initial discussion suggesting a conceptual framework, a strategy to analyse the main challenges and mechanisms for the development, up-scaling and governance of such experiments and a strategy to investigate the opportunities and barriers for sustainability experiments. It was successfully aimed to understand how experiments can /have influenced Asian development pathways and transform some of the unsustainable systems of provision (mobility, energy, food, water, housing) as well as what lessons can be learned about opportunities and barriers for policy makers and practitioners who facilitate to set up such experiments. The workshops brought together an international group of academics, practitioners and policy makers, especially from countries like China, Malaysia, Indonesia, Thailand, Viet Nam, The Netherlands and India engaged in this unique field to develop a collaborative research strategy.



Activities

- developed background papers and held 2 international workshops to understand how experiments can come to influence Asian development pathways and transform some of the unsustainable systems of provision (mobility, energy, water, housing, food); what lessons can be learned about opportunities and barriers for policy makers and practitioners and about the experiments' governance at a local level.

Outputs

- developied a consortium of partners interested in- and with capacity to- carry out tasks as explained above
- produced 143 working papers and contributed to the IHDP-IT Core Project
- prepared a solid ground for transfer (creation) of existing (new) context specific knowledge on the human dimensions of change in the Earth system

Impacts

- A research programme proposal outlining research strategy for: (a) inventorising, classifying and analyzing sustainability experiments; (b) analyzing main challenges and mechanisms for experiments development; (c) investigating opportunities and barriers for sustainability experiments as well as their governance at a local level as compared to the OECD contexts and a funding strategy, division of tasks, timeline, budget etc

WHY IT'S HIGHLIGHTED (STRENGTHS)

- Identified knowledge gaps which can form future semi long term research agenda for years to come. The pool of human resources and ideas about way forward in the field of sustainability transition in Asian context needs to be sustained in Asian context through active interaction and regional institutional leadership
- Synthesised 10 years of work under the IHDP-IT Core Project
- Engaged in multi and transdisciplinary discussions that will serve will under Future Earth

ARCP HIGHLIGHTED PROJECT 8:

FOOD SECURITY AND CLIMATE CHANGEIN THE ASIA-PACIFIC REGION: EVALUATING MISMATCH BETWEEN CROP DEVELOPMENT AND WATER AVAILABILITY

More information: *http://www.apn-gcr.org/resources/items/show/1589*

Project Reference: ARCP2010-16NMY-Huda; ARCP2011-08CMY-Huda
Project Leader: Associate Professor Samsul Huda, University of Western Sydney (UWS), **Australia**
Countries engaged: Australia, China and India
Project Summary: Crop adaptation to environmental stresses is central to sustainable agriculture. In eastern Australia, central India and China temperature has increased over the past 40 years. Cropping systems and varieties are designed so that water availability and crop water requirements are well matched, and crops are not exposed to extreme temperature and water supply conditions during critical crop development phases. Mismatches between crop and environment occur when the critical period of crop yield determination coincides with stressful conditions. Possible mismatches arising from realized and predicted warming are the focus of this project. The project demonstrated that, in some cases, the effect of regional warming can be positive, for example in northern China where the extended growing season leads to increased productivity in the winter wheat-maize system. We also identified examples of adaptation such as supplementary irrigation, breeding new varieties with better adaption to the new climate, or concentrating agriculture in areas more suited following climate change.

Activities

- Workshops in China, India and Australia to plan and monitor technical activities
- Case studies in the three countries to draw conclusions on similarities and differences in the responses of cropping systems
- Early Career Researchers' Program for professional development within the project

Outputs

- 9 peer-reviewed research papers
- mismatches were identified in both water availability and extreme temperatures during critical growth phases
- 2 conference papers
- disseminated the outputs to decision makers
- developed capacity of 2 young researchers

Impacts

- An understanding of the impact of climate change on key crops enabled the Asia-Pacific farmers, community workers and policy agencies to better prepare and adapt to climate change, through changes to existing policy and practices
- enhanced the integration and communication between disciplines required in the area of food security and climate variability

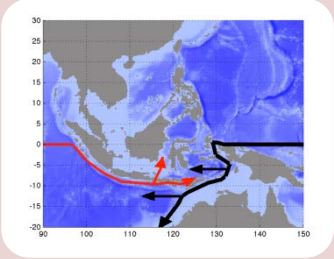
WHY IT'S HIGHLIGHTED (STRENGTHS)

- Embraced capacity building and science-policy linkages through the Young Researchers and the consultations with stakeholders
- Demonstrated strong regional collaboration among interdisciplinary partners
- Project continuity through follow-up grants

ARCP HIGHLIGHTED PROJECT 9:
RECONSTRUCTION OF SEA LEVEL CHANGE IN SOUTHEAST ASIA WATERS USING COMBINED COASTAL SEA LEVEL DATA & SATELLITE ALTIMETRY DATA

More information: *http://www.apn-gcr.org/resources/items/show/1602*

Project Reference: ARCP2011-21NSY-Manurung
Project Leader: Dr. Parluhutan Manurung, Geospatial Information Agency (BIG), **Indonesia**
Countries engaged: Indonesia, Viet Nam, USA and Italy
Project Summary: Low lying and densely populated coastal areas with thousands of small islands spreading across Southeast Asia are highly prone to sea level rise caused by global warming. Accurate sea level change maps in Southeast Asia are of great importance to scientists and decision makers in the region interested in past and present sea level change, and the answer to the question of what likely projected sea level rise will be in the future. Improving the near-coast satellite altimetry data processing will extend the coastal sea level record back in time and allow accurate mapping of sea level change in the region as well as supporting various potential applications of sea level data in the coastal zoneproject reconstructed sea level change in Southeast Asia seas by combining the global tide gauge data record, which spans many years but is sparse in spatial distribution, with the modern satellite altimetry record, which is just short of 20 years long but has, essentially, global coverage. The results show that the sea level trends in the region are some of the highest observed globally during the altimetric record, but the trends fluctuate on multi-decadal time scales due to wind forcing. Reconstructed sea level maps could be further validated using local tide gauge and along track altimetry data. Efforts have been made to explore use of coastal altimetry by conducting two workshops and training sessions and assisting the local community to build an autonomous capacity for development and processing of sea level information.




PERUBAHAN IKLIM

Kenaikan Muka Laut 2,8 Milimeter Per Tahun

Activities

- developed software for sea level reconstruction maps
- explored know-how about coastal satellite altimetry processing and its applications
- conducted trainings and workshops with participants consisting of scientists, students and government representatives
- disseminated outcomes via various mechanisms to science, policy and general public

Outputs

- 7 peer-reviewed publications and 2 conference papers
- list of recommendations to provide a future scientific roadmap to stakeholders in Indonesia
- 7 fellowships and trained 20 young scientists
- outeached to media channels via newspapers, TV and news websites

Impacts

- demonstrated knowledge transfer and capacity building of on coastal satellite altimetry have been successfully achieved
- raised awareness and outreached to general public and decision makers through a variet of tools including local newspapers, website and TV

WHY IT'S HIGHLIGHTED (STRENGTHS)

- Networked with global change programme, WCRP; developed capacity of young researchers and influenced the scientific community through peer-reviewed papers
- Accomplished beyond the original objectives and had significant outputs for a one-year project, including peer-reviewed papers, road map for decision-makers, capacity building and interaction with media

ARCP HIGHLIGHTED PROJECT 10:
MANAGING ECOSYSTEMS SERVICES IN ASIA: A CRITICAL REVIEW OFEXPERIENCES IN MONTANE UPPER TRIBUTARY WATERSHEDS

More information: *http://www.apn-gcr.org/resources/items/show/1557*

Project Reference: ARCP2008-18NMY-Braimoh; ARCP2009-06CMY-Braimoh
Project Leader: Ademola K. Braimoh, Global Land Project, **Japan**,
Countries engaged: China, Indonesia, Japan and Thailand
Project Summary: Human well-being depends on the maintenance of ecosystem services. Upper tributary watersheds provide diverse services such as water provision, soil renewal for agriculture, mitigation of floods, groundwater recharge, soil erosion control, nutrient abatement and carbon sequestration. However, policy makers have found it hard to find ways of incorporating the benefits derived from ecosystem services into decision-making. One reason is the difficulty of characterizing ecosystem services in a manner that policy makers can use it. Several promising but still insufficiently tested governance mechanisms are being explored, for example, payments for ecological services. All approaches need to consider costs and other disadvantages or risks of ecosystem services conservation to various user groups, and trade-offs intrinsic to ecosystem maintenance. This project addressed these pertinent issues by reviewing experiences across a wide range of projects and illustrating solutions and their limitations through three in-depth case studies in China, Indonesia and Thailand. The project report includes an account of the current state of biodiversity in Southeast Asia and analyses biodiversity loss vis-à-vis climatic and anthropogenic drivers with special attention to deforestation and habitat loss. It also includes a review of ecosystem services management mechanisms including spatial land-use planning, delineation for biodiversity conservation, watershed protection, forestry, agriculture, tourism and multiple uses. Case studies in China, Indonesia, and Thailand inventoried and conducted a valuation of ecosystem services based on a multi-stakeholder perspective, model deforestation and terrestrial carbon and provide policy insights into enhancing long-term sustainable use and conservation of services from ecosystems in Southeast Asia.

WHY IT'S HIGHLIGHTED (STRENGTHS)

Activities

- Undertook critical reviews on land-use, vegetation and climate impacts on biodiversity and ecosystem services and institutional mechanisms, such as payment for ecosystem services, community-based management, etc
- Conducted 3 case studies of ecosystem services management in China, Indonesia and Thailand
- Held workshops to synthesise findings and profer policies for sustainable land management

Outputs

- produced 12 peer-reviewed publications, policy briefs and conference papers
- Developed a framework for analyzing Ecosystem Services-
- Analyzed governance structures vis-à-vis the delivery of Ecosystem Services
- Identifed trade-offs and incentives for Ecosystem Services conservation

Impacts

- collaborative, institutional and policy-oriented research and synthesis activities are expected to facilitate informed environmental policy and practice
- disseminated findings to CBD COP20 in Nagoya, Japan
- created strong regional networks among global change programmes (IHDP, IGBP), UNCBD and UNU
- sustained activities beyond APN funding

- Created policy relevant information for biodiversity and ecosystem services that could potentially contribute to IPBES first assessment
- Developed strong regional partners among science and policy communities (local through national and international) and adopted interdisciplinary approaches

Scientific Capacity Building/Enhancement for Sustainable Development in Developing Countries (CAPaBLE)

Since the establishment of the CAPaBLE programme in 2003, APN has funded 129 CAPaBLE projects. During the third strategic phase, 60 CAPaBLE projects were completed as of 31st July 2014 and have undergone review. Considering the overall performance of the CAPaBLE programme, the quantitative data used to measure the impacts shows that the scientific capacity of the region has been developed under the CAPaBLE programme and that the projects conducted have contributed to strengthening the interface between scientists and policy makers. The observations in Box 3 show that 4117 people were directly engaged in APN CAPaBLE activities, 95 of whom were decision makers from local to national levels.

Proposals information (for projects completed during the third strategic phase) are shown in ***Figure 4.***

Project activities included scientific capacity development through training workshops and field-based training activities; conferences, regional and local workshops, syntheses, awareness-raising programmes at local, national and regional levels, pilot projects, etc. Eighty-three percent of projects documented their activities through means other than the APN final reports.

In an effort to determine the impact and performance of the CAPaBLE programme, a summative synthesis was undertaken at the project level and, from this, 10 of the 60 projects completed are highlighted as good examples of the work undertaken under the CAPaBLE Programme. The main objectives of the synthesis were to:

- Gauge the CAPaBLE programme performance against its goals
- Identify progress and outcomes of the CAPaBLE programme and its contribution during the APN third strategic phase
- Highlight projects that performed well according to the goals of the CAPaBLE programme (see pp42-pp51)

Observations

Thematic distribution of 60 projects that were evaluated shows that climate change and climate variability is the key thematic area that has being most addressed, followed by science and policy linkages as the second most priority theme (see page 41).

Considering the project collaborators involvement and project leader distribution, the result shows that capacity development activities conducted in South Asia and led by South Asian are comparatively lower than other APN regions.

Box 3: CAPaBLE Scientific Capacity Building by Numbers

60
Completed Projects

223
Events Conducted

4,117
People Engaged: Scientists, decision makers and general public

161
Publications: Workshops/Conference proceedings, policy briefs, toolkits and manuals, synthesis reports

44
Peer-reviewed papers

83%
Of 60 projects produced publications in addition to APN Technical Reports

72%
Of 60 projects were policy-relevant and/or engaged policy makers via various approaches

90%
Of 60 projects provided monetary co-financing

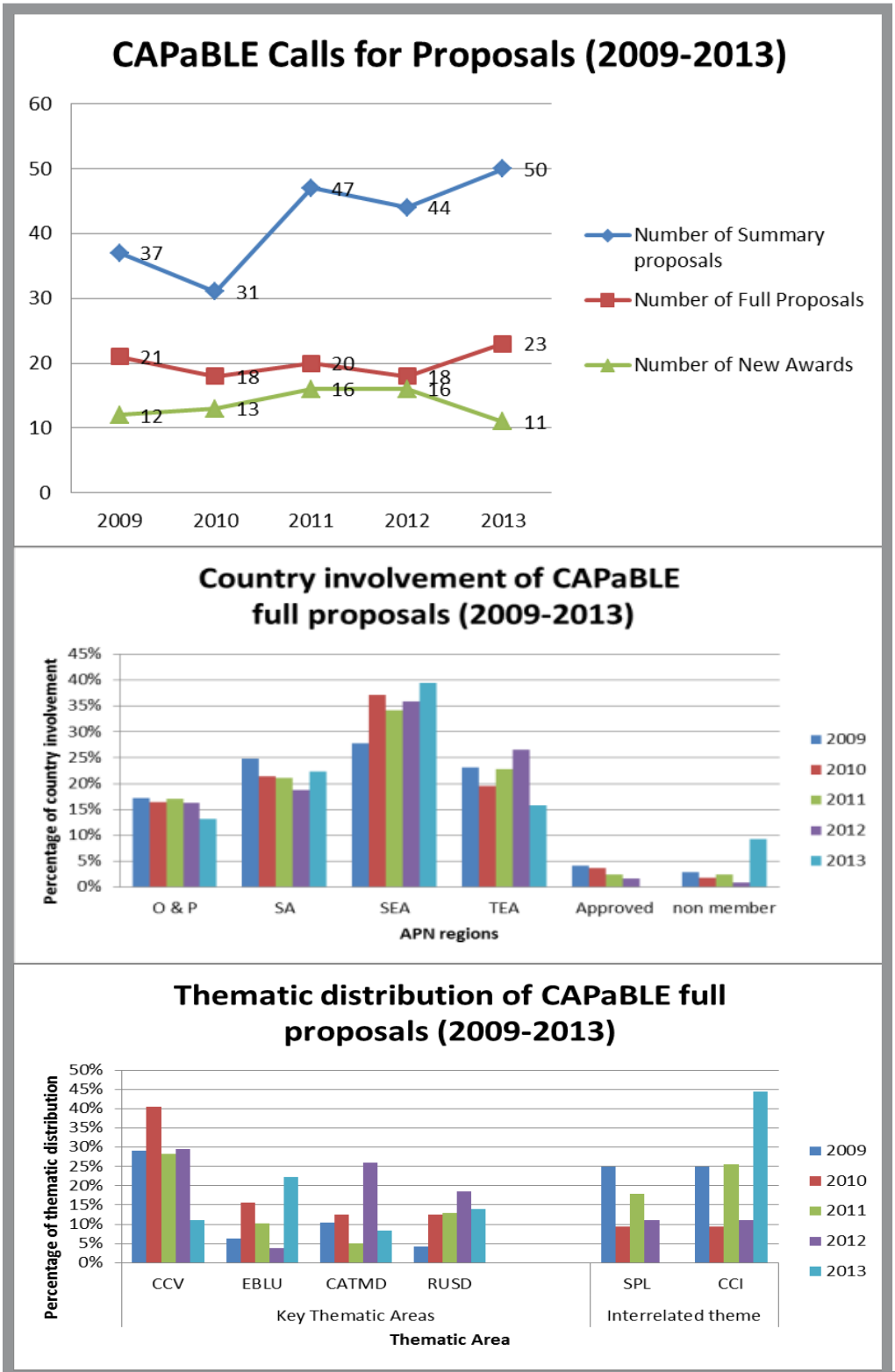
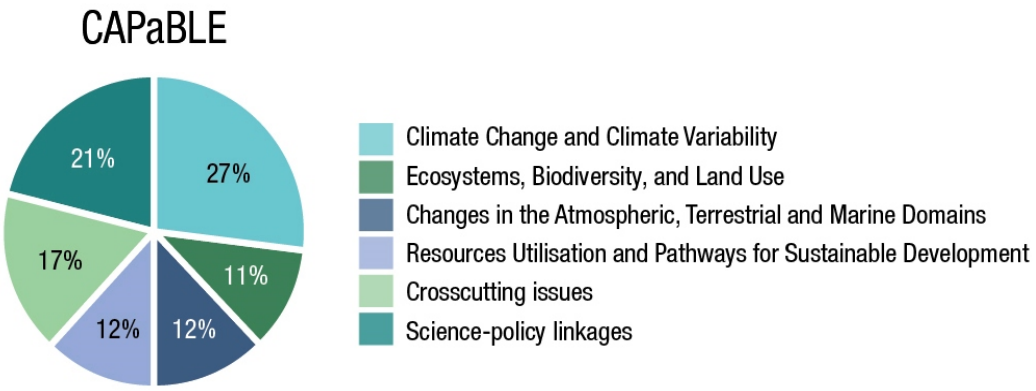
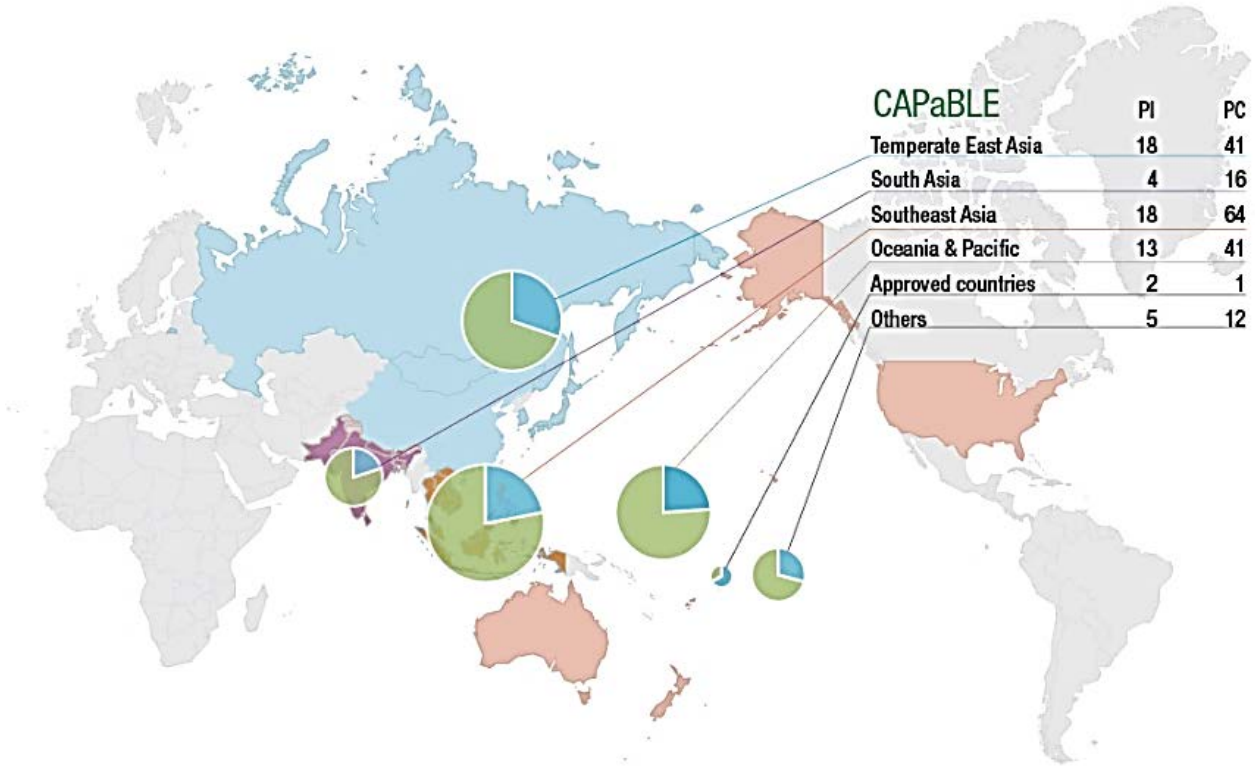


Figure 4:

CAPaBLE Proposals received, awarded, country involvement and thematic distribution

Project Demographics (for projects completed during the 3rd strategic phase)





Regional distribution of Project Leaders (PL) and Project Collaborators (PC)

CAPaBLE PROJECT 1:
CLIMATE CHANGE AND VARIABILITY IMPLICATIONS ON BIODIVERSITY YOUTH SCENARIO SIMULATIONS AND ADAPTATION

More information: *http://www.apn-gcr.org/resources/items/show/1633*

Project Reference: CBA2006-05NMY-Aalsbersberg and CBA2007-02CMY-Aalsbersberg
Project Leader: Prof. Bill Aalsbersberg, University of South Pacific, **FIJI**

Project Summary: This project aimed to identify the impacts of climate change on Pacific Islands' biodiversity that can threaten their sources of sustenance, economy and maintaining their tradition and culture. It also aimed to determine how communities can ensure the sustainability of biodiversity, and how community youth can contribute to resource management to ensure sustainability and maintenance of the abundant biodiversity. The project used drama as an innovative tool to raise public awareness and undertake adaptation implementation as a basic step to increase community and environment resilience and ensure food security and sustainable livelihoods. As a result, coastal and marine rehabilitation and protection, waste management and food security and agriculture were highlighted and implemented as adaptation measures for climate change and sustainability of biodiversity. Enhancement of awareness on climate change and variability impacts on sustainable biodiversity and practical applications of soft measure adaptation practices were highlighted and implemented with youth contribution.

