

# SOUTHEAST ASIA REGIONAL ALUMNI CAPACITY BUILDING AND NETWORKING SEMINAR

Tools for actors-based management of conflicting interests  
in the land-water-forest nexus in the Mekong region



PROGRAM INFORMATION

25 September – 1 October 2022  
in Vientiane, Lao PDR

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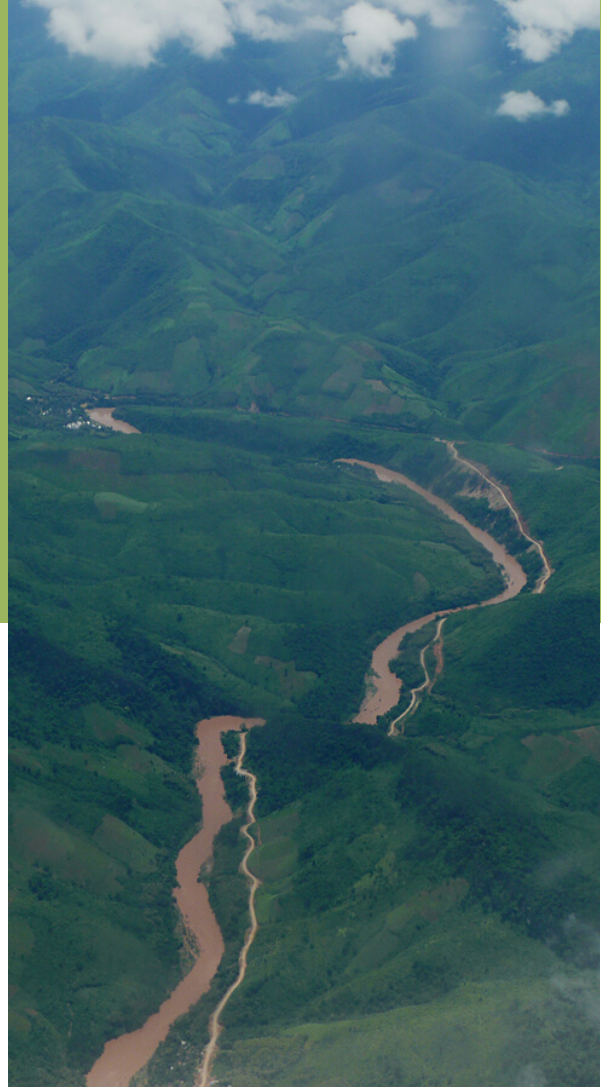
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# WELCOME

Not only since the founding of the Global Landscape Forum in 2013, there is a growing recognition that urgent, complex development policy issues require landscape-based approaches to overcome one-dimensional and disciplinary silo-thinking. Solving natural resources management and governance conflicts and crisis require interdisciplinary and holistic ways in policy making and corresponding actions on the ground. This paradigm change manifests in the rise of integrative concepts to natural resources management such as Forest Landscape Restoration (FLR) or Integrated Water Resources Management (IWRM).

Such multi-disciplinary approaches impose new demands on traditional disciplines such as forestry, hydrology, ecology, nature conservation or agriculture to think outside the box. It challenges scientists, policy-makers, development practitioners and entrepreneurs to increasingly communicate and cooperate beyond their disciplinary scopes.



This seminar will serve as training and professional exchange on integrative and actor-based management concepts for the sustainable management of natural resources at the landscape level, against the background of growing conflicts of use in the regional context of Southeast Asia. Practical experience is gained through field excursions and dialogue with landscape-based actors at different governance scales in the Mekong Region. Beyond scientific exchange and practical learning, the seminar aims at consolidating and expanding relationships and partnerships among the alumni in Southeast Asia within and across disciplines, sectors and organizations from politics, administration, science, civil society and the international development cooperation.

# PROGRAM

The seminar consists both of scientific exchange and social events. Keynote speeches on integrated natural resources management, planning and landscape governance make up an essential part of the seminar, complemented by poster presentations of the participants, role play and landscape planning exercises.

To underpin theory with valuable local practical experience, an exchange with practitioners from forestry and water management in the Mekong Region and international organizations involved will take place.

The highlight of the week will be an excursion to the Nam Ngum watershed linked with the possible exchange with local stakeholders.

Kindly find the detailed program schedule on the following pages.



