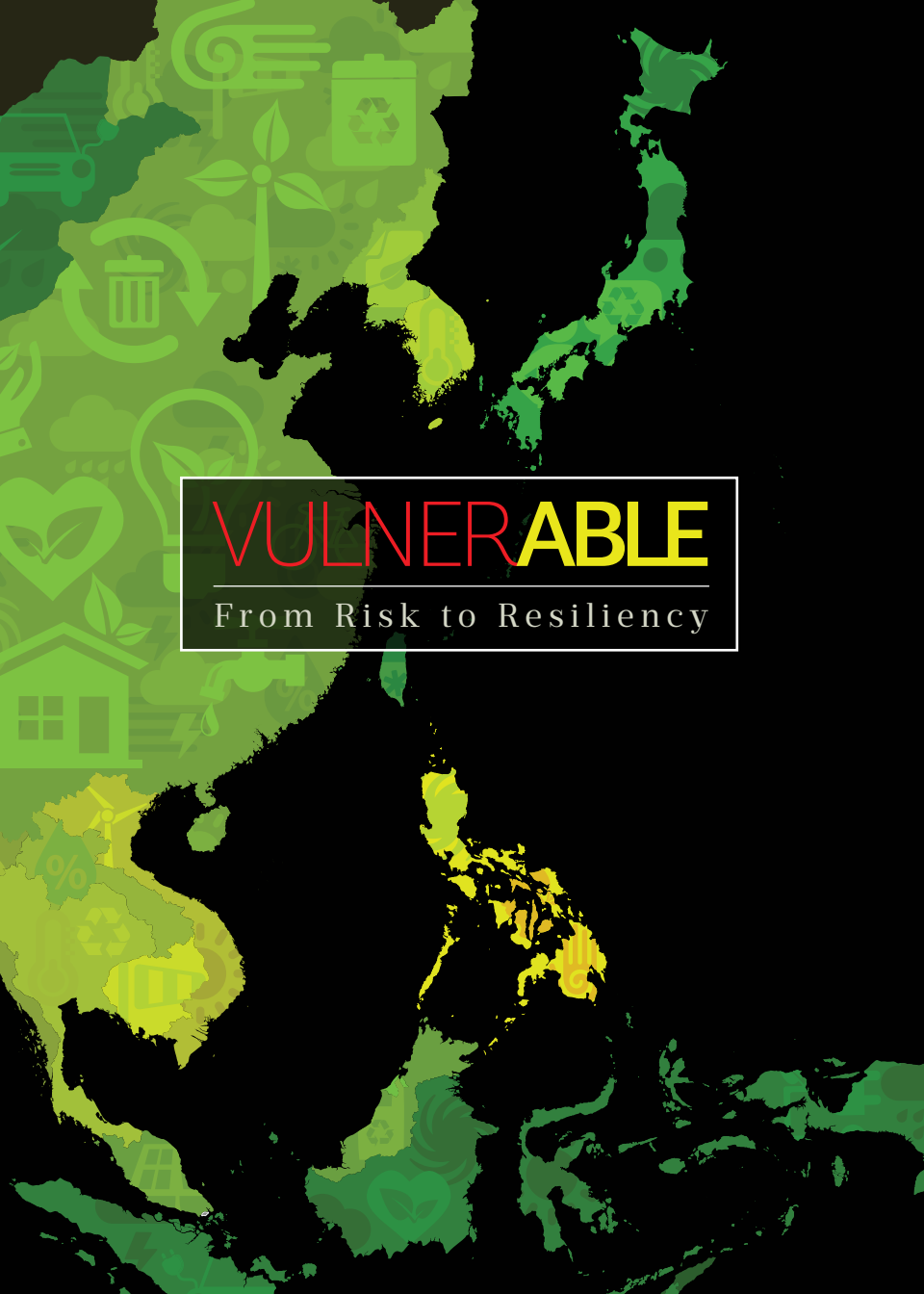
VULNERABLE
From Risk to Resiliency

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LIBERAL PERSPECTIVES ON
CLIMATE CHANGE ADAPTATION

A publication of the
COUNCIL OF ASIAN LIBERALS & DEMOCRATS

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The document compiled by Dr. Stefan Melnik and Dr. Rainer Heufers of the Friedrich Naumann Foundation for Freedom incorporated the inputs of the participants of the Second International Academy for Leadership (IAF) Workshop on Climate Change and Resource Management held in Germany last year and detailed the diversity of opinions and the major insights of the international liberal community regarding climate change and related policy issues.

Messrs. Papon Kumar Dev, Karma Dupchu, Deep Prakash Ayadi and Aladino (Nonoy) Moraca wrote the original case studies from Bangladesh, Bhutan, Nepal and the Philippines. Minister Oyun, Dr. Dagvadorj Damdin and Ms. Onon Bayasgalan wrote the study on the Ecosystem Based Adaptation Approach to Maintain Water Security in Changed Climate Conditions of Mongolia which serves as a worthy template for a national environmental policy paper.

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John Joseph S. Coronel
Editor

PREFACE

"The world has enough for everyone's need, but not enough for everyone's greed."

–Mahatma Gandhi

"Greed keeps men forever poor, even the abundance of this world will not make them rich."

–Mongolian Proverb

As the Council of Asian Liberals & Democrats (CALD) celebrated its 20th foundation anniversary at the historic Manila Hotel in the Philippine capital, Typhoon Haiyan, the strongest storm ever to hit landfall in recorded history, struck Central Philippines on November 8, 2013.

Delegates from CALD, as well as our allies from the Alliance of Liberals and Democrats for Europe (ALDE), Liberal International (LI) and the Friedrich Naumann Foundation (FNF) were in Manila and everyone was appalled by the extent of death and devastation wrought by Haiyan's fury.

The world is no longer the same as the new normal of increased frequency and greater intensity of typhoons, cyclones, heat waves and other natural disasters characterized by extreme weather conditions have become regular occurrences in all parts of the globe. And the poorest people from the poorest nations—especially women, children, the elderly and the infirmed—remain the most susceptible to the increasing calamities brought about by climate change.

My native Mongolia—with its long, rich semi-nomadic traditions and lifestyles harmonized with nature—is a country that has contributed

minimal greenhouse gas emissions and yet is experiencing its disproportionate impact. The average temperature in my country has risen by 2.1˚C, which is three times more intense than the world average level of warming. This has directly resulted in desertification, pasture degradation, water resource shortage, increase of frequency and magnitude of natural disasters and melting permafrost and glaciers that are threatening nomadic pastoralism. We are determined to exercise full and effective implementation of Mongolia's Climate Resilience and Green Development Strategy to curb the effects of climate change.

A forum of Asian liberals and democrats, CALD has long realized that the impacts of climate change including the immense loss of lives, livelihood, property and sense of security make this region—home to a large number of poor people and neglected ecosystems— particularly vulnerable. We see these negative impacts as decreasing our capacity for inclusive growth, thus furthering the gap between the haves and have nots.

Though we Liberals value wealth creation as a solution to poverty, we also realize that natural resources are finite and the carrying capacity of the planet must be taken into consideration to ensure sustainable development, equitable growth, and biodiversity conservation.

While recognizing the diversity of views, options and solutions vis-à-vis climate change, we nevertheless saw the need for a cohesive liberal agenda as CALD's contribution in shaping and re-shaping the environmental policies of Asian political parties and governments in order to achieve an energy-efficient, healthy, prosperous and sustainable Asian region.

It was within this context that CALD, in cooperation with FNF, held its inaugural Climate Change Workshop in 2011 in Bangkok, Thailand

keynoted by former Prime Minister Abhisit Vejjajiva whose speech is featured in the CALD Publication, *20 Speeches that define Asian Liberalism and Democracy* (Manila, 2014).

A total of two conferences, four workshops, one seminar, and one observation trip to typhoon devastated Leyte Island have been held in Malaysia, the Philippines, Taiwan and Thailand—all as part of CALD's Climate Change Programme which will be ongoing until 2018. A reportage on all these events is included in this publication.

The four case studies and the national policy paper from Mongolia which are featured in this book were originally presented during the CALD Climate Change Conference 2013 held in Kaoshiung, Taiwan.

On two of the CALD climate change events, an Asian environmental icon, Antonio Oposa, was our speaker. I would like to quote an excerpt from his acceptance speech of the Ramon Magsaysay Awards, the Asian equivalent of the Nobel Prize. Echoing the above quotations from Mahatma Gandhi and the old Mongolian proverb, he asserted that "the economic mindset of uncontrolled extraction and consumption is what got us into the environmental crisis that we are in now–among them the clear and present dangers of climate change. To get out of it, we need an opposite economic mindset–that of conservation, protection, and restoration or CPR. This is also known as the cardio–pulmonary resuscitation of the vital organs of life...We cannot have peace on earth unless we have peace with earth."

Last June, I was honored to have been elected as the Inaugural President of the United Nations Environment Assembly in Nairobi, Kenya. During my acceptance speech, I mentioned that environmental, social, and economic opportunities, when combined, can have mutually reinforcing outcomes for sustainable development. Through the integration

of the three dimensions, it will be possible to achieve the necessary transformative change and bring many of the issues we face under the umbrella of sustainable development. The ongoing discussions on the post-2015 development agenda and sustainable development goals will need to take into account universal concerns with a universal goal through common but differentiated responsibilities, recognizing that each country starts with a different baseline of challenges, needs, priorities, and response capabilities.

Our great responsibility is to promote environmental sustainability and to achieve sustainable development for all of us and our future generations. Let us build a world where there is dignity for all.

Hon. Oyun Sanjaasuren
Minister of Environment &
Green Development Mongolia
& CALD Chairperson

INTRODUCTION

"Climate change is *not* politically sexy."

We have heard this statement, or its variations, a number of times ever since the Council of Asian Liberals and Democrats (CALD) embarked on a climate change programme in 2011. This view, it appears, stems from the belief that it is difficult to sell climate change as an electoral issue to the general public. Advocacy of climate change adaptation or mitigation, it is claimed, would not deliver the votes. Those engaged in politics, therefore, should emphasize bread-and-butter issues such as food security, health coverage or employment. These issues hit the gut – the issues that will push people to go to the precinct and vote – not some abstract concepts like climate change.

But is climate change still an abstraction? The events of the past years, particularly in the Asia-Pacific, provide evidence to the contrary. Asia-Pacific, arguably the most vulnerable region to the adverse effects of climate change, has experienced cataclysmic natural disasters which relate to sea-level rise, increasing intensity of tropical storms and greater rainfall variability. In 2011, Sri Lanka endured the worst floods in the country's recent history, deluging 11 of the country's 25 districts, destroying 125,000 acres of rice fields, and affecting around 1 million people. In the latter part of the same year, Thailand's capital and surrounding provinces were inundated by unprecedented floods that claimed more than 800 lives, affected 3 million households and cost the economy up to USD 45 billion. Just last year, the devastation brought by the strongest typhoon to hit land on record, tropical storm Haiyan (local name: *Yolanda*), in central Philippines left at least 6,000 deaths and 4 million homeless.

Far from being an abstract concept that only delegates to United Nations (UN) conferences can understand, climate change has emerged as one of the greatest threats to life, livelihood, property and overall sense of

security. For this reason, CALD's decision to embraced climate change as one of its programme areas is not only politically expedient, but an appropriate response to the changing times. We are living at a time when unpredictable weather patterns become "the new normal", and when climate change mitigation and adaptation become a gut issue.

CALD's engagement with climate change is based on the recognition of the need to formulate and propagate a liberal climate change agenda that highlights the necessity of adapting to climate change impacts. As the only alliance of liberal and democratic political parties in Asia, CALD believes that it can pave the way in shaping and re-shaping the policies of Asian political parties and governments with regard to climate change in order to achieve an energy efficient, healthy, prosperous, and sustainable Asian region.

This handbook documents CALD's climate change work in the past years and sets its future climate change agenda. It is divided into three parts:

(I) Liberalism and Climate Change;
(II) Environmental Party Agenda and Governance Platform; and
(III) Best Practices in Climate Change Adaptation.

The first part investigates the compatibility of climate change with the liberal ideology, especially in light of the claim that an effective climate change response entails potentially intrusive state intervention which many liberals are wary of. This part also provides an overview of CALD's climate change activities, including those that dealt with the liberal climate change agenda and climate change adaptation. In the second part, the environmental agenda of two CALD member parties – the Democratic Progressive Party of Taiwan (DPP) and the Liberal Party of the Philippines (LP) – are presented to show how

they incorporated the issue of climate change in their political party and governance platforms. The national environmental policy paper of Mongolia is also included in this section as a recognition of how another CALD member party, the Civil Will Green Party (CWGP), influenced the Central Asian state's policies with regard to the environment. Mongolia's current Minister of Environment and Green Development, Dr. Oyun Sanjaasuren, also heads CWGP and serves as the incumbent CALD Chairperson. The third and last part summarizes best practices in climate change adaptation from Bangladesh, Bhutan, Nepal and the Philippines. These cases, selected from around two-dozen submissions from around the world, look into how local organizations and communities are successfully adapting to climate change impacts.

What is the liberal climate change agenda?

This is probably the most fundamental question that liberals should address at the onset. The issue runs into the compatibility of effective climate change response with the core value of the liberal ideology – freedom. For one, it is said that the strong collective action that climate change demands may be construed as interference to individual liberty.

The head of CALD Climate Change Committee, Dr. Neric Acosta, in his article included in this handbook, made a strong case on making climate change a liberal agenda. While noting that climate change should cut across political agenda or ideologies, he pointed out that liberals can view the phenomenon from the prism of three elemental principles: freedom, rights and the rule of law. As Acosta, who also serves as Philippine Presidential Adviser for Environmental Protection, articulately puts it: "...the more democratic, free, well-governed – and yes, liberal – a society, the more resilient it becomes in the face of

physical risks and hazards that come with the unsettling vagaries of climate change."

Similarly, in the compilation of liberal policy insights on climate change made by Rainer Heufers and Stefan Melnik, they argued that "... the success of policies of adaptation relies on the degree to which the key tenets of liberalism – such as the protection of private property rights, the rule of law, good governance and decentralization – are adhered to." In the perspective of liberals, an effective response to climate does not necessarily entail command structures or state interventionist policies. Moreover, Heufers and Melnik claimed that democracies and free economies, given their open and participatory systems that allow for the effective representation of all stakeholders, are in a better position to address climate change.

Democracy and market economy are core principles that CALD adheres to as a liberal network of political parties. For this reason, they remain to be the cornerstone of the network's programmes on climate change. CALD Programme Officer on Climate Change Paul Rafael provides a backgrounder of CALD's climate change activities, which have been on-going since 2011. One of the main outcomes of these activities was the adoption of CALD Statement on Climate Change in 2012. In that statement, CALD reiterates that "...an effective response to climate change requires not merely government regulation, but also deregulation as appropriate and the provision of appropriate incentives for stakeholders."

Climate change is not only a liberal agenda – it is also a political agenda. Political parties, therefore, have an important role to play in crafting an appropriate response to this phenomenon.

So what can political parties do to address climate change?

A growing number of political parties now recognize that climate change, and the environment in general, can be a powerful electoral issue. Three CALD member-parties share this view – DPP, LP and CWGP. Their commitment to the cause of the environment shows that climate change advocacy can be reconciled with political goals. The mere fact that they had included environmental protection, sustainable development and climate change in their political party or governance platforms is a testament to the increasing electoral appeal of these issues.

The DPP, whose roots can be traced to the environmental movement during the Koumintang (KMT) dictatorship, has always forwarded policies promoting environmental protection and sustainable development since its founding. Whether in government or the opposition, the party has consistently sponsored legislations which aim to advance these goals. In 2011, the party passed a 10-year policy guidelines with a dedicated chapter on climate change. It has also spearheaded well-received environmental campaigns such as those calling for an end to Taiwan's nuclear power dependence.

Similarly, LP successfully mainstreamed environmental protection, sustainable development and climate change by including it in the governance platform of Philippine President Benigno Simeon Aquino III, otherwise known as the "Social Contract with the Filipino People". In this document, the Aquino administration pledged to transform "from a government obsessed with exploiting the country for immediate gains to the detriment of its environment to a government that will encourage sustainable use of resources to benefit the present and future generations." Under the Aquino administration, the National Climate Change

Action Plan was passed in 2012, which details the short, medium and long-term plans of the government on the issue.

The CWGP, whose party leader is currently Mongolia's Minister for Environment and Green Development, appears to be in a better position to advance environmental protection, sustainable development and climate change adaptation. Under Minister Oyun's leadership, the Climate Change Coordination Office and National Climate Change Committee were established, and the National Action Programme on Climate Change was approved by the Parliament. In this handbook, Mongolia's ecosystem-based approach to maintaining water security in critical water catchments was highlighted as a best practice. This project shows how Mongolia is implementing climate change adaptive measures through sustainable management of water resources.

The examples of DPP, LP and CWGP show how political parties can play a crucial role in shaping environmental policies of their respective countries. Climate change adaptation, however, should involve more than the actions of political parties. Local communities are also devising ways on how to adapt to the changing climate.

Now what can local communities do to adapt to climate change?

The best practices from Bangladesh, Bhutan, Nepal and the Philippines included in this handbook emphasize the importance of local community participation in effective climate change adaptation. These practices, it must be noted, did not entail the creation of "command structures" or the implementation of "state interventionist policies". Their success lies on their reliance with the knowledge and involvement of local communities, which, with the assistance of governments

and development agencies, have successfully addressed problems brought about by climate change.

Papon Kumar Dev presented how crab fattening provided an alternative livelihood for climate change affected coastal communities of Bangladesh. Noting that the coastal floodplains of the country have been affected by increasing salinity, water logging and over-exploitation of natural resources which result in declining fish catches, he pointed out that fattening the mud crab, which are common in the mud flats of the Bay of Bengal and which can survive in saline water, offers another livelihood option for Bangladeshi coastal people.

In Bhutan, one of the greatest threats to life and livelihood is the so-called Glacier Lake Outburst Flood (GLOF), a result of the accelerated melting of the glaciers and the subsequent formation of glacier lakes in higher mountains in the alpine region. Karma Dupchu's study in this handbook looks into how the communities in the Punakha-Wnagdue and Chamkhar Valleys reduce GLOF risks through the installation of GLOF Early Warning System (EWS). Equally important are the educational and public awareness components, institutional capacity building programmes, effective monitoring systems and knowledge-sharing which make GLOF-EWS a holistic climate change adaptation programme.

Local knowledge also plays an important role in the climate change adaptation of Nepal's local communities in the mountainous regions. In his study, Deep Prakash Ayadi noted that these regions are experiencing extremes of too much water during monsoon and too little of it in winter. In order to address this, the author observed that the local communities have effectively used traditional methods of water harvesting and management system. These methods, according to Ayadi, can be further developed and replicated within Nepal and in other countries.

In the Philippines, a locally made water delivery system called hydraulic ram pump was also developed to bolster the rural economy and as strategic response to climate change. Recognizing that the time and energy needed to fetch water could have been devoted to more productive activities, the study of Aladino Moraca argued that the community-based installation of the hydraulic ram pump could increase productivity output and household incomes, apart from improving the health, sanitation and hygiene in rural communities.

These best practices from Bangladesh, Bhutan, Nepal and the Philippines show that an effective climate change response also relies on local community participation and involvement. After all, climate change adaptation entails concerted effort from all stakeholders – particularly the local communities that bear the brunt of climate change impacts.

Where do we go from here?

This handbook is just a preliminary attempt of CALD to systematize the outcomes of its climate change programmes. It showcases our journey to clarify the liberal position on climate change, to apply this position in the formulation of party and government policies, and to reconcile this position with the knowledge and practices of local communities in dealing with climate change impacts.