Activities

- 4 Drama workshops conducted in Tuvalu, Solomon Islands and Fiji
- 51 climate change theatre performances
- 10 soft measure adaptation activities

Outputs

- 138 youth and 127 people gained knowledge in climate change risk assessment
- Outreach to audiences totalling 9,130

Impacts

- Enhanced awareness of CC&CV impacts on sustainable biodiversity and soft measure adaptation practices
- Tuvalu community identified flooding, drought and tidal waves as major climate change threats to their biodiversity.
- Solomon Islands community identified soil and coastal erosion due to heavy rainfall, storm surges and cyclones as major climate change threats to their biodiversity

WHY IT'S HIGHLIGHTED (STRENGTHS)

- Improved skills of youth and community on climate change risk assessment and adaptation planning.
- Identified coastal and marine rehabilitation and protection, waste management and food security and agriculture as highlighted areas where adaptation measures for climate change and sustainability of biodiversity are needed.
- Effectively reached communities through an innovative way that involved cultural drama.

CAPaBLE PROJECT 2:
ENHANCING THE CLIMATE CHANGE ADAPTATION CAPACITY OF LOCAL GOVERNMENT UNITS AND SCIENTISTS IN THE PHILIPPINES

More information: *http://www.apn-gcr.org/resources/items/show/1646*

Project Reference: CBA2008-09NSY-Peñalba

Project Leader: Dr. Linda Peñalba, College of Public Affairs, University of the Philippines Los Baños, **PHILIPPINES**

Project Summary: This Project aimed to create awareness and develop the capacity of LGUs, communities and regional universities to effectively respond to climate change for sustainable development. Five vulnerable municipalities in four provinces were chosen as study sites namely: Kawit and Rosario, Cavite, Guagua, Pampanga, San Juan, Batangas and Ilagan, Isabela. Hands-on training on vulnerability assessment and climate change adaptation plan preparation were conducted using data from the most vulnerable barangays within the municipalities. Every learning and alliance building opportunities were maximized through participatory research, coaching and interactive discussion about climate change issues. To further amplify the awareness-raising objectives, vulnerability assessment was done through public consultations. Some of the lessons that can be learned from this project are: 1) hands-on and output-oriented training can yield significant tangible results; and 2) project-introduced interventions can be institutionalized and sustained.

Activities

- Climate change awareness raising seminar
- Hands-on training on vulnerability assessment and climate change adaptation plan preparation
- Five mini-workshops to discuss adaptation plan preparation with LGUs
- Six dissemination forums

Outputs

- 61 local governmental representatives are participated
- Share the project outcome at dissemination forums where 555 local people participated
- A booklet on Climate Change and Municipal Level Adaptation Planning and three journal articles were produced

Impacts

- Enhanced vulnerability assessment and climate change adaptation planning skills of LGUs
- Build the partnership between UPLB, other public educational institutions, communities and LGUs towards science-based climate change adaptation planning
- Climate risk management and climate change adaptation plans mainstreamed and integrated into the development plans of the partner LGUs

WHY IT'S HIGHLIGHTED (STRENGTHS)

- High level of local policy makers' participation led to enhanced capacity on vulnerability assessment and climate change adaptation planning.
- Effectively disseminated project outcomes at science, policy and community levels.
- Influenced local level policy makers (Local Government Units) to integrate climate risk management and climate change adaptation plans into annual investment and land-use plans for municipalities.
- Built partnerships among local institutions.

CAPaBLE PROJECT 3:
PROMOTING SUSTAINABLE USE OF WASTE BIOMASS IN CAMBODIA, LAO PEOPLE'S DEMOCRATIC REPUBLIC AND THAILAND: COMBINING FOOD SECURITY, BIO-ENERGY AND CLIMATE PROTECTION BENEFITS

More information: *http://www.apn-gcr.org/resources/items/show/1662*

Project Reference: CBA2009-11NMY-Sang-arun & CBA2010-01CMY-Sang-arun
Project Leader: Dr. Janya Sang-arun, Institute for Global Environmental, **JAPAN**

Project Summary: This project's aims were to promote the use of waste biomass for food and energy production, and identify viable approaches for utilizing biomass conversion technology in Cambodia, Lao PDR, and Thailand. Based on the project's reviews and surveys, composting and biogas generation were found to be viable technologies for converting waste biomass to a useful resource. The project developed country-specific guides for technology selection and implementation of urban organic waste utilization projects in the 3 countries. The guides were translated into local language: Khmer, Laotian and Thai and distributed to participants at respective national-based workshops. Other potential donors were identified to implement the pilot projects in selected cities and continue the training on GHG calculation at the national level in Cambodia and Thailand.

Activities

- Analysed waste composition in four major cities in Cambodia and Lao PDR
- Surveyed the current status of municipal solid waste management and organic waste utilization in Cambodia, Lao PDR and Thailand
- Conducted a pilot experiment on organic waste utilization for energy purpose
- Conducted 3 national capacity building workshops

Outputs

- Composting and anaerobic digestion are identified as the most promising technologies in the studied countries
- Developed country-specific guides for technology selection and implementation of urban organic waste utilisation for food production, energy use, and climate change mitigation
- 256 participants attended the capacity development workshops
- Produced a jounral article

Impacts

- Identified that urban organic waste utilization project could largely contribute to improved solid waste management, increase food and energy security, reducing the potential health hazards, and creating job opportunities in Cambodia, Lao PDR, and Thailand
- Share the guiding document with national governments of Cambodia and Lao PDR and influence to implement the project at city level
- Participants understood the linkage between waste management and climate change and also the benefits of waste management
- Identified other financial resources to continue project activities in other cities

WHY IT'S HIGHLIGHTED (STRENGTHS)

- A detailed country level analysis and result comparison among the participating countries.
- Closer collaboration between national, local policy makers and municipal staff from project implementation stage.
- Produced local language guides and distributed among local government officials.
- Identified potential donors to continue project activities in other cities.

CAPaBLE PROJECT 4:
NATIONAL DIALOGUES ON ADAPTING BIODIVERSITY MANAGEMENT TO CLIMATE CHANGE

More information: *http://www.apn-gcr.org/resources/items/show/1683*

Project Reference: CBA2011-05NSY-Schang
Project Leader: Dr. Scott Schang, Environmental Law Institute, **USA**

Project Summary: This project sought to build national capacity in Viet Nam and Bhutan to make biodiversity laws, policies, and management more adaptable to climate change. A National Dialogue was organized in each country to bring together 91 participants including scientists, policymakers, academics, resource managers, and civil society groups to identify climate change impacts, prioritize biodiversity adaptation needs, and discuss steps for developing and implementing a plan of action. Five representatives of each country attended both national workshops, in order to facilitate regional exchange and cooperation around climate change adaptation measures. The Dialogues were guided by two publications on climate change adaptation released by Environmental Law Institute, USA. Each National Dialogue helped build the capacity of scientists, resource managers, academics, and civil society members to understand and begin to apply the concepts of adaptive management to biodiversity protection, management, and sustainable use.

Activities

- Two National level workshops /dialouge in Viet Nam and Bhutan

Outputs

- 91 stakeholders from scientific and academic institutions, government agencies and ministries, and nongovernment organizations were trained at the National Dialogues
- Produced a list of priorities and needs for using and strengthening national and local biodiversity management systems to respond to climate change
- Established a template for similar workshops in other countries, especially in Asia

Impacts

- Build the capacity of scientists, resource managers, academics, and civil society members to understand and begin to apply the concepts of adaptive management to biodiversity protection, management, and sustainable use
- Fostered stronger, more institutionalized relationships between scientists and policymakers, and helped build a national "community of practice" to eventually educate others about the nexus of climate change and biodiversity management and the role of ecosystem-based adaptive management.
- Strengthen the understanding of policymakers of the status and priority areas for reform in existing legal and policy frameworks

WHY IT'S HIGHLIGHTED (STRENGTHS)

- Effective knowledge and skill transfer activity using developed country's capacity and knowledge
- Identify correct audience who are engaged in improving national level policies
- Effective use of available data and resources
- Stronger co-financing mechanism

CAPaBLE PROJECT 5:
DRYLAND DEVELOPMENT PARADIGM (DDP) APPLICATION FOR MOST VULNERABLE TO CLIMATE & LAND USE CHANGE OF PASTORAL SYSTEMS IN SOUTHERN KHANGAI MOUNTAINS OF MONGOLIA

More Information: *http://www.apn-gcr.org/resources/items/show/1663*

Project Reference: CBA2009-12NMY-Togtohyn and CBA2010-02CMY-Togtohyn

Project leader: Dr. Chuluun Togtohyn, Institute for Dryland Sustainability (IDS), National University of Mongolia, **MONGOLIA**

Project Summary: The project objectives was to develop policy framework for sustainable development of Dryland in the Tuin and the Baidrag river basins of Bayanhongor aimag, located in the Southern Khangai Mountains, in order to increase its adaptive capacity and resilience to climate change. The project has conducted Dryland Development Paradigm (DDP) for analysis of pastoral social-ecological systems in the Tuin and Baidrag river basins. Ecological vulnerability (drought, stocking rate relative to carrying capacity) and social vulnerability (livestock number per capita, distance to the market, livestock loss during zud) assessment trends showed that social-ecological vulnerability has increased in the desert-steppe region, compared to other ecological zones in Mongolia. Results indicate that the desert-steppe region is becoming more vulnerable to climate change, land-use change and transition in market economies. In coping with greater socio-ecological vulnerability due to both climate-related disasters and market forces in Mongolia, project identified the need of adaptive policy regulation and innovative solutions.

Activities

- Dryland Development Paradigm (DDP) for analysis of pastoral social-ecological systems in the *Tuin* and *Baidrag* river basins
- Conducted social surveys
- Held community and regional level workshops
- Conducted participatory workshops

Outputs

- Eight key implications for research, management and policy implementation for the *Tuin* and *Baidrag* river basin social ecological systems were identified
- Developed management plan of social-ecological system of *Tuin* river basin (2010-2015)
- Identify adaptation options of the *Baidrag* river basin
- Produced adaptation based-new proposal on administrative-territorial division
- Produced 21 publications based on project outcome

Impacts

- Study has concluded that social-ecological vulnerability have increased in desert steppe region compared to other ecological zones.
- Identified importance of local knowledge in achieving sustainable development in the *Tuin* and the *Baidrag* river basin.
- Project outcomes have used to creating a *Tuin* river basin sustainable management plan
- Shared the project outcome with international community through more than 20 national, regional, and international events

WHY IT'S HIGHLIGHTED (STRENGTHS)

- Stronger community level involvement
- Effective use of traditional knowledge
- Identified future research gaps and policy needs
- Developed stronger partnerships with *Tuin* River Basin Consul and produced *Tuin* river basin sustainable management plan

CAPaBLE PROJECT 6:
DEVELOPING THE CAPACITY FOR TEACHING BIODIVERSITY AND CONSERVATION IN THE ASIA-PACIFIC REGION

More information: *http://www.apn-gcr.org/resources/items/show/1664*

Project Reference: CBA2010-03NSY-Indrawan
Project leader: Dr. Mochamad Indrawan, University of Indonesia, **INDONESIA**

Project Summary: The project aim was to develop the capacity to conduct research on environmental issues and to teach advanced courses in related to environmental resource management in the Asia Pacific Region. A training programme was conducted during summer 2010 involving young scientists from 11 countries. The training consists of three workshops: Experimental Design & Data Analysis (6 days), Scientific Paper Writing (1 day), and Field course on Biodiversity, Conservation and Sustainable Development (6 weeks). Considering sustainability of the training programme a website was developed that serves to advertise programme activities and handle the application process. The project established stronger partnerships between potential donors and institutions to continue its activities. Through this partnership, the training programme has successfully continuing it activities up to present (July 2014).

Activities

- Six day workshops on Experimental Design & Data Analysis
- One day workshop on Scientific Paper Writing
- Six week field course on Biodiversity, Conservation and Sustainable Development
- Established a program website and alumni forum

Outputs-

- Provided training for young scientists from 11 countries (Experimental Design & Data Analysis -29 participants , Scientific Paper Writing-32 participants, and field course-20 participants)
- Established a website for future management of the program (www.pfs-tropasia.org) and a web-based alumni network
- Developed partnership with World Agroforestry Institute (ICRAF) and the Center for International Forestry Research (CIFOR)
- University of Gajah Mada signed an MOU with the Ministry of Forestry Indonesia to collaborate in running research activities and training courses at Alas Purwo.
- Four scholarships to attend the international meeting

Impacts

- Increased the capacity of participants on biological field research, data analysis and environmental resource management
- Increased the capacity of institutions in regional developing countries to conduct research on environmental issues
- Established partnerships with potential partners to continue the training program in the region

WHY IT'S HIGHLIGHTED (STRENGTHS)

- Sustainability of training programme
- Additional partners and donors identified to continue the training programme
- Effective use of APN funds and local resources
- Attracted local media attention and disseminated the project outcomes to general public

CAPaBLE PROJECT 7:
WEB-BASED 'DISCUSSION-SUPPORT' AGRICULTURAL-CLIMATE INFORMATION FOR REGIONAL INDIA

More information: *http://www.apn-gcr.org/resources/items/show/1668*

Project Reference: CBA2010-07NSY-Stone
Project leader: Prof. Roger Stone, University of Southern Queensland, **AUSTRALIA**
Project Summary: This project investigated and developed an innovative approach to the delivery of climate risk information for farmers in Andhra Pradesh. To capture the needs of the farmer/users and extension specialists, the project conducted "expert participation" workshops and "farmer-oriented workshops". Following these workshops, three '2nd Life' videos were produced that captured farmer decisions in addition to actual climate forecasts relevant for the needs of the farmers. The project demonstrated that it is possible to provide video productions of discussion environments that contain real-world decisions and climate forecasts in real time. It is also suggested that in developing new technology to deliver climate forecasting and associated outputs for farmers, social aspects in relation to farmer discussions, as well as delivering the core climate science output, must be addressed.

Activities

- Expert participation workshops and meetings
- Farmer-oriented and user-driven workshops
- Farm field walks
- Video production activities

Output

- Produced three 'Avatar' videos (in Telugu, Hindi and English languages), which discussed real-life farming situation in Andhra Pradesh, the relevance of climate forecasts on offer and what action the farmers may consider
- Distributed the videos through local television media
- Based on feedback obtained at farmer workshops, the 'eLearning' web-based portal team set about developing the pilot customizable, web-based climate 'discussion-support' portal.

Impact

- Project demonstrated innovative education approaches (such as video series that developed under the project) can provide effective means of enhancing discussion-support in relation to climate variability, climate forecasting and real-world farmer decisions.
- Enhanced opportunity for farmers and advisors to gain ownership of climate forecast information relevant to real farming practices in India
- Outcome led to a 3-year research project on developing web-based "discussion-support" agricultural climate information tools for the Australian sugar cane farming industry and evaluating their role in supporting enhanced climate risk management.

WHY IT'S HIGHLIGHTED (STRENGTHS)

- Improve the understanding and level of awareness of the farmers on climate forecast information and its benefit.
- Effective use of international and local experts' knowledge.
- Identify key aspects that must consider when applying new technologies to deliver climate forecasting and associated outputs to farmers.

CAPaBLE PROJECT 8:
GRADUATE CONFERENCE ON CLIMATE CHANGE AND PEOPLE

More information: *http://www.apn-gcr.org/resources/items/show/1673*

Project Reference: CBA2010-12NSY-Pradhananga
Project Leader: Mr. Dhiraj Pradhananga, The Small Earth Nepal (SEN), **NEPAL**
Project Summary: International Graduate Conference on Climate Change and People was organized in Kathmandu, Nepal from 15 to 19 November 2010. At the conference, 17 experts from fields as diverse as biodiversity, water resources, climate change science, natural hazards, anthropology, biogeography, policy, equity, and ethics shared their experiences and opinions with 117 representing from 15 counties of Asia Pacific region. The conference focused on multidisciplinary capacity building of graduate students and encouraged participants to engage actively in the lecture sessions, interacting with experts, in group discussions, in panel discussions, and in the formation of a network for communicating with one another beyond the conference on climate change issues. The technical sessions of the conference provided an opportunity for graduate and undergraduate students to gain first-hand experience on how to deal with global change issues on national and international levels and, in addition, it provided a platform for the graduate students' voices and ideas to be expressed and heard.

Activity
- Five days International Graduate Conference

Output
- 117 participants from 15 counties of Asia Pacific region were participated
- Shares of knowledge and experiences among students and experts
- Build a network among scientists, researchers and the students
- Published a declaration and shared in the 16th COP meeting at Cancun, Mexico.
- Established Eco Generation Network

Impact
- Initiate Highland to Ocean project (H2O)
- Create Bangladesh Youth Empowerment Society (BYES)
- Sensitizing the participants about the climate change issues
- Build the organizational capabilities on project management and successfully implement three APN funded projects

WHY IT'S HIGHLIGHTED (STRENGTHS)
- High level of youth participation
- Built strong networks among participants
- Organizational capacity development on project development and management
- Significantly advanced the careers of two young researchers – one from Cambodia and one from Nepal

CAPaBLE PROJECT 9:
GLOBAL CHANGE AND CORAL REEF MANAGEMENT CAPACITY IN THE PACIFIC: ENGAGING SCIENTISTS AND POLICY MAKERS IN FIJI, SAMOA, TUVALU AND TONGA

More information: *http://www.apn-gcr.org/resources/items/show/1673*

Project Reference: CBA2010-15NSY-South

Project Leader: Prof G. Robin South, Institute of Marine Resources, University of the South Pacific, **FIJI**

Project Summary: Integrating global change into policies across various national government sectors, and then translating this into actions that lead to sustainable management of coastal ecosystems is an enormous challenge. Under this project the above challenge was addressed through face-to-face dialogue between coral reef experts and government personnel responsible for coral reef management policies in pacific Island countries. Four successful workshops on Climate Change Adaptation were held in June to August 2010. One hundred and thirty senior officials from Fiji, Samoa, Tonga and Tuvalu were participated. For each country, a national dossier was developed and it included a series of issues (including gaps) pertinent to each country, which were used in the development of national coral reef plans. Countries were re-visited to review progress on established plans. Although progress varied in the four countries, it was evident that collaboration between relevant government departments needed to be improved and that there was a need for the establishment and implementation of management systems that will be on going and self-financing given the resources available.

Activities

- Four workshops on Climate Change Adaptation
- Project progress review visit (after 8 months of workshop)
- Literature review

Outputs

- 130 senior officials from Fiji, Samoa, Tonga and Tuvalu were participated
- Identified common and recurrent themes in target countries related to coral reef and climate change issues and policies
- Make recommendations on the four themes (fisheries, marine managed areas, global change and multi-sectoral, multi stakeholder consultations) in Fiji, Samoa, Tonga and Tuvalu
- Identified challenges surrounding coral reef conservation and management
- Workshop report and four national coral reef action plans were formulated

Impacts

- Identified priority actions for coral reef management
- Governments recognize the need for integrated planning on addressing coral reef management
- Samoa and Tuvalu were requested technical assistance in development of national ocean policies

WHY IT'S HIGHLIGHTED (STRENGTHS)

- Engaged senior government and civil society representatives from four participating countries
- Detailed analysis of current and future research and policy needs, as well as challenges in coral reef management and policy implementation
- Identified clear future directions for effective coral reef management
- Conducted an assessment to measure the progress of workshops

CAPaBLE PROJECT 10:
CLIMATE CHANGE INTEGRATED EDUCATION MODEL: BUILDING ADAPTIVE CAPACITY FOR THE NEXT GENERATION (MALAYSIA, INDONESIA, THAILAND, PHILIPPINES AND LAO PDR)

More information: *http://www.apn-gcr.org/resources/items/show/1687*

Project Reference: CBA2011-09NSY-Aligaen
Project leader: Mr. Julito C. Aligaen, Southeast Asian Ministers of Education Organization Regional Education Center for Science and Math (SEAMEO RECSAM), **MALAYSIA**

Project Summary: This project on Climate Change Integrated Education was aimed to integrate climate change issues across learning areas in the basic education curriculum with the end goal of learners studying and solving real world issues, informing and developing them to be responsible enough to manage their own future without compromising the sustainability of the earth's resources. The project conducted two series of workshops and 17 school-based learning projects involving 161 teachers, educators, and curriculum specialists. The project designed a learning curriculum to present real world issues (i.e. climate change issues) to learners in real context not only in the classroom but outside the classroom as well.