**DAY 01**  
25/09/22

**Full day**  
Arrival in Vientiane

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**DAY 02**  
26/09/22

**Morning**

8.00 Departure shuttle bus to Dong Dok Campus (NUOL)

9.00 **Opening Remark**

- Prof. Dr. Latsamy Boupcha, Dean of the Faculty of Forest Science, NUOL
- Prof. Dr. Lukas Giessen, TU Dresden
- Prof. Dr. Daniel Karthe, UNU-FLORES

9.20 **Introduction of the participants** and discussion of expectations

- Dr. Simon Benedikter and Dr. Xayvongsa Lamphoune

10.00 **Seminar programme and organizational issues**

- Dr. Simon Benedikter

10.15 **Keynote speeches I:** Forest-water interactions at landscape level

- **Prof. Dr. Jürgen Stamm:** "Role of Vegetation for the Water Regime, Flow Dynamic and Quality"
- **Prof. Dr. Christian Bernhofer:** "Impacts of Climate Change on Integrated Water Resources Management"

[**Moderation:** Prof. Daniel Karthe & Dr. Nayu Nuringdati Widianingsi]

11.15 **Coffee/ Tea break (with group photo)**

11.30 **Keynote speeches II:** Forest-water interactions at landscape level

- **Dr. Somvang Phimmavong** "Management and monitoring of national protected areas and upstream forests in the Lao PDR – Past developments and direction to 2025"
- **Duong Thuy Thi Nguyen** "The utilization and the payment mechanism of water-related ecosystem services from the forest in Vietnam"

[**Moderation:** Prof. Jürgen Stamm and Surendra Gautam]

12.30 **Lunch break**

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## Afternoon

1.30 Alumni Poster Session I

[Moderation: Dr. La Thi Tham]

## 02.30 Coffee/ Tea break

2.45 Alumni Poster Session II

[Moderation: Dr. Sunimal Jayathunga]

4:00 Sightseeing Tour Vientiane Capital and Pha That Luang

6.30 Joined dinner

DAY 03  
27/09/22

## Morning

7.45 Departure shuttle bus to Dong Dok Campus (NUOL)

8.45 Keynotes speeches III: Integrated management and governance at landscape level

- **Prof. Dr. Daniel Karthe** "Integrated Environmental Assessment and Management through the Resource Nexus Approach"
- **Prof. Dr. Lukas Giessen** "Governance of landscapes: Actors' and sectoral conflicts of interests as driving force and part of selected solutions"
- **Dr. Md Saifur Rahman** "Exploring innovative policy tools through analyzing multilevel power-interests nexus for forest landscape restoration in the Chittagong Hill Tracts, Bangladesh"

[Moderation: Prof. Christian Bernhofer and Prithbi Man Thapa]

## 10.15 Coffee/ Tea break

10.45 Keynotes speeches IV: Integrated management and governance at landscape level

- **Dr. Simon Benedikter** "Actors, power and policy making at landscape-level from an environmental history perspective – The case of hydro-social modernization in the Mekong Delta, Vietnam"
- **Saw Doh Wah** "Multi-stakeholder dialogs as a mechanism to promote the rights of smallholder farmers and indigenous communities for natural resource governance"
- **Ireneo Jr. Piong** "The role of a sub-national agency in River Basin Management: The Mindanao Development Authority experience"

[Moderation: Prof. Lukas Giessen and Dr. Mariam Akhter]

## 12.15 Lunch break

## Afternoon

1.30 Preparation excursion to Nam Ngum

[Moderation: Dr. Xayvongsa Lamphoune & Dr. Simon Benedikter]

2.30 Visit to GIZ Laos – Forests and Climate Change Programme

[Moderation: Dr. Martin Nowack, GIZ Laos]

5.30 Joint dinner with GIZ

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DAY 04

28/09/22

Full day

Interactive landscape excursion

8.00 am: Visit of the Nam Ngum reservoir and surrounding area  
(approx. 1.5-hour drive)

- Interaction with local land and water users (different sectoral state agencies, the hydropower company, local communities)
- Boat trip on the Nam Ngum Reservoir (depending on weather conditions)

[Facilitation: Dr. Xayvongsa Lamphoune and Dr. Somvang Phimmavong]

Lunch on the way

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DAY 05

29/09/22

Morning

8.00 Departure shuttle bus to Dong Dok Campus

9.00 Reflections on the Nam Ngum excursion

- Simulation game on integrative natural resources management at the landscape level based on the Nam Ngum Reservoir field excursion

[Facilitation: Dr. Simon Benedikter and selected alumni]

12.30 Lunch break

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## Afternoon

2.00 Visit to the Mekong River Commission (MRC), Headquarters  
Vientiane

- The role and function of the MRC: The 1995 Mekong Agreement and the Mekong Basin Development Strategy 2021-2030 (MRC-Planning Division)
- Basin-wide environmental management and assessment (MRC-Environmental Division)
- Transboundary river basin planning and management between Cambodia and Thailand (MRC-GIZ-Programme)

[Facilitation: Dr. Thim Ly, MRC]

5.30 pm: Joint dinner with MRC

DAY 06

30/09/22

## Morning

8.00 Departure shuttle bus to Dong Dok Campus

9.00 Exploring cooperation and networking opportunities

- Formalization/Establishment of an alumni network
- Involvement of alumni in teaching and curriculum development
- Exploring common interests and potential for joint research and development projects (South-South-North cooperation)
- Announcement of the alumni network strategy and action workshop at the TU Dresden (Tharandt) September 2023
- Other points