The journey is continuing, and more concrete steps are needed to make climate change adaptation, environmental protection and sustainable development truly a CALD agenda. For one, CALD member-parties can start by establishing a specific working group or committee dealing with environmental issues. This group or committee may then produce policy papers that can convince party officials and members of the necessity of incorporating climate change in their party platform and

programmes. Climate change can even be used as an electoral issue by presenting it as a threat to life, livelihood, property and one's sense of security. In doing so, CALD member-parties can even be effective instruments of public education on climate change. This could potentially expand the constituency that can bring about a climate of change that we desperately need.

Climate change, after all, is politically sexy. And the sooner political parties realize this, the greater the chances they can be effective agents of change.

Celito F. Arlegue
Executive Director,
Council of Asian Liberals & Democrats

Part One

LIBERALISM & CLIMATE CHANGE

Can A Liberal Agenda Include Climate Change?

Dr. Neric Acosta
Presidential Adviser for Environmental Protection (Philippines),
CALD Secretary General (2054–2014)
& Chair of the CALD Climate Change Committee

Those of us in the environmental advocacy front and also affiliated with liberal networks are asked time and again if addressing climate change can really be a part of a 'liberal agenda.' The working premise or assumption being that the narrative of climate change and the official, government-led responses to such militate against the tenets of individual freedom and enterprise.

The extreme position on this would be one of outright denial of climate change, or at the very least, a disputing of the science behind the entire discourse on a warming planet gravely alternating climate patterns across continents. Al Gore's 'Inconvenient Truth' is a hoax, they say, and anything that has to do with the discussion on climate change necessarily points to bigger government spending and state interventions on private business and economic activity. The 'green front' is all about being alarmist and its proponents nothing more than doomsday-scenario criers, they point out, with reason to get the powers of the state breathing down the necks of private enterprise, as it were.

The latter – such as it is manifested in terms of higher taxes on carbon emissions and fossil fuels – is seen as downright interventionist and a curtailment of economic freedom. Capping emissions based on inter-governmental targets and disincentives to business. This, all told, becomes a thoroughly anti-liberal stance.

The less extreme view, but more agnostic, would point to climate change and its impacts as imminent reality, but perhaps not as bad as it is made out to be. In this case, the apocalyptic scenarios of rising sea levels and severe weather disturbances are not entirely something to fear. In this respect, money used for climate change mitigation and adaptation strategies – from shifting to renewable sources of energy to increasing disaster-preparedness and risk-management – can be used in arguably more cost-efficient and higher value-for-money ways or better cost-benefit analyses.

Bjorn Lomborg, renowned economist and author of the widely-popular 2001 book "The Skeptical Environmentalist,' is one such prominent voice in this school of thought. Why spend for long-term, amorphous mitigation programs when such resources will go a long way towards addressing poverty and malnutrition in the developing world, or curbing malaria and other pervasive but rehabilitative diseases, or reforesting denuded mountains?

There is no doubt about the valid issues of cost effectiveness, various externalities and resource use to raise here. But if economies are derailed and political and social dislocation happen because of climate events that occur with increasing ferocity and frequency – typhoons, flooding, landslides, excessive rainfall, droughts – then we need to ask about not just the cost of climate change programs and interventions, but also about the higher cost of inaction and the lack of overall preparedness. If infrastructure and property are damaged extensively because of one super storm like Hurricane Sandy in New York and the US East Coast, or if industry and manufacturing grind to a halt because of months-long flooding in Bangkok and outlying provinces, or if agricultural productivity is lost because of a protracted drought in Australia,

or if 'climate refugees' multiply and face health epidemics in congested evacuation centers or camps such as those in the Philippines, then climate change programs become simply, inarguably a matter of economic and social survival.

If one were to take the perspective of all this being a planetary emergency, climate change cannot be simply a part of any political agenda, or a matter of ideology, but an imperative for every government and society to embrace. If it is the imperative we know it is, then our actions – whatever our political persuasion – must be geared towards this mode of survival and longer-term sustainability.

Yet if we are to be fastidious about it, the liberal agenda should see climate change from the prism of three elemental principles: freedom, rights, and the rule of law. Freedom in the form of information and the access to all available data and the scientific research on meteorology and climate is key in understanding the realities of a climate change. It is also about freedom in terms of human security, especially those who are poor and have less access to income and opportunity – to be free from the fear of losing homes and lives because of the increasing and widespread impacts of natural disasters and calamities.

The flip side of this coin of freedom is about rights. The right of every citizen and household and community to information and all available knowledge about risks and vulnerabilities that attend climate change realities, and the right to be free from forms of danger and risk to life and livelihood. These are rights that are inalienable for every individual.

When Typhoon Sendong (International name Washi) tore through northern Mindanao, Philippines in December 2011, the local govern-

ment of the region's premier city (where devastation was staggering with over 3,000 deaths and untold damage to property) was caught woefully unprepared. It was soon revealed that the city did not have a comprehensive land use plan and geo-hazard zones were not clearly defined to have a risk reduction and management plan in place for highly vulnerable and poor communities. Worse, populist programs initiated by local politicians allowed landless families to build makeshift dwellings on hazardous riverbanks and riverbeds over time, irresponsibly putting thousands of lives in harm's way when the rivers swelled and countless logs from denuded forests upstream were violently swept to sea. Humanitarian aid and reconstruction efforts were largely mismanaged in the wake of the disaster, and to this day, charges of corruption hound fuller rehabilitation and resettlement programs.

This leads us to the fundamental requisites of good governance and the rule of law in addressing climate change and its impacts. In an age of increasing uncertainty and mounting vulnerabilities, ill governance and the absence of transparency could prove nothing short of fatal. To effectively adapt to climate change impacts and increase the resilience of communities, an accountable government, an informed citizenry, and a vigilant, free press become unassailably critical.

The answer to the question raised at the outset is clear. Climate change is and should be in the liberal agenda or platform. This is, all told, the kind of political climate that needs to change: that the more democratic, free, well-governed – and yes, liberal – a society, the more resilient it becomes in the face of physical risks and hazards that come with the unsettling vagaries of climate change.

Addressing Climate Change

A Liberal Approach

Stefan Melnik / Rainer Heufers

A Liberal Policy Approach To Climate Change

This document was compiled by Rainer Heufers and Stefan Melnik and represents an attempt to identify what a liberal policy approach on the issue of climate change might consist of. It incorporates the ideas presented by participants of the second International Academy for Leadership (IAF) Workshop on Climate Change and Resource Management held in late May/early June 2013 in Gummersbach, Germany. The document contains a number of repetitions. This is a reflection of the fact that certain liberal principles were referred to time and time again irrespective of the different subjects discussed. Given the enormous differences of opinion within the international liberal community on climate change and how to address related policy issues, the document may be useful in identifying areas in which liberals might agree. It was clear from our discussion that there are five major insights of importance that most liberals share. They are as follows:

a) Much more research is required both into the mechanisms that drive climate change and that the polemics bedevilling scientific discussion must cease;

b) Individual measures to protect the environment are useful in themselves and the issue of climate change must not be allowed to obscure our concern for major threats such as species extinction, deforestation and erosion of arable land;

c) A realistic policy approach must focus on adaptation as a response to temperature increases rather than mitigation, given the enormous expense of the latter and the international impasse in negotiation we are witnessing and that is likely to continue;

d) The success of policies of adaptation relies on the degree to which key tenets of liberalism – such as the protection of private property right, the rule of law, good governance and decentralisation – are adhered to; and

e) Liberal policies must be based on market principles and oppose the state interventionist policies being proposed by socialists, social democrats, conservatives, greens and many so-called "climate activists" alike.

Climate change is not an excuse for imposing command structures into our respective economies.

General approaches to climate change

1. Liberals take the issue of climate change seriously because global warming impacts people's livelihoods directly or indirectly.

2. Liberal climate change policies provide pro-active, well-considered, and effective approaches addressing issues of environmental degradation. The focus is on such degradation and this focus is important, given that there is no full agreement on the causes of climate change or on multilateral measures in this field. All liberals agree that environmental degradation is an important issue that needs to be addressed urgently.

3. Liberals understand that bottom-up initiatives by citizens, corporations and local governments are more effective in reducing environmental degradation and improving people's livelihood than centralising government initiatives, restrictions of individual freedom, and non-enforceable international obligations negotiated by national governments.

4. Liberals also understand that climate change is by nature a global matter that needs to be addressed at an international level through the cooperative efforts of all relevant stakeholders. Democracies and market economies with their open and participatory systems allow for the effective representation of these stakeholders and are therefore in a better position to address climate change issues.

5. Liberal policies foresee the creation and protection of strong institutions (such as the rule of law, a clear and transparent system of property rights) and procedures of good governance as prerequisites for effective climate change policies.

6. Liberals protect the property rights of citizens and their enterprises because they realise that this is the key to establishing a direct link between individual action and environmental impact. People look after what they own.

7. Liberals seek to eradicate poverty because it is one of the main causes of environmental degradation. Poor people lack the resources often required for reducing environmental impact of their activities.

The science of climate change

8. Liberals seek rational solutions and rely on actual date more than emotion. Liberals want more proper peer-reviewed scientific research that is transparent and discloses sources of its data and funding.

9. Liberals support the freedom of scientists to research and speak without fear, favour, or prejudice.

10. Liberals, whilst supporting intellectual property rights where they are needed, believe that free and open access to the results of scientific research in the field of climate change is a must in improving our understanding of climate change and predictions concerning its effects in a rapid and comprehensive manner. This applies in particular to research funded by taxpayers' money.

11. Liberals acknowledge that, with the internet, knowledge is being democratised and traditional scientific authorities lose their positions of power. Liberals appreciate this empowerment of individuals and insist the internet must remain free from government interference.

12. Liberals believe that scientists must never claim to know the truth. Their task is to improve our understanding of the phenomena we examine and eliminate error. This is a process that requires respect for different opinions and perceptions that challenge mainstream views.

13. Liberals believe that the scientific community should seek to improve our knowledge about climate change but should leave it to the political community to find appropriate solutions. Scientists should not become politicians or seek to replace politicians and democratic procedures. Such solutions should always, however, bear scientific advice in mind.

Media reporting and climate change

14. Liberals oppose any attempt to regulate or censor the activities of the media in the interests of allegedly "proper" or "correct" information on climate change and environmental issues. Maintaining high professional standards that are self-enforced is the liberal approach. Media independence helps preserve credibility.

15. Liberals oppose restrictive business practices by market players as well as market entry barriers in the media industry. A competitive media industry is much less susceptible to uniformity and will more likely publish different standpoints and differing perspectives on climate change.

16. Liberals recognise that the media, and increasingly the social media, play a crucial role in informing citizens about environmental issue and climate change. This has been understood by scientists and NGOs and they have often been very skilful in using media as tools of advocacy.

17. Given this fact, and given the economic difficulties mass media are facing with the rise of the social media, liberals think it is important that media professionals maintain the highest of stan-

dards, especially those that pertain to ethics. Standards are an important key to survival. The most important is commitment to establishing the facts and impartiality when researching potential news stories. It is important to specify the sources of the information used – unless there are important reasons for maintaining confidentiality. Another important rule is to distinguish between straight reporting and editorial opinion. Political campaigning by media professionals constitutes another disservice to the profession that ultimately undermines credibility.

18. Liberals maintain that when covering issues of climate change and the environment, context is important. A figure or a story out of context might often be misleading.

19. Liberals reject alarmism because it undermines credibility especially when extreme predictions concerning climate change and the environment fail to materialise. The perception that "hype pays" is a misleading one. To a certain extent an alarmist reporting style might explain both declining interest in climate issues that we have recently seen and migration to social media for information.

20. An important task for liberals is to improve skills: how to use media and assess the quality of media output. Media might respond to vocal demands for more impartial coverage of issues. In respect it is important to realise that media:

- Have to headline articles and simplify messages in order to remain viable;
- Sometimes represent vested interests;

- Might have a political agenda; or
- Often transport subliminal messages such as "large corporations are evil" and "big government is the solution."

Liberals strive to develop a level of media literacy that ensures that awareness of such things increases.

21. Liberals perceive that media are often biased against liberal views and initiatives that are based on reason and common sense – especially when it comes to presenting and explaining more balanced market-based approaches to dealing with climate change and important environmental issues. Given the ease with which it is possible to access the social media, liberals should actively create their own media and publicly-accessible forums.

Climate change in the context of development

22. Liberals understand that climate change programmes cannot be divorced from the challenges faced by policy makers in the field of development. They include the absence of a clear vision of what constitutes development; the absence of political will to adopt strategies of modernisation; and the lack of political participation by marginalised groups in society.

23. Liberals believe that the success of climate change policies depend crucially on certain institutional prerequisites such as:

    - The rule of law, especially the robust protection of private property rights and the availability of accessible, efficient and affordable law enforcement mechanisms, and on

- Good governance, including strong, accountable, competent and decentralised government agencies.

24. Liberals struggle to ensure open access to economic and political resources in order to fight corruption. Corrupt practices undermine the rule of law, efforts to adapt to climate change, and all other efforts designed to promote development.

25. Liberals understand that the lack of access to education, poor quality in education, low or non-existent levels of economic growth, poverty and low incomes, unemployment and inadequate public health systems are among the key challenges of development that need to be addressed as a matter of urgency. Climate change might not be on top of the list or priorities in many developing countries but it may well exacerbate the problems of development. Effective efforts to promote development, particularly those that are sustainable, may contribute towards mitigating and/or adapting to the effects of climate change.

26. Liberal policies prioritise the satisfaction of basic human needs, such as food, clothing, shelter and personal safety, while recognising that climate change might aggravate the severe problems encountered in these areas.

International action and issues of governance

27. Liberals are worried by centralising characteristics of the ongoing international process of negotiation addressing the global issues of climate change and the environment. The process is an

intergovernmental one – whereas effective measures often call for action at a local and regional level.

28. Liberals see a disconnect between the current practice of pledging resources, especially financial resources, and projects implementing concrete measures that have yet to be designed. There is no point in pledging financial resources if projects are inappropriate, are hastily and badly designed; and/or promote corruption.

29. At the same time liberals fear that this process inherently favours big government because it recognizes governments as being the prime actors in climate change and environmental matters. Experience shows that central governments and large bureaucracies rarely provide sustainable solutions.

30. Liberals also fear that some governments might only be interested in paying lip-service to commitments that have been undertaken. There is thus every reason to rely on the initiatives of other actors, even to give them a leading role. Effective actors would represent localities and regions, civil society and private enterprise.

31. Liberals recognize that the linchpin that ensures that resources are used effectively and efficiently is governance. We often see well-intentioned donors and bad mechanisms for implementation. Due to deficiencies in governance there is a widespread fear that benefits will not arrive where they are needed. Good governance is a problem in most countries in which decisive action, e.g., in preserving tropical rain forests or biodiversity, is

required. Climate and environment-related action must therefore always address issues of governance and find ways and means of ensuring and monitoring implementation.

32. Liberals recognize that citizens and taxpayers in a democratic society need to know how financial resources pledged – mainly tax revenue – is used. Are scarce financial resources being used efficiently and can actors be held accountable for the way in which they are expanded? Clear targets and indicators as well as transparency are therefore a must.

33. Liberal policy focuses on the use of incentives in trying to achieve desired outcomes. It also recognizes the existence of perverse incentives. Liberals are skeptical of efforts to incentivize tropical rainforest preservation through providing income for governments that refrain from cutting down trees and transform the use of land originally covered by rainforest. One major problem is that of the compensation of welfare losses through the provision of international subsidies (REDD+) that might undermine necessary development efforts. The result may be that governments in rainforest areas, even those in areas that are not threatened by deforestation, will resort to blackmailing donor nations once they realize that this can secure a stable income.

34. With regard to safeguarding the environment – whether it is protecting rainforest or species diversity – liberals think it is important that people are encouraged to value the natural resources they use and have access to. The best way in which to do so is to attach value to them and this is best done through granting and enforcing robust property rights. Liberals recognize that the legal

certainty regarding property rights (and access thereto) is essential for sharing benefits. It allows citizens to build a patrimony for themselves and their descendants. Free access to property rights allow for fighting poverty effectively.

35. Liberals demand that recipient countries of financial assistance play their part in devoting financial and human resources to climate-related and environmental programmes.

Liberal Responses to Environmental Degradation

Extreme weather events

36. Liberals acknowledge that there is substantial global warming and that rising ocean surface temperatures are part of the problem. They both affect weather patterns which often adversely affect agricultural output, food security, access to water, etc., and hence, the livelihood of people.

37. Liberals also acknowledge that extreme weather events are directly responsible for erosion and damage of crops (through destruction and disease, to mention two examples). They thereby affect food security and safety – especially where appropriate defences, technical supervision, and quality of control systems are lacking.

38. Liberals do, however, resist alarmist reports mostly based on personal observations of recent history. Instead, liberal policies

must be based on scientific evidence substantiated by proper and long-term analysis.

39. Liberal policies primarily aim at improving capacities to adapt to extreme weather events – because policies of mitigation are extremely expensive and difficult to implement at a global level (as the post-Kyoto process demonstrates). Adaptation policies focus on the development and dissemination of new technologies and in areas such as irrigation, fresh water supply, public health, and increasingly, the development of robust disease-resistant crops.

40. Liberals strongly advocate the free exchange of goods and services, including free human migration, coupled with the advancement of new technologies. Seen in the long term, migration needs to be free in order to facilitate adaptation. In this context it is important to remember that parts of the planet face the prospect of negative overall outcomes due to changing climate patterns, whilst others experience positive outcomes.

Rainfall and water management

41. Liberals acknowledge that global precipitation patterns are changing. Decreasing rainfall in certain parts of the world adversely affect agriculture, food security and employment. Liberals emphasize the importance of technical adaptation through the development of drought-resistant crops, better water management and improved storage and distribution capacities. Their implementation requires the free international exchange of goods, services and know-how, and institutional arrangements

and improvements that promote relevant investment (secure property rights, effective law enforcement, etc).

42. Liberals also acknowledge that changing precipitation patterns influence the generation of hydroelectric power and can lead to energy shortages. Liberal policies aim to offset such dangers by identifying and promoting alternative sources of electricity (e.g. photovoltaics, solid waste). However, it is important to look at situations on a case-by-case basis to determine what measures are appropriate.

43. Liberal policies address the problem that changing climate patterns, resulting in additional rainfall, might well increase the incidence of diseases such as malaria, dengue and cholera. Here liberals also see adaptation as part of the solution: developing water management skills and technologies, including simple measures, that allow people to more effectively combat the threats that emanate from mosquitoes and other sources of waterborne diseases.

44. Liberal policies emphasize adaptation in response to changing global precipitation patterns. National and international actors lack the ability to enact and enforce policies of mitigation. It is important to identify best practices of adaptation whilst recognizing that the implementation of such practices require good and decentralized institutions.

Land degradation

45. Liberal policies protect and extend private property rights and seek effective enforcement of those rights because of the link between private land ownership and sustainability. Private owners of land have a direct personal interest in sustaining land quality and tackling degradation. Ownership incentivizes protective action and sustainability.

46. Liberal policies strongly support the successful operation of market mechanisms and reject government policies that distort the market. An example of such distortion is when government incentivizes the creation of monocultures in maize or soya bean, whilst, at the same time, de-incentivizing the production of other crops through biased taxation policies or by restricting market transaction for certain crops. Crops such as soya bean require large amounts of water and nutrients. Practices of crop rotation are abandoned because of such incentives. These factors then aggravate the problem of land degradation.

47. Liberals believe that land reclamation can provide extra land for urban and industrial development and eases the pressure of a growing world population and increasing urbanization exerts on arable land.

48. Liberals reject the notion that food resources are finite and will eventually no longer be sufficient in meeting the need to feed a growing world population. Experience has unequivocally shown that the alleged "Malthusian trap" can be overcome through technological innovation, and the optimized and hence efficient

usage of land. The genetic improvement of agricultural crops contributes significantly towards a more efficient use of land, water and other resources, and thereby reduces the pressure on environmental resources not used for agriculture. Sensitivities in Europe regarding the use of genetically modified crops have already led to a massive expansion of agricultural activities – including land-grabbing – by European enterprises outside Europe with its concomitant effects on livelihood and the social fabric of countries most affected.