Activities

- Two series of workshops (total 10 national level workshops) in Malaysia, Indonesia, Philippines, Lao PDR and Thailand
- 17 School -Based Learning Projects (SBLP) were conducted

Outputs

- 161 teachers, educators and curriculum specialists from 22 secondary schools from 5 participating countries were involved
- Developed 22 school -based learning project proposals and implemented 17 projects (Malaysia (4), Indonesia (4), Philippines (3), Thailand (3) and Lao PDR (3).
- Identified and introduced two concepts; "Sustainability Science: an Organic Approach" and "Not Enough Time to Carry out Authentic Learning: The Economic Perspective of Learning"
- Discovered four core competencies or skills that are needed to carry out lifelong learning process (communication skills, collaboration skills, problem solving skills and dialogue and negotiation skills

Impacts

- Provided an innovative learning approach to secondary schools student
- Educated the young people and improved their scientific literacy
- Real-life learning approach provided and helpd to shape the students' perspective on accountability of their lifestyles and learning in the context of sustainability
- Developed capacity of teachers and curriculum specialists to develop and conduct school based projects
- Identified importance of Integrating of climate change issues into or across the school curriculum

WHY IT'S HIGHLIGHTED (STRENGTHS)

- Developed a high level of awareness among secondary school students on climate change issues
- Improved capacity of teachers and curriculum specialists to apply integrated learning approaches to develop and conduct school-based projects
- Strong regional collaboration
- Conducted a progress assessment of 17 School-Based Learning Projects (SBLP)

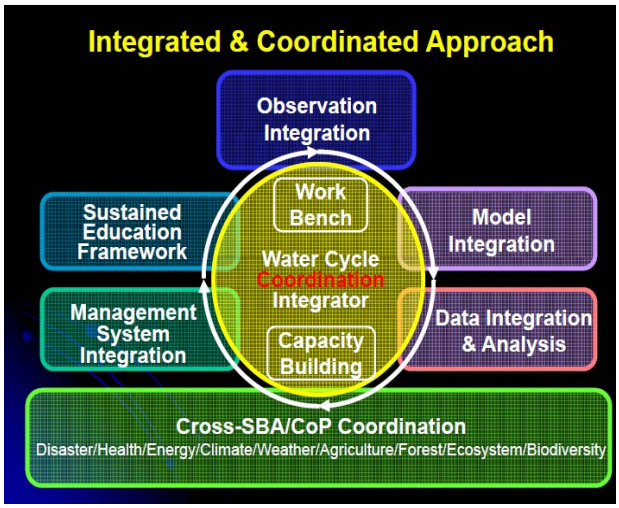
The Asia water Cycle Initiative (AWCI)

The Global Environment Observation System of Systems (GEOSS) identified nine societal benefit areas. One of these is "improving water resources management through better understanding of the water cycle". The Asian Water Cycle Initiative (AWCI) is a featured initiative of GEOSS. GEOSS/AWCI is a cooperative regional contribution to this societal-benefit area. AWCI has developed an information system of systems for promoting the implementation of Integrated Water Resources Management (IWRM) through data integration and sharing and improvement of understanding and prediction of water cycle variation as a basis for sound decision-making of national water policies and management strategies. The goal of AWCI is to better understand the mechanism of variability in the Asian water cycle and to improve its predictability. Furthermore, AWCI interprets information applicable to various water environments in different countries in Asia to help to mitigate water-related disasters and promote the efficient use of water resources. The APN has formed a strategic alliance with this initiative and supports a number of projects under its core programmes of ARCP and CAPaBLE, as a contribution to GEOSS. Some of the outputs to date are featured on page 53.

FUTURE KEY STRATEGY: Strategic discussions are needed on APN's future not only with AWCI but with GEO and GEOSS as well. Are annual reports to the Asia-Pacific GEOSS community sufficient, for example? Or should the APN be considering strengthening its partnerships further with GEO. While many of the outputs of the AWCI are excellent and have been a very good investment for the APN, the AWCI could do more to acknowledge partnership and monetary contributions from the APN, particularly in its peer-reviewed publications where APN is not acknowledged in the papers published.

ASIAN WATER CYCLE INITIATIVE (AWCI) A REGIONAL COOPERATIVE FRAMEWORK

The Asian Water Cycle Initiative was established in 2005 to address the water-related issues in Asia under the framework of GEOSS. It consists of 20 member counties in Asia including 19 APN member countries. AWCI conducts various activities such as establishment of a regional cooperative framework, implementation of national river basin demonstration projects, developing database and models, and conduct of training workshops to develop capacity of Asian researchers, practitioners and administrative & local government officials. AWCI has benefited from APN financial support for more than eight years through nine projects including five regional research (ARCP) and four capacity development activities (CAPaBLE).



AWCI Implementation design

APN has contributed US$ 733,193 for AWCI research and capacity development activities. Six APN funded AWCI projects have completed their activities during the third strategic phrase. Based on outcome of the AWCI projects, it shows great success throughout years as regional cooperative framework for monitoring and predicting water related disasters and promoting efficient use of water resources. Under the APN funded AWCI projects, the following outcomes directly supported water-related regional issues in Asia:

- Analysed a historical climate and hydrology trend using Mann-Kendall test over Asia including AWCI 18 countries.
- Proposed a numerical model for a drought early warning system, called the Water and Energy Budget-based Distributed Hydrological Model (WEB-DHM).
- Developed advanced tools and methods to enable climate change impact assessments on water cycle in basins in Asia
- Developed and/or validated various technologies and their uses for sustainable flood risk management in Asia
- Developed detailed hydrological models in four river basins the Tone River (Japan), Meghna River (Bangladesh), Pampanga River (Philippines), and Huong River (Viet Nam).
- Completed collection of in-situ data from the 18 AWCI demonstration basins and archiving in the Data Integration and Analysis System (DIAS). DIAS is an essential tool enabling the advanced research studies and activities focusing on effective transformation of observation information and scientific knowledge into information relevant for local water resources and risk management.

AWCI has conducted several training courses and workshops under AWCI capacity development initiatives, two of which were supported by APN during the 3rd strategic phase. Capacity was developed on how to use the global model precipitation for future climate projections to assess climate change impacts on basin hydrological regimes and conduct climate change assessments for adaptation options.

AWCI annually conducts International Coordination Group (ICG) meetings of participating countries, experts, and universities, to plan GEOSS/AWCI activities. These meetings help members to share information for cooperative activities, advanced technologies and other innovative practices which help to develop policy options for effective flood disaster risk reduction in Asia. These meetings have developed human connections, which has significantly strengthened cooperative collaboration on regional water issues. AWCI directly contributes to the GEOSS (water societal benefit) and, in collaboration with UNU and JAXA, AWCI has developed module-based capacity building programmes.

b) Focused Activities and Frameworks

As mentioned in Chapter 1, the APN has invested significant funds on focused activities. This has arisen from the interest of the APN's main stakeholder, Japan, to undertake activities at the international level with funds it has set aside for topics of specific interest. In the Third Strategic Phase in 2009 and 2010, the APN had 3 special calls for focused activities in the areas of:

- *Scientific Capacity Building for Climate Impact and Vulnerability Assessments (SCBCIA),*
- *Ecosystems, Biodiversity and Land Use (EBLU), and*
- *Resources Utilisation and Pathways for Sustainable Development (RUSD).*

Of these activities, 7 projects were awarded under SCBCIA, 4 for EBLU and 2 for RUSD. SCBCIA has been completed and a synthesis of the activities were summed in a policy brief and presented at the Rio+20 Summit in Rio de Janeiro in 2012. At the time of writing, the EBLU and RUSD activities are not yet complete and therefore not discussed in detail in the present report.

Scientific Capacity Building for Climate Impact and Vulnerability Assessments (SCBCIA)
Responding to the IPCC AR4 who notes, in terms of the distribution of impacts and vulnerabilities to climate change, there are sharp differences across regions, and those in the weakest economic position are often the most vulnerable to climate change and the risks it presents. Many countries lack the scientific capacity to be able to conduct crucial impact and vulnerability assessments in order to make informed decisions on how best to reduce the risks associated with climate change. In this context, the APN launched a Special Call for Proposals for **Scientific Capacity Building for Climate Impact and Vulnerability Assessments (SCBCIA)** in September 2009 to address the urgent scientific capacity needs of developing countries in the Asia-Pacific region that are particularly vulnerable to the adverse effects of climate change.

i. **82** Expressions of Interest (EOIs) were received. **34** were deemed adequate for review having met the basic eligibility criteria and, following review, **12** proponents were invited to submit full proposals; from which **9** full proposals were received.
ii. Proposals were received from Thailand, Viet Nam, China, Indonesia, Pakistan
iii. **7** projects were awarded and are listed in **Appendix 2** (Project Sets 113-119)

Of the seven projects, one was a regional-based project (mega-cities in Asia) and six were one-country activities. The countries engaged were Australia, China, India, Indonesia, Japan, Malaysia, Nepal, Pakistan, Philippines, Thailand, USA and Viet Nam, with the developed country collaborators providing their expertise.

While all activities had a number of outputs and impacts by way of APN's goals, one project led by Philippines is considered an outstanding project and more details are on pp55.

In addition, at the time of writing, the APN is conducting fourteen projects under its Climate Adaptation Framework, seven projects under its Low Carbon Initiatives Framework. The results and impacts of these activities will be reported in the next strategic phase report.

CAPACITY DEVELOPMENT ON INTEGRATION OF SCIENCE AND LOCAL KNOWLEDGE FOR CLIMATE CHANGE IMPACTS AND VULNERABILITY ASSESSMENTS

More information: *http://www.apn-gcr.org/resources/items/show/1699*

Project Reference: CIA2009-02-Pulhin

Project Leader: Dr. Juan Pulhin, Department of Forestry and Forest Governance, College of Forestry and Natural Resource, University of the Philippines Los Baños, **Philippines**

Countries engaged: Philippines, New Zealand

Project Summary: Water-related risks are attributed not only to escalating global and local changes, but to a high extent to failures in good The reality of climate change calls for a need to understand how it might affect a range of natural and social systems, and to identify and evaluate options to respond to these effects. The capacity, however, to conduct vulnerability and adaptation assessments in the Philippines is still limited, particularly with gaps in downscaling simulated scenarios and mainstreaming research findings into decision-making. The APN project trained key stakeholders from the Local Government Unit (LGU) in Albay on impacts, vulnerability and adaptation assessments using a computer-based modelling system and participatory approaches. SimCLIM was used and developed for Albay Province (AlbayClim) as an innovative tool for assessing and creating climate change scenarios. This aided in characterizing future risks specific for the province. Case studies were conducted in upland and coastal communities to demonstrate the assessment of impacts, vulnerability and adaptation to climate change and sea level rise. The AlbayClim system was complemented with participatory techniques to solicit knowledge and experiences of the local people. This put into context the source of vulnerability, as well as facilitated mainstreaming adaptive responses.

Activities

- LGU training on modelling vulnerability assessments at the local level
- Assessment conducted with scientists and local government units at the provinical level
- local commmunity training on impacts of climate change and transfer of knowldedge on science and local indigenous knowledge on adaptation
- Foruengaging all stakeholders

Outputs

- Climate model adaptated to local needs
- Media coverage
- Peer reviewed journal articles, with citations in the IPCC AR5
- toolkits and manuals to sustain the activities in the province

Impacts

- partnership created with the Philippine's Climate Change Commission
- created sustained and trusting partnerships between local government units and scientists
- Managed to change the mindset of decision-makers via science that adaptation measures should be a long-term response to climate change as well as an extreme-impact-based responses

WHY IT'S HIGHLIGHTED (STRENGTHS)

- The success of this project was made possible through a strong collaboration and partnership between the implementing scientists and government officials concerned.
- Stressed the need for science and local knowledge to be further integrated for more robust assessments climate change, impacts, vulnerability and adaptation.

c) Ongoing and Completed Activities in General

Since its establishment, the APN has provided awards to 370 projects (**Figure 5**). At the time of writing, the APN completed 107 project sets under its Core Programme activities: **60** for CAPaBLE and **47** for ARCP, **16** projects under focused activities and **11** other activities (**Appendix 2**). In addition, the APN is currently managing **78** ongoing projects under its frameworks, focused activities and core programmes. The graph presented in Figure 4 summarises the number of awards the APN has contracted since the first open call for proposals in 1998. In 16 years, the APN has more than quadrupled the number of activities it is managing from its open calls for proposals. All of the project activities in the present strategic phase can be viewed in the peer-reviewed Science Bulletin that APN publishes annually and these are available at the following links:

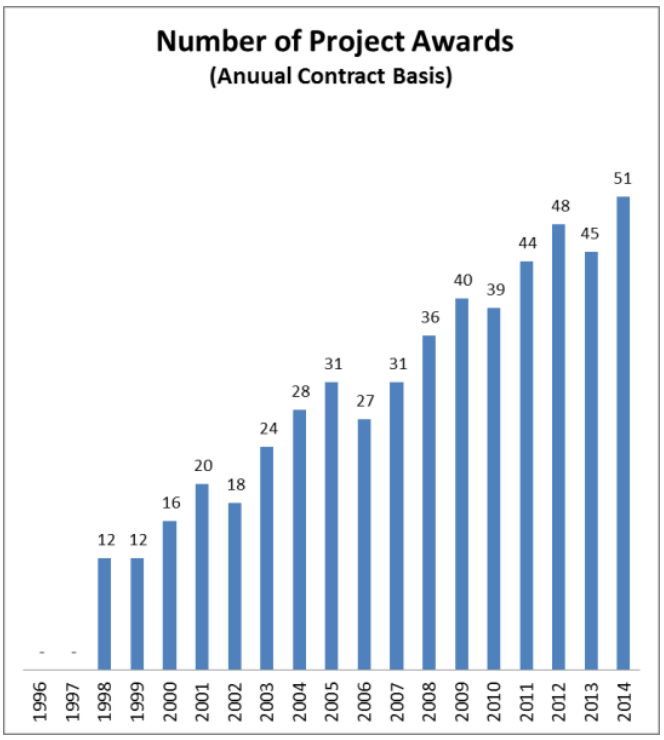


Figure 5: Number of Projects Funded Annually

Asia-Pacific Network for Global Change Research (APN). (2011). APN Science Bulletin Issue 1 March 2011. Retrieved from http://www.apn-gcr.org/resources/items/show/1845

Asia-Pacific Network for Global Change Research (APN). (2012). APN Science Bulletin Issue 2 March 2012. Retrieved from http://www.apn-gcr.org/resources/items/show/1849

Asia-Pacific Network for Global Change Research (APN). (2013). APN Science Bulletin Issue 3 March 2013. Retrieved from http://www.apn-gcr.org/resources/items/show/1879

Asia-Pacific Network for Global Change Research (APN). (2013). APN Science Bulletin Issue 3 (Supplement) September 2013. Retrieved from http://www.apn-gcr.org/resources/items/show/1927

Asia-Pacific Network for Global Change Research (APN). (2014). APN Science Bulletin Issue 4 (March 2014). Retrieved from http://www.apn-gcr.org/resources/items/show/1932

Asia-Pacific Network for Global Change Research (APN). (2015). APN Science Bulletin Issue 4 (March 2015). Retrieved from http://www.apn-gcr.org/resources/items/show/1990

These APN Science Bulletins highlight those APN projects either funded and/or completed in the year of publication The Science Bulletin has four main sections:

- Featured Articles;
- Regional Research Projects funded under the ARCP Programme;
- Scientific Capacity Development Projects funded under the CAPaBLE Programme; and
- Projects funded under the APN's Focused Activities and Frameworks.

The Science Bulletins aim to satisfy readers in both academic and non-academic communities with a keen interest in Global Environmental Change in the Asia-Pacific region.

d) Project-based Science-Policy Linkages

Identified as an important niche of the APN is science-based evidence and underpinning information that might be useful for policy- and decision-making processes. As such, APN is expected to respond to the needs of its member governments and decision-making bodies at all levels, including the general public. The APN has continued to incorporate effective methodologies and procedures in its science thematic areas and has attempted to transfer this knowledge and information to the academic/non-academic (public, civil society, etc.) and decision-making communities.

The APN has strived to achieve a good record of accomplishment of strengthening appropriate science-policy interactions during the third strategic phase. The APN's strategies and responses to those strategies are outlined:

STRATEGY	EVIDENCE-BASED RESPONSES
Strengthen science - policy interactions/linkages for ARCP and CAPaBLE projects funded under the annual Calls for Proposals. In so doing, develop a set of metrics for science - policy interactions/linkages and define specific criteria for successful science - policy linkages.	While there are no specific metrics established, all projects attempted to engage decision-making bodies at various levels. This tended to be more successful at the local and international levels.
Encourage projects to adopt interdisciplinary approaches that include natural, social, and economic and political sciences.	Evident in most regional research activities and there is an increasing trend in conducting interdisciplinary science and engaging stakeholders from the outset of project activities
Increase the number of policy publications, including policy - briefs, synthesis reports and assessments, etc. In so doing, APN will disseminate scientific results to non - science audiences in order for policy - makers, end users and the public to have a better appreciation of global change issues.	Increasing evidence that APN is performing well in this area and policy-relevant publications have been produced for various forums at various levels. Communications have been from local through international levels with some of the local-level briefs being written in local language. What is evident is that there has been greater interaction between science communities and decision-making bodies at all levels, through interactive dialogues and workshops.

a) Project Management

Of the **132** projects completed during the third strategic phase, **107** projects under the Core Programmes were asked to evaluate the performance of the APN Secretariat in managing their projects.

The results indicated below suggest that the Secretariat is doing well in this area, although it seems that the area requiring most attention is E8: Conditions and restrictions on funds from APN (compared to other funders).
As an example, one project quoted, *"…..there is a common notion among partners that more flexibility should be envisaged for modest financial support of researchers and partial coverage of their labour costs, especially in the developing countries where salaries of researchers are low; that would allow additional incentives for joint activities."*

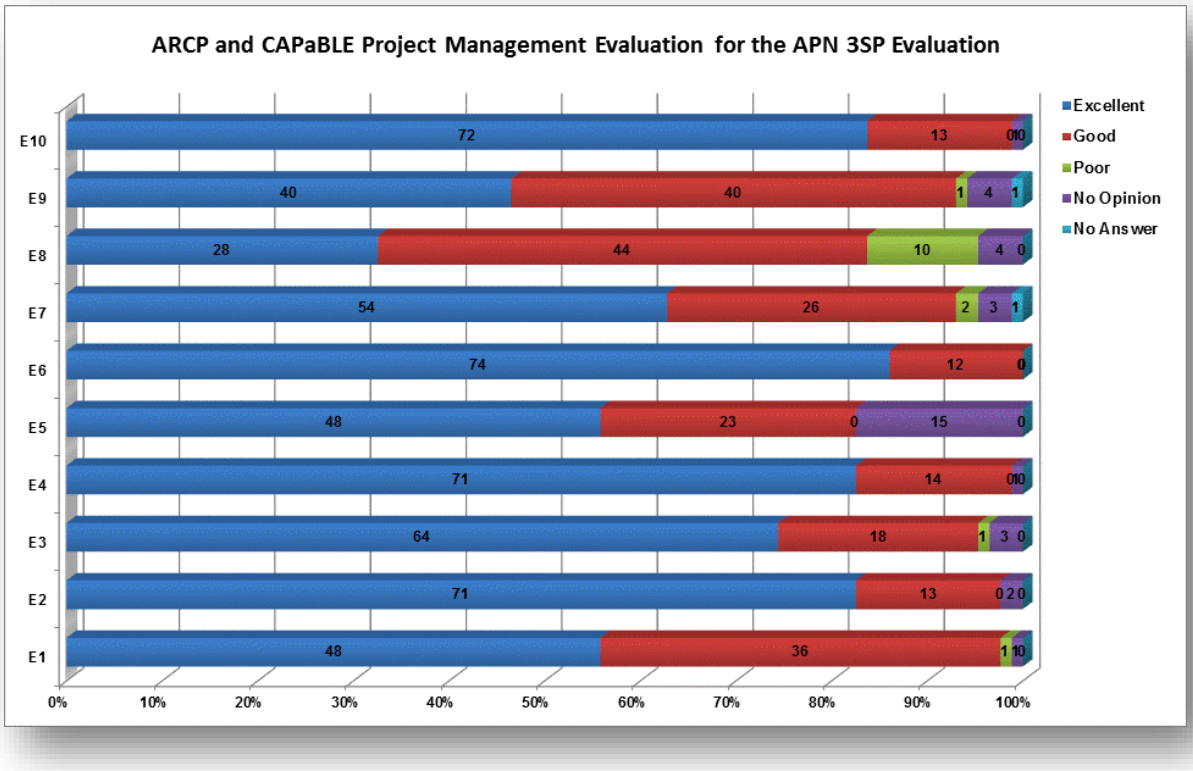


Figure Six: Project Management

Legend:
E1: General ease of the proposals application
E2: Clarity of guidelines and instructions in the proposals application process
E3: Smooth processing of the proposal
E4: Adequate administrative service/ support
E5: Handling of scientific issues and questions relating to your project
E6: Prompt response to inquiries/ request
E7: Timely transfer of funds
E8: Conditions and restrictions on funds from APN (compared to other funders)
E9: Appropriate kinds and reasonable quantity of project deliverables
E10: Overall Project Management Assistance from the Secretariat

b) Climate in Asia and the Pacific: A Synthesis of APN Activities

Work for the Synthesis – Climate in Asia and the Pacific: A Synthesis of APN Activities (the 3rd synthesis to be prepared by the APN in the last decade) began in November 2009 with a scoping workshop followed by an authors' workshop in August 2010. The work entailed summarizing over fifty scientific research and capacity building projects funded by the APN that had a climate-related element – whether natural climate variability and/ or climate change. The contributing authors of synthesis report are leaders in their field and many of them authors of the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCCAR5).