[Facilitation: Prof. Lukas Giessen & Prof. Daniel Karthe]

## 12.00 Lunch break

## Afternoon

1.30 Evaluation

- Feedback and evaluation on the seminar
- DAAD evaluation survey (questionnaire)

[Facilitation: Dr. Sabine Hahn-Bernhofer and Dr. Simon Benedikter]

## 2.30 Coffee/ Tea break (individual organizational matters)

3.00 Handing over of certificates to the alumni and Closing remarks

- Prof. Dr. Stamm (TUD)
- Prof. Dr. Karthe (UNU-FLORES)
- Prof. Dr. Latsamy Boupha (NUOL)

DAY 07

01/10/22

## Full day

Departure

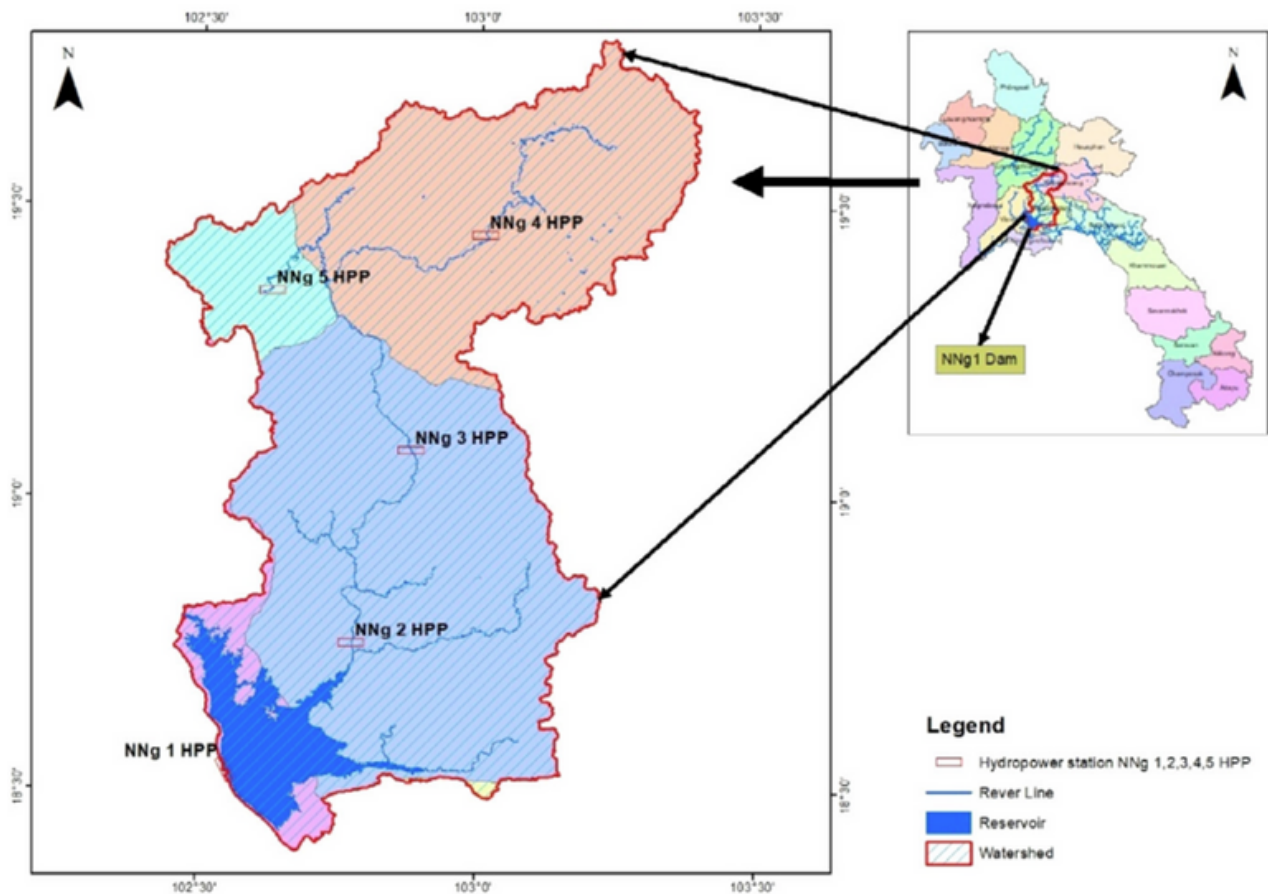




Covering a large portion of the mountainous part of the Lower Mekong Basin, Lao PDR with its estimated 18,000 Megawatts has great potential for hydropower development and even hosts some of the largest dams in Southeast Asia (e.g. Xayabouri). According to the Lao Government, hydropower is assigned a key role in the socio-economic development of the country, in particular as foreign exchange earner with the bulk of hydro-energy produced being exported to neighboring Thailand, China and Vietnam (Bardacke 1998; MRC 2005; ICEM 2010).