49. Global free markets without the current barriers of trade create incentives for the better use of land and for an optimized delivery of agricultural products to the market place.

50. Liberals emphasize the importance of high-quality education provided by competitive institutions that have succeeded in the marketplace. The aim is to allow for the best use of available knowledge, talents and skills.

Biodiversity

51. Liberals believe that private enterprise can effectively help in preserving biodiversity if a business-friendly and law-abiding environment exists and entrepreneurs can freely use the resources they have acquired for generating income. For example, concessions to entrepreneurs for the preservation of rain forests and the protection of endangered species have proven to be an instrument for preserving biodiversity.

52. Liberals believe that biodiversity can be protected by inter alia assigning commercial value to species. Trade in species can be a way of ensuring the continued existence of species in question if the farming of such species helps to satisfy demand. When a value/price is associated with a particular species, this species will be treated as an asset.

53. Liberals believe that strong international and, more importantly, strong national and local institutions are a precondition for ensuring effective law enforcement in order to protect biodiversity and vulnerable species.

54. Liberals accept that mechanisms are required to manage and minimize obvious risks before the experimental farming of genetically modified animals, plants and other organisms for commercial or other purposes.

55. Liberals accept that gene modification has always been an integral part of human agricultural activity. On the one hand, humans have always practiced genetic modification in the interests of higher yields and better products. On the other hand, new techniques pose new challenges. All innovations should be subject to scientific – rather than speculative – risk-benefit analysis before being exploited commercially. Improving agriculture and its techniques are the only way in which we will be able to feed the world's growing population. The alternative, if innovation and technological progress are shunned, is extensive agriculture with its concomitant effects on the environment and on livelihoods. We already face the enormous challenge of land-grabbing in developing countries by international companies specializing in

extensive agriculture – which is partly a response to the fact that Europeans reject technologies that improve the use of agricultural land on their own territory.

Pollution

56. Liberals insist that an effective means of reducing pollution is to reduce subsidies on polluting industries and vehicles, thereby creating an incentive to use energy rationally and more efficiently. Eliminating the manifold subsidies on hydrocarbons (e.g. petrol) throughout the world is a particularly important objective in this respect.

57. Many liberals feel that the task of reducing pollution, particularly the catastrophic levels of pollution in and around highly populated and heavily industrialized regions, may of necessity require determined action by government because of its many sources and the complexity of the problem. However, governments must refrain from directing resources to particular industries ("green economy") but should limit their activity to standard-setting for emissions and ensuring compliance.

58. Liberals recognize that "green" environmentally-friendly policies are not easy to implement. There are no simple solutions. An energy policy that seeks to reduce carbon-dioxide emissions by substituting traditional sources of energy though "renewable energy" can also create enormous challenges: massive re-investment, higher energy prices, a reliable back-up system to compensate for frequent shortfalls inherent in electricity production through renewables, and the redesigning of the electricity grid.

59. Liberals accept that the private sector must include emissions, climate-related concerns and the effects of their activities on the environment in their respective concepts of corporate social responsibility and cooperate accountability as part of corporate good governance. However, they reject mandatory social responsibility programmes imposed by government, fearing that they are ineffective and insensitive to the particular circumstances applying to each individual enterprise. Corporate policy is always a mix of different factors (customer preferences and profitability, shareholder interests, employee skills and interests, environmental concerns, relations with the local community, etc.). What works for one enterprise might not for another.

60. Liberals support attempts to put a price on natural resources. Water pricing is a case in point. A reliable supply of safe water costs money and prices that cover the price of production and supply that are borne directly by the customer – rather than indirectly through tax revenue – promote the rational and careful use of water, particularly in countries where water resources are severely limited.

61. Liberals see modern systems of waste management, e.g., incinerators and the coupled supply of heating and electricity, as another path towards massive and effective reduction of pollution and unproductive use of land resources through landfills. However, decisions on waste disposal have to be well-considered and clear so as to avoid emulating the European example of overlapping systems of disposal – recycling of combustible waste and incineration at the same time – that result in waster disposal overcapacity.

Deforestation

62. Liberals insist that attempts to solve environmental problems through investing citizens with meaningful property rights must aim to instill a sense of "patrimony" among owners of property. The implication of this approach is that the property rights granted must be permanent. This also applies to the task of preserving forests and their respective ecosystems.

63. Liberals understand that there are many factors driving deforestation and that tree planting initiatives and the imposition of strict laws and penalties will not suffice to solve the problem because trees are not ecosystems. Given the many driving forces – including poverty, the most important one – behind deforestation, the most common problems that must be addressed are:

- the lack of meaningful property rights in most of the areas covered by tropical rain forest;
- deficiencies in the rule of law and law enforcement that are the preconditions for ensuring that laws and regulations are followed;
- the lack of knowhow concerning the kinds of productive activity that are compatible with the maintenance of virgin forest cover; and
- the reduction of poverty trough the development of business opportunities and the free exchange of goods and services.

64. Liberals believe that all environmental initiatives have potential if well-designed and market-based, even initiatives that are limited in scope.

65. Liberals believe in the idea of public/private partnership in the protection and maintenance of forests – where such forests are not in private hands or where there are serious social and cultural obstacles to privatization.

66. Liberals agree that proper education in the conservation of forests is an important task, and tree planting and tree growing are good ways of ensuring the protection of forests. Preserving or planting trees in a locality might not in themselves contribute much to an ecosystem or to deforestation but the overall effect of many such initiatives on the environment and ecosystems will be positive.

67. Liberals believe that livelihood and training programs that are made available for people will give them more information and opportunities to live in their respective communities without the need for deforestation.

68. Liberals emphasize the importance of a thorough cost benefit analysis if property rights are to be forfeited for the sake of the public good (forest protection, exploration of gas or oil, etc). In that case, the following conditions must be met first:

- exhaust the possibilities of finding an agreement with the owner who is to be expropriated rather than allowing the government or interested private sector actor to impose their solutions in a one-sided manner; and
- due legal process, proper compensation for the land in question in accordance with its true market value, and/or rightful substantial share of the proceeds after expropriation.

A liberal climate-friendly energy policy

69. Liberals understand that, given currently available technologies, the adverse effects of fossil fuel emissions on climate make carbon-based forms of energy production unattractive. This may be less so far gas than for oil and coal based production. In most parts of the world they may still be profitable but, given current goals of reducing emissions, they are inefficient and, in the long term and given competition from other sources, may well prove unprofitable. Renewable energies present a long-term and sustainable alternative – but only if they are exploited efficiently in a competitive market environment.

70. Liberals seek profitable and hence secure supplies of energy and thus favour free market solutions in the energy sector.

71. Liberals are aware that the replacement of fossil-based energy production by renewable may in fact result in a so-called "rebound effect." Reduced demand for fossil fuels will depress prices. Cheaper fossil fuel prices might well encourage low-income countries to invest in fossil fuel plants and technology.

72. Liberal policies promote transparency and non-preferential treatment of resources in the production and supply of electricity. The imposition of artificial prices through subsidies will always distort markets at the expense of consumers and, especially, poorer sectors of society.

73. Thus, liberals are in favour of a free market as the instrument to enable low-carbon and affordable energy. Liberals, are thus,

clearly opposed to subsidies and undue taxation as instruments in this endeavour.

74. Liberals believe that if governments agree to a market-based mechanism to reduce emissions (such as a cap-and-trade mechanism), and if this system can be made to work, there is no need to create a second system for the same purpose (such as the complex arrangements envisaged in the German "Energiewende"). What matters is the reduction in emissions and not the way in which such emissions can be reduced – which is best left to the market.

75. Liberals believe that easy access to energy grids will provide for better distribution of and more affordable energy, while democratizing the energy sector.

Sustainability

76. Liberals think that climate change forces us to think about the future and this is in itself is a good thing.

77. Liberals consider that functioning free markets and prices determined by the free interplay of supply and demand are the best guarantee for the efficient use of resources, and hence, sustainability.

78. For Liberals, any concept of sustainability divorced from market forces and realities – is meaningless.

79. When looking for ways and means of ensuring sustainability, liberals emphasize the importance of institutions that work, especially the

institution of democracy as an institution. Sustainability depends on civic participation in the design of and a share in the outcomes of policies and projects that aim to improve people's lives and livelihoods.

80. Liberals see property as an important institution – because it creates visible stakeholders with real and tangible interests that might be affected and that have to be borne in mind by the legal system, policy makers and political parties.

81. Liberals do not criticise self-interested behaviour, but consider it to be a reality with beneficial outcomes. Protecting one's property is part and parcel of that self-interest. Many people protecting and looking after their property have beneficial overall effects on the environment.

82. Liberals embrace the new trends in corporate governance, in particular increased efforts to internalise external costs. It is in their own interest that companies do not violate human rights and that they are not seen to be evil polluters destroying the environment. The way in which the legal system and courts of law are developing the concept of liability is clear for all to see (in the case of major oil spills, for instance, or in employee health issues). Disregard for such matters will, one can already predict, have dire consequences for offending companies. However, good corporate governance is more likely to be practised in countries with strong institutions and a democratic system of checks and balances (including a free press).

83. Liberals reject the idea of mandatory Corporate Social Responsibility (CSR) defined and imposed by legislation. Liberals are also careful about attempting to dictate standards of CSR uniformly: the stan-

dards that are normal in highly developed economies might be completely inappropriate for companies in emerging economies that are struggling to become competitive internationally.

84. Liberals emphasize the fact that corporations have a self-interest in good corporate governance and social outreach (e.g. in the field of education, child care, medical facilities, living and working conditions). Liberals accept that meeting consumer needs, developing products and technologies and providing employment are in themselves services provided to the society.

85. Liberals see no contradiction between sustainability and profitability. Indeed, energy efficiency and avoidance of environmental damage can enhance profitability in a setting where all resources have a price and are subject to market forces. Consumer expectations that products are environmentally friendly can also be seen as an opportunity – as the example of fuel-efficient vehicle shows.

86. Liberals see human beings as smart and rational decision makers. They have proven on countless occasions that they are able to adapt rapidly to challenges that present themselves – even those brought about by catastrophe. Humans and human brains are the most important resources we have. Policies that limit this potential must be avoided.

87. In the debate concerning present versus future need, liberals emphasize presently known need and the rights of people today. We must also ensure that future generations are in a position to meet their own needs. This must not be undermined through the creation

of debt and the imposition of limits to technological progress and economic development.

88. Liberals see free markets and policies of non-intervention in economic processes, deregulation and privatisation as the best way of ensuring sustainable development. They are part and parcel or the concept of sustainability. Government intervention is responsible for many of the problems that undermine sustainability: incentives that lead to waste and destruction of resources, more corruption because of the increase of power in the hands of civil servants and politicians as a result of state ownership and regulation, to mention just two examples. Markets, not governments, are conducive to a well-administrated efficient use of resources.

89. Liberals think that trade in goods and services play an important role in achieving sustainability because of the international division of labour. The benefits to consumers and the exchange of knowhow it produces or promotes.

90. Liberals agree that educating the public in environmental matters is an important task and that green messages – and sometime even "green-washing" – help to increase environmental consciousness and environmental-friendly practices.

91. Liberals mistrust the romantic notion that old technologies are always good technologies. There are, after all, many instances in which old technologies were the direct cause of environmental degradation. They also see that organic farming, much of it based on old technologies, has its own problems, the most important of which is the fact that it involves extensive farming techniques.

92. Liberals reject any centralised "engineering approach" to development especially in the field of agriculture which has often been a recipe for environmental disaster (e.g. cotton, maize, soya, bean production). Local approaches with intimate knowledge of local conditions, and the avoidance of massive subsidies that result in the misallocation of resources and inappropriate farming techniques are more likely to be sustainable and ecologically sound.

93. Liberals believe that if government intervention is necessary through legislation or implementation or programs and projects, it should be preferably by local governments as they are closer to the people and would understand more the needs and concerns of the people living in the community. Local governments will also most appropriately respond in a timely manner when it comes to local or community issues.

94. Liberals maintain that functioning financial markets are a precondition for innovation and progress in environmental matters and the efficient use of natural resources. It is primarily that they provide entrepreneurs with good and innovative ideas with the financial means – and hence the opportunities – to realise them.

95. Liberals see another beneficial function of financial markets in that, if properly managed, they analyse risk before investing and, hence, the viability of a new product or service. A sustainable product in terms of its impact on the environment is more likely to be a viable than one that is not. Seen in this light, sustainability is a central concern of risk analysis.

COUNCIL OF ASIAN LIBERALS & DEMOCRATS

Climate Change Statement

We, the representatives of the Democrat Party (Thailand), Democratic Progressive Party (Taiwan), Liberal Party (Philippines), Parti Gerakan Rakyat Malaysia, Singapore Democratic Party, Liberal Party (Sri Lanka), National Council of the Union of Burma, Sam Rainsy Party (Cambodia), Indonesian Democratic Party of Struggle, and Civil Will Party (Mongolia), full member parties of CALD, on the occasion of CALD Climate Change Conference in Palawan, Philippines, following on our previous workshops in Bangkok, Thailand (28 November – 1 December 2011) and Cagayan de Oro/Bukidnon, The Philippines (10 – 14 February 2012);

Aware that the Asian region is one of the most vulnerable areas to climate change, with climate change impacts resulting in immense loss of life, livelihood, property, and sense of security of the region's inhabitants;

Recognizing further that Asia is home to a large number of poor people; and the more we neglect the ecosystem, the more we lessen the capacity for inclusive growth and consequently, deepen further the poor's poverty;

Acknowledging that climate change can result in sea-level rise, increase in temperature and extreme weather, variations in rainfall, floods and also desertification, all of which have repercussions on the lives and livelihood of people as well as the environment;

Noting that vulnerability to climate change is partly due to absence or lack of adequate enforcement of environmental laws and regulations, resulting in denuded mountains, clogged waterways, polluted bodies of waters, among other problems;

Acknowledging the importance of adequate information, accurate scientific data and research, and effective institutions to address the problems of climate change;

Emphasizing that adaptation to climate change will have to focus on integrated water, land, and coastal resource management;

Recognizing the importance of educational and information campaigns in enhancing the awareness of all stakeholders, including the general public, on the adverse impacts of climate change and what can be done to address them;

Underlining that mainstreaming the issue of climate change is vital to ensure the attention of all political parties;

Highlighting the need to formulate roadmaps and action-plans with clear targets in order to ensure proper monitoring of progress or lack thereof;

Noting that, given also the lack of progress in international climate change negotiations, national and local initiatives to address climate change must be promoted and encouraged;

Emphasizing that an effective response to climate change requires not merely government regulation, but also deregulation as appropriate and the provision of appropriate incentives for stakeholders;

Recognizing that climate change is related to economic development, and that sustainable development and green economy must be the aim of every society;

Noting that climate change presents not only threats but also opportunities, particularly opportunities to institute changes in society towards sustainable development;

Sharing a vision for an Asian region resilient and adaptive to climate change, and supporting global, regional, national and local efforts to combat climate change with emphasis on the need for those most responsible for climate change, in particular, to take remedial and recompensatory action;

Do hereby:

On Policies and Mechanisms to Address Climate Change

1. Urge Asian governments not only to have clear and coherent policies regarding land-use, water, forest and coastal conservation, but also to ensure strict enforcement at all levels of government on the basis of equity and transparency;

2. Ensure that policies are based on consultation with stakeholders and focus on community oriented pro-poor perspectives, and encourage community involvement in initiatives to preserve and protect the environment;

3. Affirm the need for regional, inter-agency and multisectoral collaboration in addressing climate change, with particular attention to reducing socio-economic vulnerability;

4. Suggest that a specific percentage of the national budget should be allocated to finance climate change planning, activities, and policy directions;

5. Underline the importance of adhering to the principles of good governance, particularly transparency and accountability, in any measure to combat climate change;

6. Urge governments to adopt general guidelines, including market reforms that would encourage full private sector awareness and involvement, to promote green, more carbon neutral economies;

On Building Adaptation and Resilience

7. Ensure inclusion of climate change and disaster risk information in national education systems as well as community-based awareness programs, with particular attention to decision-makers and administrators, while encouraging community-based preparation and early-warning systems, as well as mitigation and risk-reduction activities;

8. Recognize the particular vulnerability to disaster of poor communities, reiterate the importance of immediate rehabilitation and resettlement of those who have been affected by erratic weather patterns brought about by climate change, as well as the enactment of measures that aim to return their life to normalcy even while in rehabilitation centers;

On Water-Related Issues and Marine and Coastal Resource Management

9. Recognize the crucial importance of water resources in addressing problems arising from climate change and environmental degradation, promote expanded rainwater harvesting; water storage and conservation techniques; water re-use; desalination; efficiency in water-use; protection of mountain (snow and ice) and other water sources; and efficiency in irrigation;

10. Recommend that water harvesting and conservation should be accompanied by the development of green spaces as well as inland fisheries on a sustainable basis;

11. Encourage governments to develop effective policies for reversing coastal degradation whilst ensuring the full involvement of local communities in preparation and implementation of plans, that will also encourage local business opportunities that promote sustainable development;

12. Aware that problems with regard to water can lead to regional tensions, encourage active inter-regional cooperation that addresses specific issues in a spirit of understanding and promotion of mutual benefits;

On Land Use and Demographic Settlement

13. Support rainforest and forest protection and expansion, with particular attention to rehabilitation of degraded watersheds;

14. Register the increasing problem of land degradation, caused often by indiscriminate exploitation of mineral resources, and also the problem of desertification, assert the importance of developing counter-measures and concerted action to reverse this process and ensure continuing land use for pastoral and agricultural communities;

15. Recognize that unequal development leads to potentially destructive demographic change, advocate programs to increase opportunities and facilities in rural areas and areas currently being denuded of populations;

16. Acknowledge that populations will move to areas with natural resources, advocate regulatory control of such resources through community-based mechanisms;

17. Recommend limitations on hill-slope settlements and developments that cause landslides, and strict enforcement of relevant regulations;

On Renewable Energy, Investment and Economic Opportunities

18. Highlight the importance of transition to renewable energy in promoting more sustainable and efficient economy, with emphasis on research and development that encourages public-private partnerships;

19. Develop alternative energy sources with encouragement of investment in particular in bio-energy plants, and others such as solar and wind energy;

20. Forge partnerships and cooperatives for diversification of agriculture with support for bio-energy sources in tandem with food crops;

21. Recognize that market reforms and a competitive environment could assist in improving energy efficiency and reducing pollution;

22. Emphasize the need to invest in climate resilient or climate-proof infrastructure, with active private-sector participation and innovation, to produce new economic opportunities for sustainable growth; and

On What CALD Can Do

23. Require CALD to produce a handbook about common challenges with reports on best practices which can be replicated.

Adopted in Palawan, Philippines

this 25th of March 2012.

For the Council of Asian Liberals and Democrats:

Neric Acosta
Ng Lip Yong
Rajiva Wijesinha
Monthip Sriratana-Tabucanon

Members of CALD Climate Change Committee

REPORT ON THE CALD

Climate Change Programme

Notwithstanding hardcore critics of the 'green front', and whilst skeptics with the extreme position of outright denial of climate change, the Council of Asian Liberals and Democrats (CALD), drove toward a green direction and platform in year 2011.

To what seemed to be a daunting task of introducing an idea, aimed at environmental protection, sustainable development and largely, for climate change; to a then, uncompromising network of liberals and democrats, who see "*the narrative of climate change and the official, government-led responses to such militate against the tenets of individual freedom and enterprise*"; CALD, from its vigorous initial attempts, and through its continuous and dynamic campaigns, was able to adopt, develop and organize this platform to what is now a formal and institutional program of the organization – the CALD Climate Change Programme.