The synthesis was part of the APN's larger aim to contribute, from the science perspective, to the development of policy options for appropriate responses to climate vulnerability and impacts, including adaptation and mitigation, which in turn will contribute to sustainable development. The timing of the synthesis and the resulting publication also led into three major activities of the "Planet Under Pressure: New Knowledge Towards Solutions Conference" and the "Rio+20 United Nations Conference on Sustainable Development," both taking place in the first half of 2012, and the work of the IPCC Fifth Assessment (released in 2013 and d2014).

The synthesis report indicates that, while there is much activity at the global level, there is a great need to intensify investigative research of climate change and climate variability and trends at the regional level, as these are still poorly understood. Consistent socio-economic data collection is needed, as is the need for an interdisciplinary approach to solving complex climate change problems. The increasing frequency and severity of floods, droughts and extreme temperatures requires the use of appropriate indices to improve monitoring and prediction of extreme events. The synthesis is expected to be a useful tool not only for the IPCC, but also for scientists, decision makers and educators as it identifies both research gaps and future research activities for the Asia-Pacific region in the context of natural climate variability and climate change.

Since its publication in 2011, the report has attracted over **10,000** viewers to the APN website and has been downloaded **5,655** times.

Key recommendations:

Human activities and the natural environment of Asia and the Pacific are influenced profoundly by the climate of the region. Food and water security depend vitally on local climate, and they are susceptible to the natural variability of climate and to the trends associated with anthropogenic climate change. ***Investments by APN in projects aimed at improving our understanding of the climate of the region, at assessing the risks to society and nature from climate variability and change, and at raising awareness of these issues to decision-makers and the public are well justified in terms of need and benefits.***

For more than a decade, the APN has supported a range of activities related to the climate of the Asia-Pacific region. The scope of activities has extended from leading-edge research on the climate of the region, to forums for dialogue between scientists and decision-makers, and to public meetings to raise awareness of climate change issues. ***Formal assessments and literature citations have demonstrated that these activities have been effective and of high quality.***

Given the high quality of APN projects and the potential of many to yield longer-term benefits through the provision of marginal resources, there should be an investigation of innovative means to sustain such projects beyond the term of initial APN support. A particular focus should be placed on attempts to employ the strategy of "training trainers," where it must be recognized that trainers need continuous training and support, for example through engagement with local tertiary education institutions.
A key factor in assessing the longer-term impact of research and related activities is the development of indicators of impact that can be used to monitor the benefits of APN and other investments. This issue is internationally recognized as important, yet difficult. ***Strategic planning of APN would benefit by ensuring that it maintains***

close contact with the relevant international developments of indicators on the impact of research and capacity building activities.

Science has benefited over the last century by focusing on the analysis of a problem within its specific discipline. However, the impact of climate across disciplines and societal sectors means that climate activities are essentially multi-disciplinary. It is apparent that modelling provides a mechanism to bring together the complex crosscutting aspects of multi-disciplinary problems. In recent decades, a hierarchy of models has been developed with varying balances of complexity and depth in any one aspect. ***The APN should continue to recognize the benefits of applying appropriate models to assist the integration and synthesis of information in complex systems.***

There is increasing attention to issues associated with adaptation to climate change. Currently, the focus is on assessing vulnerabilities and identifying adaptation options. ***The complexity of adaptation due to the multidisciplinary nature of the solutions required and the lack of long-term data poses a great challenge.*** Approaches that involve communities and local governments to incorporate climate change adaptation practices into development planning will be needed, and IAMs will need to be customized for local to regional and sectoral levels.

Climate change and variability affect almost all sectors of society as well as the natural environment. Food and water security as well as energy efficiency are closely linked to climate on a range of scales. These links mean that ***the effective application of climate knowledge to practical problems of societies across the Asia-Pacific region requires effective dialogue across the traditional boundaries of science, technology and policy.***

The APN has been active in promoting the required dialogues but as climate change continues to impact across our societies these interactions will become more critical. The importance of cross-sectoral interactions is especially clear when the relationship between climate and sustainable development is considered. There must be advancement in the economic status and well-being of developing societies across the Asia-Pacific, while simultaneously recognizing the need to mitigate and adapt to the impacts of climate change and variability. ***The APN has a role to play in promoting research in the region that clarifies the strategies that lead to true sustainable development.***

The Asia-Pacific region has a rich variety of cultures and the APN has been effective in promoting connections and alliances across all of these cultures. This effectiveness comes from recognition of cultural differences and not imposing a monolithic approach. These sensitivities to culture will be especially important as the APN continues to promote exchanges of knowledge on climate-related issues across disciplines and sectors.

The exchange of knowledge is ultimately dependent upon access to and exchange of observed data. The open exchange of climate related data, which extends from traditional records of temperature and rainfall to socio-economic data that quantify the impacts of climate variability and change on societies, benefits all nations by allowing the regional and global scale features of climate to be documented and understood. These larger scale features provide a vital context for interpreting national scale features and trends. The increasing connections between economies and societies provide greater incentives to enhance understanding of larger scale features. ***It is in the interest of all countries of the APN to promote the open exchange of climate-related data.***

The most important aspect of interactions across a region is the human factor. The APN has been effective in promoting innumerable networks of participants in its projects related to climate. These networks have involved scientists from a range of disciplines, urban planners, policy-makers, natural resource managers, farmers and the general public. In addition to establishing such networks, the APN should strive to maintain them beyond the term of specific projects. ***One potential element in the development of sustained networks is through the engagement of young people who can carry their scientific and social networks into the future.***

c) Climate in Asia and the Pacific: Security, Society and Sustainability

Positive feedback following wide distribution of the synthesis report prompted the need, and decision, to complement the report with a book explaining the current status of climate change and climate variability in the Asia-Pacific region; future directions in the area and overarching issues. Immediately following the publication of the Synthesis Report, an authors' workshop for the present book convened in October 2011 kick-starting a gathering and 16-month coordination of the work of 31 authors from broad backgrounds in global environmental change. It was agreed among the authors that the foci of the book be security (food, water and energy); society (urban and remote communities; human health and governance) and sustainability (low carbon development and ecosystem services).

The 16-month project resulted in the book *Climate in Asia and the Pacific: Security, Society and Sustainability* and was published in September 2013 as a latest volume of the Springer series Advances in Global Change Research. According to Springer, the book offers a detailed survey of the current status of climate change and climate variability in the Asia-Pacific region, a thorough and thoughtful assessment of climate and security and clear recommendations on the best paths of climate research in the future. The book:

- *Offers a broad perspective on the impacts of climate change on society in Asia and the Pacific*
- *Explores a many-layered mix of science, economics, politics and sociological concerns*
- *Provides a useful resource for scientists, policy makers and practitioners*

The first chapter of the book addresses a number of key questions that relate to our current understanding of the interactions between climate, natural ecosystems and human communities across Asia and the Pacific. The analysis presented in the subsequent four chapters addresses these questions and provides recommendations for a number of future directions in research needed to better understand and manage the risks associated with climate change and variability in the region. The final chapter summarises the findings presented in the book and provides an overall picture of future needs for climate research in Asia and the Pacific. Finally, the book suggests a number of overarching issues that should be taken into account in future considerations of climate interactions across the region. These are outlined in the following paragraphs.

There are clear trends of increasing temperature in the Asia-Pacific region. There are observed trends in extreme climate events and evidence of changes in large-scale climate systems including the monsoon and the associated Hadley circulation. Modelling the climate of the region provides opportunities for improved understanding and prediction, but there remain challenges especially for mountainous terrain and small islands. Current projections for future climate indicate that existing stresses are likely to be exacerbated.

Urbanization is expected to continue and better understanding of the interactions between climate and urban areas is essential. Further work is needed to improve our understanding of adaptation and mitigation both in urban areas and in small communities. Significant challenges exacerbated by climate variability and change need to be overcome so that future needs for rice and wheat can be met. Management strategies need to be implemented globally so that fisheries will be able to provide necessary food for the region. Local management strategies are also needed to ensure water security.

Regional and international cooperation is providing initial support for integrated assessments that can investigate pathways towards low carbon development (LCD) across the region. Natural ecosystem services support substantial components of economies across the region and new strategies are being developed to enhance the resilience of natural ecosystems impacted by climate change. Natural ecosystems in Asia and the Pacific can contribute significantly to the mitigation of climate change.

Since its publication in October 2013, the report has attracted over **450** viewers to the APN website and has been viewed over **3,000** times on social media.

More details of the book can be found at Asia-Pacific Network for Global Change Research (APN). (2013). *Climate in Asia and the Pacific: Security, Society and Sustainability*. Retrieved from http://www.apn-gcr.org/resources/items/show/1924 or from Springer directly.

d) Strengthening Science-Policy Linkages through Science-Policy Dialogues

In light of the UNFCCC COP17 in Durban (December 2011), Planet under Pressure Conference in London (March 2012) and the Rio+20 Conference in Rio de Janeiro (June 2012), the APN-START Science-Policy Dialogue (SPD) on Challenges of Global Environmental Change in Southeast Asia aimed to promote informed decision-making on actions to reduce global environmental change vulnerability and promote climate adaptation strategies. The SPD, held in Bangkok, Thailand, 19–21 July 2012, was attended by 98 scientists and mid-level policy makers from Southeast Asia, including invited experts on global change science, senior policy makers in the region, and observers from Temperate East Asia and South Asia. Hosted by the Southeast Asia START Regional Center with support from APN and START (through a grant from USGCRP), the three-day dialogue confirmed the need for fostering stronger partnerships between the scientific and policy communities, and the need to incorporate others from the private sector to help shape adaptation strategies. Such sustained partnerships would benefit from a range of science-based policy options for both short- and long-terms.

The SPD was designed to provide scientific input to policy decision-making and promote science-policy interaction through facilitated discussions and participatory game sessions on communicating recent advances in scientific knowledge pertaining to: ecosystem services; climate change vulnerability and impacts; disaster risk reduction and management; and strategies for adaptation. Participants considered implications for the decision- and policy-making communities, informed them of potential actions to reduce vulnerability and promote adaptation, and promote tools for decision-making under uncertainty and multiple stresses.

In the area of implementing programmes suggested by scientists, participants emphasized the importance of having **local champions in the policy sector** who understand the issue and can help implement programmes that matter. In order to get policy makers engaged and understand the methodology used scientists need to convince them through case studies demonstrating meaningful actions. Another suggestion to improve science-policy interface was for scientists to produce **information that can lead to action**. **Social media**, such as Facebook, needs to be incorporated as part of advocacy and awareness raising efforts to get community support. Social media played a major role in disseminating information to the public during the 2011 floods in Thailand.

In trying to build programmes for sustainable ecosystem services, an equally important component is to **build trust** among all those involved. One solution is to combine good local knowledge with scientific knowledge to shape policies. A science-policy interface has to be actively managed, since governance is about who controls what and how such control is exerted. In this context, **science should be brought to local levels** to contribute critical inputs, so decision makers have a diversity of information to choose from to shape policies at the local level. The SPD needs to be aware of new trends in universities, such as in Malaysia where universities are moving into **action-oriented research**.
Management of risks in urban setting requires **innovative urban planning**. Malaysia's SMART Tunnel, which gives way from motor traffic usage to a water transfer channel following periods of heavy precipitation, serves as a good example. Partnerships between the science and policy communities need to be looked at with the aim of **identifying what works and what doesn't**. There is a need to **expand partnerships** to other sectors not only the science community. The development community is one to reach out to. In a follow-up review, participants and organizers discussed the need for sustaining the momentum of these kinds of dialogues as well as other science-policy interactions in the future.

With the success of the Southeast Asia Science-Policy Dialogue and a view to sustaining the momentum, the APN decided to conduct similar dialogues in South Asia (Bhutan, January 2015) in partnership with LoCARNet and CDKN, and a third in Temperate East Asia (2015/16). The results of all three will be discussed in a final synthesis as a Hyogo-based activity in 2016/17. The workshops will synthesise the key outcomes of three Sub-Regional Science-Policy Dialogues. The next APN Sub-regional Science-Policy Dialogue will be held in South Asia (SA-SPD) is the second APN Science-Policy dialogue among the series planned in PAN Asia that will culminate in a synthesis.

e) APN's contributions to international science and policy-related bodies

3RD STRATEGIC PHASE STRATEGY	EVIDENCE-BASED RESPONSES
Continue to empower APN members, who represent their governments, in APN activities, by seeking their guidance on best practices and opportunities to promote science and policy interactions.	This has been realized at the sub-regional level where cooperation in science-based policy results and conducting science-policy dialogues is being realized.
Cooperate with other institutions and bodies (e.g. the global change programmes, Association of Southeast Asian Nations [ASEAN], Intergovernmental Panel on Climate Change [IPCC], United Nations Framework Convention on Climate Change [UNFCCC] and other UN bodies such as the United Nations Environment Programme [UNEP], United Nations Commission for Sustainable Development [UNCSD], and United Nations Education, Scientific and Cultural Organisation [UNESCO], and Subsidiary Body for Scientific and Technological Advice [SBSTA], etc.), who, like the APN, address or face issues relating to science - policy interactions. Provide increasing opportunities for interactions between scientists and policy - makers, and through policy - based workshops where participants include policy - making groups and a cross - section of stakeholders.	This has been realized through funded projects with ASEAN, international dialogues with SBSTA annually, contributions of peer-reviewed papers of projects to the IPCC 5th Assessment report, active participation in regional-based IPCC events in Asia and in the Pacific. **Fifty one (51)** project leaders and APN members authored or reviewed the 5th IPCC Assessment Report. Regular interaction with newly established IPBES The APN continues to engage the global change community through financial support and attending expert meetings and workshops in the development of Future Earth. Joint activities have also been undertaken with DIVERSITAS, IHDP, WCRP, APAN, NOWPAP, IMBER, PAGES, LOICZ, UNU-IAS, UNCSD through Rio+20 engagements. APN continues to be engaged with IGFA and the Belmont Forum and has provided its expertise in the consultative meetings leading up to the formation of the new Future Earth, particularly related to its work in the Asia-Pacific region.

On IPBES: At the second IPBES plenary (Turkey, December 2013) IPBES adopted many important decisions to operationalise the Platform such as conceptual framework, initial work programme and budget 2014-2018 and, importantly for APN, the outcomes of the Asia-Pacific Workshop on Regional Interpretation of the IPBES, 2-4 September 2013, Republic of Korea, which was sponsored by APN and Ministry of Environment of Republic of Korea and organized by UNU and APN, relayed 12 key messages for developing the IPBES framework in regional and sub-regional context. This was well noted by IPBES. IPBES recognises APN as an important partner

for assessments at the regional and sub-regional levels and, at the time of writing, the Director of the Secretariat is participating in an international scoping workshop that will develop the modalities of operation at the regional and sub-regional levels. It is fully expected that APN will be a crucial partner in the assessment process for the Asia-Pacific region.

f) Proposals Development Training WSs (PDTW)/Young scientists career development

Proposal Development Training Workshops (PDTW) has been undertaken by APN since 2008. The initial workshop was proposed at the APN's 13th IGM meeting as a Hyogo funded activity. The primary aims of the workshop was to raise the APN profile among young and early career scientists in the Asia pacific region in an inexpensive manner and also to increase young scientist's capacity to develop a competitive proposal to the APN annual call for proposals programme. The first workshop was held as back to back events with that 8th Environmental Management of Enclosed Coastal Seas (EMECS) Conference in 2008. After the success of the first workshop, APN continues to hold training workshops as a back-to-back event with APN Sub-Regional cooperation meetings and international events. The objectives of the workshop were further developed to empower APN members to share their knowledge on the APN proposal submission process and impart their expertise on writing good proposals in global change research.

Proposal Development Training Workshops (PDTW)

	Event and Venue	Number young scientists trained	Region
1	Proposal-Writing Training Workshop, Shanghai, China 28th October 2008	18	TEA & SA
2	New York, United States of America, 7 May 2009	26	Pacific
3	APN Proposal Development Training Workshop, Makati, Philippines 11-12 November 2010	17	SEA
4	APN Proposals-Writing Training Workshop, Pune, India, 01-02 November 2010	16	SA
5	Proposal Development Training Workshop, Hanoi, Vietnam 25-29 July 2011	15	SEA
6	Proposal Development Training Workshop (SA-PDTW) Paro, Bhutan, 18-19 January 2012	15	SA
7	Southeast Asia Proposal Development Training Workshop (SEA-PDTW) Siem Reap, Cambodia 25-26 October 2012	17	SEA
8	Proposal Development Training Workshop (PDTW) Kathmandu, Nepal, 14-18 January, 2013	15	SA
9	Temperate East Asia Proposal Development Training Workshop (TEA-PDTW) Vladivostok, Russia. 27-28 February 2013	18	TEA
10	South Asia Proposal Development Training Workshop (SA-PDTW) Colombo, Sri Lanka 04-05 October 2013	15	SA
11	Southeast Asia Proposal Development Training Workshop (SEA-PDTW) Kuala Lumpur, Malaysia 28-29 November 2013	14	SEA
12	Southeast Asia Proposal Development Training Workshop, Vientiane, Lao PDR 8-11 July 2014	23	SEA
	Total	**209**	

PDTWs are two-day workshops that consist of two main sessions: learning and hands on experience. Learning session aims to provide an overview of the APN annual call for proposal and its review process together with guideline on summary proposal writing. Hands on experience sessions are designed to develop group proposals with three or four young scientists from different countries with similar areas of expertise forming a research team, and with support from two or three mentors. Up to present, APN has organized 12 PDTWs and trained 209 young scientists in the Asia Pacific region. The workshops have been held in China, United States of America,

India, Philippines, Viet Nam, Bhutan, Cambodia, Nepal, Russia, Sri Lanka, Malaysia and Lao PDR (in date consecutive order). It involved experts from the APN scientific planning group and 18 external experts who were either project leaders or project collaborators in APN funded projects.

Based on questionnaires from 88 trainees, the APN identified successful outcomes of the workshops. One main indicator was through proposals submitted under the core programmes open call for proposals. Eleven proposals submitted by trainees to the APN were successful in receiving funds. Given the highly competitive nature of the calls for proposals process under the Core Programme of the APN, this is considered a good achievement.

Strengths

APN's PDTWs are achieving its four main objectives and has developed the capacity of young/early career scientists on proposal development in Asia Pacific region. The PDTW platform is also an arena that brings young scientists together at the regional level to share their knowledge and experiences across borders. From our observations, trainees have developed long-lasting friendships and networks that may help them find research collaborators for work at the regional/international levels. The PDTW is a tool that successfully addresses regional and transboundary research issues in the Asia Pacific region.

Challenges

Although the workshops received positive feedback from the participants, APN has identified some challenges in terms of workshop organisation, the most challenging of which is identifying suitable candidates to participate. We found that the young scientists' selection process (through national focal point nomination) that most candidates are coming from diverse areas under the global change umbrella. Due to this diversity, the grouping of scientists was difficult. Another factor was late nominations, creating a challenge during the workshop preparation stage. Insufficient donor contributions were also a key limiting factor that limited the number of participants to 15 or 16 for each workshop.

