APN CAPaBLE

- Making a Difference –

Scientific Capacity Building & Enhancement for Sustainable Development in Developing Countries

ESSP's 2nd Young Scientists' Global Change Conference (YSC) and ESSP's Open Science Conference (OSC)

Final Report for APN CAPaBLE Project:
CBA2006-02NSY-ESSP
Project Leader: Roland Fuchs
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CHINA METEOROLOGICAL ADMINISTRATION

Earth System Science Partnership

DIVERSITAS IGBP IHDP WCRP

START

IHDP • IGBP • WCRP

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Project Reference Number: CBA2006-02NSY-ESSP

Final Report submitted to APN

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Part I: 2nd International Young Scientists' Global Change Conference

Overview of project work and outcomes

Non-Technical Summary

The International Young Scientists' Global Change Conference took place November 5-8, 2006 at the Science and Technology building on the China Meteorological Administration campus in Beijing, China. The conference was organized by START, the global change SysTem for Analysis, Research and Training and the China Meteorological Administration, on behalf of the Earth System Science Partnership.

The conference offered a prestigious platform for young scientists from 35 countries around the world to present their research findings to one another and leading scientists in the field. It was intended, and succeeded in stimulating competition, encouraging excellence, rewarding outstanding performance, and fostering the development of personal and institutional networks. All YSC participants also took part in the Earth System Science Partnership's Open Science Conference, "Global Environmental Change: Regional Challenges" (November 9-12, 2006, Beijing International Conference Center) thereby furthering their professional development.

Some 100 participants, from 35 countries were selected by international review panels from over 700 applications. APN support made possible participation of 30 young scientists from the Asia-Pacific region. An additional 35 young Chinese scientists were selected by the China Meteorological Administration for poster presentations as a side event.

Distinguished invited keynote speakers included Prof. Congbin Fu and Nobel Laureate Paul Crutzen. Sessions were chaired by leading members of the global change research community. As with the highly successfully 2003 First YSC Prof. Peter Tyson again served as chair of the organizing committee.

Objectives

The identification, recognition and encouragement of talented young scientists and development of their personal and professional networks are important components of capacity building. This was precisely the objective of the YSC.

The project aimed to:

- Identify, recognize, and encourage talented young scientists.
- Stimulate presentation and discussions of research findings.
- Facilitate development of the young scientists personal and professional networks as an important component of capacity building.
- Foster the integration of the young scientists into the broader global change science community as well as regional communities, such as the community represented by APN.

Amount received and number years supported

The Grant awarded to this project was:

- US$ 50,000 to YSC for one year.

Work undertaken

The overall project involved selection of 100 outstanding young scientists (30 supported by APN) to present their research in the 2nd Young Scientists' Conference and to participate in the following ESSP Open Science Conference. This involved establishing an organizing committee; an applications and review process involving the international science community for review of over 700 completed applications, and a final selection committee. This together with related correspondence, and coordination of logistics with the CMA, local hosts, and ESSP imposed a substantial burden on the staff and international networks involved. However it resulted in a tightly run and widely admired conference with a generally high level of presentations and strong interaction among participants and with senior colleagues.

Results

The YSC conference fully achieved its objectives in stimulating research across a broad spectrum of global change science including: exchange of research findings, exposure to new concepts, building self confidence, encouraging a high degree of interaction among young and more senior scientists, and furthering personal and professional network development (for further details download abstract book from http://www.start.org/YSC/pages/ConferenceProgram.html).

Relevance to the APN CAPaBLE Programme and its Objectives

A major objective of the APN CAPaBLE Programme is stated as:

"Capacity building of aspiring scientists through sharing of knowledge, experience, scientific information and data collection on climate change impacts, vulnerabilities, adaptation and mitigation."

The YSC objectives were essentially the same.

Self evaluation

That the conference was a resounding success was evident from participant reaction at the time and response to a questionnaire subsequently administered. This covered conference organization, format, benefits to participants, strong and weak points, and recommendations for the future. Responses were uniformly positive in praising the conference organization and execution, benefit to their career and network development, and their interactions, with one another and the broader community to which they were introduced. Almost all favored the idea of having future YSC back-to-back with other global change meetings. There were also suggestions that the conference would have benefited had there been an extra day available (as in the previous YSC).

Potential for further work

For many participants this meeting was their first experience in an international multidisciplinary meeting. A number will most likely go on to make significant contributions to international global change science. A number of collaborative efforts among the young scientists, and perhaps with senior scientists can also be expected.

There was considerable interest in having future Young Scientists' conferences, including possibly at the regional level. The START Secretariat was asked by its Scientific Steering Committee to explore this further, including possible collaboration with APN.

Publications

This workshop produced:

1. Abstract book (available on the webpage below)
2. Web page - http://www.start.org/YSC/YSC2006.html
3. All participants were encouraged to develop their papers and presentations into full-length papers for submission to peer-reviewed journals.
4. A special journal issue, organized by participants is now in process.

Acknowledgments

The conference was made possible through financial support by some eleven organizations. APN was a major contributor and made possible participation of some thirty young scientists from the Asia-Pacific region in both the Young Scientists' Conference and ESSP Open Science Conference. Its support is gratefully acknowledged as is that of the other donors including the CMA as local host organization and not least the volunteered time of many senior scientists including Conference Chair Prof. Peter Tyson, and keynote speakers, Nobel Laureate Prof. Paul Crutzen, and Prof. Congbin Fu.

Technical Report

Abstract

The International Young Scientists' Global Change Conference took place November 5-8, 2006 on the China Meteorological Administration campus in Beijing, China. The conference was organized by START and the China Meteorological Administration, on behalf of the Earth System Science Partnership.

Some 100 participants, from 35 countries were selected by international review panels from over 700 applications. APN support made possible participation of 30 young scientists from the Asia-Pacific region.

The conference offered a prestigious platform for young scientists from 35 countries around the world to present their research findings to one another and leading scientists in the field. All YSC participants also took part in the ESSP Open Science Conference (November 9-12, 2006, Beijing International Conference Center) thereby furthering their professional development.

Distinguished invited keynote speakers included Prof. Congbin Fu and Nobel Laureate Paul Crutzen. Sessions were chaired by leading members of the global change research community. As with the highly successfully 2003 First YSC Prof. Peter Tyson again served as chair of the organizing committee

1.0 Introduction

YSC: The future of global change science is dependant on attracting young scientists to its community, furthering their research capabilities, and integration of young scientists into global scientific programs and networks. A specific challenge is that of assisting young global change scientists from developing regions where global change science has not been a high priority until quite recently.

The Young Scientists Conference has its specific objectives:

- Identify, recognize, and encourage talented young scientists.
- Stimulate presentation and discussions of research findings.
- Facilitate development of the young scientists personal and professional networks as an important component of capacity building.
- Foster the integration of the young scientists into the broader global change science community as well as regional communities, such as the community represented by APN.

These objectives coincide closely with those of the CAPaBLE program, in particular the objectives:

> "Capacity building of aspiring scientists through sharing of knowledge, experience, scientific information and data collection on climate change impacts, vulnerabilities, adaptation and mitigation."

Young scientist and the ESSP OSC: Participants in the YSC also participated (by attending sessions, presenting papers and posters) in the immediately following ESSP OSC (Described below) which provided an exceptional opportunity to learn of advances

across the broad spectrum of global change science and to encounter many of the nearly 1000 participants, take part in discussions, and further broaden their personal and professional networks.

2.0 Conference Outputs

List the outputs here with a description of each. Links can also be included here to the PAGES websites (outputs may also be placed in the appendix section of CDROMS – see appropriate section).

- Abstract book – Wire bound abstract book of 143 pages details conference proceedings, keynote speaker biographies, participant abstracts, and funder listings. Distributed to START regional centres, all funders, and available upon request and on web below.
- Web page - http://www.start.org/YSC/YSC2006.html – Provides participant abstracts and displays conference overview, award winners, presentation titles, program, and pictures.
- All participants were encouraged to develop their papers and presentations into full-length papers for submission to peer-reviewed journals.
- A special journal issue, organized by participants is now in process.
- A number of young scientists have been highlighted in several newsletters and articles as a result of their conference participation (for example those highlighted in the CAPaBLE updates section of the most recent APN newsletter)

3.0 APN-Funded Participants

Use of Funds: APN support was crucial to the success of the 2nd International Young Scientists' Global Change Conference. Many of these outstanding scientists would not have had the resources to travel to Beijing and participate in the YSC had it not been for APN support. The funds contributed by the APN enabled thirty young scientists, or approximately 30% of all participants to take part in the conference YSC as well as the following ESSP Open Science Conference. Funds were used to cover travel, accommodation, subsistence, common costs for the YSC, and registration fees for the OSC. A detailed cost breakdown for each participants is included in the appendix.