Driven by the principles of liberalism and democracy, seen through the lenses of freedom and human rights, the program recognizes the fundamental human right of individuals, groups, communities, institutions, and businesses, simply put, society as a whole, to be free, however not necessarily directly undisturbed, from environmental insecurity and climate risk and vulnerability. It sees climate change not as a hopeless case, and beyond the threat its adverse impacts poses, is the optimistic possibility that it can be approached within the lines of mitigation and adaptation.

Under the umbrella of the program is a series of projects that will be ongoing until 2018.

These are covered under thematic hats, namely:

CCI. Formulating/Promoting a Liberal Climate Change Agenda	2011 – 2015
CCII. Identifying Best Practices in Climate Change Adaptation	2013 – 2016
CCIII. Promoting Best Practices in Climate Change Response and Adaptation	2014 – 2018

It is the objective of this chapter to review and revisit the timeline of the CALD Climate Change projects.

The Liberal Climate Change Agenda

It is no surprise to anyone, that the contemporary international system is marked by conflicting political, economic and ideological interests of different states and non-state actors: intergovernmental organizations, non-governmental organizations, and multinational corporations, to name a significant few. It is this very setup and status quo of the global landscape that has led to the failure to achieve concrete and unanimously decided solutions for a universal approach to climate change. Hence, it was the first and foremost mission and responsibility of CALD to address these conflicting debates in order to build and lobby support for the green platform.

CALD led the introduction to, and formulation and propagation of, a 'liberal climate change agenda' to its member-parties and partner organizations, in its Climate Change Proposal in 2011. The attention toward, and the subject matter itself, sparked exhaustive and clashing discourses within the network – which began with the primary question of whether or not climate change can really be materialized as part of a 'liberal agenda'.

Despite battling ideological challenges, manifested either through the difference in opinion, or the indifference to the subject matter, CALD began with a workshop in November 2011 at Bangkok, Thailand. It was an activity that brought a raging wave of insights and recommendations: the accessibility of climate change discourse and information to politicians and policy-makers; and the clarification of the liberal position on climate change, among others. Notably, this led to the formation of the CALD Climate Change Committee composed of Dr. Rajiva Wijesinha and Dr. Neric Acosta, then CALD Chair and Secretary General, respectively, together with Parti Gerakan Rakyat Malaysia's Ng Lip Yong and the Democrat Party of Thailand's Monthip Sriratana.

As the formation of the agenda was still underway, a follow-up workshop and a conference were organized in the Philippines in February and March of 2012, at Cagayan de Oro and Palawan respectively. These activities emphasized the need to include local government involvement as a catalyst for climate change adaptation by spearheading community-based participation. It also stressed upon the need for the subject to be made an electoral and a social issue that people can relate and identify with, and from where CALD can build a base of supporters and followers. Significantly, the sessions conducted provided a suitable space and forum for specific positions on climate change to be clearly

identified. This, in turn, led to the adoption of the CALD Climate Change Statement.

The adoption of the CALD statement facilitated the systematized organizational approach to climate change in different key priority areas: (1) policies and mechanisms to address climate change; (2) building adaptation and resilience; (3) water-related issues and marine and coastal resource management; (4) land use and demographic settlement; (5) renewable energy, investment and economic opportunities; and (6) on what CALD can do.

In November 2012, as an offshoot of the natural calamities or environmental disasters that gravely hit the Asia Pacific Region, CALD organized a seminar on climate change adaptation and disaster preparedness at Bangkok, Thailand. A critical reevaluation of the basic understanding of disaster risks, to intensify and broaden vulnerability reduction; to focus on enabling development strategies that reduce exposure; and to promote a direct approach to reduce disaster risk, was seen as imperative. The seminar likewise recommended that the CALD network expose its members in excursions or site visits to areas that practice adaptation and disaster preparedness strategies.

By 2013, CALD sought to involve its youth wing, CALD Youth, and maximize its potential to contribute to climate change-related initiatives.

Inspired by the concept of *intergenerational justice and equity* which asserts that: *"We, the human species, hold the natural environment of our planet in common with all members of our species; past generations, the present generation, and the future generations. As members*

of the present generation, we hold the Earth in trust for future generations" (Brown-Weiss, 1990).

This inspired CALD to organize a youth climate change workshop in Cebu City and Bantayan Island, Cebu, Philippines, which focused on practical and legal strategies to address climate change. The general objectives were basically to spark a mind-shift and develop a sense of awareness among youth leaders on the central role they play in the promotion of the liberal climate change agenda; to impress upon their responsibility in taking immediate action for climate change; and to uncover the available mechanisms and approaches (i.e., the rule of law).

It is noteworthy to mention that the activity received considerable media coverage, for the youth participants' involvement in the *Road-Sharing Movement*, an idea coined by international environmental lawyer Antonio Oposa. The idea resulted in the historical and ceremonial filing of letter of petitions to reform the Philippine road system – a nationwide campaign that had over twenty towns simultaneously filing the same petition was realized.

By November 2014, CALD will organize a seminar on the liberal climate change agenda in Hong Kong. The aim is for the green platform's greater promotion in a larger liberal and democratic community with the participation of the Economic Freedom Network Asia, Liberal International and the Friedrich Naumann Foundation for Freedom.

It is in this very same gathering where CALD intends to launch its climate change educational video – a communications project and strategy that will be targeting the youth, most specifically, youth leaders, as audience. The video will touch upon the need for the pro-

motion of climate change awareness; the encouragement for youth involvement in it; and the empowerment that will call for action to the youth worldwide, anchored to adaptation strategies, to engage climate change in one's lifestyle – more than just encountering it for intellectual discourse's sake.

In a span of no less than 3 years, the CALD project on the liberal climate change agenda has been firmly and progressively undertaken. It has blurred the lines of differences in opinion and has developed a more cohesive understanding of climate change – that, "*it cannot be simply a part of any political agenda, or a matter of ideology, but an imperative for every government and society to embrace*".

The project has facilitated the identification of key priority areas, and the necessary strategies that are indispensable to the work for climate change. It has also assisted in the formulation and development of the two other CALD climate change projects.

Best Practices in Climate Change Adaptation

Inspired by the occasions that unfolded in 2012, where a policy recommendation was adopted to give focus on practical strategies of climate change adaptation, CALD developed this as CCII of the program. The principal purpose was to identify best practices in governance, legislation and community involvement, which encapsulate the liberal climate change agenda. Also, apart from the involvement of CALD Member-Parties, who were the target group of CCI, this project included the direct participation and contribution of civil society organizations and other relevant actors.

The climate change conference last September 2013 in Kaohsiung, Taiwan, was the very first activity under this project. It brought select researchers who offered case studies on best practices in climate change adaptation in the Asia Pacific context. The presentations aimed to recognize noteworthy initiatives, and more so, to highlight the viability of these local projects in other areas.

Apart from CSOs, a new actor was in picture – the private sector. Corporate companies opened their doors to showcase their ventures on renewable energy as a long-term sustainable investment, a venture that should be patronized by all.

Furthermore, the adoption of the climate change statement in 20112 acknowledged the importance of adequate information, and accurate scientific data and research. This inspired CALD to undertake a research and publication project of its own, hence, the realization of this handbook.

CALD was able to receive more than two dozen submissions from all over the world for its call for papers – from Southeast, East and Central Asia; Oceania; Europe; Africa; and North America.

This project will run until 2016, but there is still far greater work that can be done and initiated in identifying and highlighting exceptional strategies on climate change adaptation. It is CALD's hope to strengthen its network within the region, and reach other regions as well, and to share the Asian experience as a possible role model worldwide.

Promoting Best Practices in Climate Change Adaptation

Most recent of all three (3) CALD climate change projects, is CCIII, which was adopted in January 2014. Its chief goal is to disseminate exemplary cases of climate change response and adaptation to decision-makers, opinion leaders and multipliers in order to ensure their sustainability and encourage their replication. A special feature of this endeavor is the inclusion of youth participation and youth leadership as central components.

The youth's dynamism and potentials can effectively be channeled toward suitable initiatives, which can foster effective and significant social change for the greater good. Across the Asia Pacific, and more so, worldwide, the youth has been able to convert and transform their energy, in synergy with fellow young individuals and groups, towards developing effective and cooperative domestic, regional and international youth networks.

CALD recognizes the role and immense potential of youth leaders, youth organizations and youth movements for effective social change, most especially in climate action; and as prime movers in sustainable development and biodiversity conservation.

The program commenced with an observation trip in May 2014 to the Typhoon Haiyan-Devastated Areas in Central Philippines. In the spirit of solidarity with the Philippines, the observation trip brought and immersed 10 youth representatives from CALD Member-Parties to a meaningful and unique experiential activity which afforded the opportunity of dialogue and interaction with the local communities as well as national and international relief workers.

The coming of *Haiyan* was an exceptional case that served as an eye-opener to the extreme vulnerability of the Asia Pacific region to environmental disaster-related risks. It raised the red flag that climate change adaption is needed, now more than ever worldwide.

Furthermore, thrusting from the need for the capacity building of the youth leaders of the CALD network, in both the promotion and the action for environmental protection, sustainable development and climate change, a communications seminar and youth camp was organized in September 2014 at Ulaanbaatar, Mongolia.

The seminar and camp was aimed at (1) enhancing the understanding of the youth's role in building support for youth-led climate change initiatives among their respective youth wings, parties and constituencies; (2) enriching the participants' skills and capabilities on youth organizing for youth-led climate change initiatives; (3) encouraging the use of available tools such as new media and social media in promoting climate change awareness; and (4) empowering the youth to inspire others to join and participate in the movement.

Trailblazing for Climate Change toward Greater Horizons

There have been quite a number of initiatives borne from these three projects: international conferences, workshops and seminars, and research and publication undertakings – all of which have had relatively and inarguably significant accomplishments. But much remains to be done.

While CALD and its network acknowledges the great potential to pave the way in shaping and re-shaping the policies of Asian political parties and governments with regard to climate change in order to achieve an energy efficient, healthy, prosperous, and sustainable Asian region; the organization admits that there are limits to its capacity as well. It cannot falsely preach and universally claim to hold global and/or regional power and influence that can drive the world in a complete 180 degree turn to go, think and act 'green'.

But nonetheless, CALD will unceasingly continue its work, fill the necessary gaps, and move toward greater heights and new horizons for climate change. This may all seem like a small pebble that was tossed into a pond, or a tiny drop in a bucket – 'irrelevant' as it may to some, to receive the full attention of the world's eyes. But the ripples that it will create will start a wonderful wave of change for climate change that the world can learn from and perhaps, emulate.

Paul Rafael
CALD Programme and Administrative Officer
for Youth & Climate Change

Part Two

ENVIRONMENTAL PARTY AGENDA & GOVERNANCE PLATFORM

PARTY ENVIRONMENTAL AGENDA OF THE

Democratic Progressive Party of Taiwan

Provisions on Environmental Protection, Sustainable Development and Climate Change Adaption in the Party Constitution

The party, through its National Party Congress, has the authority to pass Resolutions, which must receive a 2/3 majority to become a valid resolution that is implemented party-wide.

The Resolution on Creating a New Era in Taiwan's Economy (passed in 2001) contains the following points related to environmental protection and sustainable development:

- Aggressively integrate and improve Taiwan's transportation, fiber-optic, and broadband networks, while developing environmentally friendly, regional energy industries. This enables greater communications of information and ensures adequate supplies of water and electricity while establishing the infrastructure to build Taiwan into a "Green Silicon Island."

- Carefully formulate plans for water and ecological conservation, while introducing plants with deeper root structures on mountainsides to prevent soil erosion and mudslides. In addition, conduct a full soil analysis of Taiwan to aid in land conservation. To achieve a comprehensive system for national land development, form a national institute for land planning, charged with formulating regulations to protect national land and soil conservation, completing the national geographic information system, and transforming the island into a "Green Taiwan."

Related Party Policies

Aside from the abovesaid resolution, the **10 Year Policy Guideline** was passed in 2011 by the Central Standing Committee as the policy guideline of the party and for Taiwan to implement if it gains administering powers. It also serves as guidelines for localities and municipalities government by the DPP. The dedicated chapter on climate change, Chapter 9 on Environment is ten pages long. The chapters starts with the following introduction, "Lately, global climate has changed rapidly; the extreme climate caused large-scale natural disasters, becoming a threat to the existence of human beings and sustainable development. In Taiwan, in the past several decades, stressing economy and neglecting environment led to over-exploitation and destruction of the environment, and consequently leading to disasters in Taiwan. Without thoroughly reflecting the past ignoring of environmental resources and abuses in Taiwan's sustainable development lessons resulted in the difficulty of shaping effective policies and actions."

For over 20 years, the DPP has advocated ending nuclear power dependence in Taiwan. As an island located in a highly-prone earthquake zone, the DPP has questioned whether the power plants were safe enough to sustain earthquakes and tsunamis. The Fukushima Daiichi Nuclear Disaster in 2011 proved that the DPP followed the right policy direction, and it also helped gather momentum from the public.

Environmental Legislation of the Party

Land Restoration Bill	NOT PASSED
Environmental Basic Act	PASSED
Greenhouse Gas Reduction Act	PASSED
Nuclear-Free Homeland Bill	IN MOTION
Renewable Energy Development Bill	NOT PASSED
Energy Tax Bill	NOT PASSED
Disaster Prevention and Protection Act	PASSED
Environmental Impact Assessment Act	PASSED
Electricity Act Amendment	NOT PASSED
Resource Recycling Act	PASSED
Marine Pollution Prevention Act	PASSED

Environmental Legislation Supported by the Party

Water Pollution Prevention Act	PASSED
Poison Management Act	PASSED
Air Pollution Prevention Act	PASSED
Waste Disposal Act	PASSED
Environmental Education Act	PASSED

Environment Issues in Political Campaigns

Since the party's foundation, the DPP has been considered a "green" party, not simply because its party colors are green, but its policies have been focused on promoting environmental protection and sustainable development.

Environmental Programmes and Projects

Around spring every year, the DPP organizes a massive rally with the collaboration of environmental NGOs to raise awareness on Taiwan's need to end dependence on nuclear energy. The rally gathers the attendance of hundreds of thousands. It is not just held in the nation's capital, but also in several counties and cities in Taiwan by DPP-governed municipalities.

Institutional Arrangements on Environmental Protection

Research & Policy:

- Policy Research Committee (climate change research and policy development, engages with legislators)

- New Frontier Foundation (climate change research and policy development, engages with academics and environmental experts)

Mobilization and Promotion:

- Department of Social Development (engages with environmental NGOs nationwide; mobilization for campaigns, awareness promotion, etc.)

The party allocates a large amount of budget to hiring of staff, events and promotion of activities, programs and research focused on climate change, approximately half a million USD per year.

International Activities

Participation in CALD Climate Change Programme and related events	
Inspection & Study of Greenhouse Gas Emissions Trading System	2000
Greenhouse Gas Emission Reduction–Energy Star Programme Transfer	2000
Green House Gases Emission Reporting and Banking	2000
Extended Analysis and Policy Integration	2000
A Study of Global Climate Change on Food Productions in Asian Pacific Rim Countries	2001
GHG mitigation / MARKAL	2004 2005

MARKAL modeling for Central America	2004
Transfer selected US EPA GHG mitigation programs	2004 2005
Transfer selected EPA GHG mitigation programs	2004 2005
eeBuilding	2006 2007
GHG industry–government partnership program and carbon market mechanism	2007
Analytical capacity building of greenhouse gas emission mitigation and policy formulation under sustainable development	2007
Indoor Air Quality	2007
Reducing GHG Emissions from the Electronics Industry	2008
Forecasting Greenhouse Gas Emissions and Assessing Greenhouse Gas Mitigation Strategies	2008

PARTY ENVIRONMENTAL AGENDA OF THE

Liberal Party of the Philippines

Party Policies on Environmental Protection, Sustainable Development, and/or Climate Change Adaptation/Disaster Risk Management

Both the rich and the poor bear the consequences of urban decay, thus, inclusive urban development where people of varying income levels are integrated in productive, healthy and safe communities is a solution.

From a government obsessed with exploiting the country for immediate gains despite the detriment of its environment, the Aquino government is committed to the sustainable use of natural resources.

The commission of public policy and advocacy of the party is the one responsible for the public education and policy of the party including initiatives on environmental protection. The International Affairs Commission is responsible for the international liaison and networking with other liberal parties and organizations in the world. It represents the party in international meetings and conferences, whenever specifically designated by the party president. It also monitors international developments that may have significance for the party's political work.

Environmental Legislation of the Party

President Benigno Aquino III signed on July 6th Executive Order No. 79 entitled "Institutionalizing and Implementing Reforms in the Philippine Mining Sector Providing Policies and Guidelines to Ensure Environmental Protection and Responsible Mining in the Utilization of Mineral Resources." EO 79 is the Aquino Administration's mining policy to strengthen environmental protection, promote responsible

mining, and provide a more equitable revenue-sharing scheme amid the projected boom in the mining sector. It aims to increase the revenue of government from mining; improve environmental standards; and put consistency in national and local laws pertaining to mining.

As representative of Bukidnon province in Northern Mindanao to the House of Representatives for three consecutive terms (1998-2007), Dr. Neric Acosta's major legislation included bills on clean water, solid waste management and biodiversity protection, and is the principal author of the groundbreaking Clean Air Act, a model of environmental legislation in Asia. Recognized as an environmental champion in and outside LP, Dr. Acosta's legislative legacy on environmental protection remains unsurpassed to this day.

Other bills and resolutions of LP members are as follows.

1. Senate Resolution No. 35 by Senator Ralph Recto (July 13, 2010), directing the Senate Committees on Economic Affairs and on Environment and Natural Resources to conduct an investigation, in aid of legislation, on the reported abusive practices in the grant and use of various mining permits under Republic Act no. 7942 or the Philippine Mining Act of 1995, with the end in view of preventing such abusive practices.

2. House Bill (HB) No. 2717 by Angelica M. Amante-Matba, authorizing provincial governments to issue both small and large scale mining permits for mining operations within their respective territorial jurisdiction subject to the guidelines of the Mines and Geosciences Bureau of the Department of Environment and Natural Resources.

3. HB00228 by Amado S. Bagatsing, regulating the practice of environmental planning, repealing for the purpose of Presidential Decree 1308 entitled "Law Regulating the Environmental Planning Profession in the Philippines and for Other Purposes."

4. HB00261 authored by Rep. Eric Olivarez, requiring parents to plant two trees for every child born to them and other purposes.

5. HB00099 authored by Rep. Douglas Hagedorn, preventing and controlling pollution from ships and providing penalties therefore.

6. HB00095 authored by Rep. Teodoro Baguilat, Jr., protecting, conserving, utilizing, developing and sustainably managing forest resources.

7. HB00359 authored by Rep. Lawrence Fortun, regulating the production, importation, sale, provision, use, recovery, collection, recycling and disposal of plastic bags.

8. HB00484 authored by Rep. Rodolfo Biazon, increasing the penalty imposed against polluters of navigable waters by amending Presidential Decree No. 979.

9. HB00108 authored by Rep. Kaka Bag-ao, instituting a national land use and management policy with implementing mechanisms.

The party always supports the passage of bills on environmental protection, sustainable development, and climate change adaption/disaster risk management. Two of the champions for environmental protection

are Dr. Neric Acosta (Presidential Adviser for Environmental Protection) and Rep. Malou Acosta.

Environment Issues in Political Campaigns

Environmental protection, sustainable development, and climate change adaptation are always part of the party's campaigns. In fact, President Aquino's Social Contract with the Filipino People provides, among others, the following:

1. An organized and widely-shared rapid expansion of our economy through a government dedicated to honing and mobilizing our people's skills and energies as well as the responsible harnessing of our natural resources;

2. From allowing environmental blight to spoil our cities, where both the rich and the poor bear with congestion and urban decay to planning alternative, inclusive urban developments where people of varying income levels are integrated in productive, healthy, and safe communities; and

3. From a government obsessed with exploiting the country for immediate gains to the detriment of its environment to a government that will encourage sustainable use of resources to benefit the present and future generations.