Recommendations

Taking these into consideration, the APN at its 19th IGM agreed to:

- Increase the time allocation for the workshop to three days instead of two days
- Open the proposal development workshop as a competitive call for applications
- Solicit the completion of a pre-workshop questionnaire survey among participants to identify their capabilities and awareness of APN activities
- Allow participants to identify their own groups by implementing online registration forms
- Invite other Regional/National research funding organizations to share information on their research funding opportunities
- Conduct an in depth discussion on general proposal writing tips which is applicable to any funding organization
- Include discussion sessions on:
    - Project implementation and management
    - CAPaBLE Proposal development
    - More in depth discussion on budgeting and timeframe development

g) Mitra Award

Dr. Ashesh Proshad Mitra
(February 21, 1927 – September 3, 2007)

During the 15th IGM in Busan, Republic of Korea, APN introduced a new activity "Networking & Young Scientists Poster Session," with the aim of providing young/early career scientists with an opportunity to share their research work to the APN and the global change scientific and policy communities. Each year, this session is open to young/early career scientists who are undertaking their research in an institutions based in the host country of the IGM. In addition to providing the opportunity to discuss their work, the APN scientific community evaluates the posters presented and selects the best poster among the competitors. The best poster presentation is awarded the "Mitra Award for Scientific Excellence". The Mitra award was created to honour Prof Emeritus Dr. Ashesh Proshad MITRA, a prominent member of the APN and SPG member for India from 1996 to 2007, and who provided excellent scientific advice to the APN, particularly for its Science Agenda.

Poster Presentations

Events	Number of presented poster
15th IGM	18
16th IGM	16
17th IGM	11
18th IGM	14
19th IGM	5
Total	**64**

2010 Mitra Awardee (15th IGM/SPG Meeting)
Winning Scientist: Mr. Woo-Seop Lee, from Kongju National University, Republic of Korea
Presentation Title: Relationship between absorbing aerosols and snow cover/snow water equivalent over the Himalayas and the western Tibetan Plateau during boreal spring"

2011 Mitra Awardee (16th IGM/SPG Meeting)
Winning Scientist: Dr. W.G.D. Lakmini, Faculty of Agriculture, University of Ruhuna, Sri Lanka
Presentation Title: Plant Mediator to Tackle Climate Change

2012 Mitra Awardee (17th IGM/SPG Meeting)
Winning Scientist: Dr. Evi Gusmayanti, Center for Wetlands People and Biodiversity, Universitas Tanjungpura, West Kalimantan Province, Indonesia
Presentation Title: Natural Properties of Carbon Stock in Customary Peat Forest at Danau Sentarum National Park, West Kalimantan, Indonesia Plant Mediator to Tackle Climate Change

2013 Mitra Awardee (18th IGM/SPG Meeting)
Winning Scientist: Joni Jupesta, United Nations University – Institute for Advance Studies, Tokyo, Japan:
Presentation Title: Rio+20 Outcomes into Implementation: Water-Energy-Food Security Nexus in Indonesian Palm Oil

2014 Mitra Awardee (19th IGM/SPG Meeting)
Winning Scientist: Mr. Khon Puthea, Wetlands Work, Cambodia

Presentation Title: Sanitation technology for a safe environment in floating communities in Tonle Sap Lake, Cambodia

CHAPTER III: CONCLUSION

APN AS AN INSTITUTION

APN's function, role and ability to facilitate the implementation of research and capacity development in developing countries and provide holistic approaches linking the natural science of global environment change with socio-economic aspects are key for effective responses. The expansion of the science-policy approaches to other regions may be pertinent and worthwhile by sharing best practices.

Other main areas highlighted during the third strategic phase need to be considered as APN transitions into its fourth Strategic Phase from April 2015.

Some of these are:

- Identifying best practices and global change knowledge and sharing the information with the public, private sector and practitioners;
- Sharing national experiences across borders on what has already been done;
- Considering a second generation of projects that are more complex in nature and larger in scope;
- Protecting the strong uniqueness of APN and the niche it serves in the Asia-Pacific region;
- Enhancing Member Countries' commitment by re-confirming the benefit and potential of being actively engaged in the APN;
- Further strengthening interactions among APN Members, as well as scientists and policy makers, by using mechanisms such as the Sub Regional Cooperation (SRC);
- Strengthening the Co-Financing Partnerships for action-oriented research; and
- Continuing to mobilise funds. In doing so, developed and developing countries need to be involved.

APN'S AGENDA IN SCIENCE, POLICY AND CAPACITY DEVELOPMENT

Most member countries noted in the year of the 3rd strategic planning process (i.e. in 2009) that important topics for the countries in region are climate (particularly adaptation, vulnerability and climate extremes); water, agriculture and food security; capacity building in earth observations (through collaboration with bodies such as the Global Earth Observation System of Systems [GEOSS]); education for sustainable development; integrated global change science and society; the integration of human dimensions in GC research; social and physical aspects of mega-cities; biofuels; air quality and human health; ecosystem degradation and desertification.

This continued into the third strategic phase with topics such as ecosystem services, low carbon initiatives and adaptation standing out in most sectors. Strong partnerships are evident, for example, with GEO and GEOSS through the projects funded by the APN under the AWCI and the annual Asia-Pacific GEOSS symposia, in which APN has spoken at for the past 5 years. Also evident is the increasing interest and strengthening of partnerships in ecosystem services and biodiversity with policy bodies, including such initiatives as REDD+, PES and MRV systems being funded by the APN.

While it is clear that specific research priorities are not going to change or emerge on an annual timescale, the APN has aimed to identify topics that are of concern for the region, and addresses this on an annual basis to ensure dynamism and to facilitate its annual calls for proposals for research and capacity building activities. Setting the context on highlighted topics better illustrates the relevance to the global change community, policy makers and stakeholders.

In the present strategic phase, ***Biodiversity and Ecosystems Services*** and ***Climate Change*** and associated research and capacity development in impacts, vulnerability, adaptation and mitigation has continued to dominate the APN

Science Agenda. These are further promoted through the establishment of the three Frameworks of the APN on Low Carbon Initiatives (strong links here with LoCARNet and Sustainable Development), Ecosystems, Biodiversity and Land Use (following the development of an Opportunity paper, with links to IPBES) and the APN's Climate Adaptation Framework (14 projects currently being undertaken, that address many issues in the policy arena that pertain to adaptation, risk, and loss and damage).

In addition to this, emphasis is increasingly being placed on ***effective pathways and transformations to sustainability***, ***increasing resilience***, **and** ***disaster risk reduction*** as evidenced in the proposals being submitted and projects being undertaken by the APN. The international community is also responding through Rio+20 Summit, Planet Under Pressure, Future Earth and the IPCC as indicated in its 5th Assessment Report.

Interdisciplinary and/or transdisciplinary research is seen as key for policy-relevant research. The third strategic phase saw more engagement of natural and social scientists, more engagement of decision makers and more research activities with an interdisciplinary flavour.

With regard to the challenges faced by APN member countries at the beginning of the strategic phase, the priority needs of members in terms of research and institutional capacity and a qualitative analysis indicated the constraints (or implementation gaps) faced by members, particularly developing country members, in conducting meaningful research in global environmental change.

These included the ***lack of adequate human resources*** (experts, scientists) and ***research tools*** (toolkits) and/or models; applying research and/or ***mainstreaming research into policy processes***; inadequate research facilities (such as laboratory, equipment, etc.); ***training on the use of appropriate methods/analysis; data access/availability***; ***finding suitable international collaborators/appropriate experts***; and ***assistance or training in writing research proposals***.

In particular, in the present strategic phase, APN has kept abreast of emerging topics, particularly those that are significant for the region. These are well documented in the present report and the impacts of the projects conducted under the APN's Core Programmes, Frameworks and Focused Activities can be summarized in numbers:

In the strategic phase covered by this report:

Over **6500** **People**

engaged in scientific research, policy and capacity development

Over **800** **Outputs**

outputs (technical papers, reports, proceedings, toolkits, manuals, etc.)

Over **250** **Scientific Articles**

peer-reviewed papers

Over **69%** **Science-Policy Engagement**

projects engaged with decision makers and practitioners from local to national and regional levels.

RECOMMENDATIONS FOR APN'S 4TH STRATEGIC PLAN

The following recommendations are provided against the goals of the APN:

1. **Supporting regional cooperation in global change research on issues particularly relevant to the region**
   - Strategic discussions are needed in order to confirm the importance of, and our commitment to, the two main pillars of APN's global change activities, i.e. ARCP and CAPaBLE, on the one hand; and the focused activities around the three frameworks, on the other.
   - Develop a more robust funding strategy for Frameworks if they are to play an important role in the APN's future by way of responding to stakeholders' needs.
   - There remain significant gaps in the region that can continue to be addressed by the APN through national and international initiatives.

2. **Strengthening appropriate interactions among scientists and policy makers, and providing scientific input to policy decision making and scientific knowledge to the public**
   - The APN must continue to address the ***extent*** to which it has been effective. This is clear in the scientific outputs of the present strategic phase through the number of peer-reviewed projects, but less clear in terms of capacity building and policy-making. It is clear that capacity building and policy-relevant work is being undertaken by the APN, but more examples of the extent to which these are happening needs to be addressed.
   - APN is encouraged to devise some metrics for successful policy-relevant outputs, although detailed metrics are not realistic.
   - It is important to ensure that the outputs of the work conducted under the frameworks are preserved through synthesis (such as the recent Climate synthesis of the APN in 2011) of what has been learned and provided to policy and decision makers.

3. **Improving the scientific and technical capabilities of nations in the region including the transfer of know-how and technology**
   - Institutional and individual capacity building must continue to take precedence in the region in order for meaningful research to be undertaken by developing countries.

4. **Cooperating with other global change networks and organisations**
   - APN must continue to secure and serve its niche in the region through important partnerships with all stakeholders sectors (including the private sector, foundations, etc.) and empowering its membership by promoting ownership of the APN.
   - APN should follow closely the development in global environmental change at the international level, including that of bodies such as IPCC, IPBES, Future Earth, UN-relevant bodies, ASEAN, SAARC and other sub-regional bodies as well as continue its partnerships with the more conventional GC programmes, including WCRP and START.

ACRONYMS, BOXES, FIGURES AND TABLES

APN	Asia-Pacific Network for Global Change Research
APAN	Asia Pacific Adaptation Network
ARCP	Annual Call for Regional Research Proposals
AWCI	Asia-Water Cycle Initiative
B&ES	Biodiversity and Ecosystems Services Framework
CAF	Climate Adaptation Framework
CAPaBLE	Scientific Capacity Building/Enhancement for Sustainable Development in Developing Countries
CCAFS	Research Program on Climate Change, Agriculture and Food Security
CDC	Capacity Development Committee
CDKN	Climate Development Knowledge Network
EMECS	Environmental Management of Enclosed Coastal Seas
IGBP	International Geosphere-Biosphere Programme
IHDP	International Human Dimensions Programme
IPBES	Intergovernmental Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
IGM	Inter-Governmental Meeting
LCI	Low Carbon Initiatives
LoCARNet	Low Carbon Asia Research Network
nFP	national Focal Point (APN)
Oceania & Pacific:	Australia, New Zealand and Pacific Island Countries
PDTW	Proposal Development Training Workshop
RUSD	Resources Utilisation and Pathways for Sustainable Development
SBSTA	Subsidiary Body for Scientific and Technological Advice
SPG	Scientific Planning Group
SPG-SC	SPG Sub-Committee
SRC	Sub-Regional Committee
SA	South Asia
SAARC	South Asia Association for Regional Cooperation
SEA	Southeast Asia
SC	Steering Committee
SCBCIA	Scientific Capacity Building for Climate Impact and Vulnerability Assessments
TEA	Temperate East Asia
UNCBD	United Nations Convention on Biodiversity
UNFCCC	United Nations Convention on Climate Change

Appendix 1: Sub-Regional Cooperation Evaluation

Appendix 1-1. South Asia Sub-Regional Committee Evaluation Report

Introduction

The formation of Sub-Regional Committees (SRC) were proposed at the 11th Inter-Governmental Meeting (IGM) as a "Liaison Model" with the primary purpose of enhancing the flow of communications within the sub-region through maintaining regular contacts among APN members and project leaders in the region, specifically within the sub-region concerned. The South Asia Sub-Regional Committee (SA-SRC) was initiated during the 14th IGM/SPG meeting held in Kuala Lumpur, Malaysia in March 2009 and at present, it consists of 6 member countries, namely, Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka. Bhutan is the youngest member joining APN following the 15th IGM/SPG meeting in March 2010. The first SA-SRC meeting took place during 27-28 July 2009 in Colombo, Sri Lanka followed by subsequent meetings being held in India, Bhutan, Nepal with the 5th one held in Sri Lanka in October 2013. As one of the goals of APN is to achieve its mission of fostering global change research in the Asia-Pacific region, it is essential to strengthen appropriate interactions among the scientists and policy makers in order to maintain effective communications through enhanced flow of information among the member countries. The Committee also convenes its meetings during the annual IGM/SPG meeting.

Past experiences clearly indicates that Sub-regional cooperation meetings participated by key international organizations have improved the flow of information among members of the APN at the sub-regional level and have strengthened collaboration with key partners.

1. Communications among members and other institutions within the region.

While challenging, it is essential to have effective and workable sub-regional cooperation and communication at the national level between nFPs and SPG members; between nFPs, SPG members and APN project leaders/collaborators (at the national level); among APN member countries in the sub-region and from sub-region to sub-region. Various measures and strategies were proposed which, to some extent, have improved communications at various levels.

Communication among proponents and country members improves when proponents send their proposals to their respective APN members before submitting it to APN. The participation of nFPs and/or SPGs in APN workshops or seminars held in the country has also helped to strengthen the interactions between project leaders and APN members. In addition, towards the end of the project nFPs and SPGs and other relevant institutions are usually invited to learn about project outcomes as well as interact with participants. More needs to be done to strengthen the interaction of nFPs/SPG members with project leaders and potential proponents of project proposals on a continuing basis.

2. Conducting South Asia Science-Policy Dialogue

Except in a few cases, results from APN projects cannot be easily utilised by decision makers and it is a challenge for the scientific community to convey results to policy makers so that they can be useful in decision-making processes. It is essential to understand how scientists convey information to policy makers and how the policy makers use this information. However, such conversation about science in a development context is needed. The level of science and policy interaction needs to be strengthened because there is an inherent weakness, marked by prevailing obstacles. Scientific information is needed to formulate policies that have to be implemented. Scientists need to consider this perspective from the lens of policy makers who are looking for information that offer solutions. At the same time, it is also necessary to understand that people in governments who make decisions on policies are held accountable for those decisions.

Considering these facts Members of South Asia, at its 4th SA-SRC meeting in Kathmandu, Nepal expressed their interest to hold a science-policy dialogue in South Asia so as to have in-person communication among the scientists and policy- decision makers. APN has been instrumental in enhancing research and capacity building in

the Asia-pacific region. The use of these results in the decision- policy-making process has been a great challenge. Understanding the gravity of the problem, APN has already started arrangements for a science-policy dialogue in South Asia.

3. Working remotely as an SA-SRC Committee

The SA-SRC has being effective in working remotely through electronic communication in organising the SRC meetings and PDTW, and identifying suitable young scientists for the PDTWs. The SA-SRC members have also been active in assisting project proponents to find suitable collaborators in the region for proposal development. The advancement of electronic communication technologies can be used effectively to work remotely as much as possible to enhance its activities, and devise and undertake joint projects.

4. Financing with a view to becoming self-sustainable

As a group of developing countries, SA-SRC countries lack financial support for travel to SRC meetings and, therefore, depend on the APN for financial support. However, there has been in-kind contribution to support some activities during the meetings. The SA-SRC felt a need to explore the financial resources to support activities like PDTWs at the regional level, government representatives getting support from their national agencies for travel support or holding the meetings back-to-back with other regional fora with a view to becoming self-sustainable.

5. Success of PDTWs

The APN initiated Proposal Writing Workshops with the first workshop in Shanghai, China in October 2008 with the participation of Bangladesh, China, Mongolia, Nepal and Pakistan. Since then such workshops continued in APN sub-regions and some of the facts related to South Asia are presented in the following table.

	Venue	No. of scientists	Resource person	Successful proponents
1	Proposal-Writing Training Workshop Shanghai, China; 28th October 2008 (Bangladesh, China, Mongolia, Nepal and Pakistan)	**6**	Prof. Zhongyuan Chen Dr. Gouqing Li	1. Dhiraj Pradhananga CBA2012-17NSY-Pradhananga,CBA2010-12NSY (Project leader) 2. Mr. Muhammad Arif Rashid Goheer, CIA2009-07-LOTIA (project Collaborator)
2	APN Proposals-Writing Training Workshop, Pune, INDIA 01-02 November 2010	**16**	Mr. Dhiraj Pradhananga	
3	Proposal Development Training Workshop (SA-PDTW) Paro, Bhutan, 18-19 January 2012	**15**	Dr. Chhemendra Sharma; Dr. Kedar L. Shrestha; Mr. M. Arshad Gill	One group proposal was further developed and was awarded APN fund, ARCP2013-20NMY-Shrestha project; Ms. Suneetha Pilli Mr. Jeeban Panthi,Ms. Qurat-ul-Ain Ahmad are collaborating
4	Proposal Development Training Workshop (PDTW); 14-18 January, 201; Kathmandu, Nepal	**15**	Mr. Dhiraj Pradhananga	One group proposal was further developed (ARCP2013 -11FP Lokupitiya) and received a Seed grant
5	5th APN South Asia Sub-Regional Cooperation Meeting/ Proposal Development Training Workshop (PDTW); Colombo, Sri Lanka 04-05 October 2013	**15**	Dr. Buddhi Marambe Dr. Janaka Ratnasiri	

The main aim of Proposal Development Training Workshops (PDTWs) is to expose young scientists to the art of developing competitive proposals and, at the same time; giving them perspective of what is a broad spectrum of research opportunities that APN offers. During the workshops, the young researchers also have opportunities to learn from past project leaders – including success and failure. Such interaction has proven to be effective.

In this process, there is a significant contribution toward capacity development of young scientists in the region. As depicted in the above table, 67 young scientists from South Asia were trained in proposal preparation in these workshops. Through PDTWs several proposals emerged which were successful in APN under ARCP or

CAPaBLE programmes (two from Nepal, one from Pakistan and one from Sri Lanka). One proposal from India was initiated out of the 2012 Bhutan PDTW and successfully reached the final stage of ARCP process (ARCP2013-FP23-Suneetha), but did not pass at the final hurdle – this is both due to fierce competition as well as limited funding available.

6. Success of the regional proposals conducted through the committee activities.

In addition to the proposals submitted by the scientists in the region or those coming out of PDTWs, there was consensus from sub-regions that regional proposals that address common and pertinent issues and problems in the region need to be developed and submitted to the APN. It was agreed at the 7th Steering Committee Meeting in October 2007 that the mechanism for submitting proposals for funding to APN is only through the Annual Regional Call for Research Proposals (ARCP) and the CAPaBLE Programme.

During the 17th IGM/SPG meeting in Jakarta, Indonesia in March 2012, SA-SRC identified five main topics for collaborative research, which are related to the region: 1) Biodiversity and ecosystem services; 2) Climate change and adaptation in relation to agriculture; 3) Awareness-raising among the general public and policy makers on the reality of climate change using existing data and evidence, involving both the scientific and policy-making community; 4) Coastal and ocean pollution, acidification, salinity intrusion and increasing temperature; and 5) Energy use and energy efficiency.

Subsequently, the 4th SA-SRC meeting that was held in Kathmandu, Nepal in January 2013 focused attention on climate change adaptation in the agriculture sector and in the field of biodiversity and ecosystem services in South Asia. With input from member countries two proposals were developed.

- Climate Resilience in Farming Systems under Sloping Lands of South Asia
    - Member countries involved: Sri Lanka, Bangladesh, Nepal, ICRAF-South Asia Program
- Assessment of Ecosystem Services of Selected Landscape of South Asia
    - Members involved: Sri Lanka, Bangladesh, Nepal, Bhutan, ICRAF- South Asia Program and Nairobi office

7. Other issues:

On knowledge sharing, among the Member countries of South Asia, country reports presented helped members understand their neighbouring countries environmental and other emerging issues. In the first SA-SRC meeting during July 2009 in Colombo, Sri Lanka all members shared their thoughts and provided comments and suggestions as additional input for the evaluation of APN's third strategic phase and formulation of the fourth strategic plan. An open discussion among the participants resulted in ideas on thematic areas, needs, priorities and gaps in South Asia.

On membership of Maldives in APN, the 18th IGM/SPG formally welcomed Maldives as an approved country to APN.