Almost half of APN funds (US $ 24,864.57) were spent on plane tickets. The common cost of the YSC was US $300.00 per participant or US $9000.00 total. APN also supported hotel cost (US $ 2,460.00) and registration fees (US $4,650.00) for the young scientist's participation in the larger ESSP Open Science Conference, held directly after the YSC. The remaining balance of funds (US $ 9025.09) went towards participant perdiem, covering meals, visa costs, and travel expenses for young scientists.

Supported Participants: Selection of participants followed a rigorous multi-tiered review process. A widely disseminated call for proposals (involving APN and its national contacts) resulted in over 1000 initial inquiries and 700 completed applications. Reviews of the applicants involved a large number of global change scientists drawn from the international science programmes and selection of 100 most highly ranked young scientists by a selection committee. A listing of these young scientists supported by the APN including name, country, paper or poster title, and contact information follows. Full abstracts of each presentation can be found in the program abstract book attached in the appendix.

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Study on the effect of elevated carbon dioxide on nitrogen and carbon fixation by the marine diazotroph *Trichodesmium*
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Reconstructing El Niño-Southern Oscillation (ENSO): Integrating evidence from tree-ring, coral, ice core and documentary palaeoarchives, A.D. 1525-2002
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The potential of private forest management in climate change policy in Korea
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Convective lifting of South Asia pollution to the upper troposphere during the Asian summer monsoon: Linking regional pollution to global climate change
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Intensification of 400,000 year signal in Northern Hemisphere climatic proxies 4 million years ago
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Assessing adaptive capacity to tropical cyclones in the east coast of India: A pilot study of public response to cyclone warning information
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Vulnerability of wheat production in different climatic zones of Pakistan under climate change scenarios using CSM-CERES-Wheat Model
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Synthesis of Earth system measurements and modeling for the post-industrial period and future
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The postnormal science perspective on knowledge production in the Intergovernmental Panel on Climate Change
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Benefits of attending the 2nd International Young Scientists' Global Change Conference: The current interests of each APN funded participant will be evident from their paper titles as indicated above and described more fully in their full abstracts (see abstract book). They covered a wide range of global change sciences from past environments to contemporary issues of societal consequences of climate change, and adaptation and mitigation measures. That the conference was a resounding success and highly beneficial to participants was evident from comments at the time and those received in response to a subsequent questionnaire. This covered conference organization, format, benefits to participants, strong and weak points, and recommendations for the future. Responses were uniformly positive in praising the conference organization and execution, benefit to their career and network development, and their interactions, with one another and the broader community to which they were introduced. A selection of participant response follows:

YSC on Global Change was great experience for me to meet people from different fields, to learn a lot more about global change problems and what and how people are doing to mitigate the global change problems. I am working on dust aerosol and its interaction with ocean water. I presented a poster on the theme "The production of isoprene from the interaction between dust particles and seawater". I was surprised about the interest and motivation of the other young scientists like me during the poster session discussion at the conference. The conference was really fruitful for getting to know many other young and senior scientists in the field and I am sure we could well benefit from these new contacts in the near future when establishing our careers. **– Ariunaa Batsaikhan**

YSC, 2006 was a perfect platform to exchange our research ideas with other young scientists from different fields of science as well as to discuss our problems with the senior scientists and it was not only helpful to gain some knowledge, but also helped us to enjoy the science in an enthusiastic way. **- Haimanti Biswas**

My future research will lie in climate change and impact studies. This conference has been a brilliant experience for me. It inspires largely my research interest into other disciplines, such as ecology and hydrology. I have been benefiting from it greatly especially by the network setup with other young scientists during it. One additional extraordinary output is to prepare one manuscript for the RIEMS special issue organized by START-TEA. – **Xuefeng Cui**

I learned a lot from the presentations and made some good friends. – **Chaochao Gao**

My PhD addressed uncertainties surrounding late 20th century El Niño extremes. This involved reconstructing the long-term history of El Niño using high-resolution palaeoarchives (tree-rings, corals, ice-cores and historical documentary records).

The YSC gave me practice in communicating the essence of my research to a multi-disciplinary audience. This is essential for the collaborative initiatives that are needed to tackle the serious issues posed by global change. It was excellent to be able to share data/publications/knowledge with people from varying disciplines. For me it was great to see that people were interested in a direct application of my research. **- Joelle Gergis**

My field of interest is socio-economic aspects in implementing ecosystem conservation focusing on financial compensations for ecosystem services such as carbon sequestration, watershed management, and biodiversity protection. Those two conferences gave me a chance to understand what issues were highlighted and what research were needed in global environment change, which provided me with ideas to

design a more practical research. In addition, participants' activities in various fields and regions could be a potential expert network for further cooperations. **– Ki Joo Han**

These conferences provided me a great opportunity to increase my understanding of the research and problems in the field of Atmospheric sciences. I was able to interact with many world known scientists including the noble prize laureate Dr. Paul J. CRUTZEN. During the poster presentation, I came across many suggestions about my work which definitely increased my vision to polish this study in the more scientific way. In OSC, many different lectures from the experience scientist of the world have increased my knowledge in the field of climate modeling as well as climate systems. My participation in YSC has definitely helped me in developing my interest and vision for my research and scientific career. At the end, I am very thankful to APN for funding me to participate in this activity. – **Siraj Ul Islam**

I found the conference a wonderful opportunity to meet and learn about the work of young scientists from different disciplines and countries. I was able to present and received feedback on my research "Vulnerability and adaptation to climate variability and water stress in Uttaranchal state, India." This forum was important at this stage in my career not only to improve the quality of my research, but also to expand my horizons and explore possibilities of collaboration with my fellow presenters. Participating in the Young Scientists Conference also allowed me to attend the ESSP Open Science Conference, and learn about the activities of various climate science programmes, as well as to interact with senior scientists. – **Ulka Kelkar**

My fields of interest are paleoclimates, paleooceanography and stable isotope geochemistry. I'm interested in how earth's climate changed for the last 5 million years on various timescales. My recent research projects include glacial-interglacial variability and Holocene (last ~10 thousand years) climate (temperature and hydrology) variability in the Monsoon Asia region. As a participant of the YSC, it benefits me in many ways. Networking is very important for me at this stage of my career, which fosters a lot of potential future collaborations and funding sources. My presentation at YSC also brought attention of scientists in related fields. I'm invited to contribute my presentation to the ESSP MAIRS project. - **Liu Zhoughui**

Working in the field of climate impact assessment, my research interest varies from climate modelling to vulnerability, resilience analyses and sustainable development. It is essential for a young scientist like me to communicate with other young colleagues as well as senior scientists to further my study and establish networking within the scientific community. The Second International Young Scientists held in Beijing in November 2006 has given me such opportunities. The conference is not only an interesting scientific forum, where different research topics were discussed and shared, but also an invaluable opportunities for us young scientists to meet each other from which an informal network, which I hope will be formal in the near future, to share, exchange and communicate our studies. Meeting senior scientists also gave us opportunities to seek funding for our research and be a part of a larger scientific network. - **Huy Luong, Quang**

My research interest is in mechanisms of orbital-scale and tectonic-scale climate change. Thus my research focuses on paleoclimate reconstruction. And before going to this YSC, I didn't really care about the climate and environment change in the modern days, the last century, and the last millennium because the previous conferences I went before were all more specific, i.e. very closely related to my own field. However, by going to this YSC, I had a chance to spend 3 days in listening to my other colleagues' work, which is pretty diverse but focuses more on the climate and environment change in the modern days, the last century, and the last millennium.