Environmental Programmes and Projects

President Aquino is firm in his commitment to the National Greening Programme (NGP). The NGP was launched by Aquino last year as the government's largest greening program, aiming to plant 1.5 billion trees in 1.5 million hectares nationwide in five years. The same was actually reiterated also by Sec. Manuel Roxas, President on Leave of the Party, in urging Mindanao Executives to help plant 1.5 billion trees by 2016.

The said program is related to President Aquino's issuance last year of Executive Order 23 declaring an indefinite log ban and creating an Anti-Illegal Logging Task Force headed by the Department of Environment and National Resources (DENR) head.

Also, Secretary Manuel Roxas, as Vice Chairman for Preparedness of the National Disaster Risk Reduction Management Council (NDRRMC), strongly urges the youth to take an active role in disaster risk reduction. These programs and projects are among the many initiatives being undertaken by the Party through its leaders.

Moreover, the party members under the Mamayang Liberal (Liberal Citizens) Wing composed of different sectors in the society such as women, youth, farmers, fisherfolk, labor and urban poor, have also undertaken environmental awareness projects and programs. The same are given sufficient funding and support by the Party.

Institutional Arrangements on Environmental Protection

The Commission of Public Policy and Advocacy of the party is the one responsible for the public education and policy of the party including its undertakings on environmental initiatives working hand in hand with the Philippine liberal think tank, the National Institute for Policy Studies (NIPS).

Leadership and Membership Support for Environmental Programmes

The Party gives prime consideration to environmental projects and programs especially related to disaster preparedness and risk reduction. The same has been a key program or focus of the Party through Department of Interior and Local Government (DILG) Secretary and Vice Chairman for Preparedness of the NDRRMC, Mar Roxas. In fact, President Aquino has ordered various concerned agencies to strengthen government efforts in curbing illegal logging and ensure the restoration and preservation of the country's forests for the benefit of future generations.

International Activities

The party actively participates and coordinates with the Council of Asian Democrats and Liberals as well as the Friedrich Naumann Foundation when it comes to regional and national environmental protection, sustainable development and climate change. It religiously sends representatives to symposia, forums and trainings regarding the said matter.

National Environmental Policy Paper of Mongolia

Ecosystem Based Adaptation Approach to Maintain Water Security in Changed Climate Conditions of Mongolia

Oyun Sanjaasuren, Ph.D.
Dagvadorj Damdin, Ph.D.
Onon Bayasgalan MEM

BACKGROUND

Climate Change in Mongolia

Since 1940, the mean temperature in Mongolia has risen by 2.1°C, which is approximately three times the global average temperature rise (MARCC 2009). Mongolia's already dry and harsh climate conditions, and the nomadic lifestyle of its people, make it particularly vulnerable to the onset of climate change. With the country's heavy emphasis on the livestock sector, and high dependence on water provisioning services, climate change is predicted to have a severe and direct effect on the economy and ecological systems in the absence of adaptive or mitigation measures. The energy sector represents 65.4% of total GHG emissions, and the agricultural sector emits 41.4% of total GHG emissions, mostly in the form of methane gas (Ibid.).

Unsustainable agricultural and development practices already test the sustainability of Mongolia's natural resource use. As such, Mongolia's ecosystems do not have the resilience and reserves required to cope with any further stress. If current trends of livestock overpopulation and unsustainable resource management practices persist, the vulnerability of Mongolia's rural communities will increase as climate change ac-

celerates the deterioration of hydrological and pastoral resources and increases climatic variability. The agricultural sector accounts for 16% of the nation's GDP, of which 80% is comprised of livestock husbandry (WB, 2013). The agricultural sector is the country's largest employer, covering 29% of the entire workforce (Ibid.). Unfortunately, this sector is the most vulnerable to the effects of climate change, because livestock depends directly on climatic conditions for its food, water and habitat.

Severe winter conditions, also known as dzuds[1], have been known as one of the most economically devastating threats in Mongolia. For example, in the dzud of 2009- 2010, approximately 6.7 million animals out of a total of 44 million perished according to the National Emergency Management Authority. Herders typically depend solely on their livestock for subsistence, which means that the dzud of 2009 left thousands of families financially devastated. Since Mongolia transitioned into free market capitalism in 1990, the population of goats grew drastically from 5 million in 1990 to 19 million in 2009, due to the global demand for cashmere garments (NSO, 2014). This has significantly added to pressures on pastureland, and been repeatedly linked to severe pasture degradation and increasing desertification.

Surface water is increasing in Mongolia's mountainous north and west as climate change accelerates permafrost and glacier melt. In these areas, water stores and riparian areas are gaining. This trend will continue for several decades until frozen water reserves are depleted.

1 A dzud describes a severe winter that leads to high mortality of livestock. A white dzud consists of excessive snow cover, which renders forage inaccessible. A black dzud consists of cold weather with little snowfall, which limits the supply of drinking water. A hoofed dzud involves high livestock mortality that is influenced by strong competition for forage.

In the remainder of the country, suface water is already decreasing. The 2007 water inventory reveals that 852 rivers and streams out of a total of 5,128 have dried up; 2,277 springs out of a total of 9,306 have dried up; 1,181 lakes and ponds out of a total of 3,747 have dried up; and, 60 springs out of a total of 429 have dried up (MARCC 2009). Altered summer rainfall and the reduced duration of winter ice formation are changing reliable river flow patterns.

Although Mongolia has always been active in international climate change agreements (supported UNFCCC since 1993, and member of the Kyoto Protocol since 1990), national scale policy efforts began to intensify in 2009. In 2010, the Mongolia Assessment Report on Climate Change (2009) became the first publication in Mongolia to present the findings of the country's climate change research[2]. This document, which sources the work of sixteen prominent scientists in Mongolia, has become the foundation for all dialogue around climate change. In 2011, the Climate Change Coordination Office was established within the Ministry of Environment and Green Development (MEGD), and the first-phase plan (2011-2016) of the National Action Programme on Climate Change (NAPCC) was approved by the Parliament. Mongolia developed a national framework for climate change mitigation and adaptation responses, including the establishment of the National Climate Change Committee chaired by the Minister for Environment and Green Development.

In 2013, the MEGD carried out and published the Technical Needs Assessment (TNA), which are two comprehensive reports on climate

2 Mongolia: Assessment Report on Climate Change http://www.unep.org/pdf/MARCC2009_BOOK.pdf

change mitigation and adaptation options in Mongolia[3]. In the same year, Japan and Mongolia signed a bilateral document concerning the Low Carbon Development Partnership[4]. Within this partnership, Japan will contribute to international efforts to prevent global warming by facilitating the reduction of greenhouse gas emissions in Mongolia through a credit-based mechanism. There are currently four projects that have been registered under the Clean Development Mechanism in Mongolia. Two of these projects are related to hydropower, one on wind energy, and the other on the retrofitting of decentralized heating stations[5].

These developments highlight the fact that the Government and its partners recognize the severity of climate change induced challenges and are sincerely intent on implementing a solution. The country is striving to invest and orient the profits from new mineral wealth into programs and practices that promote more sustainable livelihoods.

3 Technology Needs Assessment: Volume 1- Climate Change Adaptation in Mongolia http://unfccc.int/ttclear/sunsetcms/storage/contents/stored-file-20130820162919645/TechnologyNeedsAssessmentAdaptation_Mongolia.pdf These two documents were funded by GEF, and implemented by UNEP-Risoe Center in collaboration with the Asian Institute of Technology.

4 JCM agreement: http://www.mmechanisms.org/document/130108jcm_mongolia.pdf

5 Mongolia CDM Website: http://www.cdm-mongolia.com/index.php?option=com_content&view=article&id=27&Itemid=8&lang=en

Best Practice: Ecosystem Based Adaptation Approach to Maintaining Water Security in Critical Water Catchments in Mongolia

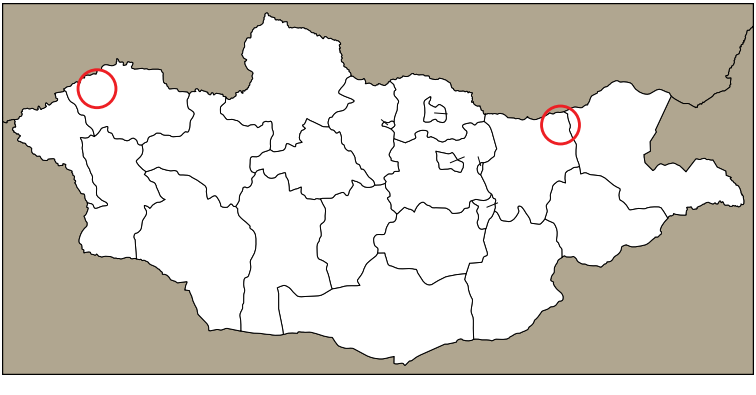
In this paper on Mongolia's best practice in climate change adaptation, we selected the project entitled "Ecosystem Based Adaptation Approach to Maintaining Water Security in Critical Water Catchments in Mongolia" (EBA Project) as representing the most exemplary case of multi-lateral collaboration to promote and develop adaptation efforts in the country.

The main goal of the EBA project is to maintain the water provisioning services supplied by mountain and steppe ecosystems by internalizing climate change risks within land and water resource management regimes. The project has been providing an example of how the country can implement adaptation actions through the sustainable management of surface water resources. This project is being implemented by the MEGD and UNDP, with financing from the Adaptation Fund. Initiated in 2012, this project will reach its completion in 2017.

The EBA project targets two eco-regions: the Altai Mountain/Great Lakes Basin and the Eastern Steppe, which represent very vast landscapes in Mongolia. Local level interventions will target two river basins within these broader eco-regions. The Kharkhiraa and Turgen river basin is located in the Altai region. It covers approximately 5,300 sq.km in ten soums in Uvs province. The water flow begins in mountainous glaciers in the Kharkhiraa or Turgen mountains, and flows into the Uvs Lake. The Ulz river basin is located in the Eastern Steppe, and covers approximately 38,000 km^2 in seven soums of Dornod and

Khentii provinces. The Ulz River has multiple sources within forests and wetlands in Khentii Province.

The target landscapes represent a significant portion of Mongolia's water resources and encompass an array of representative ecological, social and economic samples in the country, with potential for generating a variety of experiences and lessons. Both eco-regions and watersheds are emblematic of Mongolia's resilience barriers and concrete adaptation challenges, e.g., over-grazing, riparian disturbance, and over-appropriation.



Location of the two sites in the EBA project

The EBA project's unique feature is that instead of restricting its activities to political boundaries, it focuses on the boundaries of the hydro-geographical boundaries of the river basins. Therefore, the project has prioritized baseline research that is heavily science-based. A diverse team of prominent scientists, who participated in the MARCC

and TNA research, were hired to conduct the baseline analysis of the various ecological and climatic features of the river basins. The ultimate aim of the project is to improve livelihoods with the apprehension of climate change. As a result, the UNDP staff and their contractors have worked very closely with local citizens practicing livestock husbandry and crop cultivation. A total of nine local residents were hired as project coordinators to oversee day-to-day activities within the seventeen project soums[6]. In 2013, the EBA project led the efforts to establish the Integrated Water Resource Management Plan (IWRM) in the two river basins.

Ecosystem-based adaptation is defined by its role in supporting communities to adapt to the adverse impacts of climate change through increased biodiversity and availability of ecosystem services, while taking into account risk management and resilience enhancement, as part of overall local and national level adaptation strategies. As such, this project's primary ecosystem service of interest is water provisioning, although other services such as food and habitat provisioning services are also addressed.

The EBA project is fully consistent with Mongolia's national development policies and programs. Vital parts of these policy documents reference the need to generate effective management and protection of pastureland, water and forest resources, rain and snow water harvesting, and basin-based integrated water resources management. Applying an ecosystem-based holistic planning approach will contribute to specific sector-based programs and policies covering climate

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6 A soum is an administrative unit within the provinces. There are a total of 372 soums in the 21 provinces of Mongolia.

change adaptation, water management, forest management, biodiversity conservation, and combating desertification. The two landscapes and water bodies within the river basins are specifically stated in program documents such as the NAPCC, the National Action Plan on Combating Desertification (NAPCD), and the National Programme on Water (NPW).

The project activity will focus upon the maintenance of water-provisioning services as a measure of broad EBA success. Project investments will alleviate vulnerabilities and dismantle identified barriers by implementing three interconnected components:

Component 1. Establish eco-region level integrated land use and water resources monitoring and planning system and associated program focusing on reduction of climate change vulnerability. The broad-scale strategies will be completed for two eco-regions to detail resilience challenges/opportunities and provide guidance for development sectors.

Component 2: The majority of the project fund investments will support communities in the two river basins to implement a number of adaptation methods well proven to restore and/or maintain ecosystem functionality while reducing climate change vulnerability. "On-the-ground" changes within these two watersheds will improve social welfare and the security of ecosystem services. Implementation will focus upon better tactics for grazing management, restoration of riparian zones, biodiversity conservation, and more efficient water use.

Component 3: Strengthen the policy and institutional frameworks required to support national adoption and implementation of EBA

principles and practices. This will include institutional and policy improvements to generate integrated, landscape level decision-making. The Component will stimulate coherent approaches for resilience impacting sectors such as surface and ground water management, grazing and pastureland management, and the management of riparian habitats.

ISSUES AND CHALLENGES OF THE EBA PROJECT

In spite of many substantial efforts made by the Government, there are three primary challenges that reduce the success rate of all of the efforts carried forth by the Government and communities to address climate change. These identified challenges are:

1. Absence of landscape level framework for internalizing ecosystem resilience to climate change in coherent land use and water resources monitoring and planning system.

2. Inadequate demonstrated experiences in ecosystem based adaptation approaches at the landscape level.

3. Weak institutional capacity and policy framework to promote ecosystem based adaptation approach.

The EPA project was met with each three of these broad challenges. As the pioneer large-scale climate change adaptation project in Mongolia, the EBA project was inevitably met with the challenge of having no prior demonstrated experiences in the country to make the groundwork efforts more efficient. Although there was substantial data for the

scientist team to utilize, there was always a demand for more data on past conditions of climate, pasture conditions, hydrological conditions, animal distribution and so forth in more geographical areas, and covering a longer timeframe. The scientists used seven different models and techniques to predict the future impact of climate change in the two regions: the Global Climate Model (GCM), the Regional Climate Model (RCM), the Snowmelt Runoff Model (SRM), the MAXENT Model, the CROPWAT Model, and the Ricardian Technique. These models were used in a forthcoming economic valuation report of climate change in the two river basins.

In 2012, the MEGD made it their mission to begin their efforts to develop 29 River Basin Administrations (RBA) in Mongolia, a policy which they had approved in 2010. The establishment of these RBAs entails a complete restructuring of the pre-existing framework, in which the protected areas network was in charge of managing water bodies. As such, not all water bodies were actively overseen and managed in Mongolia. The RBAs are required to practice Integrate Water Resource Management (IWRM), which is a water management concept that has been growing popular throughout the world. This management approach is designed to address the problems that come with fragmented water management efforts by different parties representing different interests. As mentioned earlier, in 2013, the EBA project established the RBAs in the two regions, and created EBA Strategy Implementation Plans through a multi-stakeholder participatory approach. These plans are to be implemented by the RBAs in two stages between 2013 and 2021. Thus, the most pressing challenge for the EBA project has been to build capacity among the different actors involved in the implementation plan. Currently, the working capacity of the staff in all levels, have not reached its full potential, and the level of coordination and unified vision are as

yet undeveloped. The RBA system forces administrators from different provinces and different soums to work together and cohesively to manage the same resource. This entails teamwork among people who were previously competing for their water supply, usually with the upstream citizens having a clear advantage over water possession. The problem does not lie in the people's unwillingness to collaborate, but more in the novelty of the task of co-management.

In addition, other challenges lie in shifting the mindset of the people in the different localities. Local citizens have to actively plan for the future in the units of decades, and apprehend the onset of climate change. Not only water resources, but also pasture resources are demanding collaborative management as an adaptation measure. None of these efforts have full weight until the majority of citizens are greatly aware of climate change and its scientific foundation. Currently, citizens have observed environmental changes in their lifetime, but are not fully aware of climate change, and/or their role in contributing to the negative effects of climate change.

STRATEGIES ADOPTED TO ADDRESS CHALLENGES

The main strategy that the EBA project has undertaken to address its various challenges is to strengthen people's understanding of concepts, and to disseminate necessary information. The UNDP staff has organized multiple workshops and training sessions, bringing together regional administrators and scientists into one room and one platform. While some sessions were mainly didactic, others emphasized participatory involvement, and resulted in handbooks and guiding documents that was a product of the multi-stakeholder discussions. Many of

these sessions were organized together with the Climate Change Coordination Office working under the MEGD. As an example, in 2013, the EBA project organized a workshop teaching the skills of measuring water pollution. Their plan in 2014 is to organize workshops on writing project proposals, monitoring water conditions, and different skills to improve people's livelihoods.

In 2014, the project is also planning to make the EBA Strategy Implementation Plans more detailed by making individual ones for each of the seventeen soums. In turn, to strengthen the likelihood for their success, these plans will be incorporated into the soum and province governors' action plans. Emphasis will be made to make sure that the Implementation Plans are a working document that is flexible to changes and amendments.

The EBA project has invested a lot of time and money on strengthening the relationships between the administrative players among the soums. By providing many formal and informal opportunities to meet and talk, the different soums and agencies have been able to share knowledge, experiences and ideas. This is a critical part of the project's strategy to leave river basin administration structures that are sustainable. The UNDP project office cannot oversee the implementation of the project indefinitely, therefore, its emphasis on leaving behind an independent working entity is critical to future success.

BEST PRACTICE JUSTIFICATION

The EBA project is the first ever large-scale adaptation project in Mongolia, which looks at the consequences of climate change ho-

listically. This endeavor has a heavy emphasis on multi-stakeholder management, and on ensuring that many different players are pulled into the discussions. Scientists with various different backgrounds were hired to conduct research to assess climate change forecasts, and the subsequent vulnerability levels of the populations.

The EBA project is managed by UNDP, an international agency with very high credentials, and by the MEGD, which is the haven of all of the environmental data and past experiences in Mongolia. The project is funded by the Adaptation Fund, a very large and reputed financing entity with an approximate budget of 5 million US dollars over the project's lifespan. This trilateral collaboration allows for very heavy levels of checks and balances, and diverse knowledge backgrounds. UNDP's many relationships with different institutions around the world have pulled in international consultants such as Professor Robert Mendelsohn from Yale University, and Jinxia Wang from the Center for Chinese Agricultural Policy.

In addition, the EBA project has a relatively long lifespan of six years (2012-2017), and the MEGD plans to incorporate its best practice experiences and methodologies into national-scale implementation.

Various projects on climate change adaptation have been implemented in the past. However, many were one-time projects that were small-scale, short-lived and covered a very small geographical area. A few of the examples of the adaptation projects are as follows (UNDP, 2013):

- The Green Belt project implemented in Dornogovi province covers an area of 20 km^2. A variety of plants were planted to reduce the effects of wind surges, in order to reduce soil erosion and soil

movement in an area that has seen rapid desertification. This project was supported by UNFCCC and occurred five times between 1997 and 2005. Although this project had good intentions, its success was limited by the lack of supply of caretakers in the project area, the high costs associated with the maintenance of the plants, and the climatic conditions that are not conducive to successful plant growth.

- 14 hectares of pastureland in Uvurkhangai province was fenced off to allow for regeneration. By doing so, it will allow herders to use the pasture for years when heavy winter conditions, or drought years put pressure on available pastures. Although, this project can be effective for small areas, it would be extremely costly and complicated if it were to be up-scaled.