Appendix 1-2. Southeast Asia Sub-Regional Committee Evaluation Report

Introduction

The Southeast Asia Sub-regional committee (SEA-SRC) comprising of 7 APN member countries - Cambodia, Indonesia, Lao PDR, Malaysia, Philippines, Thailand and Viet Nam, was established in 2007. The terms of reference of the SEA-SRC are to improve communications among its members; identify the research needs of the region; and promote research in global change that supports policy-making decisions. In addition, the committee is also tasked with raising the profile of APN at national and regional levels. The first SRC meeting was held in Indonesia in 2007 with subsequent meetings held annually in Thailand, Philippines, Viet Nam, Cambodia and Malaysia, respectively. There was no meeting in 2008. The committee also meets during the annual IGM/SPG Meetings. Since 2010, PDTWs for young scientists in the region were held back-to-back with the SEA-SRC meetings. To gauge the performance of the SRC with reference to its mandate, an evaluation was undertaken on the following seven key issues.

1. Communications among members and other institutions within the region.

Communication at the national level, between nFP and SPG members, between APN representatives (nFPs and SPGs) and APN project leaders/collaborators at the national level, among APN member countries in the region and between the sub regions were identified as challenges. Various measures and strategies were proposed which to some extend has improved the communications at various levels.

At the national level the interaction between the nFP and SPG members has improved significantly. With the APN project leaders the communication is getting better after the requirement that the proponents of projects carbon copy their proposal to the national nFP and SPG or seek their advice before submitting proposals to APN. The participation of nFPs or SPGs in APN workshops or seminars held in the country has also helped to strengthen the interactions between projects leaders and APN representatives of the countries. More needs to be done to further strengthen the interaction between the nFP/SPG and project leaders and potential proponents of project proposals on a continuing basis.

The SEA SRC noted that communication between its members has not been too effective and suggested new mechanisms such as skype video conferencing, mobile phone communications, or other telecommunication applications to readdress the need for enhanced communications. One of the main reasons for poor communication was identified communications due to the frequent change of representatives, especially nFPs. Furthermore, as most nFPs are senior bureaucrats in their respective governments, they often assign alternates as representatives in APN meetings. To overcome this issue nFPs who are senior government officials must take greater ownership of their membership in APN to make the SEA-SRC a more dynamic body of the APN.

2. Conducting SEA SRC Science-Policy Dialogue

The SEA Science-Policy Dialogue (SPD) was organized for the first time in Bangkok, Thailand from 19-21 July, 2012 in collaboration with START. The theme of the dialogue was "Challenges of Global Environmental Change in Southeast Asia" where the common and specific policy issues related to climate change impacts and adaptation challenges and strategies using top down and bottom up approaches were presented. Another highlight of the dialogue was the participatory "serious fun" games that engaged stakeholder communities in adaptation practices and decision making under uncertainty. A visit was made to the "Green Village" flood adapted residences in Binna, Ayutthaya. This type of SPD is an excellent example that could be beneficial to improve the linkages among science and decision making communities, however there is a need to invite more policy makers to make presentations. The SEA-SRC agreed there is also a need to engage the private sector and business communities to play an active role in the future, so that science research and results can meet stakeholders' needs; and the private sector and business communities in partnership with the government can translate science into working models to address global change issues.

Another emerging SPD seminar/symposium and capacity building activity related to integrated waste management and GHG reduction and mitigation, and climate change adaptation was prepared by SEA-SRC under the project leadership of Viet Nam to meet the requirements of the 2013 Annual Call for Proposal under Capable

program. The SEA-SRC should organize more SPDs as it is, perhaps, the best way forward to gather and share information as well as make comparative studies and learn best practices on climate change impacts, adaptation and mitigation.

3. Working remotely as an SEA-SRC Committee

The SEA-SRC has being effective in working remotely through electronic communication in organizing SRC meetings and PDTWs, and identifying suitable young scientists for PDTWs. The SEA-SRC members had also being active in assisting project proponents to find suitable collaborators from within the region for ARCP proposals. The SEA-SRC had actively worked remotely to identify suitable partners from individual member countries and in the process of developing the proposal submitted by the SRC on "Urban Adaptation to Climate Change". The SEA-SRC can take advantage of the advancement in electronic communication technologies to work remotely as much as possible to enhance its activities. For this to happen a clear-cut approach is needed and activities need to be identified and timelines need to be set. The annual SEA-SRC meetings and the Committee meetings during IGMs could be used to address weaknesses and strengthen ongoing activities as well as propose new regional activities or projects for implementation for the future.

4. Devising and undertaking joint projects

The SEA-SRC members were actively involved in the Southeast Asia SPD, which was jointly organized by APN, and START that was held in Bangkok Thailand from 19-21 July 2012. Another undertaking of the SEA-SRC is the CAPaBLE proposal on "Summer School on Urban Adaptation to Climate Change". This is a joint activity with East-West Center and START. In the first submission, the proposal was given a seed grant to develop the proposal further and a full proposal will be submitted in 2014. There had being discussions at the SRC meetings to look into the possibility of undertaking joint projects with the ASEAN Secretariat.

5. Financing with a view to becoming self-sustainable

One of the main problems for most of the SEA APN member countries is the lack of internal funds for travel to SRC meetings and therefore the dependence on APN to support the SRC meetings. However there has being in-kind contribution to support some activities during the meetings. The SEA-SRC recognizes that due to budget constraints and the need to support more capacity building activities like PDTWs at the regional level, the SEA-SRC needs to explore other means to secure resources. This might be in the form of government representatives getting support from their national agencies for travel support, or holding meetings back-to-back with other regional forums. This is needed in order for the SEA-SRC to become self-sustainable. The SEA-SRC will continue its discussions, looking at various options to at least partially fund the SEA-SRC meetings.

6. Success of PDTWs

Since the PDTW was introduced in 2010, more than 60 young scientists from Southeast Asia have have been trained on how to write a successful APN project proposal. One of the highlights of PDTWs is the exposure given to these young scientists on how to look beyond their narrow field of specialization and work in a team comprising specialists from different disciplines to tackle global change research, which is both multi-disciplinary and crosscutting in nature. Presentations by past APN project leaders on their experiences in developing successful project proposals also benefitted the participants. The half-day seminar and country presentations during SRC meetings were also attended by PDTW young scientists providing good exposure to a range of global change issues being addressed in the region as well as the the existing research gaps that must take priority in the coming years.

A total of 5 research proposals that came out these training workshops over the last few years were submitted for APN funding under ARCP or CAPaBLE. One of the proposals, where all the collaborators are from the 2011 PDTW, received a seed grant to develop the proposal. The proposal then succeeded to the final stage under the 2013 call for proposals. For the other 4 proposals the proponents were PDTW participants and, of these proposals, one successful proposal was, unfortunately, turned down by the proponent. One other proposal reached the full proposal stage, thus demonstrating the success of the PDTW. This said, however, the SEA-SRC feels there is

room for improvement and some suggestions were raised, which include: an earlier call for nominations; SEA-SRC members play a bigger role in vetting and selecting the best candidates; and providing a longer lead-time prior to the PDTW to perform an effective literature review on selected research topics. A follow-up mechanism with young scientists needs to be established with the support of SEA-SRC members to further develop the ideas generated from PDTW groups during the workshops. This is expected to strengthen the sub-regional network while maintaining momentum and provide an excellent opportunity for the SEA-SRC to stay in touch remotely. The feedback from the reviewers will go a long way in building the capacity of the young scientist to write good proposals for global change research.

7. Success of the regional proposals conducted through the committee activities

Regional proposals funded by APN where the SEA-SRC had a direct or indirect role included the SPD that was held in Bangkok, Thailand from 19-21 July 2012. This was a highly successful workshop. The proceeding of the workshop has been published as a symposium proceedings and a policy brief. The proposal from SEA-SRC on Urban Adaptation to Climate Change received a seed grant to develop the proposal further and is to be submitted as a CAPaBLE proposal in the 2014 call for proposals for funding. A proposal on "Asia-Pacific Seminar on Integrated Waste Management and Climate Change Mitigation and Adaptation" to be held in Viet Nam in 2015 was submitted to APN as a CAPaBLE proposal in the 2013 call for proposals. The SEA-SRC has also addressed the issue of high-resolution regional climate downscaling for Southeast Asia, which could be used for vulnerability assessments and adaptation strategy formulation. A half-day seminar was organized during the 2011 SEA-SRC meeting, where lectures on climate downscaling, the uncertainties involved, multi-ensemble climate projections and some of the current work in progress in climate downscaling in SEA was presented. A multi-year ARCP proposal on climate downscaling, which involves all SEA-SRC member countries was approved for funding in the 2012 call for proposals and this project is now in progress.

8. Other matters: SWOT Analysis

A SWOT analysis was carried out during the second SEA-SRC meeting in 2009. Some important points from the analysis are presented here.

Strengths

- Global Change research is of high interest in the Asia-Pacific region and there is confidence among donor countries in APN to continue their support
- Effective representation from both the policy and scientific community through nFPs and SPGs
- Strong institutional mechanism in APN to support high quality research and capacity building activities with effective linkages to regional and international global change programmes
- High involvement of a large number of scientists and policy makers from across the region who are well aware of APN activities

Weakness

- Lack of coordination between project leaders and nFPs (*this is being addressed)*
- Frequent change of representatives in some member countries
- Limited funds and insufficient incentive for the members
- Lack of vigorous effort to support groups in strengthening proposals preparation and lack of post project follow-ups and grants to support these follow up activities. *(PDTW and seed grants to address this issue)*

Opportunities

- Ability to influence national research agenda through participation in biennial open science conferences
- Presence of different regional networks working on related areas as potential strong partners.
- Huge demand for policy-relevant information (e.g. on climate change, mitigation and adaptation)
- Accumulation of research findings from funded projects which could potentially aid in the future decision and for policy-formulation processes, and regional assessments with policy makers' involvement on completed projects (e.g. adaptation)

Threats

- Insufficient funds to support more projects
- Shifting priorities at the international community

9. Other matters: Membership of Myanmar in APN

SEA-SRC welcomes the IGM recommendation to include Myanmar as an approved member, but because of its strategic importance in Global Change research, the APN secretariat should continue to engage Myanmar with a view of having Myanmar as a full member of APN in the future. To start with, the SEA-SRC will try to establish contact with Myanmar scientists to identify a suitable contact person who could be invited as an observer to the next SRC meeting.

APPENDIX 2: LIST OF COMPLETED PROJECTS in 3rd STRATEGIC PHASE					
Project Set	**Project Reference**	**Title**	**Countries Engaged**	**Thematic Area**	**APN Electronic Library / Metadata Link**
ARCP					
1	**ARCP2006-06NMY ARCP2007-01CMY ARCP2008-01CMY**	Sediment Dynamics and Down-stream Linkages in Tropical Streams as Affected by Projected land-cover/Land-use and Climatic Change	China, India, **USA**, Viet Nam, Thailand, Japan	EBLU/CC&CV	http://www.apn-gcr.org/resources/items/show/1541
2	**ARCP2006-09NMY ARCP2007-04CMY ARCP2008-02CMY-David**	Integrated Vulnerability Assessment of Coastal Areas in the Southeast Asia and East Asian Region	**Philippines,** Cambodia, Indonesia, Malaysia, Thailand, Viet Nam, Germany (LOICZ)	CATMD	http://www.apn-gcr.org/resources/items/show/1542
3	**ARCP2007-10NMY ARCP2008-03CMY**	Collaborative Studies in Tropical Asian Dendrochronology: Addressing Challenges in Climatology and Forest Ecology	**Philippines**, India, USA, Sri Lanka, Thailand, Malaysia	EBLU/CC&CV	http://www.apn-gcr.org/resources/items/show/1543
4	**ARCP2007-11NMY ARCP2008-04CMY**	Regional collaborative research on climate change impacts on surface water quality in eastern Monsoon Asia: Towards sound management of climate risks	**Republic of Korea,** Malaysia, Indonesia, China, Cambodia, Thailand, Lao PDR	CC&CV	http://www.apn-gcr.org/resources/items/show/1544
5	**ARCP2007-12NMY ARCP2008-05CMY**	Marine Biodiversity of The Coastal zones in the NW Pacific: Status, regional threats, expected changes and conservation	**Russia**, Republic of Korea, China	EBLU	http://www.apn-gcr.org/resources/items/show/1545
6	**ARCP2007-13NMY ARCP2008-06CMY**	Quantification of land use urbanization level in three developing Asia countries based on the analysis of scale effects in landscape pattern	**China,** Philippines, Viet Nam	EBLU	http://www.apn-gcr.org/resources/items/show/1546
7	**ARCP2007-14NMY ARCP2008-07CMY**	Climate Perturbation and Coastal Zone Systems in Asia Pacific Region: Holistic Approaches and Tools for Vulnerability Assessment and Sustainable Management Strategy	**Australia,** Bangladesh, Japan, Thailand, Viet Nam.	CATMD	http://www.apn-gcr.org/resources/items/show/1547
8	**ARCP2007-16NMY ARCP2008-08CMY**	Asian Mega-deltas: Monsoon circulation in relation to deltaic-coastal hazards and future mitigation – millennial to seasonal dimensions	**China,** Bangladesh, Viet Nam, USA	CATMD	http://www.apn-gcr.org/resources/items/show/1548
9	**ARCP2007-17NMY ARCP2008-09CMY**	Assessing vulnerability of communities and understanding policy implications of adaptation responses to flood-related landslides in Asia	**Philippines** China, Nepal, Viet Nam	CC&CV	http://www.apn-gcr.org/resources/items/show/1549

10	**ARCP2007-19NMY-Sheikh ARCP2008-10CMY-Sheikh**	Development and Application of Climate Extreme Indices and Indicators for Monitoring Trends in Climate Extremes and their Socio-Economic Impacts in South Asian Countries	**Pakistan**, Nepal, Bangladesh, India, Sri Lanka	CC&CV	http://www.apn-gcr.org/resources/items/show/1550
11	**ARCP2008-12NSY-Webb**	Historical Reconstruction and Mapping of Pacific Island Coasts (PI-Coast Map)	**Fiji,** New Zealand, Japan	CC&CV	http://www.apn-gcr.org/resources/items/show/1551
12	**ARCP2008-13NMY-Fukami ARCP2009-01CMY-Fukami**	Flood Risk Management Demonstration Project (phase 1) Under the Asian Water Cycle Initiative for the Global Earth Observation System of Systems (FRM/AWCI/GEOSS)	Bangladesh, Bhutan, Cambodia, China, India, Indonesia. **Japan**, Korea, Lao-PDR, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, Uzbekistan, Viet Nam	CATMD	http://www.apn-gcr.org/resources/items/show/1552
13	**ARCP2008-14NMY-Okladnikov ARCP2009-02CMY-Okladnikov**	Human Impact on Land-cover Changes in the Heart of Asia	**Russia**, Mongolia, USA	CATMD	http://www.apn-gcr.org/resources/items/show/1553
14	**ARCP2008-15NMY-Nikitina ARCP2009-03CMY-Nikitina**	Reducing Water Insecurity through Stakeholder Participation in River Basin Management in the Asia-Pacific	**Russia**, Thailand, China, Australia, Viet Nam	EBLU	http://www.apn-gcr.org/resources/items/show/1554
15	**ARCP2008-16NMY-Shrestha ARCP2009-04CMY-Shrestha**	Impacts of Global Change on the Dynamics of Snow, Glaciers and Runoff over the Himalayan Mountains and Their Consequences for Highland and Downstream Regions.	China, **Nepal**, India, Pakistan	CC&CV; RUSD	http://www.apn-gcr.org/resources/items/show/1555
16	**ARCP2008-17NMY-Sellers ARCP2009-05CMY-Sellers**	Peri-Urban Development and Environmental Sustainability: Examples from China and India	**USA,** Australia, China, Singapore, India	CATMD; RUSD	http://www.apn-gcr.org/resources/items/show/1556
17	**ARCP2008-18NMY-Braimoh ARCP2009-06CMY-Braimoh**	Managing Ecosystems Services in Asia: A Critical Review of Experiences in Montane Upper Tributary Watersheds	**Japan,** Thailand, China, Indonesia	EBLU	http://www.apn-gcr.org/resources/items/show/1557
18	**ARCP2008-20NMY-Iqbal ARCP2009-08CMY-Iqbal**	Assessment of Food and Water Security in South-Asia under Changing Climate Scenario Using Crop Simulation and Water Management Models, and Identification of Appropriate Strategies to Meet Future Demands	Bangladesh, **Pakistan**, Sri Lanka, USA	CC&CV, RUSD	http://www.apn-gcr.org/resources/items/show/1559

19	**ARCP2009-09NSY-Skole**	Developing Small-holder Agroforestry Carbon Offset Protocols for Carbon Financial Markets – Twinning Sustainable Livelihoods and Climate Mitigation	**USA**, Laos, Thailand, Viet Nam	EBLU	http://www.apn-gcr.org/resources/items/show/1560
20	**ARCP2009-10NSY-Gautam**	Assessment of Role of Community Forests (CFs) in CO2 Sequestration, Biodiversity, and Land Use Change	**Nepal**, Japan, Indonesia	EBLU	http://www.apn-gcr.org/resources/items/show/1561
21	**ARCP2009-11NSY-Roy**	Role of Experiments in Sustainability Transitions in Asia	**India,** Thailand, USA, Netherlands	RUSD	http://www.apn-gcr.org/resources/items/show/1562
22	**ARCP2009-12NSY-Karve (Haefele)**	Biochar for Carbon Reduction, Sustainable Agriculture and Soil Management (BIOCHARM)	**India,** Cambodia Philippines, USA and UK	EBLU	http://www.apn-gcr.org/resources/items/show/1563
23	**ARCP2009-13NMY-Sthiannopkao ARCP2010-01CMY-Sthiannopkao**	Collaborative Research on Sustainable Urban Water Quality Management in Southeast Asian countries: Analysis of Current Status (comparative study) and Develop a Strategic Plan for Sustainable Development	**Republic of Korea**, Cambodia, Indonesia, Thailand, Viet Nam	RUSDCCI	http://www.apn-gcr.org/resources/items/show/1564
24	**ARCP2009-14NMY-Phua ARCP2010-02CMY-Phua**	Integrated Prediction of Dipterocarp Species Distribution in Borneo for Supporting Sustainable Use and Conservation Policy Adaptation	**Malaysia**, Japan, Indonesia	EBLU	http://www.apn-gcr.org/resources/items/show/1565
25	**ARCP2009-15NMY-Marambe ARCP2010-03CMY-Marambe**	Vulnerability of Home Garden Systems to Climate Change and its Impacts on Food Security in South Asia	**Sri Lanka**, Bangladesh, India	CC&CV, EBLU, RUSD	http://www.apn-gcr.org/resources/items/show/1566
26	**ARCP2009-16NMY-Wang ARCP2010-04CMY-Wang ARCP2011-01CMY-Wang**	Building Asian Climate Change Scenarios by Multi-Regional Climate Models Ensemble	**China**, USA, Republic of Korea, Australia, Japan, Thailand	CC&CV	http://www.apn-gcr.org/resources/items/show/1567
27	**ARCP2009-17NMY-Luck ARCP2010-05CMY-Luck**	The Effects of Climate Change on Pests and Diseases of Major Food Crops in the Asia Pacific Region	**Australia,** Bangladesh, India	CC&CV	http://www.apn-gcr.org/resources/items/show/1568

28	**ARCP2009-19NMY-Bai ARCP2010-07CMY-Bai**	Asian Coastal Ecosystems: An Integrated Database and Information Management System (DIMS) for Assessing Impact of Climate Change and its Appraisal	**Malaysia**, India, Singapore, UK.	CC&CV, CATMD, CCI	http://www.apn-gcr.org/resources/items/show/1570
29	**ARCP2010-08NSY-Freeman**	Impact of Climate Change on Food Security and Biosecurity of Crop Production Systems in Small Pacific Nations	**Australia**, Tonga, Vanuatu, Kiribati, Tuvalu	CC&CV, EBLU	http://www.apn-gcr.org/resources/items/show/1571
30	**ARCP2010-09NSY-Patankar (formerly Patwardhan)**	Enhancing Adaptation to Climate Change by Integrating Climate Risk into Long-Term Development Plans and Disaster Management	**India**, Philippines, Thailand	CC&CV	http://www.apn-gcr.org/resources/items/show/1572
31	**ARCP2010-10NMY-Koike ARCP2011-02CMY-Koike**	River Management System Development in Asia Based on Data Integration and Analysis System (DIAS) under the GEOSS	**Japan**, Bangladesh, Bhutan, Cambodia, India, Republic of Korea, Lao PDR, Malaysia, Myanmar, Mongolia, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, Viet Nam, Uzbekistan	CC&CV	http://www.apn-gcr.org/resources/items/show/1583
32	**ARCP2010-11NMY-Asanuma ARCP2011-03CMY-Asanuma**	Intercomparison of Landsurface Process Modelling at Asian Drylands	USA, **China**, Japan, Mongolia	CATMD	http://www.apn-gcr.org/resources/items/show/1584
33	**ARCP2010-12NMY-Uprety ARCP2011-04CMY-Uprety(Paudel)**	Community Based Forestry and Livelihoods in the Context of Climate Change Adaptation	**Nepal**, Bangladesh, Viet Nam and Thailand	CC&CV, EBLU, RUSD	http://www.apn-gcr.org/resources/items/show/1585
34	**ARCP2010-13NMY-Bae ARCP2011-05CMY-Bae**	Climate Change Impact Assessment on the Asia-Pacific Water Resources Under AWCI/GEOSS	**Republic of Korea**, Bangladesh, Pakistan, Japan	CC&CV	http://www.apn-gcr.org/resources/items/show/1576
35	**ARCP2010-14NMY-Li ARCP2011-06CMY-Li**	Analysis on Urban Land-Use Changes and its Impacts on Food Security in Different Asian Cities of Four Developing Countries Using Modified CA Model	**China**, Viet Nam, India, USA and Australia	EBLU	http://www.apn-gcr.org/resources/items/show/1587
36	**ARCP2010-15NMY-Han ARCP2011-07CMY-Han**	The Impact of Spatial Parameters on GHG Emission: A Comparative Study between Cities in China and India	**Australia,** India, China	CC&CV, CATMD	http://www.apn-gcr.org/resources/items/show/1588