This makes me realize the importance of the climate change in multi-scales. Also, it makes me realize that how my current works fit into the general framework of climate change. I feel that I benefited a lot from this conference and I hope to continue to attend this conference in the future. - **Junsheng Nie**

Attendance at the YSC provided me with a great opportunity to interact with other young scientists and leading researchers in the field of climate change. I came to the conference with a background in plant and soil science, in particular, the measurement of terrestrial C storage and emissions from different subtropical land uses. The diversity of subjects discussed in the conference, was a wonderful introduction to the multi-disciplinary approaches used to address global change and an incredible learning experience. The YSC also gave me the chance to present my own work and interact with other young scientists and senior scientists working in climate change research. During my poster presentation I received valuable feedback and made many new contacts with other young scientists in my field. This has given me a link to an extensive network of global change scientists, who will be at the forefront of their fields in the next few years. Overall, I am extremely grateful to APN for giving me the opportunity to attend the YSC. The experiences that I have taken away from these conferences will be invaluable to my future career in global change science. - **Anna Richards**

During my time at YSC, I was amazed at how diverse the Problem of Global Change really is. My interests are in Marine Biology, particularly in Coral Reef Ecology, and because of that conference my scientific vision is much wider today than before. As a result of this conference I was able to link up with many young scientists spanning the entire globe, many of whom I still keep in touch with, and for me, this is the biggest thing I took away from YSC. I hope my connections will remain and grow even stronger in the future, and that is going to be very important to face Global Changes. Last but not least, I would like to express my gratitude to all the people who were involved in the 2006 YSC conference. – **Kazuyo Shiroma**

My interest focused on constructing long-term tree ring chronologies (more than 2000 yr.), revealing response of trees on environmental changes in the recent period and in the past, establishing reaction of trees on extreme events (atmospheric circulation, volcanic eruptions and fire), revealing physiological mechanism and reaction of trees to climatic changes by using isotope analysis ($\delta^{13}C$, $\delta^{18}O$).

The Young Scientific Conference which took a place in Beijing, China in November 7-8 was very good start for new contacts, collaboration and allowed to extend my knowledge about other scientific work. I think that such kind of meeting very useful for young scientist and give us unique opportunity for presenting our results and discussion joint scientific problems. I'm very appreciating for this chance to start together with START. Thank you! - **Olga Sidorova**

The conference provided me an exposure to the scientific community and broadened my vision on different aspects of global changes. Especially the discussion with fellow researchers doing similar research was very stimulating and surely will be helpful to improve my research skills. Apart from being a learning activity, it was an exciting gathering of enthusiastic participants from different nationalities, with different cultures and scientific backgrounds. I returned back from the conference with feeling of motivation to improve my work and a number of new connections to interact with. – **Humaria Sultana**

I developed a global-annual-mean model for carbon cycle, atmospheric chemistry, and climate system and use such a model for inverse calculations to analyze the

interdependences of the uncertainties. Through the participation in the International Young Scientists' Global Change Conference, I mainly benefited from the high quality of the presentations and the eagerness of the participants to interact together. The participants were geographically well-diversified and the conference venue was in Beijing -- it was also a cultural exposure for me. After some months, email communications still continue for research collaborations and friendships. I thank for the conference participants and organizers! **- Katsumasa Tanaka**

My research interests include investigating the response mechanisms and tempo-spatial patterns of terrestrial ecosystem to climate change and variability in the past and future by experiments, remote sensing images and models. In the 2nd YSC and ESSP conference, I saw a lot of interesting presentations, and also exchanged ideas with some excellent colleagues. I learned more about the frontier researches and scientists in global change field in a lively manner. I really enjoyed it. **- Fulu Tao**

I gained many important research information from the conference. I communicated with many foreign friends and practiced my English. – **Juan Wang**

My research work focuses on the nutrient dynamics in savanna ecosystem in southern Africa, namely, the Kalahari. Specifically, I am looking at how nutrients and water interactively control the savanna ecosystem and developing new tools to better monitor the system dynamics. The YSC definitely helped me broaden my view of my research, and helped me put my own research into a bigger context. In addition, I found out some of the meeting organizers did some pioneers work in the same systems as I did, it always be good to hear valuable experiences from older generations and carry on the research work. Last but not least, I had the chance to meet many African colleagues during the meeting, which I believe will be a tremendous help for my later research. **- Lixin Wang**

I attended lots of young scientists' oral or poster presentation and learned about many cutting edges of the research in Global Change. Their research work and wonderful presentation enlarged my horizon. This international young scientists' global change conference did provide a very good platform for us young scientists to communicate freely and to show our original thoughts and intensive research work. – **Shaoqiang Wang**

YSC give me chance to communicate with the top scientists and the young scientists come from world. In addition, YSC give me chance to show my newest research results. – **Tao Zhou**

4.0 Conclusions

The Young Scientists' Conference as its predecessor was apparently a transformative experience for the young scientists involved. Participation in the ESSP Open Science Conference added greatly to this experience not least by adding to the self-confidence of many of the young scientists who came to realize that they could "compete" at an international level. Participation broadened their personal and professional networks in ways that will contribute significantly to their career development.

For many it was their first opportunity to participate in international meetings. To do so first in the context of a small meeting interacting with other young scientists, and sympathetic senior scientists, and then in a large international meeting was an extraordinary experience.

The high level of their disciplined presentations, energetic and constructive discussions, and their intense interaction with one another, as well as with the more senior representatives of global change science attending was impressive. It is quite likely that the conference will have long term consequences in the form of future research informed by new perspectives and frameworks, collaborative international and interdisciplinary research, and integration in the international science programs. APN can take great pride in the success of the conference and its role in helping make it possible.

PART II - ESSP Open Science Conference

Overview of project work and outcomes

Non-technical summary

ESSP Open Science Conference (ESSP OSC): Following the first Global Environmental Change Open Science Conference in July 2001, which brought together scientists and other interested parties from 105 countries (including APN-funded participants from the Asia-Pacific region), the ESSP has created four major interdisciplinary studies of carbon, food, health and water to explore the relationship between global environmental change and sustainable development. In addition, the ESSP has initiated the first of a series of integrated regional studies (with APN support). It was, therefore, the right time to once again bring together researchers (including those from the APN community) working on global environmental change to present advances in Earth System Science and lay plans for the future.

Objectives

The present project aimed:
1) To present the results of the last five years of global environmental change research, emphasising the Earth System Science approach, in particular as it relates to carbon, food, health and water (opportunity for APN to showcase its research).

2) To highlight the rich variety of research conducted by the global environmental change community, particularly the GEC programmes' core and joint projects, and how that research contributes to and supports the objectives of the ESSP.

3) To point the way for the next decade of Earth System Science (and identify opportunities for closer collaboration between the APN and ESSP).

Amount received and number years supported

The Grant awarded to this project was:

- US$ 25,000 for Year 1

Work undertaken and Results

The ESSP OSC in Beijing was a major success with over 900 scientists, policy-makers, and journalists in attendance. The next generation of Earth System Science researchers were also in attendance following the successful Young Scientists' Conference, organized by START. Highlights of the Conference included an impressive variety of keynote presentations on advances in Global Environmental Change to Earth

System Science and the way forward. There were 44 parallel sessions ranging from Monsoon Asia to the future of Earth System Modelling to the governance of water, food, and carbon and over 500 poster presentations. Major outcomes of the Conference included the launch of the new ESSP Joint Project on GEC and Human Health as well as the launch of the Monsoon Asia Integrated Regional Study (MAIRS) initial Science Plan. The ESSP Open Science Conference delivered a message of urgency to governments to take action on issues of global environmental change and sustainable development. The Conference also received wide media attention, ranging from Chinese and German national TV, the Economist and the Financial Times, Nature, the BBC website and The Independent and Guardian Newspapers. For a complete list of media coverage, access: www.essp.org/en/media/media-coverage.html.

See Conference highlights, http://www.essp.org/en/integrated-regional-studies/open-science-conferences/beijing-2006/today-in-beijing.html

Launch of ESSP Monsoon Asia Integrated Regional Study, http://www.essp.org/en/media/press-releases/061108-press-release-mairs-launch.html

Launch of ESSP Joint Project on GEC and Human Health, http://www.essp.org/fileadmin/redakteure/pdf/GEC_HHSciPlan.pdf

Relevance to the APN CAPaBLE Programme and its Objectives

The ESSP OSC highlighted what has been learned from the Earth System Science approach to studies (that relate directly to the APN science agenda) of the physical, biogeochemical, biodiversity, and human dimensions aspects of global environmental change. Science in support of sustainability also featured, with special sessions on global environmental change research relating to carbon, food, human health, and water; as reflected in the ESSP joint projects and the activities of the APN CAPaBLE Programme. Research (with co-funding from the APN) concerning global environmental change in monsoon Asia (MAIRS) was a particular focus of the OSC.

Self evaluation

The ESSP Open Science Conference exceeded expectations and was very successful indeed. Participant evaluations for the OSC are still being compiled but the responses, thus far, are extremely positive.

Potential for further work

1. Session-related articles in peer reviewed journals
2. Establishment of research networks
3. Project planning at an international level
4. Capacity enhancement of Asia-Pacific researchers

Publications

Conference programme and abstract book was produced.

Acknowledgments

Participation of Asia-Pacific researchers at both the YSC and OSC would not have been possible without the generous support of the APN.