- 200 hectares of land in Umnugovi province was irrigated with the use of shallow groundwater that was fed by mountain water flow. This project can also be replicated in other sites as a climate change adaptation practice.

- In an area covering 10 hectares in Umnugovi province, spring water was collected for later use for the watering of crops. This project is very small-scale, but it is a very good example of people conserving scarce water for later use. In the EBA project, the adaptation strategies will involve the creation of reservoirs, which can be used for seasons when water is extremely scarce.

This list of climate change adaptation practices is not exhaustive. However, it illuminates the kind of small-scale efforts that have been carried out in the past.

CONCLUSION & RECOMMENDATIONS

Reaching the solution to adaptation requires setting in place capacities and tools to remove barriers currently hindering climate risk from being actively integrated within land and water resource planning and management.

Despite the growing understanding and evidence that the maintenance of ecosystem services plays a major role in reducing the effects of climate change and in assisting societies to adapt to its impacts, national and local mitigation and adaptation management frameworks have paid little attention to ecosystem based adaptation approaches. Existing and pending legislation, such as the draft Pastureland Management Act, do not fully incorporate the need to maintain ecosystem services. Government fiscal policies continue to incentivize production and maximization of resource use rather than conservation and maintenance of ecosystem services.

The desired situation requires improving the capacity of government decision-makers and private resource users to conserve and rehabilitate natural ecosystems. Stakeholders at all management levels should be able to identify, assess, and internalize climate change risks into water and land resource management. This should occur in both mountainous and steppe landscapes and accomplished at all management tiers. To reduce the vulnerability of communities to ever-increasing water scarcity induced by climate change, the natural facilities of grasslands, forests, wetlands, aquifers and riparian areas that enhance water quality and quantity resilience must be strengthened.

The final result should be fully operational systems for land use and water resources management that are holistic. Management approaches should embrace ecosystem wide solutions that incorporate climate change risks and provide clear avenues for adaptation and mitigation. The ultimate success of national, aimag, and soum level resource use management should be measured by the ability of ecosystems to continually provide critical services, including the abatement of land degradation and the regulation of water baseflows.

Among all of the climate change projects that have been implemented in Mongolia, the EBA project is incontestably the best adaptation project based on the breadth and depth of its forethought and planning activities. Halfway into its project schedule, the EBA project has not seen all of its expected results manifest themselves. However, the returns on the investment of all climate change projects, by its nature, are likely to only be shown in the decades to come.

In the TNA, the report identifies high priority technologies for climate change adaptation in the sectors of arable farming and animal husbandry (the two most vulnerable sectors). For arable farming, the three selected priority technologies are adopting a system of wheat intensification (SWI), vegetable production system (VPS) with drip irrigation, and potato seed production system (PSPS) (TNA, 2013). In the animal husbandry sector, the three priorities are seasonal to inter-annual prediction and livestock early warning system (SPLEWS), high quality livestock (HQL) through selective breeding and animal disease management, and sustainable pasture management (SPM). The EBA project is well aware of these technologies, and it is recommended that these technologies be given emphasis in the livelihood workshops.

The EBA project is well aware of the increased risk of large-scale natural disasters, such as dzuds (extremely harsh winter conditions) and droughts, which has a tendency to lead to high levels of livestock mortality. Cattle are the most vulnerable animal to dzud occurrences, which suggests that herders should place special emphasis on providing supplemental nutrition to these animals. Adaptation can mean tradeoffs in many cases, and thus, it is recommended that herders reduce the number of goats in order to allocate investments to other animals. The TNA recommends that within the dzud risk framework, the gathering of supplement feed for the winter and springtime be adopted to protect households from suffering large asset loss. Within its activities, the project can focus on new ways for implementing this activity in a manner that is affordable and supports livelihoods.

The actions under the project are expected to tie into national climate change and development policies and strategies, and support their delivery. This project outputs will form the basis of further EBA activities in other mountainous and steppe areas around the country, and potentially in other ecosystems. Lessons learned on how EBA can be integrated into policies and strategies at local and national levels will be gained and these lessons can be scaled-up as policy examples at cross-sub regional and national level. Through parallel and cooperative development, the application of methodologies and tools, and the implementation of pilot activities, the project will shorten the learning curve of local and national institutions, and fast-track the transfer of knowledge and experience in building ecosystem resilience.

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Part Three

BEST PRACTICES IN CLIMATE CHANGE ADAPTATION

Case Studies

Vulnerability to Bounty

From the case study, *Crab Fattening as an Alternative Livelihood Option for Climate Change Affected Vulnerable Coastal People of Bangladesh, by* Papon Kumar Dev

Climate Change in Bangladesh and Increasing Salinity of Coastal Areas

The Organization for Economic Cooperation and Development (OECD) asserts that climate change in the next two to three decades is expected to increase mean sea level, which, in turn, increases storm surge, inundation frequency and levels, and intrusion of saline water; increase year-round temperatures; reduce winter rainfall and increase monsoon rainfall; increase the intensity of cyclones including associated rainfall frequency; increase dry season crop stresses (higher evapo-transpiration, reduced rainfall and increased salinity in surface and ground water); and increase flooding from a combination of higher snowmelt in upper catchments, rainfall, sea levels, and storm surges. During the last two decades, the coastal floodplains of southwest Bangladesh are beset with the problems of salinity, water-logging and over-exploitation of natural resources. Fish catches are declining; lands for grazing and share-cropping have been lost to shrimp farms; and demand for day labour has fallen. In most developing countries, the extreme poor are the most vulnerable and susceptible given the adverse impacts of climate change on their livelihoods.

In the Southwestern Flood Plains of Bangladesh, problems of increasing salinity brought about by waterlogging, and the abuse and over exploitation of natural resources have become serious concerns. Salinity levels are expected to even further rise due to Climate Change and Sea Level Rise (CCSLR). In the foreseeable future, Bangladesh is

likely to be affected by the biggest ever and longest lasting CCSLR, which is essentially a manmade disaster. Increases in temperature and salinity result in the decrease of both the quality and quantity of agricultural production, including fisheries as many fish species cannot thrive or even merely survive in CCSLR events.

The reduction of freshwater flow from the upstream, the salinity of groundwater, and the fluctuation of soil salinity all contribute to salinity intrusion, which is becoming a major ecological concern in Bangladesh. The major impacts of salinity intrusion are the following: ten percent more land (relative to 1990) will be saline-affected with a corresponding ten percent increase in saline intensity (Rahman & Ahsan, 2001); decreased availability and productivity of agricultural lands; impacts on food security as naturally growing species disappear, and water security as safe drinking water becomes more scarce; loss of biodiversity including tree and freshwater species; and socio-economic impacts with women generally being more vulnerable.

Why Mud Crabs?

The mud crab (*Scylla serrata)* can survive in the saline water of 15 to 30 parts per thousand (ppt)[1]. Mud crabs are common in the mud flats of the Bay of Bengal. They dominate the mangrove fauna and are ecologically

1 Salinity is measured by parts per thousand or abbreviated as ppt. A 15 ppt, for example, means that there are 15 grams of salt for every kilogram (1000grams) of water. Average ocean salinity is 35 ppt.

important in the Sundarban Mangroves Forest[2] where seed crab, the most valuable raw material in crab fattening, is found in abundance.

In the past, crab was marketed only locally and in limited quantities especially since crabs are eaten only by the non-Muslim residents. Muslims do not eat crabs for religious reasons. In recent years, crabs have emerged as a potential and promising export commodity in Bangladesh and Kamal (2002), estimates that more than 50,000 fishers, traders, transporters, and exporters are found to be involved in this industry.

Hence, this study has been conducted to identify the suitability and effectiveness of crab fattening as an alternative adaptive livelihood option in climate change-vulnerable and increased salinity areas; and to explore the economic prospects and opportunities of such a livelihood. Data for the study was collected through structured questionnaire, following focus group discussions (FGDs), and individual interviews with government officials, non-government organizations (NGOs), and various stakeholders especially those directly involved with the harvesting and trading of mud crabs. Secondary information was used to crosscheck, complement or illustrate the collated primary data.

2 Bangladesh has a coastline of 710 kilometers with 618,780 hectares of mangrove tidal flat and 80,000 hectares of prime area suitable for brackish water aquaculture. (Anon, 2003)

Crab Fattening 101

Crab fattening as an Ecosystem Approach to Aquaculture (EAA) management proved to be one of the most effective adaptation measures in the southwest coastal zone. It integrates aquaculture of extractive species with other practices and short cycle aquaculture yielding high returns. It can be practiced in saline water up to 30 ppt although the most suitable for the fattening of mud crabs are in waters with salinity levels of 12 to 22 ppt.

The fattening of crab is the monoculture of crab to produce both "egg crabs" or female crabs with ripe ovaries which are sought after in Asian markets, and hard-shelled "meat crabs", preferably male crabs with a hard body and large, intact claws. This involves the caring and feeding of crabs inside a closure (pond/cage) for two to three weeks until weights are increased by 10 to 15 grams and gonads are filled and hence, ready for market. One cycle of fattening lasts 15 days and 18 to 22 cycles can be managed within one year. Feeds, nets, fences, bamboo poles, PVC pipes, threads and needles, and fertilizers are needed. Crab fattening is a profitable venture.

Bangladesh's production and export of mud crabs, even in comparison with other crab species, have increased significantly in the past few years. Bangladesh mud crabs are of high food quality and are larger than those from other countries leading to increased market demand and economic profit, which, in turn, benefit those involved in this industry especially minority groups that have traditionally been engaged in this profession.

Supply of mud crabs for export and domestic consumption is mainly dependent on wild catch from swamps, tidal rivers, canals and tide fed traditional shrimp ponds. Lean crabs caught from the wild are sometimes collected for fattening and future sale. The rainy season from April to July is a major fishing period especially in mangrove and shrimp ponds and crabs caught during this period are larger in size compared to those caught in winter (September to January).

Mud crabs occur abundantly in the coastal rivers of Cox's Bazaar, Chittagong, Barisal, Patuakhali, Satkhira, Khulna, Noakhali and the inshore islands of Moheshkhali, Kutubdia, Sandip, Hatia and Dubla. They are most abundant in the Khulna and Chokoria Sundarban areas (Khan & Alam, 1991). For the Sundarban Reserve Forest, the dry season from October to March is the peak season (Ferdoushi et al, 2010 and Khan & Alam, 1991).

Crab fattening can be done in earthen points or in cages using tidal saline water where turbidity is comparatively less. Doing it in earthen points is more profitable but it poses more risks. Crab fattening in cages is less risky but it is less profitable as well due to its limited numbers of boxes.

In 20 decimals of land (almost 810 square meters) used for the fattening of 4,000 kilograms of seed crab in an earthen point, an estimated annual profit of BDT 150,000.00 or more than USD 1,900.00[3] can be realized. Expenses include land lease, labour, seed crabs, materials (bamboo, nets, pipes, etc.), and feeds. A crab cage which can be used

3 Henceforth and unless otherwise stated, all dollar figures are based on 2014 Bangladeshi Taka and US Dollar exchange rates.

for two to three years can yield an estimated annual profit of BDT 20,000.00 or about USD 257.50. Average market price of mud crab is BDT 400.00 or about USD 5.15[4]. Estimated crab mortality is included to compute estimated profit for both crab cage and earthen point technology.

Crab fattening status in southwest coastal region

District	Upazilla	No. of union covered in the fattening	No of crab fattening pond /plot	Fattening Land area (acre)	No of depot
Satkhira	Shyamnagar	11	1542	20.56	186
	Debhata	2	167	2.10	85
	Kaliganj	4	325	4.24	96
Khulna	Paickgacha	7	2620	25.14	330
	Dacope	4	305	4.04	130
	Batiaghata	2	124	2.27	100
	Koyra	4	407	7.32	125

4 There are many factors affecting the price of mud crab in both the domestic and international markets, particularly as the supply of crab is mainly dependent on wild sources. During Christmas and the Chinese New Year, international demand and corresponding prices increase. Though demand in the domestic market is seen as steady throughout the year, any price increase in the international market will ultimately increase the price in the domestic market. While the majority of the collectors and farmers claimed that their depot owners had the most influence over price, depot owners felt that suppliers and exporters had the greatest influence.

Bagerhat	Morelganj	4	105	0.92	125
	Sharonkhola	2	28	0.25	12
	Mongla	3	2393	27.07	305
	Rampal	5	2625	28.37	317
Total		**48**	**10641**	**122.28**	**1811**

Source: Shushilan–Proscrab Project, 2008–09

Project Profile, Livelihood Interventions and Necessary Interventions

In 2004, about 50 hectares of land, 10,641 fattening ponds or plots and 1,811 depots were used for crab culture in 11 Upazillas (counties) in three districts (Bangladesh has 64 districts) in the southwest coastal region of the country. According to the local people, the size of crab fattening areas and the number of depots have increased by two to three folds since 2004 (Sushilan–Proscrab Project, 2008–09).

The Sushilan–Proscrab Project (2008–09) identified a total of 5,050 households in these 11 Upazillas engaged in crab fattening, crab catching and marketing with four Upazillas having the highest number of households (from 896 to 1,200). Crab fattening in these 11 Upazillas yielded 8,003.91 metric tons (MTs) annually with only 47.13 MTs used for domestic consumption. The extension of crab farming areas and the increasing number of depots resulting from higher demands for fattened crabs are putting a strain on mangrove resources.

Different government agencies, research institutes, and national and international NGOs are attempting to promote crab fattening as an alternative livelihood option in Bangladesh.

The Adapting Natural Resources Management to Climate Change & Increasing Salinity (ANRMCCIS) Project is being implemented at parts of the country with increasing salinity zones, waterlogged areas and excessive drought in order to achieve millennium development goal targets on hunger and poverty reduction, and environmental sustainability by 2015. The project beneficiaries are extremely poor households with a daily income of not more than BDT 22.00 (about USD 0.27[5]) and who do not have access to institutional financial support, particularly those from minority groups, vulnerable and households headed by a woman.

The project attempts to provide these extreme poor households with access to land and water resources, and promote social capital enhancement and livelihood improvement through natural resource based small enterprises. Floating agriculture in water-logged region, crab fattening in saline affected area and watershed management in drought prone areas have been identified as the project's main innovations.

The ANRMCCIS crab fattening project includes 200 extreme poor households in Shyamnagar Upazilla by establishing groups of 8 to 12 persons to implement the intervention. Two groups from Porkatla and Kolbari villages earned BDT 131,753.00 (about USD 1,700.00) and BDT 126,066.00 (about USD 1,626.00) from 20 and 16.5 decimals of land (about 810 and 668 square meters), respectively, for one year. Another village that engaged in cage culture earned BDT 34, 613.00 (about USD 446.00).

5 Based on 2009 Bangladeshi Taka and US Dollar exchange rates

In terms of marketing and livelihood, the major findings are as follows:

- Most of the marginalized segments of the coastal population were found to be involved in mud crab collection for their livelihood. As their level of income fluctuates depending on the seasonality of crab collection, the lean season means that they can afford very little food for their family (Salam, et. al, 2006).

- The average daily income of crab collectors was considerably lower than their counterparts in other economic activities. However, the number of crab collectors increased over the last couple of years due to the unavailability of viable alternatives.

- Depot owners usually pay crab collectors in advance on the condition that they sell their entire catch at a pre-arranged price often benefiting the former. All depot owners have contractual crab collectors.

- All depot owners conduct privately owned businesses with 80 percent owning fattening ponds where underweight and grade rejected crabs are kept (Salam, et. al, 2006). They either sell directly to exporters or engage the services of agents.

The major problem in crab farming in Bangladesh is the scarcity of seed crabs. The natural populations of mud crab are declining throughout Southeast Asia as a result of over-exploitation, loss of natural mangrove habitat, and coastal environmental degradation. Inadequate fund and government support whether in financing or skills training hinder the promotion of crab fattening; thus, appropriate culture technology, scientific research and baseline studies, the establishment of crab

hatcheries and nurseries, proper training and counseling, national level advocacy and interest-free financing must be extended, especially to small farmers.

Conclusion

Following the 1980s, the unregulated and intensive shrimp production contributed to the spreading of diseases, particularly the white spot syndrome virus (WSSV) epidemic, which necessitated alternative aquacultural products and practices that are both economically and environmentally sustainable. Crab culture is one such alternative especially for the people of the southwest coastal region whose livelihoods are improving through crab fattening. Research and baseline studies must be conducted especially since seed crabs continue to be sourced from the wild, which potentially contribute to the destruction of natural resources and the disturbance of the ecological balance of the coastal habitats and wildlife of the Sundarbans. Though numbers of national and international organizations are working on this adaptive aquaculture practice but still comprehensive policies and regulations are necessary for communities who are directly and indirectly associated with crab fattening.

(Abridged version edited by John Joseph S. Coronel)

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Murmurs from the (Glacier) Lake

Abridged version of the case study, *GLOF Monitoring and Early Warning System in the Punakha-Wangdue Valley in Bhutan,* by Karma Dupchu

The glaciers of the Himalayas are the main sources of fresh water that feed river systems in the region where downstream, millions of people live. Agriculture provides livelihood and employment to more than 79 percent of the population who practice subsistence farming in marginal lands along river valleys. Hydropower is an important source of energy and revenue for Bhutan, with hydropower exports to India accounting for more than 45 percent of national GDP. Agricultural lands and infrastructures such as hydropower plants are all vulnerable to flooding.

Accelerated melting of glaciers because of global warming causes glaciers to retreat further and has led to the formation of glacier lakes in higher mountains in the alpine region which, in turn, poses higher risks of Glacier Lake Outburst Flood (GLOF). Caused by the bleaching of terminal moraine releasing large volumes of water, GLOF can wreak havoc on human settlements as well as important historical sites downstream. Bhutan is considered most vulnerable compared to Pakistan, Nepal and India as it has more than 677 glaciers and 2674 glacier lakes including 25 potentially dangerous ones (ICIMOD,2011). These glacier lakes, located 4000 meters above sea level (masl), are inaccessible, remote and harsh; thus, the difficulty in identifying and monitoring these lakes. Komori et. al. (2012) identified 21 outburst cases in Bhutan since the 19th Century. Though not as frequent as flash floods and landslides, GLOF can cause considerable casualties and destruction considering that most settlements and infrastructures in the mountainous region are along river valleys.

The Project Area

The Punatsangchu River Basin—the project area—is one of Bhutan's largest with an approximate area of 13,263 square kilometres and with the Phochhu and Mochhu Rivers as the two main tributaries of the river. The basin has 272 glaciers and 980 glacier lakes including 14 of the 25 potentially most dangerous in the country (ICIMOD, DGM, 2001). Lunana, a GLOF high risk area, is located at the headwater of the Phochhu River in west-central Bhutan. Agricultural lands, towns and various public infrastructure such as schools and hydropower plants are located downstream in lush river valleys.

The latest GLOF event in Bhutan occurred on 7 October 1994 from Lugge Lake and wrought havoc in Punakha-Wangude Valley. The 1994 GLOF killed 22 people and damaged a 17th Century fortress-Punakha Dzong. Subsequently, the Government of Bhutan in collaboration with bilateral and international organizations, initiated systematic scientific investigations and concerted efforts to reduce GLOF risks. An Indo-Bhutan team investigated residual risks and recommended mitigating measures for Raphstreng Lake including the immediate lowering of its water level.

With funding from the Indian Government, the first phase of the Raphstreng Tsho (Lake) Outburst Flood Mitigation Project involved the controlled opening of the moraine dam by manually (i.e., without the use of machines) widening the outlet channel. Pumping was tried initially but later discarded because it was both ineffective and expensive considering the remoteness of the area. By 1998, the water level was lowered by four metres.