The Nam Ngum basin embraces about 16,841 km<sup>2</sup> (approx. 7 percent of the country), including the Vientiane Plain, a densely populated and agriculturally important area for Laos in terms of rice production and national food security. The Nam Ngum has experienced growing interventions in terms of hydropower development over the past decades. Nam Ngum 1, the first of several dams, was installed in late 1960s. Since then hydropower has constantly increased. Currently, there are five hydropower stations in various building stages along the course of the Nam Ngum River (Sorachampa et al. 2020), three of which are in operation. There are plans to rise the total number of hydroelectric power stations along the Nam Ngum River up to 10 in the future (Bartlett et al. 2012). Nowadays, most of Nam Ngum dam's energy is exported to Thailand, yielding revenues accounting for about 36 Mio. USD annually.

Being located about 90 km north of Vientiane, beside energy production the Nam Ngum reservoir is used for flood protection, irrigation, fisheries and tourism. Nam Ngum is considered a "multipurpose river basin" due to the many ecosystem services it provides such as mineral resources, forestry, fisheries and agriculture (Boulapha & Lyle 2011). Furthermore, at the southern edge, the reservoir adjoins the Phou Khao Khouay Biodiversity Conservation Area. Given the diverse land-use around the reservoir, there are different sectors and actors having a stake in the Nam Ngum watershed and landscape.



The project of Nam Ngum 1 was initialized by the Government of Laos in 1960 due to insufficient power supply and growing demand for energy. With the funding of stage 1, construction works began in 1968 and were completed in 1971. In 1978, after completion of stage 2, the ecosystem functions downstream were strongly affected due to the dam. As a result, the abundance of fish reduced and downstream fishery communities were negatively affected. In response, the Netherlands and Switzerland supported the Laos Government in fishery development projects with construction of primary schools for fishery employment and water supply networks as well as the provision of gill nets and boat engines to selected villages. Between 1980 and 1990, hundreds of fishermen moved from the riverside to the Nam Ngum reservoir due to the projects.

Studies revealed that economic tradeoffs between hydropower, irrigation and flood control are modest in the Nam Ngum basin (Bartlett et al. 2012). In the past, hydropower had only low influence on irrigation expansion of agriculture and vice versa. However, these tradeoffs have scarcely been explored. It should be noted that these services are highly dependent on wet hydrologic conditions which may change under changing climatic conditions, and may induce large economic cost for all stakeholders at the Nam Ngum Reservoir in the future (Bartlett et al. 2012).

# NAM NGUM 1 AT A GLANCE

## Dam

Construction began	1968
Opening Date	1971
Construction cost	97 Mio USD
Height	70 m
Length	468 m
Owner/Responsibility	Électricité du Laos (EDL)

## Reservoir

Capacity	4.7 km <sup>3</sup>
Catchment area	8460 km <sup>2</sup>
Surface area	370 km <sup>2</sup>

## Power Station

Installed capacity	155 MW
Annual generation	865 GW

## REFERENCES

Bardacke, T. (1998). 'Battery of Asia' may run flat: Thailand's economic crisis is raising questions over the energy exporting hopes of neighbouring Laos. Financial Times

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# PARTICIPANTS

We are delighted to welcome scientists and practitioners to this seminar. All of you come from very different fields: Working in universities or research organizations; being employed in state administration, civil society organizations, development agencies or the corporate sector. But there is one thing you all have in common: All of you are having a stake in environmental and natural resources management, including land, water, forest or biodiversity. Thus, we look forward to creative exchange and a diverse interdisciplinary discourse during the Alumni Networking Seminar here in Vientiane, Lao PDR. On the following pages, all participants will be introduced in a profile-like manner, followed by their abstract on the topic they will present during the seminar.



## Abstracts

All the participants have prepared various papers and poster presentations covering a wide range of topics. They vary from forest management and policy, to ecosystem services and payment mechanisms, hydropower, water resource management and land use change, sustainable development, monitoring and remote sensing.



## DR. MARIAM AKHTER

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B.Sc. in Forestry

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## ABSTRACT

### Case Study: Bangladesh

### Collaborative forest management to restore the forest landscape

Bangladesh is a densely populated country and about 15.58% of the country is forest land, which is subject to various types of conflicts and disturbances. To reduce the problem, the local, poor, and forest-dependent communities are involved in forest management since the 80's to protect, conserve, increase and manage forests and biodiversity through the social forestry and co-management activity. To institutionalize the activities, the government approved the Social Forestry Role in 2004 and subsequently, the Protected Area Management Rules in 2017. The land cover map of 2015 of the country has identified about 4% of the forest land is degraded due to anthropogenic interventions. This large area of forest landscape does not fall under the rules. Targeting these lands, a project namely "Sustainable Forests and Livelihoods" is currently under implementation by the Forest Department to innovate a separate tool to restore the watersheds and degraded forest landscape of Hill and Sal forests of the country through a collaborative approach.