Technical Report

Abstract

Following the first Global Environmental Change Open Science Conference in July 2001, which brought together 1400 scientists and other interested parties from 105 countries (including APN-funded participants from the Asia-Pacific region), the ESSP has created four major interdisciplinary studies of carbon, food, health and water to explore the relationship between global environmental change and sustainable development. In addition, the ESSP has initiated the first of a series of integrated regional studies (with APN support). It is, therefore, the right time to once again bring together researchers (including those from the APN community) working on global environmental change to present advances in Earth System Science and lay plans for the future.

1.0 Introduction

The first Global Change Open Science Conference in Amsterdam in July 2001 brought together 1400 scientists and other interested parties from 105 countries to describe, discuss and debate the latest scientific understanding of natural and human-driven changes to our planet. They examined the effects of these changes on our societies and our lives, and explored what the future might hold. A proceedings volume entitled “Challenges of a Changing Earth” has been published by Springer.

Participants at the Conference signed “The Amsterdam Declaration on Global Change” which, amongst other things, stated that “A new system of global environmental science is required.” It called for strengthening of current cooperation amongst the global environmental change research programmes and for greater integration across disciplines, environment and development issues and the natural and social sciences. It also called for greater collaboration across national boundaries and for intensified efforts to enable the full involvement of scientists from developing countries.

In response to the Declaration, the four international global environmental change research Programmes: DIVERSITAS – an international programme of biodiversity science; the International Geosphere-Biosphere Programme (IGBP); the International Human Dimensions Programme on Global Environmental Change (IHDP); and the World Climate Research Programme (WCRP) joined together to form the Earth System Science Partnership (ESSP) devoted to the study of the integrated Earth System.

Since its inception the ESSP has established Joint Projects on carbon, food, health and water, as major interdisciplinary studies to explore the relationship between global environmental change and sustainable development. These projects and the ongoing core Programmes take an Earth System Science approach that brings together researchers from diverse fields and from across the globe, to undertake an integrated study of the Earth system, its structure and functioning, the changes occurring to the system and the implications of those changes for global sustainability. In addition, the ESSP has initiated the first of a series of integrated regional studies, in Monsoon Asia. The ESSP has decided that, five years after the first Global Change Open Science Conference, it is now time to once again bring together the worldwide global environmental change research community to assess progress since the Amsterdam meeting and to lay plans for the future.

Audience and outreach:

The Conference attracted scientists and others interested in the Earth System Science

approach to global environmental change research. This included members of the broader global environmental change science and development communities, including policy makers, practitioners, journalists and members of the private sector.

Immediately prior to the main Conference, the 2nd International Young Scientists (YSC) Global Change Conference (5-8 November 2006) organised by the ESSP SysTem for Analysis Research and Training (START) provided an opportunity for selected young scientists to present and discuss their work and to participate in the ESSP Open Science Conference. A special effort was made to attract and support scientists from developing countries and post-doctoral researchers and graduate students to participate in the OSC. The OSC International Organizing Committee and START worked together to ensure that capacity building was an important element of both events.

This ESSP Open Science Conference was different from the OSC of the GEC Programmes in that it focused on the integrative and multidisciplinary aspects of the whole of the ESSP, especially the ESSP joint projects. There was also a special evening event to celebrate over 25 years of WCRP research.

Sessions:

The Conference programme emphasised plenary sessions in order to meet the Conference objective of bringing together practitioners from many different disciplines to focus on the integrated Earth System approach to global environmental change research. A Call for Session Proposals was issued in October 2005 and a Call for Papers was issued in February 2006. The exact nature of the programme was determined by the International Organising Committee based on the response to the Call for Sessions. Major sessions topics included: integrated regional studies with emphasis on Monsoon Asia; integrative modelling of the water, carbon and other cycles; role of science in informing public policy development; role of science in development, including food security, health and water management; and characteristics, impacts and responses to extreme events.

Conference Objectives:

- To present the results of the last five years of global environmental change research, emphasising the Earth System Science approach, in particular as it relates to ESSP Joint Projects on carbon, food, health and water.
- To highlight the rich variety of research conducted by the global environmental change community, particularly the Core Projects of the four international GEC Programmes, and how that research contributes to and supports the objectives of the ESSP.
- To point the way for the next decade of Earth System Science.

Conference themes:

- Earth System Science Approach: New advances in studies of the physical, biogeochemical, biodiversity, and human dimensions aspects of global environmental change.
- Science for Sustainability: Global environmental change research relating to carbon, food, human health, and water; as reflected in the ESSP Joint Projects.

- Integrated Regional Studies: The dynamics, impacts and consequences of the interactions between natural and social systems at regional scales, including extreme events, and how they connect with global-scale phenomena.
- Global Change in Monsoon Asia: Global environmental change research in monsoon Asia.

2.0 Conference Outputs

The ESSP OSC in Beijing was a major success with over 900 scientists, policy-makers, and journalists in attendance. The next generation of Earth System Science researchers were also in attendance following the successful Young Scientists' Conference, organized by START. Highlights of the Conference included an impressive variety of keynote presentations on advances in Global Environmental Change to Earth System Science and the way forward. There were 44 parallel sessions ranging from Monsoon Asia to the future of Earth System Modelling to the governance of water, food, and carbon and over 500 poster presentations. Major outcomes of the Conference included the launch of the new ESSP Joint Project on GEC and Human Health as well as the launch of the Monsoon Asia Integrated Regional Study (MAIRS) initial Science Plan. The ESSP Open Science Conference delivered a message of urgency to governments to take action on issues of global environmental change and sustainable development. The Conference also received wide media attention, ranging from Chinese and German national TV, the Economist and the Financial Times, Nature, the BBC website and The Independent and Guardian Newspapers. For a complete list of media coverage, access: www.essp.org/en/media/media-coverage.html.

Conference Outcomes:

- Higher visibility for the ESSP (and APN), across a broad community.
- Further development of cohesiveness within and planning of the ESSP, with involvement of a broad community, to set future directions of the ESSP.
- Recommendations for Programme directions and involvement of governments and others.
- Input into the future evolution of major initiatives.

Launch of ESSP Monsoon Asia Integrated Regional Study,
http://www.essp.org/en/media/press-releases/061108-press-release-mairs-launch.html

Launch of ESSP Joint Project on GEC and Human Health,
http://www.essp.org/fileadmin/redakteure/pdf/GEC_HHSciPlan.pdf

3.0 APN-Funded Participants

ESSP OSC participation was open to scientists (from all APN member and approved countries) who are interested in the Earth System Science approach to global environmental change research. The following are APN-funded ESSP OSC participants:

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Abstracts contributed by APN-supported participants and general comments based on experience of attending ESSP OSC

STUDY ON THE SUSTAINABLE DEVELOPMENT OF THE METROPOLITAN INTERLOCKING REGION IN SHANDONG PENINSULA: BASED ON THE ANALYSIS OF WATER SHORTAGE AND WATER RESOURCE PROTECTION

P. Wu, China

Developing Metropolitan Interlocking Regions (MIR) is China's new urbanization strategy. Shandong, a populous province in eastern China, is experiencing rapid urbanization process. The 8 megacities in Shandong Peninsula, including 35 small cities in their administrative precincts, are programmed by the local government as a whole MIR based upon the convenient intercity transportation, highly developed urban infrastructure and urban economy, and the immense potential for urbanization.

However, the water resource in Shandong Peninsula is most scarce, where the per capita water possession is only one sixth of that in China. Water shortage exists in every city or town and is an obstacle to the local economy. Much more, the excess and irrational water use has resulted in environment problems such as water pollution, ground water table dropping and seawater invading. It is no doubt that the urban population will expand and the water crisis will be more serious following the urban sprawl.

This study analyzes the current utilization and problems of water resource in Shandong Peninsula MIR, predicts the urbanization process and urban water consumption, and brings forward strategies for sustainable development of Shandong Peninsula MIR. It points out that the water shortage and water environmental problems in the MIR are mainly influenced by urban scale and distribution, urban industry structure and water use efficiency. Restricting high water consumption industries, strengthening tertiary industry, renovating production techniques to reduce sewage, using new water resources such as purified sewage, rain and seawater, harmonizing the rural–urban water resources are some of the suggested countermeasures.

MANAGEMENT STRATEGIES FOR URBAN COASTAL ZONES: INTEGRATING DPSIR CONCEPTS WITH GIS TOOLS IN PEOPLE'S PARTICIPATORY PROGRAMS.