An Austro-Bhutan Cooperation, the second phase of the project which assessed the geological risks of Raphstreng and Thorthormi Lakes started in 1999. An integrated multidisciplinary fieldwork using remote sensing, and geological, hydro-geological and geophysical methods interpreted the subsurface characteristics of the moraine dam (Hausler et. al. 2000; Mool et. al. 2001) and results indicated that risks of outburst from Raphstreng Lake was low but it was high for Thorthormi Lake (Hausler et. al. 2000). The project also prepared a hazard zonation map of the upper watershed and recommended the installation of a GLOF-early warning system (EWS) with multiple sensors.

The "Study of Glacier Lake Outburst Floods in the Bhutan Himalayas", a Japan-Bhutan Cooperation under the Science and Technology Research Partnership for Sustainable Development (SATREPS), completed an inventory of historical glacial lake expansions and a detailed analysis of hazardous lakes; assessed GLOF risk factors and triggers; and recommended effective counter measures like the GLOF-EWS (DGM, 2001).

Bhutan's National Adaptation Programmeme for Action (NAPA), 2008 to 2013, implemented a project to reduce climate change-induced risks and GLOF vulnerabilities by examining the structural risk reduction measures in the Punakha-Wangdue and Chamkhar Valleys. Aided by a USD 3.5 million-grant from the Global Environment Fund (GEF), the project has three components implemented by three government agencies of Bhutan: (1) artificial lowering of the water level of Thorthormi Lake[1] (2) installation of the GLOF-EWS; and (3) an educational and information campaign. Educational and public awareness components,

1 After four years, Thorthormi Lake's water was reduced by five metres. GLOF risks from the lake source was reduced but not completely.

institutional capacity building programmes, effective monitoring mechanisms, and knowledge sharing with regional and international cooperation agencies characterize the holistic approach of the GLOF-EWS.

GLOF-EWS: What Did Not Work Before and Why

After the 1994 Lugge Lake GLOF, a manually operated GLOF-EWS was installed in the Lunana Region involving a station close to glacier lakes operated by a staff of two who are equipped with wireless sets and satellite telephones and are tasked to report lake water levels on a regular basis (water monitoring gauges were installed in lakes and major rivers) and to issue warnings to downstream inhabitants.

The reliance on the personnel of the two is the main disadvantage of this manual, EWS given the possibility that the personnel is unable to communicate, or that the stations remain unmanned when flooding occurs, among other factors involving human intervention (UNDP, 2007). This is exacerbated by the absence of disaster response mechanisms—sensors or siren towers, identified evacuation areas, proper training of concerned government personnel and community preparedness—in vulnerable communities of the valley, which would further render the ineffectiveness of this EWS.

The installation of GLOF monitoring and early warning systems in the area presents several challenges: remoteness and inaccessibility of the terrain, harsh climatic conditions, security, maintenance and operational issues, and high costs of these capital intensive technologies. The GLOF EWS in Nepal that could provide lessons and best practices unfortunately failed or were proven ineffective because of improper

planning and designing of systems that proved costly to install and operate; inadequate resources to meet all GLOF-related needs; inadequate institutional support and mechanisms for a holistic approach to disaster risk reduction (DRR); and most importantly, the failure to involve the communities affected by the project.

The GLOF-EWS in the Project Area

Prior to the implementation of a new GLOF-EWS in Bhutan's Punakha-Wangdue valley, the project management considered all aspects of the system (UN ISDR, 2003), as follows:

- Risk Knowledge: systematic assessment, and patterns and trends mapping of hazards and vulnerabilities.

- Monitoring and Warning Service: accurate and timely forecasting of hazards based on reliable and scientific data, methods and technology.

- Warning Dissemination and Communication: clear and timely relaying of warnings to all stakeholders.

- Education, Response Capability and Disaster Preparedness: communities and other stakeholders are capacitated with the proper knowledge to act and respond accordingly once the warnings are communicated.

Excluding counterpart funding for the national staff, the supply of goods, installation, testing and commission of the whole system cost

USD 1.05 million and all equipment and accessories were imported from the United States. Field survey and site assessment for EWS sites were done by a multi-disciplinary team in close consultation with communities and the local government.

To provide more lead time in flood events, water level sensors were installed in the lakes during summer (May/June to mid-October) when the lakes became accessible via mule tracks that take about nine days to navigate.

The EWS consists of a control station in Wangdue, 17 siren stations and six hydro-meteorological monitoring stations—four Automatic Water Level Stations (AWLS) on main glacier lakes and two AWLS combined with Automatic Weather Stations (AWS). The project is divided into two areas: the upper sites near the glacier lakes and the lower valleys where the settlements are located. Four AWLS and a combined AWLS-AWS are located in elevations reaching above 4267 masl which necessitates the use of a two-way Iridium communications services.

AWLS at the glacier lakes of Lugge, Thorthormi, Rapstreng and Baytsho measure lake water levels every 15 minutes from November to February and every five minutes from March to October and data is transmitted every hour. When a parameter threshold is detected, an Iridium message is instantly transmitted to the control station for immediate activation of upper sirens and for verification prior to the activation of lower sirens. Each AWLS is equipped with a data logger, a Sutron's Dual Orifice Constant Flow Bubbler with Logger for double sensor measurement and for back-up, an Iridium modem, and an AC/DC power supply for future connection. The stations are powered by a 50-watt solar panel and regulator, and a 100AH 12-volt battery.

Automatic Weather and Water Level Stations in Dangsa and Thanza measure weather parameters and river levels every 15 minutes and transmit collected data every hour. Like AWLS, combined AWLS-AWS communicate warning messages once selected alarm parameters are triggered.

Of the 17 sirens, three are in the upper region near the mountain lakes which also have some upland villages while 14 are in the more densely populated river valley settlements. Each siren station transmits diagnostics such as battery voltage and siren statistics to the control station once a day and is equipped with a data logger, an Iridium modem, an AC/DC power supply for future connection and a Whelen OA-1 siren with amplifier. Two 80-watt solar panels with two 75AH 12-volt batteries ensure uninterrupted operations.

The Wangdue GLOF-EWS Control Room collects data from all 23 stations (17 siren stations and six AWLS/AWLS-AWS) into the data custom database via Iridium satellite telemetry developed by Sutron Corporation, an American company. In addition to managing scheduled and on-demand data collection including water levels, weather and warning information, the control operators oversee siren activation. Iridium Satellite Communications was chosen over other systems after a cost-benefit analysis which identified the Iridium system as the most economical, most reliable, and best suited for Bhutan's remote and rugged terrain, and extreme weather conditions (Tagg, 2010).

Once flooding is detected by the water level sensors in Lunana, the conservatively estimated approximate time available for alerting via the EWS and for evacuation is between five to six hours. However, flood lead time cannot be accurately determined as the speed of floodwaters

travelling downstream from upland lakes depends on several factors and scenarios like the volume of water released, the formation of artificial dams on river course, and the amount of carried debris, among others.

Yellow Alert. An alert message is transmitted in the control room once water level reaches alert level and the staff is put in a state of readiness, and monitoring becomes more vigorous. The remote stations where water has reached a critical level will be updated and turn yellow on the control room display. Similarly the icon on the GLOF website map will also turn yellow. At this point, no siren is activated.

Red Alert (Alarm). Only the three sirens in the upper Lunana region (Nos. 15, 16 and 17) are automatically activated when any of the four lakes reaches alert level. Only when the water level at the Thanza and Dangsa remote stations reaches the alarm level would the 14 sirens in the lower valleys will be activated The water levels will be updated in the control room display which had turned red, accompanied by an audible alarm. Similarly the icon on the GLOF website map will also turn red.

The GLOF-EWS covers more than 90 percent of the population in the 21 vulnerable communities in the Punakha-Wangdue valley. These include 875 households, four schools and two vocational training institutions. More than 15,000 employees work at two more power plant projects[2] that are under construction. Aside from the 17 sirens, warning information will be disseminated through national radio and

2 Punatsangchhu Hydropower Project Authority (PHPA) Projects I and II.

television stations. Data from the control station will be relayed to the National Disaster Emergency Operation Centre (NEOC) operated by the Department of Disaster Management (DDM) of the Ministry of Home and Cultural Affairs, local governments, communities, power plants and other relevant entities and agencies. Mobile phones have been distributed to designated focal points to further disseminate warnings and other vital information in vulnerable communities.

The standard operating procedure (SOP) of the GLOF-EWS provides the basic principles and protocols of GLOF warning procedures which are to be adhered to by all flood monitoring and warning staff.

The soft components of the project, implemented by DDM, include the identification of GLOF evacuation areas, and an information and education campaign to prepare local communities in the event of climate-related disasters. The project identified more than 31 vulnerable communities and 38 GLOF evacuation sites (Chencho, DDM, Presentation, 2013).

Public awareness workshops were organized for more than 500 households, staff, and students of five schools and two vocational training institutes, more than 300 monks, and representatives of hotels and resorts located along the valleys. Public consultations for information sharing on GLOF were held. Evacuation drills were conducted after the testing and commissioning of the GLOF-EWS to familiarize the people in vulnerable areas with the system and how it works, and with the routes leading to evacuation centres.

Community focal points in all vulnerable areas were established and were provided with mobile phones. Community-Based Disaster Risk

Management & Planning (CBRM) programs were initiated by DDM for all local government officials and local communities in the project area.

To ensure the sustainable operation of the GLOF–EWS, staff and personnel within the focal agency received training on the hardware and software of the system conducted by the company that supplied the system. Except for the first few stations, majority of the stations were installed by the staff of the local counterparts; thus, ensuring technology and skills transfer directly into the hands of those at the field.

Conclusion

The potential risks from GLOF in Bhutan Himalaya are imminent. Climate change impacts accelerate the melting of glaciers and the formation of more glacier lakes in the mountainous headwater posing even more threats downstream where majority of human settlements are present.

Risks can be mitigated by lowering the water levels of glacier lakes; however, this is both costly and difficult to do because of the remoteness of the lakes, harsh weather conditions, lack or absence of transportation and communication infrastructures and immense manpower requirements. Limited financial and human resources are coursed to other priority projects in Bhutan although the lowering of lake water levels by channelization has been done before.

The GLOF–EWS is integral in reducing risks related to hydrological and climate induced hazards. Although GLOF occurrence was perceived to have increased as a result of climate change, the frequency of outburst

does not seem to have increased (Komori et. al., 2012), particularly in Bhutan. Designed not only as a warning system but as part of a national hydro-meteorological network, the GLOF-EWS is able to collect valuable climate and hydrological data that can be used for various purposes including climate change research.

Additional funding beyond the project allocation was mobilized with co-financing from hydropower projects. This is the first time wherein entities engaged with hydropower generation have invested in EWS through cost sharing mechanisms.

The project also included educational trainings on disaster risk reduction; established institutional links among central and local government units and agencies and affected communities; and initiated the mainstreaming of DDR in development planning through CBDRM programs.

As Bhutan lies in the headwater, the knowledge, experiences and skills gained from the implementation of the GLOF-EWS will be useful for replication in other basins and regions.

(Abridged version edited by John Joseph S. Coronel)

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Indigenous Knowledge, Ingenious Solutions

Abridged version of the case study, *Indigenous Knowledge on Water Resource Management–A Tool in Climate Change Adaptation in Nepal,* by Deep Prakash Ayadi

The drying up of water resources, erratic rainfall, and increments in the number and intensity of natural disasters are some of the more pronounced impacts of climate change. Climate-induced risks and hazards can have wide ranging, often unanticipated, effects on the environment and on socio-economic and development related sectors including agriculture and food security, biodiversity, water resources, energy, health, and urban settlement (NCVST, 2009; WFP, 2009).

Least developed countries suffer most from the impacts of climate change although they contribute least in terms of greenhouse gas (GHG) emissions. Nepal which contributes a mere 0.025 percent of total annual GHG emissions ranks fourth in the global ranking of countries most vulnerable to climate change impacts.

Shrestha (2007) notes the increasing dry periods, rainfall, floods, landslides, forest fires, glacial retreats, and Glacier Lake Outburst Flood (GLOF)[1] in Nepal. Extreme temperatures and increases in annual temperature averages have been observed in recent years with days and nights becoming warmer and cool days and nights becoming less frequent (Baidya, et. al., 2008). The OECD (2003) projects that temperature for the years 2030, 2050, and 2100 will significantly and consistently increase, with winter months experiencing higher

1 GLOF is extensively discussed in the Bhutan Case Study entitled, *Murmurs from the (Glacier) Lake*

temperature increases compared to the summer months; similarly overall annual increase in precipitation is projected. Rainfall pattern has become inconsistent with higher intensities of rain and less number of rainy days alternately causing long droughts and heavy rainfall (Malla, 2008). NCVST (2009) suggests significant warming, particularly at higher elevations, leading to reduced snow and ice cover, increase in climactic variability, and higher frequency of extreme events including floods and droughts.

There is also a greater demand for water given an ever increasing population and other demographic, economic and social factors. Climate change impacts exacerbate existing pressure on water resources.

Water Resources in Nepal: Challenges & Opportunities

Climate change will potentially have profound and widespread effects on the availability of, and access to, water resources (ICIMOD, 2009). Climate change-related risks to water supply include more frequent flooding, landslides, sedimentation, more intense precipitation during monsoon, greater unreliability of dry season flows (OECD, 2003), and delayed and weakened monsoon (PU, 2009).

Water is a principal resource supporting the economy of Nepal; 33 percent of the country's agricultural production is based on irrigation, and 84 percent of its power requirement is provided by hydroelectric generation (WRS, 2002).

In Nepal, non-climactic changes (demographics, development initiatives, and the like) may have a greater impact to water resources than

climate change. The challenge, therefore, is for the local population and policy makers to plan and implement water resource management, systems and adaptation programs and policies to address the hydrological variability induced by climate change. Proper resource management reduces increased vulnerability.

Indigenous People in Nepal's Mountains

The local inhabitants of the mountainous regions of Nepal have been adapting to the extremes of too much water during monsoon and too little of it in winter. They also cope with geographical and topographical challenges of managing water. Development and demographic factors (e.g., population increase) have resulted to the neglect, or even destruction of traditional social structures and institutions, and consequently, the social norms and values accompanying water conservation.

One technology developed by the indigenous people but gradually disappearing is the systematic way of managing runoff from the mountain ridge to the valley with strategically-located drainage channels and ponds to hold, divert, and delay the flow of runoff. Aside from preventing casualties and damage during monsoon, these ponds become water reservoirs during winter (Upadhya, 2009).

The identification and development of effective and doable local and traditional techniques (like the above-mentioned example) have become necessary to meet the challenges of water scarcity and water-induced disasters exacerbated by climate change. The significance of traditional methods of water harvesting and management systems to cope with,

and adapt to, emerging water stresses, and the evolution of local water resources and management practices are assessed in this case study.

The traditional practice of managing water, which evolved locally through years of experience and incorporated the knowledge and skills of generations of people, was sustainable in the past. Overlooked by various development efforts and consequent socio-economic changes, indigenous knowledge, practices, and systems can be reviewed and further explored, and later, incorporated with emerging adaptive measures such as integrated water resource management.

Current Indigenous Knowledge & Practices in Water Resource Management

In his book *Ponds and Landslides*, Upadhya (2009) asserts that traditional water-centric resource management is driven by problems associated with either too much water or too little of it. Storing monsoon water to mitigate problems arising from too much water also becomes additional water supply during the dry season when there is too little water. Trails used as drainage canals, channels within farms, ponds to hold water, and levelled terraces are some of the gradually vanishing traditional techniques of water harvesting and runoff management. Dug out ponds have been proven to be effective in maintaining the balance between too much and too little water. He proposes the revival of ponds and the extensive propagation of this technology throughout the Himalaya. Hill farmers should be made part of the solution rather than being unfairly castigated as being part of the problem.

The collection of rainwater as a principal source of water has been practiced in Nepal since ancient times. Rainwater collection ponds have been built in hilly regions where water is collected during the rainy season and used during the dry season (Sharma et. al, 2009).

Diverting water from the same stream at different elevations is a popular method of water delivery in the high hills of Nepal. Using simple technology and locally available materials, farmers designed and constructed a channel head diversion using bamboo and a drain locally called *Kulo* to carry water using gravity (Ibid.).

Paalo Baadhney is an indigenous method of equitably allocating water among the families in the community with each family having its turn to irrigate its own farmland (Ibid.).

Indigenous people's belief that cutting trees and throwing litter in the watershed would bring ill will aids in the conservation of forests and water sources. Unfortunately, traditions such as this belief are slowly disappearing (UN, 2005).

Rivulets and Earthen Ponds

In the Cha Khola Micro-watershed, Kavre District, wells and taps (piped water) are the principal sources of water for domestic use with a few using rivulets, locally known as kholcha, to supplement the water needs of livestock. The kholcha is used to fill small earthen ponds with water, a common method in watersheds. The rising number of stall-fed buffaloes has spurred the building of ponds close to springs from where seepage is diverted into the manmade ponds. Believing that it is healthy for animals to use flowing water, some people have built ponds in the middle of the irrigation canal (Lohani & Banskota, 2001).

The Gravity Canal

The gravity canal, an indigenous system that used to supply most of the local people's water needs, remains popular in the Mustang region. Small ponds, locally called ching, collect water from a feeder canal which is stored through the night and released in the morning. The modern piped canal system—designed using conventional engineering principles, and introduced by external agencies—now supplies much of the water for domestic use. The indigenous gravity canal system—developed by the villagers on their own initiative and built using their own investments—is extensively found in the mountainous region. Local ingenuity and skills have been put to use through the ages and the building of these indigenous infrastructures is made possible because of community participation—an important feature of an integrated water resource management (Parajuli & Sharma, 2001).

Current Policy & Legislation/Strategies to address Policy Gaps & Problems

Despite its crucial role in climate change adaptation, current policies and legislation have largely ignored indigenous knowledge. The Climate Change Policy (2011) is the exception as it mentions the identification and documentation of—and the necessary improvements that can be made in—traditional climate-friendly techniques and indigenous skills, knowledge, and practices.

Nepal is a signatory to the Convention on Biological Diversity and the Convention on Climate Change. Both conventions oblige each signatory to integrate conservation and the sustainable use of biological resources in its national policies; thus, the government has developed the National Biodiversity Strategy to honour its international obligations, and to protect biologically diverse resources and ensure that their utilization will benefit the people. The strategy provides a platform to support climate change adaptation.

In order to integrate indigenous knowledge on water resource management into the national agenda, the following strategies are recommended:

- Improvement of current traditional technologies on water resource management.

- Making policy makers, academia, mass media and communities aware of such technologies.

- Documentation (through case studies, policy briefs and articles) and dissemination of indigenous knowledge and their best practices through mass media, social networking sites, and public for that focus on global climate change discussions.

- Wider levels of discussions on the topic by major stakeholders, especially among the grassroots and policy makers.

- Raising the issue in international platforms to lobby for its inclusion in the global agenda of climate change adaptation.

Conclusion

The impacts of climate change are now more apparent in Nepal and are particularly pronounced in terms water resources, or the scarcity of it.

The crucial role of traditional practices and indigenous knowledge in climate change adaptation, how these can be improved or further adapted to suit the current needs of the country, how these can be replicated within Nepal and elsewhere, and what strategies to pursue must be holistically viewed and understood within the context of a country like Nepal where development initiatives are often constrained by limited resources. Climate change adaptation incorporating and improving indigenous knowledge and practices must be sustained at the local level.

Adaptation strategies that build on existing traditional practices and draw on indigenous knowledge are considered more sustainable

over the long term and less harmful to biodiversity, and require fewer resources.