37	**ARCP2010-16NMY-Huda ARCP2011-08CMY-Huda**	Food Security and Climate Change in the Asia-Pacific Region: Evaluating Mismatch between Crop Development and Water Availability	**Australia,** China, India	CC&CV	http://www.apn-gcr.org/resources/items/show/1589
38	**ARCP2010-17NMY-Towprayoon ARCP2011-09CMY-Towprayoon**	Strategic Rice Cultivation for Sustainable Low Carbon Society Development in South East Asia	**Thailand**, Indonesia, Japan	EBLU, RUSD	http://www.apn-gcr.org/resources/items/show/1590
39	**ARCP2010-18NMY-Lutaenko ARCP2011-10CMY-Lutaenko**	Coastal Marine Biodiversity of Viet Nam: Regional and Local Challenges and Coastal Zone Management for Sustainable Development	**Russia**, Viet Nam, Republic of Korea	EBLU	http://www.apn-gcr.org/resources/items/show/1591
40	**ARCP2011-19NSY-Koottatep**	Affordable Sanitation as an Adaptive Strategy to Emerging Waterborne Diseases due to Climate Change	**Thailand**, Laos, Viet Nam	CC&CV. CCI	http://www.apn-gcr.org/resources/items/show/1600
41	**ARCP2011-20NSY-McEvoy**	Assessment of Climate Change Risks and Adaptation Options for Secondary Cities in South-western Bangladesh and Central Viet Nam	Bangladesh, Viet Nam, **Australia**	CC&CV	http://www.apn-gcr.org/resources/items/show/1601
42	**ARCP2011-21NSY-Manurung**	Reconstruction of Sea Level Change in Southeast Asia (RESELECASEA) Waters Using Combined Coastal Sea Level Data and Satellite Altimetry Data	**Indonesia**, Viet Nam, USA, Italy	CC&CV	http://www.apn-gcr.org/resources/items/show/1602
43	**ARCP2011-22NSG-Liu**	The Impact of Global Warming on Ocean-atmosphere Feedback Strength at Tropical Indian Ocean	**China**, Malaysia, USA	CC&CV, CATMD	http://www.apn-gcr.org/resources/items/show/1603
44	**ARCP2011-18NMY-Jung ARCP2012-08CMY-Jung**	Impacts of Global Warming on Coastal and Marine Ecosystems in the Northwest Pacific	**Republic of Korea**, Russia, China, Japan	CC&CV, EBLU, CATMD, RUSD	http://www.apn-gcr.org/resources/items/show/1599
45	**ARCP2012-22NSG-Prayitno**	Scoping Workshop to Develop Proposal: Vulnerability Assessment of Mangrove Biodiversity to Climate Change in Southeast Asia	**Indonesia**, Malaysia, Philippines	CC&CV, EBLU	http://www.apn-gcr.org/resources/items/show/1761
46	**ARCP2012-23NSG-Crawford**	Scoping Workshop to Develop Proposal: Human Responses to Catastrophic Monsoon Events in South Asia, Designing a Spatially Explicit Model in Low-Lying Coastal Areas	Bangladesh, India, Sri Lanka, **USA**	CC&CV	http://www.apn-gcr.org/resources/items/show/1762

47	**ARCP2012-21NSY-Siswanto**	Climate change and human impacts on marine biological production in the Asia-Pacific marginal seas	Thailand, Malaysia, Viet Nam, **Japan**	CATMD, CCI	http://www.apn-gcr.org/resources/items/show/1760
CAPaBLE					
48	**2005-CB03-NMY CBA2006-12CMY CBA2008-01CMY**	Increasing Adaptive Capacity of Farmers to Extreme Climate Events and Climate Change through Policy-Science-Community Networking	**Indonesia** (National Level)	CC&CV & SPL	http://www.apn-gcr.org/resources/items/show/1640
49	**CBA2006-05NMY CBA2007-02CMY**	Climate Change and Variability Implications on Biodiversity -- Youth Scenario Simulations and Adaptations	**Fiji**, Solomon Island, Kiribati and Vanuatu	CC&CV & EBLU	http://www.apn-gcr.org/resources/items/show/1633
50	**CBA2008-03NSY-Park/Ashok**	Training Course on Regional Downscaling for Asia-Pacific Region using APEC Climate Centre Global Seasonal Climate Prediction	**Republic of Korea**, New Zealand, Russian Federation, Viet Nam, Philippines, Thailand	CC&CV	http://www.apn-gcr.org/resources/items/show/1641
51	**CBA2008-04NSY-Nakashizuka**	Training in Science-Policy Interfacing to Promote the Application of Scientific Knowledge on Adaptation of Forests and Forest Management to Climate Change	**Japan**, USA, Bangladesh, Cambodia, China, Fiji, India, Indonesia, Lao PDR, Mongolia, Nepal, Pacific Island Countries, Pakistan, Philippines, Sri Lanka, Thailand, Viet Nam	CC&CV, EBLU, CCI, SPL	http://www.apn-gcr.org/resources/items/show/1642
52	**CBA2008-05NMY-Ailikun CBA2009-01CMY-Ailikun**	The Capacity Building for Drought Monitoring and Studying in Monsoon Asia Under the Framework of Asian Water Cycle Initiative (AWCI)	Japan, **China**, Mongolia, Thailand, Viet Nam, Pakistan, Philippines, Nepal	RUSD	http://www.apn-gcr.org/resources/items/show/1653
53	**CBA2008-06NSY-Fuchs**	Cities At Risk: Developing Adaptive Capacity for Climate Change in Asia's Coastal Mega Cities	**USA**, Bangladesh, Sri Lanka, China, Thailand, Japan (Australia, Indonesia, Singapore, Malaysia, India, Pakistan, Viet Nam, Republic of Korea, Philippines)	CC&CV, CATMD	http://www.apn-gcr.org/resources/items/show/1643
54	**CBA2008-07NSY-Srivastava/Schmidt**	"Social Challenges of Global Change": The 7th International Science Conference on the Human Dimensions of Global Change (IHDP Open Meeting 2009); Bonn, Germany, 26-30 April 2009	**IHDP**, Open to all APN member countries	all APN science agenda	http://www.apn-gcr.org/resources/items/show/1644

55	**CBA2008-08NSY-Andonowati**	Integrating Indonesian Capacity for Coastal Zone Management	**Indonesia**	CATMD	http://www.apn-gcr.org/resources/items/show/1645
56	**CBA2008-09NSY-Peñalba**	Enhancing the Climate Change Adaptation Capacity of Local Government Units and Scientists in the Philippines	**Philippines**	CC&CV	http://www.apn-gcr.org/resources/items/show/1646
57	**CBA2008-10NSY-Dye**	Regional Participation in the US-Japan Workshop on Monsoon Asia Tropical Forest Carbon Dynamics and Sustainability	**Japan**, USA, Indonesia, Malaysia, Thailand	CC&CV, CATMD	http://www.apn-gcr.org/resources/items/show/1647
58	**CBA2008-11NSY-Bai/Rechkemmer**	6th Biennial International Human Dimensions Workshop (IHDW) on Global Change Research: A Series of Capacity Building Training Seminars	**IHDP**, Open to all APN member countries	all APN science agenda	http://www.apn-gcr.org/resources/items/show/1648
59	**CBA2008-12NMY-Ishida CBA2009-02CMY-Ishida**	The Global Earth Observation System of Systems Asian Water Cycle Initiative Observation Convergence and Data Integration (GEOSS/AWCI/OCDI)	Bangladesh, Cambodia, China, India, Indonesia, **Japan**, Korea, Lao PDR, Mongolia, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, Viet Nam	CCI, SPL, RUSD	http://www.apn-gcr.org/resources/items/show/1654
60	**CBA2008-13NSG-Li (seed grant)**	Seed Grant for Inter-Agency Earth Observation (EO) Information Collaborate Technologies Changing the Global Change (GC) Research in Asia Pacific (AP) Region	**China**, Thailand, United States, Mongolia (invited members Republic of Korea, Russia, Japan, India, Nepal)	all APN science agenda	http://www.apn-gcr.org/resources/items/show/1661
61	**CBA2009-03NSY-Bishry**	Project Scoping and Training Workshop for REDD in Indonesia, Cambodia, and Lao PDR	**Indonesia**, Cambodia, Lao PDR, USA	CC&CV, EBLU, RUSD	http://www.apn-gcr.org/resources/items/show/1655
62	**CBA2009-04NSY-Visarto**	Workshop on Climate and Agricultural Risk Management, Phnom Penh, 2009	**Cambodia**, Australia, Thailand, Viet Nam, India, Bangladesh, USA, Philippines	CC&CV, RUSD	http://www.apn-gcr.org/resources/items/show/1656
63	**CBA2009-05NSY-Salinger**	International Workshop on the Content, Communication and Use of Weather and Climate Products and Services for Sustainable Agriculture	**New Zealand,** Australia, Bangladesh, Cook Islands, China, Fiji, Indonesia, Kiribati, Malaysia, Samoa, Philippines, Russian Federation, USA, Vanuatu, Viet Nam.	CC&CV, RUSD, CCI, SPL	http://www.apn-gcr.org/resources/items/show/1657

64	**CBA2009-06NSY-Brunner**	Capacity Building for Mainstreaming Climate Change Issues into Socio-Economic Development Planning in Viet Nam	**Viet Nam**	CC&CV, CCI, SPL	http://www.apn-gcr.org/resources/items/show/1658
65	**CBA2009-07NSY-Larigauderie**	Second DIVERSITAS Open Science Conference: "Biodiversity and Society: Understanding Connections, Adapting to Change": Ensuring a Strong Scientific Contribution from the Asia-Pacific Region	**DIVERSITAS**, Philippines, Japan, Indonesia, other Asia-Pacific countries	EBLU, CATMD, RUSD	http://www.apn-gcr.org/resources/items/show/1659
66	**CBA2009-08NSY-Almoite**	Scaling-Up Agroforestry Promotion Towards Mitigating Climate Change in Southeast Asia	Philippines, Thailand, **Indonesia**, Viet Nam, Lao PDR	CC&CV, CCI, SPL	http://www.apn-gcr.org/resources/items/show/1660
67	**CBA2009-10NSY-Li**	Inter-Agency Collaboration Technologies in Earth Observations (EO) for Global Change Research in the Asia-Pacific Region	**China**, Japan, Mongolia, Russian Federation, Republic of Korea, Thailand, USA	CC&CV, CCI, SPL	http://www.apn-gcr.org/resources/items/show/1661
68	**CBA2009-11NMY-Sang-arun CBA2010-01CMY-Sang-arun**	Promoting Sustainable Use of Waste Biomass in Cambodia, Lao PDR and Thailand: Combining Food Security, Bio-energy and Climate Protection Benefits	**Japan**, Cambodia, Lao PDR, Thailand	CC&CV, RUSD, CCI, SPL	http://www.apn-gcr.org/resources/items/show/1662
69	**CBA2009-12NMY-Togtohyn CBA2010-02CMY-Togtohyn**	Dryland Development Paradigm (DDP) Application for the Most Vulnerable to Climate and Land Use Change of Pastoral Systems in the Southern Khangai Mountains of Mongolia (DDPPaS)	**Mongolia**, USA, Australia	CC&CV, EBLU, SPD	http://www.apn-gcr.org/resources/items/show/1663
70	**CBA2010-03NSY-Indrawan**	Developing the Capacity for Teaching Biodiversity and Conservation in the Asia-Pacific Region	**Indonesia**, China	EBLU	http://www.apn-gcr.org/resources/items/show/1664
71	**CBA2010-04NSY-Dhakal**	Carbon Governance in Asia: Bridging Scales and Disciplines	Collaboration between Global Carbon Project and Earth System Governance Project of IHDP.	CATMD, CCI, SPL	http://www.apn-gcr.org/resources/items/show/1665
72	**CBA2010-05NSY-Lorrey**	Improving Pacific Island Meteorological Data Rescue and Data Visualisation Capabilities through Involvement in Emerging Climate Research Programmes	**New Zealand**, Australia, Fiji, USA PICs (workshop participants)	CC&CV, CCI, SPL	http://www.apn-gcr.org/resources/items/show/1666

73	**CBA2010-06NSY-Kench**	Improving Understanding of Local-Scale Vulnerability in Atoll Island Countries: Developing Capacity to Improve In-Country Approaches and Research	**New Zealand,** Tuvalu and Marshall Islands	CC&CV, CCI, SPL	http://www.apn-gcr.org/resources/items/show/1667
74	**CBA2010-07NSY-Stone**	Web-based 'Discussion-support' Agricultural-Climate Information for Regional India	**Australia**, India	CC&CV, CCI, SPL	http://www.apn-gcr.org/resources/items/show/1668
75	**CBA2010-08NSY-Salinger**	Addressing the Livelihood Crisis for Farmers: Weather and Climate Services for Sustainable Agriculture – Development of Tools	Australia, Cambodia, China, India, Indonesia, Japan, Malaysia, Mongolia, **New Zealand**, Pacific Islands, Philippines, Russian Federation and Viet Nam	CC&CV, RUSD	http://www.apn-gcr.org/resources/items/show/1669
76	**CBA2010-09NSY-Okayama**	Scientific Capacity Development of the Trainers and Policy Makers for Climate Change Adaptation Planning in Asia and the Pacific	Thailand, Australia, China, India, **Japan**, Republic of Korea, Kazakhstan, and Philippines	CC&CV, CCI, SPL	http://www.apn-gcr.org/resources/items/show/1670
77	**CBA2010-11NSY-DeGuzman**	Capacity Building for Research and Monitoring of Marine Protected Areas: An Adaptive Mechanism for Climate Change in the Asia-Pacific Region	**Philippines**, Indonesia	CATMD, SPL	http://www.apn-gcr.org/resources/items/show/1672
78	**CBA2010-12NSY-Pradhananga**	Graduate Conference on Climate Change and People	**Nepal**, Bangladesh, India, Pakistan, Sri Lanka, Kyrgyzstan, USA, China and Republic of Korea	CC&CV	http://www.apn-gcr.org/resources/items/show/1673
79	**CBA2010-13NMY-Kawai** **CBA2011-01CMY-Kawai**	Capacity Building of Biodiversity Research in the Coastal Zones of the Asia Pacific Region: Phycology Taxonomy Analysis Training Using Genetic Marker	**Japan**, Korea, Australia, China, Russia, Taiwan, Philippines, Indonesia, India, Malaysia and New Zealand	EBLU	http://www.apn-gcr.org/resources/items/show/1679
80	**CBA2010-14NMY-Kaihotsu** **CBA2011-02CMY-Kaihotsu**	Drought Monitoring System Development by Integrating In-situ Data, Satellite Data and Numerical Model Output	**Japan**, Bangladesh, China, Nepal, Philippines, Pakistan, Thailand and Viet Nam	CC&CV, RUSD	http://www.apn-gcr.org/resources/items/show/1680
81	**CBA2010-15NSY-South**	Global Change and Coral Reef Management Capacity in the Pacific: Engaging Scientists and Policy Makers in Fiji, Samoa, Tuvalu and Tonga	**Fiji**, Samoa, Tuvalu and Tonga	CATMD, CCI, SPL	http://www.apn-gcr.org/resources/items/show/1676
82	**CBA2011-03NSY-WCRP**	WCRP Open Science Conference: Climate Research in Service to Society	**WCRP,** China, USA, Japan, Australia, Open to all APN member countries	CC&CV	http://www.apn-gcr.org/resources/items/show/1681

83	**CBA2011-04NSY-IHDP**	IHDP Training Workshops on Asian Development Pathways in the Context of Transitions Towards a "Green Economy"	**IHDP,** India, Korea, China, Japan, USA, Australia, open to APN member countries	CCI, SPL	http://www.apn-gcr.org/resources/items/show/1682
84	**CBA2011-05NSY-Schang**	National Dialogues on Adapting Biodiversity Management to Climate Change	**USA**, Bhutan, Viet Nam	CC&CV, EBLU, SPL	http://www.apn-gcr.org/resources/items/show/1683
85	**CBA2011-06NSY-LOICZ**	Young LOICZ Forum 2011: Capacity Building in the Asia-Pacific Region	**China**, Australia, India, Japan, New Zealand, Philippines, Singapore, USA, Viet Nam (Open to all APN member countries)	CATMD, CCI	http://www.apn-gcr.org/resources/items/show/1684
86	**CBA2011-08NSY-Baker**	Towards engagement in the United Nations Regular Process for Global Assessment of the Marine Environment: Strengthening Capacity of Developing Countries in the Seas of East Asia	**Australia**, Cambodia, PR China, Indonesia, Republic of Korea, Malaysia, Philippines, Singapore, Thailand, Viet Nam	CCI, SPL, EBLU	http://www.apn-gcr.org/resources/items/show/1686
87	**CBA2011-09NSY-Aligaen**	Climate Change Integrated Education Model: Building Adaptive Capacity for the Next Generation (Malaysia, Indonesia, Thailand, Philippines and Lao PDR)	**Malaysia**, Indonesia, Thailand, Philippines, Lao PDR	CC&CV, CCI	http://www.apn-gcr.org/resources/items/show/1687
88	**CBA2011-10NSY-Ngari**	International Workshop on Climate and Oceanic Fisheries	**Cook Islands**, Australia, Cambodia, China, Fiji, India, Indonesia, Japan, Kiribati, Malaysia, New Zealand, Samoa, Philippines, Russian Federation, United States, Viet Nam	CC&CV, CATMD, RUSD	http://www.apn-gcr.org/resources/items/show/1688
89	**CBA2011-11NSY-Tienhaara**	Climate Change Governance in the Asia-Pacific Region: Agency, Accountability and Adaptativeness	**Australia**, Open to all APN member countries	CC&CV, SPL	http://www.apn-gcr.org/resources/items/show/1689
90	**CBA2011-13NSY-Tolentino**	Institutionalizing Agroforestry as a Climate Change Adaptation Strategy through Local Capacity and Policy Development in Southeast Asia	**Philippines,** Lao PDR, Viet Nam, Malaysia, Thailand, Indonesia	EBLU	http://www.apn-gcr.org/resources/items/show/1691
91	**CBA2011-14NSY-Ng**	Water Safety from Source to Tap – Strategies and Implementations	**Singapore**, Sri Lanka	CC&CV	http://www.apn-gcr.org/resources/items/show/1692