N. Alungal Balchand, India

Management strategies for urban coastal zones has evolved through recent ages, mostly relying on our fundamental understanding of the complex environmental processes embedded in these fragile systems, driven by the urge to endure and proliferate in such fringe regimes. This paper describes the "Kerala Model", now re-defined, to the urban area of Cochin, which places emphasis on the sustainable use of resources in an epoch of global environmental change. A theory of continuum in managing the affairs of this city is aimed at establishing ecological integrity vis-à-vis economic security vis-à-vis social equity. The management pathways now adopt multi prone approaches: top – down (mostly conventional) to middle bulge (experimental) to bottom up (community driven), ably aided by science and technology. With the advent of Geographical Information Systems (GIS), now a new dimension has been achieved wherein, Driving Force – Pressure – State – Impact – Response (DPSIR) concepts can be better explained, understood and applied purposefully. Coupling these to purely societal initiatives such as People's Participatory Programs (PPP) has led to

new innovative experiences in the realm of coastal urban zone management so as to combat likely environmental changes.

Comment: “My functions, officially at University and personal, within societal circles, aim at creating general and specific awareness among a vast cross-section of people, but more focussed to students, researchers and environmentalists, the sense of evolving management strategies for coastal zones with people’s participatory programs. In this background, the ESSP OSC in Beijing enlightened my thoughts on the ongoing practices elsewhere in maritime states, Asia in particular, as we surge forward to tackle frequent natural (in light of global change) and man made (technology induced) issues of the coasts. I am pleased to confirmation, thanks to APN support, the enrichment of my knowledge leading to disseminating new approaches in CZM, problem analysis, re-kindle the urge and passion of public as well to initiate the restructuring of the curriculum at my university department.”

INTEGRATING HUMAN DIMENSIONS AND COASTAL ZONE MANAGEMENT DURING NATURAL DISASTERS

A. G. Bhole, A. V. Parwate, **India**

The fishery sector is gaining importance in Global Economy. Aquaculture has emerged as one of the most promising industries in the world with considerable growth potential and it is expected to contribute about a quarter to the global fishery harvest by year 2000. Availability of water is a constraint in a non-irrigated agriculture system. Aqua farming has a multidimensional context in perspective agricultural growth. It is tool for utilizing land and water (Ground- surface, river, lakes and coastal) more economically and optimally to increase productivity, of both, land and water, through sustainable agriculture for global food security. The countries in the Asia-Pacific region have vast and varied aqua farming resources. Often these are the main source of surface as well as ground water irrigation in this region. Overuse of groundwater, quality and catchments characteristics along coastal regions causes long term impacts on environment and diverse problems in many countries reducing the cultivable area resulting in reduction in agricultural and aquaculture production in global economy. This paper focuses on the coastal zone management and human use of oceans including Surface and ground water along coastal regions with special reference to disaster prone regions and their interrelationships – quality, policy and management and issues with reference to aquaculture and its impacts on the global environment .The paper also deals with the management of aquaculture sector along coastal zones during natural disasters such as cyclones, hurricanes , heavy rains, flash floods and Tsunami.

Comment: “Support from the APN for participation in the ESSP OSC is important for me and my organization (ISDR, India) for networking with the several organisation in the Asia and Pacific region in the field of earth science, ocean resources development and management, disaster management to enlarge our research program in the region. The ESSP OSC was extremely useful for us for capacity building in the field of disaster management and further studies on climate changes in this region. We sincerely acknowledge financial assistance from the APN.”

BIODIVERSITY AND LEGAL ASPECTS OF FARMER FORESTS – A CASE FROM WESTERN GHATS REGION OF INDIA

C. Kalyani Devasena, India

Traditional societies of Asia, largely residing in uplands such as Western Ghats and Himalayan region in India are often closely linked with biodiversity rich ecological situations, much of the biodiversity in the low lands are being already declined due to human exploitation. In India, where the village communities manage their valued forest cover such as foliage forests, sacred groves and village forests, there as been a tendency to maintain plant diversity and to preserve biomass availability. In central Western Ghats of South India, areca-growing farmers are allowed by the state to use a proportionate village minor forest area as the needed organic support, but the ownership rest with the government. Such forests are called foliage forests. The present study was carried out to find out how the foliage forests compare with the natural forests of the region in terms of biodiversity and to analyze the ecological health of foliage forest keeping in view of legal aspects and suggest measures for sustainable management.

Our survey reveals that the biodiversity in the foliage forests is considerably larger than the numbers reported from form natural forests in Western Ghats region of India. The high species diversity of the foliage forests speaks well of the farmers' maintenance in this area, which deserves all encouragement and should be given legal support. In this paper we will discuss biodiversity and policy relating issues of the farmers forests of Western Ghats regions of India.

Comment: "The ESSP conference was well focused on various subjects. The conference was of immense use in knowing where we are in the global change. The topics covered were very excellent. I am very much thankful for the APN funding me to attend this conference."

NATURAL DISASTERS MITIGATION-ISSUES ON ECOLOGICAL AND SOCIAL RISK

E.G. Khadse, G.M. Jagwani, Ashok Kandelkar, **D. G. Fadnavis**, **India**

Asia pacific region is more vulnerable to Geo disasters and impacts of climate changes in recent years. On 26 December 2004 massive waves triggered by an earthquake surged into coastal communities in Asia and East Africa with devastating force. Hitting Indonesia, Sri Lanka, Thailand and India hardest, the deadly waves swept more than 200 000 people to their deaths. Also in an another extreme climate change phenomenon during last week of July 2005 , causing heavy rains and flooding situation in the Mumbai ,and state of Maharashtra .More than 20 million population in the Mumbai metro region alone and 150 million all over the Indian states are witnessing the social- economical and ecological risks and impacts due to climate changes. Also, a number of hurricanes cyclones forest fire and flash floods occurs around the continents of the globe . The economic losses to coastal ecosystem, agriculture, irrigation, aquaculture, drinking water resources, coastal industries and infrastructure are very high due to extreme geo-disasters that are linked with environmental and climate changes .The ecosystem, economic system, agriculture and aquaculture system in this region are severely affected and need systematic rehabilitation. This presentation reviews the status and issues of rehabilitation of flood affected population in India and along Indian coast focusing on problems and damage arising from the extreme floods, and earthquake and tsunami in south Asia

and social and economic losses , and coastal economic systems, etc.

MONSOONAL EFFECTS ON THE BIODIVERSITY OF MARINE PLANKTON COMMUNITIES, SOUTH INDIA

N. Godhantaraman, India

Plankton of the tropics are variegated and showed remarkable seasonal variations due to the impact of active northeast monsoon, which brings heavy precipitation (ca. 1000 mm) for 3 months period from October to December, and the annual precipitation is usually around 1400 mm. In order to understand the influence of climatological conditions on the marine environment and biota, seasonal variations in species composition, abundance and biomass were investigated in the most important tropical Vellar estuarine system, a unique coastal marine environment in South India, as it is connected with mangrove ecosystem, brackish water and Bay of Bengal, by 10 years of intensive study from 1988 to 1998. There were remarkable seasonal variations in environmental parameters, chlorophyll a concentrations and diversity of species, abundance and biomass of phytoplankton and zooplankton communities: - being highest in summer (April – June) and lowest in monsoon (October – December). There were wide temperature fluctuations (range: 22.5 – 33.8 C), salinity gradients (2.9 – 34.5) and chlorophyll a concentrations (1.4 – 18.6 _g l-l). The overall mean abundance of phytoplankton 4.3 fold and zooplankton 3.6 fold were higher in summer than in monsoon. The low diversity and abundance of plankton (both phyto and zooplankton) during monsoon might be due un-favorable climatological conditions (low temperature and low salinity), disappearance of many species, scarcity of food and high turbidity condition of the water column. Thus, summer and monsoon conditions exert major influence on the biodiversity of plankton communities and significantly affect the food web structure of the coastal marine ecosystem.