Outputs till to date:

#### Collaborative Forest Management (CFM)

- Extensive consultation under the guidance of Community Operation Manual (COM) on CFM has been undertaken in villages around the targeted forest areas.
- NGOs have listed 600 Forest Conservation Villages around targeted forest areas based on criteria prescribed in COM and General Body of the villages have been formed through organizing village meeting.
- 36,630 forest dependent beneficiary households identified through Community Identification of Poor (CIP) process.
- 7,415 households have already deposited BDT 1,874,680.
- CFM institutional capacity building training started (31 batches completed).
- Baseline survey completed for 30,000 households.



## DR. SIMON BENEDIKTER

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## Education

Ph. D. in Development Studies  
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## ABSTRACT

### **Actors, power and policy making at landscape-level from an environmental history perspective – The case of hydro-social modernization in the Mekong Delta, Vietnam**

Landscapes are socio-culturally shaped and naturally constituted entities, resulting from complex interactions of natural and human factors over time and space. Environmental history provides insights into the making of landscape and the social forces involved. Subduing nature and harnessing water resources rose to become the key paradigm of modernization in the Mekong Delta, Vietnam. Over the past 200 years, waterscape engineering turned Vietnam's largest river estuary into one of the most agriculturally productive areas in the world. This socio-ecological transformation, best depicted as the shift from adaption to control (taming nature), occurred in consecutive episodes of water resources engineering and landscape transformation embedded in global and regional historical events and political developments. As can be learnt from the case of the Mekong Delta, environmental histories of landscapes are critical for generating a holistic understanding of present power structures, including actors along with their interests and conflicts, formal and informal governance arrangements and policy processes. In the specific case of the Mekong Delta, where water is omnipresent, water (or hydraulic) engineers have emerged as powerful agents of ecological and social transformation, exerting control over central and local water bureaucracies, planning offices and engineering companies exerting control over the flows of water and related land-use patterns. Partly collaborating, partly struggling with each, they have significantly shaped water sector reforms (e.g. IWRM) and climate change policies over recent years.



## PROF. DR. CHRISTIAN BERNHOFER

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## Education

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University of Natural Resources and Life Sciences, Vienna, Austria

**Dr. phil. in Meteorology and Botany**  
University of Vienna, Austria

**Degree in Meteorology and Botany**  
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## ABSTRACT

### Impacts of Climate Change on Integrated Water Resources Management

Integrated Water Resources Management (IWRM) relies, among many factors, on proper climate information. This concerns especially precipitation and atmospheric drivers of evaporation (radiation, vapour pressure deficit & wind), as well as their temporal and spatial distribution including extremes. Climate Change /CC) will alter all climate properties and has lasting effects on the design of dams, urban water supply and drainage, on irrigation systems and on production of energy, food & fiber. These changes threaten traditional practices of IWRM and require a new "balance & flexibility" of authorities and people. As extremes, like floods and droughts, might become even more severe, a "climate proof society" has to prepare for CC & CC adaptation. A system of monitoring, data analysis, modelling and impact evaluation, supported by well trained "climate coaches" can help local & regional authorities to arrive at well supported decisions on IWRM. While authorities at (inter) national level should contribute to CC mitigation. Probably, the combination of CC adaptation and mitigation provides the best chance for sustainability in IWRM.



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## Education

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## ABSTRACT

### Enhancing Conservation Law Enforcement and Wildlife Monitoring in the Sundarbans Reserved Forests (SRF) using the Spatial Monitoring and Reporting Tool (SMART)

The Sundarbans are the world's largest mangrove forest and a UNESCO World Heritage Site harbouring globally important biodiversity. Limited resource harvesting and access to the forest is regulated through a permit system. However, the unique Sundarbans ecosystem is threatened by illegal activities such as poison fishing, logging and poaching. A lack of strategic biomonitoring data is likewise hampering effective conservation management in the Sundarbans.

An immediate priority for protecting the Sundarbans and its wildlife is to move from the current reactive law enforcement approach to prevention of illegal activities. A critical component of a proactive approach to protecting wildlife and its habitat is to strengthen the capacity and accountability of law enforcement and monitoring patrols.

The SMART (Spatial Monitoring and Reporting Tool) approach combines a cutting-edge biodiversity conservation management tool with capacity building and a set of best practices. The SMART software makes it possible to collect, store, communicate and analyse ranger-collected data on illegal activities, biodiversity, patrol routes, and management actions to understand where efforts should focus, and evaluate ranger performance. When used in combination with Cybertracker, a mobile data collection app, SMART permits automated field data collection, analysis and reporting, and is fully customizable by local users.

The poster will focus on why SMART was introduced in the SRF, who is involved, what are the achievements and challenges and also looking into the future of SMART in the SRF and Bangladesh as a whole.