92	**CBA2011-15NSY-Wagan**	Capability Enhancement of the Local Experts from State Universities and Colleges in Assessing Climate Change Vulnerability and Adaptive Capacity of Crop-based Farming Systems in Various Agroecological Settings	**Philippines**, Thailand, Indonesia	CC&CV, RUSD	http://www.apn-gcr.org/resources/items/show/1693
93	**CBA2011-16NSY-Li**	Demonstration Study on Advancing Global Change Research Approaches Based on Inter-Agency Collaboration and Data Infrastructure of GENESI and GeoBrain	**China**, Japan, Malaysia, Mongolia, Thailand, United States and a partner country outside the AP area (European Union	CC&CV, CCI	http://www.apn-gcr.org/resources/items/show/1694
94	**CBA2011-17NSG-Devy**	Building Partnerships for Developing a South Asian Canopy Science Research Program	**India**, Japan, Malaysia, Sri Lanka, Australia	EBLU	http://www.apn-gcr.org/resources/items/show/1695
95	**CBA2011-18NSY-Peñalba**	Awareness Raising and Capacity Building on Alternative Water Management for Communal Irrigator's Association in the Philippines	**Philippines**	CC&CV, SPL	http://www.apn-gcr.org/resources/items/show/1696
96	**CBA2012-04NSY-Kanie**	The Exploring Effective Architecture for Emerging Agencies in International Environmental Governance	Cambodia, **Japan,** Thailand, Lao PDR, Viet Nam	CCI	http://www.apn-gcr.org/resources/items/show/1764
97	**CBA2012-06NSY-Zhang**	International workshop: Needs assessment for capacity development for integrated marine biogeochemistry and ecosystem research in the Asia-Pacific region	**China**, Australia, India, Pakistan, Philippines, Korea, Thailand, USA, Chile, South Africa, Turkey	CATMD, CCI	http://www.apn-gcr.org/resources/items/show/1766
98	**CBA2012-07NSY-Arida**	ASEAN Training Workshop on Building Capacity on ABS	Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, **Philippines**, Timor Leste, Thailand, Viet Nam	EBLU	http://www.apn-gcr.org/resources/items/show/1767
99	**CBA2012-08NSY-Hongbo**	Proposal for an international workshop on MIS problems in Northwest Pacific region	**China**, Russia, Japan, Republic of Korea	EBLU, SPL	http://www.apn-gcr.org/resources/items/show/1768
100	**CBA2012-10NSY-Zondervan**	Governing Critical Uncertainties: Climate Change and Decision-Making in Transboundary River Basins	**ESG (IHDP)**, All APN countries	CC&CV, SPL, CCI	http://www.apn-gcr.org/resources/items/show/1770
101	**CBA2012-12NSY-Cruz**	Enhancing the LGU capacity for implementing conservational farming village and a strategy for climate change adaptation and upland environment	**Philippines**	EBLU, RUSD, SPL	http://www.apn-gcr.org/resources/items/show/1772

102	**CBA2012-13NSG-Bora**	Capacity Building in Climate Change Mitigation through Precision Agriculture	**USA**, Thailand, India, Viet Nam, Bangladesh	CC&CV, RUSD, SPL	http://www.apn-gcr.org/resources/items/show/1773
103	**CBA2012-14NSG-Adiningsih**	Creating a Learning Network Among Asian Planning Schools for Climate Change Adaptation Education and Enhancing the Interface with the Global Change Science Community	Cambodia, **Indonesia**, Lao People's Democratic Republic, Malaysia, Philippines, Thailand, Viet Nam	CC&CV, CCI, SPL	http://www.apn-gcr.org/resources/items/show/1774
104	**CBA2012-15NSY-Hiwasaki**	Capacity-building to strengthen resilience of coastal and small island communities against impacts of hydro-meteorological hazards and climate change	Indonesia, Philippines, **Japan**, UK	CATMD, CC&V	http://www.apn-gcr.org/resources/items/show/1775
105	**CBA2012-16NSY-Gordov**	Capacity building to study and address climate change induced extremes in Northern Asia	**Russia**, USA, and China	CC&CV, RUSD	http://www.apn-gcr.org/resources/items/show/1776
106	**CBA2012-17NSY-Pradhananga**	Preparation of Next Generation Leadership in Sustainability: An Approach in the Asia Pacific Region	**Nepal**, USA	RUSD, CCI	http://www.apn-gcr.org/resources/items/show/1777
107	**CBA2012-18NSY-PAGES**	The Past: A Compass for Future Earth - PAGES 2nd Young Scientists Meeting and 4th Open Science Meeting	**PAGES (IGBP)**, Open to all APN member countries	CATMD &SPL	http://www.apn-gcr.org/resources/items/show/1931
FOCUSSED ACTIVITIES					
108	**CRP2006-01NMY CRP2007-01CMY CRP2008-01CMY**	Improving Policy Responses to Interactions between Global Environmental Change and Food Security across the Indo-Gangetic Plain	**Nepal**, Bangladesh, India, Pakistan (Australia, New Zealand, USA)	RUSD, CC&CV, CCI	http://www.apn-gcr.org/resources/items/show/1650
109	**CRP2006-02NMY CRP2007-02CMY CRP2008-02CMY**	Integrated Model Development for Water and Food Security Assessments and Analysis of the Potential of Mitigation Options and Sustainable Development Opportunities in Temperate Northeast Asia	**China**, Mongolia, Russian Federation (New Zealand)	RUSD, CC&CV, CCI	http://www.apn-gcr.org/resources/items/show/1651
110	**CRP2006-03NMY CRP2007-03CMY CRP2008-03CMY**	Climate Change in Southeast Asia and Assessment on Impact, Vulnerability and Adaptation on Rice Production and Water Balance	**Thailand**, Lao PDR, Viet Nam, Cambodia (Australia)	RUSD, CC&CV, CCI	http://www.apn-gcr.org/resources/items/show/1652

111	**CRP2009-01NMY-Weber (project closed in 2nd year)**	Vulnerability Mapping as Policy Tool in Developing Countries	**Fiji**, India and Thailand	CC&CV	http://www.apn-gcr.org/resources/items/show/1677
112	**CRP2009-02NMY-Pereira CRP2010-02CMY-Pereira CRP2011-01CMY-Pereira**	Strengthening Capacity for Policy Research on Mainstreaming Adaptation to Climate Change in Agriculture and Water Sectors	**Malaysia**, Viet Nam, India, Japan	CC&CV, CCI	http://www.apn-gcr.org/resources/items/show/1697
113	**CIA2009-01-Snidvongs**	Climate Change Vulnerability Assessment and Urban Development Planning for Asian Coastal Cities.	**Thailand**	CC&V	http://www.apn-gcr.org/resources/items/show/1698
114	**CIA2009-02-Pulhin**	Capacity Development on Integration of Science and Local Knowledge for Climate Change Impacts and Vulnerability Assessments	**Philippines**	CC&V	http://www.apn-gcr.org/resources/items/show/1699
115	**CIA2009-03-Lun**	Climate Change in the Eastern Himalayas: Advancing Community-Based Scientific Capacity to Support Climate Change Adaptation	**Tibet, China**	CC&V	http://www.apn-gcr.org/resources/items/show/1700
116	**CIA2009-04-Gaol**	Increasing Capacity of Local Scientists for Climate Change Impact & Vulnerability Assessments on Indonesia Archipelagos: Training In-Situ/Satellite Sea Level Measurement	**Indonesia**	CC&V	http://www.apn-gcr.org/resources/items/show/1701
117	**CIA2009-05-Jitpraphai**	Developing Research Capacity on Assessing Community Livelihood Vulnerability to Climate Change Impacts in Central Viet Nam and Mekong River Delta	**Thailand**, Viet Nam	CC&V	http://www.apn-gcr.org/resources/items/show/1702
118	**CIA2009-06-Duc**	Capacity Development for Adaptation to Climate Change in the Rural Coastal Zone of Viet Nam	**Viet Nam**	CC&V, CCI	http://www.apn-gcr.org/resources/items/show/1703
119	**CIA2009-07-Lotia**	Capacity Development of the Scientific Community for Assessing the Health Impacts of Climate Change	**Pakistan,** Malaysia	CC&CV, CCI	http://www.apn-gcr.org/resources/items/show/1704

120	**EBLU2010-01NSY(R)-Suneetha**	Evaluation of Trade-offs between conservation and development- Case of land use change in Malaysia and Indonesia	Indonesia, **Japan**, Malaysia	EBLU	http://www.apn-gcr.org/resources/items/show/1705
121	**EBLU2010-04NMY(C)-Skole EBLU2011-02CMY(C)-Skole**	Developing an MRV system for REDD+: Scaling up from project level to a national level REDD + MRV systems for Laos and Viet Nam	Lao PDR, **USA**, Viet Nam	EBLU	http://www.apn-gcr.org/resources/items/show/1708
122	**EBLU2010-05NMY(C)-Sekiya EBLU2011-03CMY(C)-Sekiya**	Capacity Building of ALOS satellite data to support Mapping and Monitoring Deforestation and Degradation in Indonesia	**Japan**, Indonesia	EBLU	http://www.apn-gcr.org/resources/items/show/1709
123	**RUSD2010-02NMY(C)-Sun RUSD2011-01CMY(C)-Sun**	Assessment and Promotion of Japanese Strategies and Techniques for Biomass Use in Countryside of China -Concentrating on Agricultural Straw Residue	Japan, **China**	RUSD	http://www.apn-gcr.org/resources/items/show/1711
124	**n/a**	International Symposium: Coexistence with Nature "Biodiversity and People – Hyogo Dialogue for the Future "	Japan, Thailand, USA	EBLU	http://www.apn-gcr.org/resources/admin/items/show/1955
125	**AOA2011-01NSY-EMECS**	EMECS9 — Global Summit on Coastal Seas	Japan, USA	CATMD	http://www.apn-gcr.org/resources/admin/items/show/1956
126	**AOA2011-03NSY-HEAA**	Symposium and Training Workshop in Connection with the Hyogo-Mongolian Reforestation Project	Japan, Mongolia	EBLU	http://www.apn-gcr.org/resources/admin/items/show/1957
127	**AOA2011-02NMY-NewCommons**	First workshop on Building Resilience with Common Capital	France, Germany, Japan	EBLU	http://www.apn-gcr.org/resources/admin/items/show/1958
128	**AOA2011-02NMY-NewCommons**	Second workshop on Building Resilience with Common Capital	France, Germany, Japan	EBLU	http://www.apn-gcr.org/resources/admin/items/show/1959
129	**AOA2011-02NMY-NewCommons**	Third workshop on Building Resilience with Common Capital	France, Germany, Japan	EBLU	http://www.apn-gcr.org/resources/admin/items/show/1960

130	n/a	Symposium on Low Carbon Society in Asia through Dissemination of Renewable Energy Technology	Japan, Malaysia	RUSD	http://www.apn-gcr.org/resources/admin/items/show/1961
131	OAA2013-02SY-EMECS	EMECS10-MEDCOAST2013 Joint Conference	Japan, Turkey	CATMD	http://www.apn-gcr.org/resources/admin/items/show/1962
132	n/a	Application of Low Carbon Technology for Sustainable Development in emerging countries	Japan, India	RUSD	http://www.apn-gcr.org/resources/admin/items/show/1963

Key Science Themes

CC&CV: Climate Change and Climate Variability
EBLU: Ecosystems, Biodiversity and Land Use
CATMD: Changes in Atmospheric, Terrestrial and Marine Domains
RUSD: Resources Utilisation and Pathways for Sustainable Development

Other important themes: SPL: Science-Policy Linkages and CCI: Crosscutting Issues

Appendix 3: List of Peer-Reviewed Publications

ARCP

Project Set 1: Sediment Dynamics and Down-stream Linkages in Tropical Streams as Affected by Projected land-cover/Land-use and Climatic Change

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1. Bruun, T., De Neergaard, A., Lawrence, D., & Ziegler, A. (2009, June). Environmental consequences of the demise in swidden agriculture in SE Asia: soil nutrients and carbon stocks. *Human Ecology*, 375-388. doi: 10.1007/s10745-009-9257-y
2. Chang, T., Wang, Y., Feng, C., Ziegler, A., Giambelluca, T., & Liou, Y. (2012, June). Estimation of root zone soil moisture using apparent thermal inertia with MODIS imagery over a tropical catchment in northern Thailand. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, 752-761. doi: 10.1109/JSTARS.2012.2190588
3. Cuo, L., Giambelluca, T. W., Ziegler, A. D. (2011). Distributed-Hydrology-Soil-Vegetation Model Parameter Sensitivity Analysis. Hydrological Processes, 25, 2405-2421.
4. Fox, J., Vogler, J., Sen, O., Giambelluca, T., & Ziegler, A. (2012, May). Simulating land-cover change in montane mainland Southeast Asia. *Environmental Management, 49*(5), 968-979. doi: 10.1007/s00267-012-9828-3
5. Guardiola-Claramonte, M., Troch, P., Ziegler, A., Giambelluca, T., Vogler, J., & Nullet, M. (2008). Local hydrologic effects of introducing non-native vegetation in a tropical catchment. *Ecohydrology, 1*, 13-22. doi: 10.1002/eco.3
6. Guardiola-Claramonte, M., Troch, P. A., Ziegler, A. D., Giambelluca, T. W., Durcik, M., Vogler, J. B., & Nullet, M. A. (2010). Hydrologic effects of the expansion of rubber (*Hevea brasiliensis*) in a tropical catchment. *Ecohydrology, 3*(3), 306-314. doi: 10.1002/eco.110
7. Li, S. Y. and Lu, X. X. and He, M. and Zhou, Y. and Li, L. and Ziegler, A. D. (2011). Daily CO_2 partial pressure and CO_2 outgassing in the upper Yangtze River basin: a case study of Longchuanjiang, China. *Biogeosciences Discussions, 8*(5), 10645-10676. doi: 10.5194/bgd-8-10645-2011
8. Lu, X. X., Li, S., He, M., Zhou, Y., Li, L. & Ziegler, A. D. (2012, May 30). Organic carbon fluxes from the upper Yangtze basin: an example of the Longchuanjiang River, China. *Hydrological Processes, 26*(11), 1604–1616. doi: 10.1002/hyp.8267
9. Sidle R., & Ziegler, A. (2010, April). Elephant trail runoff and sediment dynamics in northern Thailand. *Journal of Environmental Quality, 39*(3), 871–881. doi: 10.2134/jeq2009.0218
10. Sidle, R. and Ziegler, A. (2012). The dilemma of mountain roads. *Nature Geoscience, 5*(7), 437-438.
11. Li, S., Lu, X., He, M., Zhou, Y., Bei, R., Li, L., & Ziegler, A. (2011). Major element chemistry in the upper Yangtze River: A case study of the Longchuanjiang River. *Geomorphology, 129*(1-2), 29-42. doi: 10.1016/j.geomorph.2011.01.010
12. Wood, S., Ziegler, A., & Bundarnsin, T. (2008, October 15). Floodplain deposits, channel changes and riverbank stratigraphy of the Mekong River area at the 14th-Century city of Chiang Saen, Northern Thailand. *Geomorphology, 101*(3), 510–523. doi: 10.1016/j.geomorph.2007.04.030
13. Wang, Y., Chang, T, & Liou, Y. (2010, April). Terrain correction for increasing the evapotranspiration estimation accuracy in a mountainous watershed. *Geoscience and Remote Sensing Letters, IEEE, 7*(2), 352-356. doi: 10.1109/LGRS.2009.2035138
14. Wood, S., & Ziegler, A. (2008). Floodplain sediment from recent 50-year-recurrence floods of the Ping River in northern Thailand. *Hydrology and Earth Systems Science, 12*, 959-973.
15. Lu, X., Li, S., He, M., Zhou, Y., Bei, R., Li, L., & Ziegler, A. (2011, August 05). Seasonal changes of nutrient fluxes in the Upper Changjiang basin: An example of the Longchuanjiang River, China. *Journal of Hydrology, 405*(3-4), 344-351. doi: 10.1016/j.jhydrol.2011.05.032
16. Ziegler, A. D. (2012). Water management: Reduce urban flood vulnerability. *Nature, 481*(7380), 145. doi:10.1038/481145b
17. Ziegler, A. D., Phelps, J., Yuen, J. Q., Webb, E. L., Lawrence, D., Fox, J. M.,…Koh, L. P. (2012, July 26). Carbon outcomes of major land-cover transitions in SE Asia: great uncertainties and REDD+ policy implications. *Global Change Biology, 18*(10), 3087–3099. doi:10.1111/j.1365-2486.2012.02747.x
18. Ziegler, A. D., She, L. H., Tantasarin, C., Jachowski, N. R., & Wasson, R. (2012, May). Floods, false hope, and the future. *Hydrological Processes, 26*(11), 1748-1750. doi: 10.1002/hyp.9260

19. Ziegler, A. D., Fox, J. M., & Xu, J. (2009, May). The Rubber Juggernaut. *Science, 324*, 1024-1025. doi:10.1126/science.1173833
20. Ziegler, A.D., Bruun, T. B., Guardiola-Claramonte, M., Giambelluca, T. W,. Lawrence, D., & Nguyen, T. L. (2009, June). Environmental consequences of the demise in swidden cultivation in montane mainland Southeast Asia: Hydrology and Geomorphology. *Human Ecology, 37*(3), 361 - 373. doi:10.1007/s10745-009-9258-x

Project Set 4: Regional collaborative research on climate change impacts on surface water quality in eastern Monsoon Asia: Towards sound management of climate risks: Ji-Hyung Park

21. Park, J., Inam, E., Abdullah, M. H., Agustiyani, Dwi, Duan, Lei, Hoang, T. T.,…Wirojanagud, W. (2011). Implications of rainfall variability for seasonality and climate-induced risks concerning surface water quality in East Asia. *Journal of Hydrology*, 400 (3-4). 323-332. doi: 10.1016/j.jhydrol.2011.01.050
22. Duong, C. N., Ra, J. S., Cho, J., Kim, S. D., Choi, H. K., Park, J. H.,…Kim, S. D. (2010). Estrogenic chemicals and estrogenicity in river waters of South Korea and seven Asian countries. *Chemosphere*, 78. 286-293. doi: 10.1016/j.chemosphere.2009.10.048
23. Park, J., Duan, L., Kim, B., Mitchell, M.J., & Shibata, H. (2010). Potential effects of climate change and variability on watershed biogeochemical processes and water quality in Northeast Asia. *Environment International*, 36. 212-225. doi: 10.1016/j.envint.2009.10.008

Project Set 5: Marine Biodiversity of The Coastal zones in the NW Pacific: Status, regional threats, expected changes and conservation

24. Belogurova, L.S., Zvyagintsev, A.Y., Moshchenko, A.V. (2007). Meiofauna of fouling communities on the cooling system hydrotechnical installations of Vladivostok Thermoelectric Power Station No. 2. *Izvestiya TINRO*, 150. 250-270.
25. Korn, O.M., Kornienko, E.S., Zvyagintsev, A.Y. (2007.) Naturalization of the hermit crab *Diogenes nitidimanus* Terao, 1913 (Decapoda: Anomura: Diogenidae) in the Vostok Bay of the Japan Sea – hypothesis or reality?. *Izvestiya TINRO*, 150. 291-297.
26. Lutaenko K.A., Xu, F. (2008). A catalogue of types of bivalve mollusks in the Marine Biological Museum. *The Bulletin of the Russian Far East Malacological Society*, *12*, 42-70. People's Republic of China: Chinese Academy of Sciences.
27. Lutaenko, K.A., Zhushchikhovskaya, I.S., Mikishin, Y.A., Popov, A.N. (2007). Climate change and cultural dynamics: A global perspective on mid-holocene transitions. In D.G. Anderson, K.A. Maasch and D.H. Sandweiss (Eds.), Mid-Holocene climatic changes and cultural dynamics in the basin of the Sea of Japan and adjacent areas (pp. 331-406). Amsterdam, etc.: Elsevier Inc.
28. Pavlyuk, O.N., Tarasova, T.S., Trebukhova, Y.A. (2008). Foraminifera and Nematoda communities within the area of *Ahnfeltsia tobuchiensis* field in Stark Strait (Peter the Great Bay of the Sea of Japan). *Russian Journal of Marine Biology*, 34 (3). 151-158. doi: 10.1134/S1063074008030024
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30. Pavlyuk, O.N., Trebukhova, Y.A., Belogurova, L.S. (2007). Effect of the Razdolnaya River on structure of the free-living nematode community of the Amursky Bay, Sea of Japan. *Russian Journal of Marine Biology*, 33 (4). 213-221. doi: 10.1134/s1063074007040025
31. Pavlyuk, O.N., Trebukhova, Y.A., Nguyen, V.T., Nguyen, D.T. (2008). Meiobenthos in estuary part of Ha Long Bay (Gulf of Tonkin, South China Sea, Viet Nam). *Ocean Science Journal*, 43 (3), 153-160. doi: 10.1007/BF03020696
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Project Set 7: Climate Perturbation and Coastal Zone Systems in Asia Pacific Region: Holistic Approaches and Tools for Vulnerability Assessment and Sustainable Management Strategy (Dutta)

35. Alam, M. J., & Dutta, D. (2013). Predicting climate change impact on nutrient pollution in waterways: A case study in the upper catchment of the Latrobe River, Australia. *Ecohydrology*, *6*(1), 73–82. doi:10.1002/eco.282
36. Alam, M. J., & Dutta, D. (2012). A process-based and distributed model for nutrient dynamics in river basin: Development, testing and applications. *Ecological Modelling*, *247*, 112–124. doi:10.1016/j.ecolmodel.2012.07.031
37. Bhuiyan, M. J. A. N., & Dutta, D. (2012b). Assessing impacts of sea level rise on river salinity in the Gorai river network, Bangladesh. *Estuarine, Coastal and Shelf Science*, *96*, 219–227. doi: 10.1016/j.ecss.2011.11.005
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Project Set 8: Asian Mega-deltas: Monsoon circulation in relation to deltaic-coastal hazards and future mitigation – millennial to seasonal dimensions (email sent 2nd June for special issues).

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