MANAGEMENT OF COMMON POOL NATURAL RESOURCES FOR ENVIRONMENTAL RESTORATION AND SUSTAINABLE RURAL LIVELIHOOD OPTIONS IN HIMALAYAN HEADWATERS OF INDIA

P. Tiwari, India

In Himalaya, nature of terrain imposes severe limitations on level of resource productivity as well as on efficiency of infrastructure. Hence, subsistence agriculture constitutes main source of rural livelihood. This biomass based traditional .agro-ecosystem is interlinked with forests and pastures. Maximum proportion of these resources is under Common Pool Resources (CPR). Rural poor are heavily dependent on CPR for fulfilment of their various resource needs and also for their livelihood. During recent past, variety of changes have emerged in traditional resource use structure mainly in response to growing population, and increasing political, economic and social marginalization. Consequently, common pool resources have deteriorated and depleted steadily and significantly leading to their conversion into degraded and non-productive lands. As a result, productivity of rural ecosystem has declined and livelihood securities of poor have affected adversely. The headwaters could not escape this process of resource depletion, and emerging as frontiers of environmental conservation and resource exploitation conflicts. The main objective of the paper is to evolve framework for CPR management to help implementing environmental conservation and livelihood development schemes by local government agencies, with a case illustration of Kosi Headwater (108 km2)in Kumaon Himalaya, India. Community based Participatory GIS approach has been used. An integrated framework for

sustainable development of common pool resources has been evolved and various non-traditional, pro-poor and environmentally sustainable livelihood options have been identified within the CPR management framework. Local grass-root institutional mechanism has been strengthened to institutionalize common pool resources and to sponsor non traditional livelihood interventions.

Comment: “I am geographer and working on environment and natural resource management in Himalaya. I have been immensely benefited by participating in the ESSP Open Science Conference as interaction with international experts has helped me in evolving more appropriate strategies for sustainable development of natural resources and addressing impacts of climate change more scientifically, in the Himalayas. The conference also brought me into contact of global scientific programs of APN, ESSP, START and IHDP. Now, I am involved in scientific activities of GLP, UGEC, GECFS and MAIRS. Currently, I am developing proposals for endorsement by UGEC and GLP, and for financial support to APN.”

WATER AND CARBON FLUXES OVER THE BRANTAS RIVER, EAST JAVA, INDONESIA

E. Aldrian, S Adi, Prihartanto, N Sudiana, SP Nugroho, **Indonesia**

Under on going SARCS project, understanding the terrestrial water and carbon flux variation, spatially and temporally from mid 2005 to mid 2006 over the tropical monsoonal Brantas catchment area are identified and characterized for its carbon flux variation in relation to the local climate and hydrology variations. The data were collected monthly over 9 sampling stations up and downstream and then compared with a station near the estuary that have continued data under MERMAID project from 2001 to 2003. The new data shows that the TIC concentration was significantly higher than TOC as indicated by TIC/TOC varied 4 - 5 mostly in the dry season and 2 – 4 in the rainy season. The maximum carbon concentration occurred in the downstream region whereas the inorganic carbon increased during the rainy season. In comparison to the MERMAID station collected in 2003, our data indicated similar pattern, with the average TIC/TOC was found to be 4 - 6 times of the maximum MERMAID data. Whereby, the maximum TIC recorded in MERMAID was 3763 uMol/L compared to our data of 3831 uMol/L in the closed station (5 km away). Additionally, the existence of lime stone soil in the river basin may explain the significant high inorganic carbon. The permanent, hourly and continued measurement such as the MERMAID was very powerful to identify the carbon fluctuation in much detail. However, the spatial and temporal monthly measurement may enhance the terrestrial carbon source distribution over the catchment.

Comment: “My field of interest is the water cycle in the atmosphere, land surface and oceans. Recently we have just finished a water and carbon cycle project on a river in East Java. The result of this research has been presented as a poster at the ESSP OSC in Beijing. The ESSP meeting was held after the Young Scientists’ Conference at the same place, so that many participants of that meeting also attending the meeting. The ESSP meeting is a very valuable meeting for us especially in exposing a broad view of international workshops and cooperation on the Earth System Science Partnership. Although it is a very broad meeting, our small session on water and carbon was very helpful in building the network. I also found the MAIRS kick off as the next joint cooperation that I would like to participate in. In the ESSP meeting I met many participants from all over the world and many old friends and professor that I met in the past. I took that opportunity to discuss my field of interest as well as possible future collaboration.”

STATUS AND TRENDS OF HEALTH ECOSYSTEM IN JAKARTA BAY, INDONESIA

S. Nurdjaman, Safwan Hadi, Widya Prarikeslan, **Indonesia**

Assessing ecosystem health in Jakarta Bay was done and presented in this paper. There are five components were selected as health ecosystem indicators: (1) Chlorophyll-a concentration; (2) nitrate concentration; (3) phosphate concentration; (4) dissolve oxygen; and (5) transparency. A scale from 0 to 1 was chosen as a basis for ranking where an ecosystem health index (EHI) of zero indicates the worst possible health state and one of 1 the best possible health state. Using data during 1975-2004, the assessment results of the Jakarta ecosystem health show that a temporal order of ecosystem health state from bad to good is determined as follows: wet seasons (0.48), dry seasons (0.57), transition period I(0.62), and transition period II (0.7); while, a spatial order of health state from good, middle and worst is offshore - center of bay - mouth of river. Some recommendations to improve further the marine coastal ecosystem health in the Jakarta Bay are finally discussed in the paper.

Comment: “Broadly speaking, my area of research interest is in numerical modelling in material transport in coastal seas. My previous research in material transport includes sediment transport, heat thermal, water quality and hydrodynamics of coastal seas particularly in Indonesian waters. My last research in material transport is ecosystem modelling. 1-D box model, 2D horizontal vertical and do some exercise of 3D lower trophic level ecosystem modelling have been undertaken to study the behaviour marine ecosystems. I also completed an exercise on 3D numerical modelling of upwelling circulation at Southern Coast Java Indonesia.

I am very grateful to ESSP and especially to APN (Asia-Pacific Network for Global Change Research) to give me the opportunity to join the ESSP conference in Beijing, last November and also to give me financial support to attend that conference. The conference was very valuable for my life’s work and for my career. From the conference I can introduce and inform my research, I gained knowledge and recent information about earth science research that will help me to further develop my knowledge and also enhance networking with other researcher in the world. I hope I will be the part of future ESSP and APN activities. Thank you.”

LINKING CONSERVATION AND SUSTAINABLE UTILIZATION OF BIODIVERSITY TO IMPROVE LIVELIHOODS IN NEPAL

K. Prasad Acharya, Nepal

The Community Forestry in Nepal is successful in improving the supply of forest products and rehabilitating degraded hills. The emerging evidences indicate that biodiversity has either declined or has been altered indicating threats to conservation. Further, rural people with subsistence agriculture may not put equal value on all species growing in their forest and putting equal value on all species may not produce forest products as can be produced by maintaining few fast growing multi-purpose species. It is likely that local elimination of weeds, shrubs and low quality timber species from the community-managed forests can occur.

This paper is based on findings from a research conducted in Western Nepal aiming to develop an approach for sustainable conservation and utilization of bio-resources contributing to poverty reduction. It argues that it is possible to develop a management approach leading to win–win situation by harmonizing utilization of bio-resources for poverty reduction. It was established that weeds; shrubs and low quality

timber species were utilized to generate income and employment. The paper argued that the identification of species specific value other than utilitarian value of biodiversity conservation is one of the most important agenda at local level. The paper presents the process and approaches of the project, benefits derived by the users and implications for land improvement and poverty reduction. Recommendations have been made how it can be best utilized at landscape level for sustainable utilization and conservation of biodiversity.

Comment: "I am a forestry researcher from Nepal working in the Department of Forest Research and Survey as a Research Officer. My interest is to understand the dynamics of natural forests and people interaction. Both my posters were visited by many of the conference participants. A good level of interaction was observed and it was a very interesting event for me. Similarly, the participation in various sessions help enriched my knowledge and understanding of natural and human driven changes in the Earth system and current state of science in the issue."

ONE STATE, TWO REGIMES: POLICY AND INSTITUTIONAL CHALLENGES FOR MANAGING NATURAL RESOURCES IN NEPAL

B. R. Upreti, Nepal

The Communist Party of Nepal (Maoist) is now controlling over more than 80 percent of Nepalese territory. In their control area, they apply 'their own policy and institutional arrangements (what they say 'new regime') where as the government (Maoists say 'old regime') is working with its own. People residing in these areas are confronting with the new realities and challenges in access, control and use of available natural resources. The aim of this paper is to examine this dimension for better understand of sustainability aspect of the resource management in fragile states.

The qualitative methods such as focus group discussion, key informant interview, field observation, triangulation and literature review are used in the study across Nepal. Findings of the study demonstrate that dominant role of the government in managing natural resources as state owned property has now been drastically changed in Nepal due to the 'new regime' and even does not exist in the 'core areas' of the insurgents. Instead, new arrangements of collective actions in resource management are expanding in the controlled areas of 'new regime' as well as creating confusion to local people because of contradictions with the government policy and institutional arrangement. This paper concludes that confrontation between the policies and institutional arrangements of two regimes has not only posed enormous challenges, but also provided new opportunities in managing available natural resources.