## MR. SURENDRA GAUTAM

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## Education

**PG Qualitative Method for Social Science**  
Lincoln University, New Zealand

**M. Sc. in Hydro Sciences and Engineering**  
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**M. Sc. in Environmental Management**  
Pokhara University, Nepal

**B. Sc. in Environmental Management**  
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## ABSTRACT

### System Strengthening at Local Government for Waste / Water Innovation Management

According to the National Planning Commission, only 44.5% of all households have access to tap water and barely half of these households have a private connection. The remaining 55.5% depend on closed wells (38.5%), open wells (7%) and other unsafe sources such as rivers or spring water (10%). Even for households with access to "improved" water sources, service quality is a key challenge. In 2014, a Multi-Indicator Cluster Survey (MICS)<sup>1</sup> found that 71% of households across the country were receiving water from sources contaminated with Escherichia Coli. Likewise, it is estimated at around 1500 tons/day waste is produced in urban areas and dumped in open space, mostly uncovered. The waste produced in rural settings has not been quantified yet. The water, wastewater and sludge management are the major issues; for water sources contamination, however, no serious effort has been made in the country. The risk of contamination and diseases is technically not accounted for. On the other side, national water quality remains an issue, and arsenic is a major problem in Terai's groundwater.

Here, the willingness is a major concern. Political instability, natural disasters, and poverty is always an excuse (6.7 million people living below the national poverty line) though in the new constitution, WASH is citizen right. All 753 local authorities have decentralized mandates for WASH services; however, they are new, and claim that budget, technology, and skill is always a hurdle. In this context, I worked on a highly relevant community-managed self-sustain water management approach for system strengthening at the local level. The process includes a combined approach of soft and hardware i.e. policy lobbying, technology innovation to community hand over. It is very ambitious but the initiative includes mainstream sustainable policy-dialogue, local technology, and social entrepreneur business model. The entrepreneurship model converts wastewater/sludge and service management into the business. The design involves knowledge and skill transfer through experts to the community in a simpler form. In the second stage, the community owns the entire process and management. The designed system strengthening pilot project involved, IRC's nine building blocks as a guiding principle. The design at this involves the following components,

#### a. Technology innovation (micro-level)

- Assessment of resources and service
- Developed multi "technology center"/ "Service center" at the community level for "Sludge Management Service", water quality management
- Introduction of household treatment technology
- Building customer demand for WASH products and services to enhance " Waste is Wealth"
- Fecal sludge services
- App-based service demand

#### b. Financial sustainability (Meso-level)

- Improving access to finance for WASH microenterprises through cooperative loans, microcredits, etc. for youth under group collateral
- The financial model with analysed waste value chain
- Economic empowerment (especially of youth and women)

#### c. Policy Innovation (Macro level)

- Policy Dialogue and design municipal integrated "Periodic WASH plan"



## PROF. DR. LUKAS GIESSEN

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### Education

Habilitation in International land use  
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## ABSTRACT

### Governance of landscapes: Actors' and sectoral conflicts of interests as driving force and part of selected solutions

This talk will introduce the concept of governance, consisting of institutional arrangements, actors' interactions and the effects of either of both. It will then extend the governance perspective from single-issue/mono-sectorial perspectives to the case of landscapes. Consequently, it will demonstrate how despite individual actors' interests, also broader interests of policy sectors are colliding when taking a broad landscape perspective. The talk will then analyse the major conflicting interests of sectors and actors in landscapes, paying special attention to the forest-water nexus, before outlining, how such a governance perspective on conflicting interests can be harnessed for developing tools for landscape management.



## MR. BIBEK KARANJIT

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## Education

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M. Sc. in Environment Management  
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B. Sc. in Environmental Management  
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## ABSTRACT

### Sustainable Development of Hydropower with reference to Nepal

In harnessing renewable energy (hydropower in this case), there are always new challenges related to cross cutting issues like change in land use pattern, environmental degradation, disturbance in ecosystem, energy legislations, rural development and nation's economic development. In Nepal, due to inadequate studies and not enough convincing evident examples on relation between land-water-forest and hydropower design, we are still facing challenges on how to incorporate land-water-forest nexus resilience policy in National hydropower development guideline.

Nepal being blessed with huge surface water resources, harnessing hydropower is very much important for the development of the country. However, use of water for irrigation purpose is much more significant in uplifting rural areas where about 81 percent of the total population of Nepal reside and pursue agricultural activities. Hence, development of hydropower simultaneously demand for integration of change in land-use pattern, irrigation prioritization and socio-economic issues.

In Nepal, hydropower systems are traditionally designed on the basis of hydrological data, river dynamics and morphology. But due to the minimum implementation and awareness on Integrated Water Resources Management (IWRM) plan, there are very few practices on landscape-based approaches in developing hydropower infrastructures in our region.

Moreover, rugged topography of the county (elevation ranging from 60 m to 8848m above mean sea level) makes it vulnerable to multiple natural disasters, especially avalanches, floods and landslides. And these frequent occurring natural disasters are further aggravated by not implementing landscapebased approaches on integrative natural resource management.