(Abridged version edited by John Joseph S. Coronel)

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Bringing Water, Nurturing Hopes

Abridged version of the case study, *Impact of Community-based Installation of Hydraulic Ram Pump for Water Supply on Climate Change Adaptation in the Context of Rural Development in the Philippines,* by Aladino C. Moraca

Hard to reach rural villages in the Philippines suffer from the lack of access to water resources needed for both household and agricultural uses. Women and children traditionally fetch water by trekking through kilometers of difficult terrain. During the dry season, springs in upland areas dry up and only springs located near creeks, rivers and lakes which are even further away can provide vital drinking water. This exacerbates the prevailing poverty in the countryside.

In 2008, the Ecological and Agricultural Development Foundation Inc. (EcoAgri) commenced its research and development activities. Two years later, an efficient, durable, and heavy duty, made from local materials, and low-maintenance Ram Pump model was finally developed. By 2013, EcoAgri has installed 12 Ram Pumps in six villages benefitting more than 4,800 people.

The government (various local government units and national government agencies), non-government organizations (NGOs), people's organizations (POs), the private sector, church groups, the academia, national and international funding agencies, and other stakeholders have supported the promotion, installation, and mainstreaming of this technology to alleviate the living conditions of the local population especially in removing the heavy burden on the part of the women and children who have to continue fetching water in the absence of this technology, and to serve as a practical approach to climate change ad-

aptation. In particular, the Local Government of Kabankalan City, in the province of Negros Occidental identified the Ram Pump System both as an effective instrument in bolstering rural economy and as a strategic response to climate change. The time and energy needed to fetch water are used instead for more farming activities including organic farming; thus, increasing productivity output and household incomes.

Furthermore, EcoAgri's flagship program, **Bringing the Water Closer to the Communities for Drinking and Household Uses through Installation of Hydraulic Ram Pump**, had an impressive impact of watershed conservation. Aware that without the conservation of water sources, the Ram Pump will be rendered ineffective, the people themselves initiated and adopted a community-based management of the watershed by planting fruit and endemic trees in the surrounding areas of water resources installed with the Hydraulic Ram Pump System.

The replication of the Hydraulic Ram Pump System in other areas in the Philippines and eventually in other countries has started with inquiries from other provinces and regions and actual projects in the pipeline. EcoAgri has trained a technical team adept at the fabrication and installation of the hydraulic ram pumps.

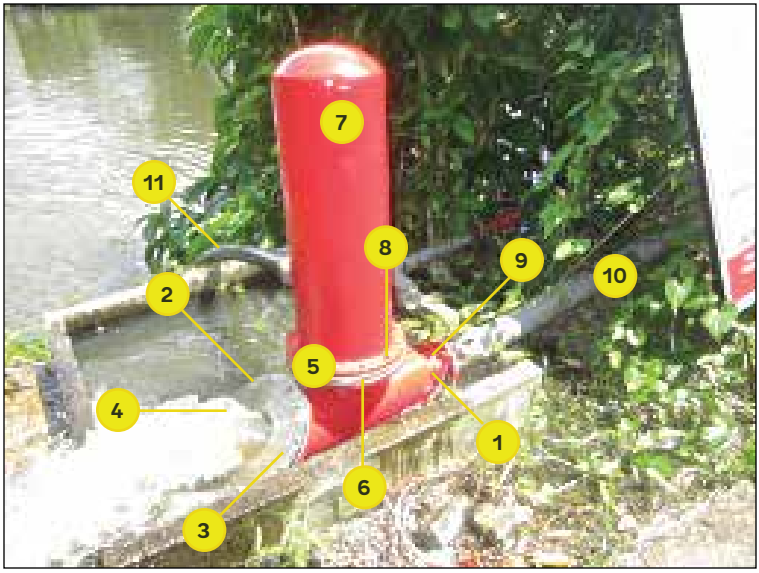
Hydraulic Ram Pump

The concept of the hydraulic ram pump was developed as early as 1796 by the Mongolfier Brothers of France who also did pioneering work in hot-air balloons. This automatic pumping device utilizes a small fall of water to lift a fraction of the supply flow to a higher level; a larger flow of falling water through a small head lifts a small flow of water to a

higher head. It is mechanically simple with only two moving parts—the check valve and the impulse valve.

The Hydraulic Ram Pump Model developed by EcoAgri and RU Foundry and Machine Shop Corporation with the help of **Mr. Dominador A. Clavejo, an engineer, and the Provincial Technical Director of the regional office of the Department of Science and Technology (DOST) in Region VIII** uses the force of water running downhill through a drive pipe in order to pump water uphill that is much higher than its source. From the source, the water runs downhill through an intake pipe 9 to 35 meters from the source to the ram pump. Water enters the pump and exits through an impulse valve, producing a column of water inside the drive pipe. The kinetic energy produced by the column of water flowing downhill works the pump. The water velocity increases to the point overcoming the tension of the waste valve which is then slammed closed. A tremendous pressure is built by the sudden stoppage of the water flow pushing through a one-way check valve and into an air compression chamber until the kinetic energy is converted to potential energy in the form of compressed air. This compressed air pushes the water back out of the chamber and since the check valve is unidirectional, the water being forced backwards cannot return and is forced into the exit gate valve and then into the delivery pipe travelling uphill as far and high as the energy from the compression chamber can take it. With the impulse and check valves' ram cycles of opening and closing, water continues to move until it reaches its uphill destination.

RU-EcoAgri Ram Pump Model



The optimum configuration for the Hydraulic Ram Pump System is a five to one ratio: the drive pump length is five times more than the vertical fall from the water source to the ram pump. The EcoAgri model uses this optimum configuration.

The parts of the hydraulic ram pump are as follows: (1) a ram pump body made from gauge 80 galvanized iron (GI) pipe; (2) rubber gasket; (3) stainless steel impulse valve plate; (4) stainless steel valve; (5) stainless steel delivery valve plate; (6) delivery valve rubber gasket with ply; (7)

casted air vessel; (8) stainless steel bolts; (9) flanges made of mild steel; (10) a drive pipe made from gauge 40 GI pipes; and (11) a delivery line made from HDPE–SDR 11 and 17. A welding machine, a lathe machine, a cutter pin and differently sized wrenches are among the needed tools to fabricate and install the ram pump. All materials are locally made and are readily available at hardware stores. The economic lifespan of the EcoAgri–developed Hydraulic Ram Pump Model ranges from 20 to 30 years with a maintenance cost of only two dollars (USD 2.00) a month.

Stakeholders' Equity, Resource Allocation & Collective Management

Aside from providing technical assistance and preparations preceding the installation of the ram pump system, EcoAgri engages the people of the community where the technology is to be placed. The commitment of the villagers to establish a community–based watershed to conserve the water sources and to ensure the life–time operation of the hydraulic ram pump is required before EcoAgri starts the project implementation. EcoAgri also promotes organic agriculture through organic vegetable farming, family–based poultry and livestock production, and organic fertilizer production.

EcoAgri also trains local technicians to ensure the sustainability of the water system's operation. Mechanics are trained from the start to the completion of the installation which takes 30 to 90 days. Hands–on training especially on troubleshooting is conducted during this period.

Policies and guidelines on water management are discussed and agreed upon collectively by the residents of the concerned community.

A minimal contribution of USD 0.50 per family per month is collected for repair and maintenance including honorarium for EcoAgri-trained local mechanics.

As a rule, water allocations for drinking and household use are given priority. Family-based poultry and livestock production, irrigation of backyard organic gardens, and organic fertilizer production benefit from water surplus. A ram pump system utilizing rivers and springs may be installed primarily for irrigation purposes.

Effect and Impact/Conclusion

The following effects and impacts were observed amongst the 4,800 people in rural villages that have benefitted from the installation of 12 hydraulic ram pump units that has brought water closer to the communities.

- Household incomes have increased by at least 30 percent with the creation and/or expansion of various agricultural and livelihood activities mentioned earlier. Freed from the need to fetch water from distant and difficult to reach sources, women and children are able to contribute more to livelihood opportunities.

- The alleviation of people's lives and welfare and the easing of daily chores are significant considering how this technology has lifted the burden of people, especially women and children who had to trek long, difficult and even dangerous terrains to retrieve water.

- Availability of water has improved health, sanitation and hygiene in communities. Water contamination has been avoided and villagers have started to construct toilets to properly dispose human waste.

- The success of the program has influenced government policies of LGUs and national line agencies towards the adoption of systems and technologies that contribute to climate change adaptation.

- Funds and support from local and international agencies are increasing in support of initiatives to spread the use of this technology to other provinces and regions of the country, and possibly, to other countries as well.

- EcoAgri has provided employment opportunities to 12 people working as technical staff in the fabrication and installation of the hydraulic ram pumps. As of August 2013, at least 120 villagers in various communities have been employed during the actual installation.

- And last but not the least is environmental conservation. The community-managed watersheds have been planted with at least 20,000 fruit and endemic trees as of August 2013 which are maintained by at least 800 families who are the end users and direct beneficiaries of the Hydraulic Ram Pump System.

The fabrication and community-based installation of the ram pump system has encouraged government to take part in addressing climate change adaptation and to integrate this advocacy in its policies and governance practices

Communities have been encouraged to take serious action in protecting and conserving the environment and in adopting organic farming practices. Being made aware of the direct relationship between the availability and quality of vital water supply and the quality of the watershed is an impetus for environmental protection at the grassroots.

The installation of the Hydraulic Ram Pump System is an effective instrument of gaining the support of communities in conflict areas where the impact of government programs and projects are hardly felt.

(Abridged version edited by John Joseph S. Coronel)

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Case Study Authors

Deep Prakash Ayadi

Director–Research and Development
The Thin Page Pvt. Ltd
Naxal, Kathmandu, Nepal
Phone: +9779841935895
Email: deep.ayadi@thethinpage.com
Web: www.thethinpage.com

Mr. Deep Prakash Ayadi is the founder of The Thin Page Pvt. Ltd, an institution that aims to offer high-quality, knowledge-based research, development, consulting and capacity building services to its clients on issues related to environmental management in Nepal. Established in February 2014, Deep is currently working as the Director of Research and Development to establish this newly formed company. Prior to this, he was the Senior Programme Officer in the Climate Adaptation Programme at the Himalayan Climate Initiative (HCI). His responsibilities included program development, fundraising and project implementation. The HCI focuses on undertaking a number of innovative and community-centric projects to mitigate climate change threats to Nepali communities. Through his work in the areas of biodiversity conservation, sustainable livelihoods and climate change adaptation and mitigation in low land areas and high hills of Nepal, Deep has observed the growing impacts of climate change on poor vulnerable communities. He believes that more efforts are required to strengthen climate change adaptation, mitigation through rural energy especially for mountainous communities who are already marginalized from development. Deep Prakash obtained his BS and MS in Environmental Science from the Tribhuvan University, Nepal.

Papon Kumar Dev

Final Year, Urban Development,
Technical University Berlin El-Gouna Campus
135 Kaiser Friedrichstrasse, Berlin, Germany;
Phone: +4915218330275
Email: papon_urp05@yahoo.com

Mr. Papon Kumar Dev has completed his degree in Urban and Rural Planning at the Khulna University. He acquired significant academic inputs on different spatial, social, economic and environmental issues. Furthermore, he also has knowledge on Poverty Reduction, Monitoring and Evaluation, Governance, Geo-spatial techniques, Disaster Management and Climate Change-related Policy and Planning issues. Presently, He is conducting his Masters degree on Urban Development in a multi-country program under Technical University Berlin, Germany. He has previously acquired technical experiences being a Senior Monitoring and Evaluation Officer at Shushilan. He was also associated with the Economic Research Group, Urban and Rural Planning Discipline at Khulna University and Wetland Resources Development Society being a Research Officer and Research Assistant, respectively.

Karma Dupchu

Chief/Project Manager
Department of Hydro-Met Services
Ministry of Economic Affairs, Bhutan
Email: kdupchu@gmail.com

Mr. Karma Dupchu has more than 16 years of professional experience on hydro-meteorology, water resources planning and management, disaster risk reduction. He was the Project Manager from DHMS for the Project *"Reducing Climate Change-induced Risks and Vulnerabilities from Glacial Lake Outburst Floods in the Punakha-Wangdi and Chamkhar Valleys* – funded by an LDCF /GEF for the component: Installation of GLOF Early Warning System in the Punakha-Wangude Valley. Mr. Karma has Master's Degree in Natural Resources Management with specialization in Integrated Watershed Development and Management (IWDM) from the Asian Institute of Technology, Thailand. In addition, he also worked and implemented number of projects related to development of Water Resources Management Plan (WRMP), Hydropower feasibility study projects in Bhutan supported by NORAD and other donors.

Aladino "Noynoy" C. Moraca

Executive Director
Ecological and Agricultural Development Foundation, Inc.
RU Foundry Building, Pahanocoy,
Bacolod City, Philippines 6100
Tel. No. +630344443286
Fax. No +630344441337
Email: ecoagribcd@yahoo.com

Mr. Aladino (Nonoy) C. Moraca is in his 24th year of service as a development worker. His field of expertise: renewable energy and appropriate technologies, sustainable agriculture, community-based enterprise, watershed/bio-diversity conservation, community organizing and community development. He has attended international conferences and trainings and implemented various Climate Change Adaptation projects at the community level. He is a Bachelor of Science in Agriculture (BSA) – Major in Agribusiness graduate of the Negros Occidental Agricultural College (NOAC), now Central Philippine State University (CPSU) and is a Licensed Agriculturist. He has earned a degree on Master in Business Administration (MBA) from the University of Negros Occidental Recoletos (UNO-R). At present, he is the Executive Director of Ecological and Agricultural Development Foundation, Inc. (EcoAgri) and Technical Consultant of RU Foundry and Machine Shop Corporation.

CONCLUSION

The reality of climate change has forced upon societies a rethinking of old assumptions and the order of things -- and with that, a recalibration of local and national plans on the economic, political and social fronts. Political parties are not exempt from this phenomenon. Whether it is to deny, question, affirm or act on the data and issues that swirl around the discourse of climate change, political parties increasingly find themselves in the thick of discussions that point to a public demand to better understand the challenges at hand.

The CALD has seen fit to get on board a global movement for understanding – and acting on – climate change. Some will argue that government or state interventions to address climate change impacts and initiate mitigation and adaptation programs militate against more liberal or libertarian tenets of freedom and individual liberty. Or that government action on climate change on a whole translate to more obtuse layers of bureaucracies and increased inefficiencies in the use of scarce resources.

But for countries like the Philippines, consistently ranked in the top three or top five in various studies or indices on vulnerability and risk factors vis-à-vis climate impacts, freedom cannot simply be framed in conventional political or economic terms. For most of Asia, in fact, when droughts ravage cropland or floods inundate communities and threaten livelihood, freedom takes on an urgency heretofore unheralded.

Freedom means, all too unequivocally, the freedom to be spared from the worst impacts of climate change or extreme weather events. It is the freedom, all told, to be able to cope and build resilience, so that individuals and communities are able to feel secure and unfettered to live, learn, earn and function even in the face of growing threats brought about by climate change.

The latter point is, arguably, straight up the alley of fundamental human rights. The right to the fullest information and science available, and the right, as a necessary function of water and food security, to the least interruption to the basic conditions of a life of dignity and well-being. This frames adaptation and resiliency, in fact, as a rights-driven imperative, as fundamental as the freedoms of expression or enterprise.

The papers and case studies compiled in this handbook are presented in this light, as free and liberal approaches to understanding and tackling the challenges of climate change threats and impacts by informed, proactive individuals and communities. The examples of Bangladesh and the seeming novelty of crab-fattening, or understandable, accessible Early Warning Systems in Bhutan, or Water Resource Management using Indigenous Knowledge in Nepal, or a simple Ram Pump technology to sustain water security in Philippine villages, all clearly highlight what are 'do-able' low-hanging fruit, as it were, for communities and local settings to work with.

These examples may strike some as somewhat esoteric, novel or out-of-convention, or perhaps even quirky or peculiar in parts. But that is what climate change has challenged all of us to become: as free, creative and resourceful as we can be, using our individual faculties and collective energies to safeguard human security, or simply, manage the risks and lessen the vulnerabilities that have become inevitable in this day and age of frequent typhoons, or protracted dry spells, or hazards that largely reduce the essential supplies of food, water and energy – or threaten the basics of shelter and livelihood.

From examples such as these, and many more yet unsung or undiscovered in and around Asia, these are deeply emancipating – and liberal -- at their core. As we salute them, we take more inspiration in what else awaits us in CALD as in the larger expanse of Asia. This means that for all of what climate change represents – danger, risk, fear, insecurity – there is

much of the converse that is evoked and unleashed: innovation, ingenuity, cooperation, foresightedness, resiliency, and yes, hope and freedom. In the language of green, carbon-free, climate-smart economics and social rethink, these are all too simply and assuredly, renewable.

Dr. Neric Acosta

About FNF

The Friedrich-Naumann-Stiftung für die Freiheit (FNF), is a German liberal foundation committed to promoting the value of freedom in dignity worldwide. FNF seeks to promote this core liberal value by working to strengthen: human rights and the rule of law, liberal participatory democracy, and a free market economy.

Funded by the German parliament, the Foundation supports a wide range of activities in 60 countries. Its partners include parliaments, political parties, universities, think tanks, research institutions, NGOs, the media, business associations, and community organisations. Its key tasks are civic education, policy dialogue, and consultancy to help find liberal solutions for the problems facing our societies.

The Friedrich-Naumann-Stiftung für die Freiheit has worked in in partnership with CALD since 1993. They have collaborated to organise conferences, meetings, networking opportunities, and publications designed to further policy dialogue and cooperation among like-minded Asian political parties.

About CALD

The Council for Asian Liberals and Democrats (CALD) was inaugurated in Bangkok in 1993, with the support of then Thai Prime Minister Chuan Leekpai and South Korea's Kim Dae-Jung. CALD, which offers a unique platform for dialogue and cooperation, is the only regional alliance of liberal and democratic political parties in Asia.

CALD was formed out of the recognition of leaders of like-minded political parties in Asia of the need for a dynamic forum promoting discussion and exchange of ideas regarding trends and challenges affecting democracy, human rights and the rule of law in the region. The chair parties of CALD since its inception to the present have been the Democrat Party of Thailand or DP (1993- 1995; 2002-2004), the Democratic Progressive Party of Taiwan or DPP (1995- 1997, 2004- 2005), the Liberal Party of the Philippines or LP (1997-1999, 2005- 2007), the Liberal Party of Sri Lanka or LPSL (1999-2000, 2010-2012), the Sam Rainsy Party of Cambodia or SRP (2000-2002, 2012-2014), the Singapore Democratic Party or SDP (2007-2010), and the Civil Will Green Party (2014-present).

The other members of CALD include the Parti Gerakan Rakyat Malaysia (PGRM), and the Indonesian Democratic Party of Struggle (PDI-P). The Liberal Forum Pakistan (LFP) is an associate member, the National League for Democracy is an observer member, and while the Hong Kong legislators Martin Lee and Sin Chung-kai are individual members. In 2010, CALD bestowed honorary individual membership to Daw Aung San Suu Kyi.

Through CALD, political parties, groups, and individuals have a continuing discussion on the developments occurring in the various countries of the region. The aim is to assess the possibilities for liberal solutions to problems facing Asian democracies.

Accordingly, CALD organizes network meetings including those with its partners (Friedrich Naumann Foundation, Liberal International, Alliance for Liberals and Democrats for Europe, Alliance of Democrats, Taiwan Foundation for Democracy, and the National Democratic Institute for International Affairs), international conferences on vital issues affecting the region, and regular workshops on communication, political management, and women in politics. It also sends missions for various advocacies, sponsors internship programs in its secretariat and in the European Parliament, as well as maintains a website, a social network account and a weekly electronic newsletter.

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Printer

CALD Secretariat

Unit 410, 4/F La Fuerza Plaza 2,
2241 Don Chino Roces Ave.
corner Sabio St., 1231
Makati City, Philippines

T: +632 8196071
M: +63 908 8908978
F: +632 8196055
info@cald.org
www.cald.org

CALD.ORG