Comment: "I am Bishnu Raj Upreti, a Nepali citizen, participant of the ESSP OSC in Beijing. My participation was partially funded by the Asia Pacific Network for Global Change Research and Swiss National Centre of Competence, North-South. My area of interest is related to sustainable resource management, livelihood security and conflict mitigation. The conference gave me an opportunity to meet people working in the same area and to exchange experiences and learn from them. Further, I was co-organizer of the panel (Parallel Session 18) on Institutions for Sustainable Resource Management and Livelihood Security in Asia, which further enhanced my capacity to organize such panels, facilitate structured discussions and synthesize the various papers and presentations."

DECENTRALIZED NATURAL RESOURCE MANAGEMENT IN NORTHWEST PAKISTAN: JOINT FOREST MANAGEMENT OR STATE VERSUS CIVIL SOCIETY?

K. Iqbal, **B. Shahbaz, Pakistan**

The decentralized forest management (at provincial level) in the North West Frontier Province (NWFP) of Pakistan was initiated during the last decade. A key part of this approach is the village land-use planning process (VLUP), involving step-by-step approach for preparing an action plan. Theoretically VLUP is a process that establishes village development committees (VDC) and women organizations that represent all community sections and that will become the local community based organizations for improved natural resources management, and prepares natural resources management plans at village level through a set of guided steps in a planning process in collaboration with the forest department (representing the state). Such paradigm of participatory management of natural resource (forests) should ensure the increase of trust and friendly relationship between state and the civil society. In this context, the present paper attempts to evaluate the sustainability of the decentralized forest management project by critically analyzing the level of trust and relationship between different actors involved in decentralized forest management system introduced in late nineties in the mountainous regions of Pakistan. The paper argues that the sustainability of collaborative or joint forest management projects are very much depended on the trusts and mutually defined rights and responsibility of both parties (state and the communities). The insights from the ongoing research indicate that the forest department, which is supposed to be the custodian of public as well as private forests, is perceived by the local communities as main obstacle in participatory forest management system. The paper also identifies the issues hindering the effectiveness decentralization process.

Comment: “I organized a session (No. 18) at the ESSP open science conference. The title of the session was “Sustainable Natural Resource Management and Livelihood Security in Asia”. My participation at the OSC was supported by the APN. My fields of interest/research are natural resource management, livelihoods and sustainable development. This conference proved to be really beneficial for me as I gained useful insights from the scholarly presentations and academic debates of scientists from all over the globe. My participation in the OSC was, therefore, very helpful for my ongoing research. An added value of this conference was networking with other scientists and organizations.”

MONITORING GLOBAL CHANGE WITH LICHENS IN MOUNTAIN REGIONS

G. E. Insarov, Russia

Background and purposes. Study of climate change effects on terrestrial biota becomes important in view of projected climate change in XXI century. Anticipated climate change and its effects in alpine regions are greater than global mean values (IPCC, 2001 and 2002). Lichens are known as sensitive organisms to enrichment of atmosphere by N-, S- and C-compounds, intrinsic variability of lichen communities (LC) is comparatively low, and so LC are efficiently used for biological monitoring of air quality over decades.

The purposes of the study are:

- To elaborate methodology for observation of lichen communities in Mountain Nature Reserves (MNR) and for detection LC changes caused by climatic stress;

- to provide baseline against which these changes can be measured.

Methodology includes:

- LC observations using effective sampling procedure in MNRs where influence of other than target factors is minimal,
- Assessment of lichen sensitivity to climatic stress in MNRs along altitudinal gradients;
- construction of Trend Detection Index (TDI) which has the highest resolution in detecting changes in LC affected by global and regional change in air pollution and climate. TDI is based on lichen observation results and on altitudinal transect studies

Results and Conclusions:

Field observation methodology for epiphytic lichens was tested, and basic surveys were done in 20 MNRs in Russia and adjacent countries, including MAB UNESCO biosphere reserves, and in MNRs in a number of other countries as well. Effectiveness of TDI was demonstrated. Lichens are proved to be good monitors for regional effects of global change. Established system can serve as an early warning system of biodiversity change in MNR and as a reference point for economically meaningful changes in managed ecosystems of the adjacent mountain regions.

Comment: “My field of scientific interests includes monitoring of biota influenced by global changes. The ESSP Open Science Conference in Beijing provided an excellent opportunity to present my results and to communicate with international scientists working in this and similar fields. Many presentations made in plenary, parallel and poster sessions were rather interesting and useful. Direct contacts with the authors allowed to establish connections which can lead to joint research in future. Many thanks to the Conference organizers and sponsors.”

VARIABILITY MODES OF SURFACE WIND OVER THE JAPAN/EAST SEA AND TYPICAL PATTERNS OF ITS STRESS AND CURL

O.O. Trusenkova, V.B. Lobanov, Yu.B. Ratner, S.V. Stanichny, **Russia**

The Japan/East Sea (JES) located in the East Asia monsoon region is subjected to intensive wind and thermal forcing substantially affecting marine ecosystem dynamics through its impact on sea circulation and water structure. Recent findings from numerical modelling suggest that some wind stress and curl patterns specific for different frequently applied datasets can induce circulation dissimilar to traditional schemes, at least in affected areas. Diversity of the JES circulation patterns is documented from the vast observational evidence in the last decade. Northwest wind dominates over the JES during the winter monsoon, while wind is extremely changeable, with prevalence of southern component, in the warm season. These considerations and availability of meteorological high-resolution datasets motivate re-investigation of wind variability. To this purpose the complex EOF analysis of 1x1 degree NCEP/NCAR 4 times daily wind over the Japan Sea for 1998-2005 is performed. The principal variability modes are associated with prevailing wind direction typical for summer or winter monsoon, its zonal and meridional modulation and cyclonic/anticyclonic curl component. Typical wind stress and curl patterns are revealed and their possible impact on the JES circulation and water structure is discussed.

Intensified zonal (meridional) wind component in winter accompanied by prevalence of cyclonic (anticyclonic) stress curl over the northwest JES can be a cause of documented wintertime SST variability. Diversity of wind stress and curl patterns during the warm season suggests that wind impact on currents can substantially differ from that expected for cyclonic (anticyclonic) curl over the subarctic (subtropical) region.

Comment: “My research interests cover regional climate studies in Northeast Asia and numerical modeling of circulation and thermohaline structure in the Japan/East Sea, including dynamical response to a change in external (atmospheric) conditions. My participation in the ESSP Open Science Conference, 9-12 November, 2006, Beijing, possible through partial funding from the Asia-Pacific Network for Global Change Research (APN), gave me an opportunity to consider my research in a broader aspect of global climate change and, on the other hand, to learn about international programs on regional aspects of global change, such as the ESSP Monsoon Asia Integrated Regional Study (MAIRS). New and valuable contacts were made with colleagues, in particular from NOAA, USA, and the Polish National Committee of IGBP”.

ENSO AND MONSOON CIRCULATION ANOMALIES OVER INDIAN OCEAN

N. A. Vyazilova, Russia

The purpose of this paper is to show the nature of the relationship between ENSO and monson circulation anomalies in Indian Ocean region, that is important in the prediction as of ENSO, as of summer monsoon rainfall over India with a population of about one billion.

The study based on NCAR/NCEP reanalysis mean monthly datasets for period 1950-1999. For study the dry and wet years - with weak (strong) summer Indian rainfall, and warm (cold) events of ENSO during following seasons were selected. For every season of dry and wet years were created composite anomalies map for sea surface temperature, OLR, velocity potential and streamfunction, and height – longitude distributions of the equatorial zonal averaged for zonal wind, moisture and potential temperature anomalies.

The study showed the character of Walker and Hadley circulation modulation of over tropical Indian and Pacific Oceans during annual cycle of dry and wet years, and demonstrated, how zonal and meridional circulation anomalies accompanied with moisture and heating anomalies in the tropical atmosphere, may be main way of the impact as of Indian ocean to ENSO, as of ENSO to Indian Ocean.

The analyses of annual cycle of 1997 (normal summer Indian rainfall) and 1994 (intensive summer Indian rainfall) with warm event of ENSO was showed, that positive Indian Ocean Dipole modulates Walker and Hadley circulation over Indian Ocean, reduces the ENSO influence, contributes to the surplus reainfall over India. On other hand, by this circulation modulation IOD impacts on development of ENSO.