Therefore, incorporation of natural resources management and environment management at ground level with a focus on the forest-land-water nexus is vital for hydropower project appraisal, design, construction and operation, resulting in more robust and sustainable projects.



## PROF. DR. DANIEL KARTHE

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### Education

**Habilitation in Geography**  
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**First and Second State Examination in  
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## ABSTRACT

### Integrating land, water and forest management: insights from the Resource Nexu

The management of environmental resources such as land, water and forest is often organized in a sectoral way and with focus on resource-specific objectives such as increasing land productivity, enhancing water security or restoring forests. However, in natural ecosystems, compartments such as the pedosphere, the hydrosphere and the biosphere are interlinked and interdependent. Therefore, the management of one environmental resource directly or indirectly impacts other resources. The understanding of ecosystem complexity led to the development and popularization of the Resource Nexus concept, which addresses interlinkages, potential synergies and tradeoffs between resource-specific management goals. This presentation introduces the Resource Nexus concept with specific focus on the land – water – forest nexus and highlights recent advances, good practice examples but also practical challenges for the application of nexus approaches in research and policy.



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## ABSTRACT

### Climate Scenario Development in Myanmar for Impact Assessment in Forestry, Agriculture and Water and Health sectors

Myanmar was ranked as the second most vulnerable country to climate change over the world due to increase in temperature associated with less rainfall triggering frequent and severe drought events in the central Dry Zone Area, while frequent and heavy rainfall associated with cyclone triggers landslides at Mountainous regions and flood occurrence in lowland coastal area due to intense rainfall associated with tidal movement. There are several areas that remain unobserved due to lack of daily and monthly projected climate scenarios based on commonly used RCP4.5 and RCP8.5. Although Global Circulation Models (GCMs) and Regional Circulation Models (RCMs) are available through Coupled Model Intercomparison Project - 5 called CMIP5 and other CORDEX data platform, spatial resolutions are coarse which are not suitable for climate impact studies especially for climate sensitive economic sectors.

There are still limited studies on the impact of climate change on the agriculture, water, forest and health sectors across the country due to limited sources of freely available and reliable future projection data. It is also found that single model applications are highly biased and will not reflect the real situations.

In this study, CMIP5 and nine meteorological stations (daily) data covering daily mean, maximum, minimum temperature and precipitation over 1981-2010 choosing from 3 different ecological zones namely coastal (lowland) zone region, central dry zone region and mountainous region were used. Overall, 40 GCMs and 13 RCMs are included and the data were extracted from SimCLIM software so that we can start from 2011 to 2100 on a monthly basis to produce daily projection data following the "Pattern Scaling Method". A total of 2.2 Terabyte ascii (change factor) rasters with the spatial resolution of 1 are collected and R statistical software is used to extract zonal statistics of the 19 states and regions (shapefile) which are further combined with used for future projections of nine meteorological stations.

The results show that coastal areas are less impacted by temperature increase than dry zone areas, which is most likely impacted by the highest temperature increase and Mountainous areas are in between coastal and dry zone areas. Changes in rainfall shows 40% increase in the winter season and ~ 7 -20 % increase in the rainy season. Individual Climate Models applications should not be blindly applied in climate impact assessment in all economic sectors. There are several future research directions to be able to answer about forest, agriculture and water.



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## ABSTRACT

### Scenarios toward sustainable development of Acacia timber value chains in central Vietnam

Small-scale producers currently manage about half of the planted forests in Vietnam which play an important role in sustaining the domestic timber supply, especially after the restriction of timber harvest from natural forests. Of the cultivated species, *Acacia auriculiformis* × *Acacia mangium* hybrids is the most prevalent. However, up to 80% of wood production from plantations is harvested prematurely for low value-added wood chips production. To stimulate higher value uses of plantation wood, the Vietnamese government has issued several policies to promote the domestic industry, especially the furniture processing sector, and to develop the timber value chain (VC). The analysis on the transformation orientation of the timber industry, nevertheless, is lacking.

This study integrates the qualitative scenario approach into the VC analysis framework to clarify and evaluate different pathways of Acacia timber VC in Thua Thien Hue province where the species has been cultivated for 20 years. A number of economic, social, technical, institutional and environmental drivers of the forest transition in Vietnam are identified. Two key groups including institutional actors, especially state, and private actors, especially processing companies and small-scale producers, involved in this transformation are additionally determined. Secondary literature review, field study results and 40 expert interviews facilitate the identification of three different development scenarios based on the level of forest transition interventions and the reactions of key actors. The main criteria for timber VC assessment are justified according to the three pillars of sustainable development encompassing (i) economic potential; (ii) social benefits; and (iii) environmental improvement. The findings indicate that under the current situation, a fast transition model with strict plantation control is not advisable for timber VCs' stakeholders, especially those who operate on the ground. A slow transition scenario with a co-management model, instead, serves as a suitable development pathway.