IMPACT OF INVASIVE ALIEN SPECIES ON NATIVE BIODIVERSITY OF SRI LANKA

C.S. Kariyawasam, R. S. S. Ratnayake, **Sri Lanka**

Sri Lanka is an island in the Indian Ocean covering a land area of approximately 65,610 km2 and considers as one of the global biodiversity hot spots. Today Invasive Alien Species (IAS) can be considered as one of the major threats on this rich

biodiversity greater than ever before. Even though, the first introduction of IAS to Sri Lanka goes back more than hundred years, the history of invasive plant introduction clearly shows a substantial increase in the rate of introductions.

The development of research and scientific investigations on the scope and magnitude of the impacts posed by IAS in Sri Lanka is insufficient. Anyway based on the few studies and observations, it is quite clear that some of the species such as Wedelia trilobata, Mimosa pigra, Panicum maximum and Annona glabra are spreading fast threatening the native flora and fauna of the particular ecosystems. A native freshwater species, Nelumbo nucifera (Lotus) which is spreading fast in most of the silting freshwater tanks of the country, has become a controversial issue.

The development of regulations to control and eradicate IAS in Sri Lanka is still at the age of infancy. As a country which has signed and ratified the CBD, Sri Lanka is obliged to prepare effective plans and programs to protect and safeguard country's rich biodiversity. Preparation of the national list of invasive alien plants in 1999 can be considered as important national level initiative. Sri Lanka held the first national workshop on IAS in 1999 and followed by several such programs.

Comment: “I am Champika Shyamalie Kariyawasam from the Biodiversity Secretariat of the Ministry of Environment, Sri Lanka. My participation at the ESSP-OSC was made possible by a grant from the Asia-Pacific Network for Global Change Research (APN) under its CAPaBLE (scientific capacity building/Enhancement for Sustainable Development in Developing Countries Project. I presented a poster at Session 8 of the Conference under the title “Impact of invasive alien species on native biodiversity of Sri Lanka”. ESSP-OSC-2006 is the most comprehensive technical conference I have ever participated in. The conference well reviewed my scientific knowledge and gave me a clear understanding on new technological developments, research and techniques worldwide. This new influx of information enhanced my capacity of my interested area of research. I am very grateful to the APN for making available funds for my participation in the ESSP-OSC.”

NEARSHORE SEDIMENT DYNAMICS AND BEACH EROSION ALONG THE CHANTHABURI COASTLINE, THAILAND

T. Bhatrasataponkul, Thailand

A study was investigated along the Chanthaburi coastline with the aims of characterizing the sediment depositional-erosional cycle and examining the causes of beach erosion. Beach profile measurements were monthly conducted and sediment traps were seasonally deployed. Results showed sediment transport and depositional-erosional cycle. Coastline change is driven by various factors such as waves, currents, tides, monsoon system, climate change, sea level rise and human activities. These parameters were examined and described in details following field observations and model scenarios.

Comment: “I have been concerned about global environmental changes for years. My areas of interests are ocean-atmosphere dynamics, ecosystem modelling and coastal process and management. Having attended the ESSP OSC, I took this opportunity to broaden my perspectives and develop new ways of thinking and approaching issues both intellectually and culturally. Intellectually, I exposed my view on creativity, analysis, critical thinking and academic discourse. Culturally, I appreciated different approaches to the issues of teamwork, leisure, stereotypes, honor and respect and the role of intellectuals in society. Honestly, these would be beneficial to my research and lectures in one way or another. Most of all, I was grateful to APN for the grant support.”

EXPORT OF NUTRIENTS AND DISSOLVED INORGANIC CARBON FROM SONGKHLA LAKE TO THE GULF OF THAILAND

S. Chaichana, P. Sompongchaiyakul, T. Sae-Eong, **Thailand**

Songkhla Lake is the largest natural lagoon in Southeast Asia. The lake surface covers an area of 1,040 km2, but it is very shallow. The deepest part is <3 m. Water salinity varies spatially and temporally. The outer part, 182 km2, where connected to the Gulf of Thailand, is a high productive estuary. The average depth of this part is 2 m. Average annual freshwater discharge is 5,000 x 106 m3. Sixty percent of discharge occurs within 3 months during high flow period. Nutrients concentration in the lake water and vertical profile (at the lake mouth) were determined during the end of high flow season (January 2006). Dissolved inorganic carbon (DIC) and pCO2(aq) were calculated from temperature, pH and alkalinity.

The whole lake was covered by freshwater plume and extending offshore. Sharp stratification was observed. In general, N:P ratio in the lake was about 5:1, except around the river (U-Tapao) mouth (~20:1). Average chlorophyll-a within the lake was 13.4 ± 5.8 mg/m3, and drop very fast offshore, not far from the lake mouth, to about 1-2 mg/m3. High productivity was common in the freshwater plume. Depth profiles of nutrients show high concentrations in surface water and gradually decrease with depth where higher salinity was observed. Average DIC and pCO2(aq) in the lake water in high flow season was 523 ± 139 µM and 3,03 8± 1,824 µatm, respectively. River runoff is the source of nutrients supporting productivity within the lake during high flow season. However, it may not the case in low flow season.

Comment: “My research interests lie within the field of environmental process in water and sediment, biogeochemistry in the coastal/marine environment and trace metals/nutrient in the environment. Especially, how sediment and water play an important rule in the accumulation and fluxes of contaminants in the water environment. Asia-Pacific Network for Global Change Research (APN) funding, gave me a valuable opportunity to participate in the ESSP Open Science Conference in Beijing. That widened my research experience. From those experiences, I am keen to learn more and support useful and up to date information to pass on to my students. Those people who participated can be part of a future research network. So, I would like to thank APN for funding - I hope that I will be part of future activities.”

HOW CAN COASTAL RESOURCE MANAGEMENT BE INTEGRATED INTO LIVELIHOOD POLICIES IN VIETNAM

K. A. Thi Nguyen, T. A. Thi Nguyen, M. H. Thi Diep, **Viet Nam**

The coastal waters is one of the most dynamic environments in Vietnam. This zone abounds with opportunities for the poor to exploit traditional livelihood activities. Still, as prevalent in many parts of the world, this area is under the major threats from a range of factors including population growth, sectoral conflicts, the concentration of land-based externalities, and access rights. Those threats have resulted in habitat degradation, climate-related impacts, shrinking resources and biodiversity loss. What is not debatable is that the fisheries has already been in place and will continue to prosper on the critical condition that the law of nature is respected and the marine rehabilitation capability is maintained. This logic, to greater extent, is also working the other way around, that is, viable resources, healthy ecosystems and responsible fisheries definitely need vigorous communities to be created – which constitutes the

destination of all fisheries policies. At long last, resource management and development should be considered just a means, not an end, in itself to achieve broader and deeper meaning, that is, to deliver sustained benefits to fishing communities.

The paper is designed to separate out key issues facing the coastal resources, provide some practical illustrations that can be found in Vietnam, and put forward recommendations that will help those involved in the policy making process to get a more comprehensive insight into how the situation might be improved without detriment to the low-income and marginalized groups whose livelihoods crucially depend on coastal resource exploitation.

Comment: "I would like to extend my sincere and profound gratitude to the APN CAPaBLE programme for giving me financial support to participate in the ESSP OSC in Beijing last November. I was very satisfied after the presentations of the key speakers and the speakers at session $N^0$18 (Institutions for Sustainable Resource Management and Livelihood Security in Asia). I believe that livelihood security is one of the best ways to contribute to a sustainable global environment. I am interested in Economics and one of the main research areas is livelihood security of fishermen and how to generate alternative incomes for fishing households. The outputs of the conference is very valuable for my teaching and doing research at my university, Nha Trang University of Fisheries, Vietnam. I therefore have disseminated the knowledge reaped from the conference to my colleagues, students as well as the fishermen in Vietnam and I am willing to participate actively in APN activities in future."

4.0 Conclusions

The ESSP OSC in Beijing was a major success with over 900 scientists, policy-makers, and journalists in attendance. The next generation of Earth System Science researchers were also in attendance following the successful Young Scientists' Conference, organized by START. Highlights of the Conference included an impressive variety of keynote presentations on advances in Global Environmental Change to Earth System Science and the way forward. There were 44 parallel sessions ranging from Monsoon Asia to the future of Earth System Modelling to the governance of water, food, and carbon and over 500 poster presentations. Major outcomes of the Conference included the launch of the new ESSP Joint Project on GEC and Human Health as well as the launch of the Monsoon Asia Integrated Regional Study (MAIRS) initial Science Plan. The ESSP Open Science Conference delivered a message of urgency to governments to take action on issues of global environmental change and sustainable development.

Participation of Asia-Pacific researchers at the ESSP Open Science Conference would not have been possible without the generous support of the APN.