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## ABSTRACT

### Conservation of Delacour's Langur in Van Long Wetland Nature Reserve, Vietnam - A view from Protected Area's Governance

Van Long Wetland Nature Reserve (NR) is located in Ninh Binh province, Vietnam. Van Long NR claims to be the largest semi-natural inland wetland in the Northern Plain. The Nature Reserve is also home of the world's largest population of Delacour's langurs (*Trachypithecus delacouri*). Recent counts confirmed c. 150-160 individuals of this langur, a significant increase compared to the number at the time of NR establishment in 2001, which was 60-67 individuals. Delacour's langur is an endemic species to Northern Vietnam, and also listed as critical endangered globally by IUCN. This species is now legally protected by the Government of Vietnam. This paper is about one of the most successful efforts of species conservation in Vietnam.

**Effectiveness in Conserving Biodiversity:** Although Van Long NR is small compared to other Protected Areas in Vietnam, the core area of biodiversity conservation in Van Long is proving very effective in conserving biodiversity. Van Long NR maintains to be the biggest inland wetland in the Northern Plain. The Nature Reserve is also the place with the biggest community of Delacour langur, at present about 150-160 individuals, a very big increase (238%) compared to the number recorded at the time of its establishment, which was 60-67 individuals. Delacour langur population is reproducing well. Beside that, water birds are increasing in numbers made Van Long became a interesting bird watching site. In addition, as a result of good management and protection of the limestone ecosystem and karst landscape, the limestone forests has rapidly recovered, contributing to the increased forest cover up to 30%. The Nature Reserve also performs good protection of the biggest inland wetland in the Northern Plain, which contributes to the preservation of valuable genetic sources for aquatic species. **Local Commitment and Participation:** Van Long NR was created at the request of the local communities themselves, and they have maintained a strong commitment in their participation of protecting and maintaining ecological and cultural values of Van Long.

**Multi-stakeholder management board:** The Van Long Management Board, has the mandate to make decisions in VLNR. It is a multi-stakeholder Management Board and was established in 2001. **Governance assessment under the IUCN Green List Process:** Governance assessment processes led by the site engaged local stakeholders and developed action plans on key governance principles on participation, accountability and benefit-sharing.



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## ABSTRACT

### **Integrated assessment of changes in land use and associated Ecosystem Services from a Coastal province of the Mekong Delta**

Coastal provinces of the Mekong delta display natural, semi-natural, riverine, artificial, cultivated terrestrial and aquatic land cover types. Shifts in land uses/covers (LULC) particularly from natural, semi-natural ecosystem to artificial types are common, this together with land degradation exacerbated by natural and human induced pressures, pose a serious threat to the supply of key Ecosystem Services (ES). To aptly capture the impact of land use changes on potential and supply of ES, we use both expert-based and empirical approach to quantify ES indicators. For this, LULC changes were quantified in Ben Tre province for 5-years (2015-2020) using remote sensing. To link these to changes into relevant ES, we first elaborate, a list of relevant ESs through literature reviews and regional expert's knowledge. A LULC v/s ES scoring matrix is used to assess relevancy and importance of ES to locals. Indicators are to be calculated for important ES using secondary data sources. Spatial zonal statistics, ES bundles and hotspots would be analysed in GIS. Albeit, localised, findings from this study can not only help in understanding the interactions of these ES with the varying pressures and amongst themselves (synergies and trade-offs). But could further provide insights into the current coping capacity and resilience of local communities that are heavily dependent on those natural resources for their livelihoods and well-being. It can be beneficial, if such assessments can find relevant entry points for recognising and integrating ESs into policy or SDGs frameworks at a delta wide scale.





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## ABSTRACT

### The utilization and the payment mechanism of water-related ecosystem services from the forest in Vietnam

Forest-water nexus is a major concern for the world as water-related ecosystem services for different economic sectors. However, the utilization of water-related ecosystem services from the forest has many negative impacts to the ecosystem. According to FAO (2013), water cycle and forest are two essential and closely intertwined elements of our natural capital and therefore, forest are crucial to the sustainable management of water ecosystems and resources just as water is critical to the sustainability of forest ecosystems. In which, payment for water-related forest ecosystem services can be seen as one of strategies geared towards safeguarding and sustaining the ecological, social and economic functions of the nexus. Under this scheme, Vietnam is not an exception, several water-related ecosystem services from the forest are used for drinking, agriculture, fishery, industry and hydro-power energy purposes. To serve the dual goals in economic development and sustainable forest management, Vietnamese government has been implemented several policies related in payment for ecosystem services. Therefore, this presentation aims to indicates the utilization of water-related forest ecosystem services in Vietnam and describes the mechanism of the payment for these services which was gear under the Forestry Laws and Decree 99/ 2010 of Vietnamese government.



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## ABSTRACT

### Updating the progress of sustainable Forest management implementation and upstream forest conservation in Lao PDR

During much of the last century, primary forests in many tropical countries were significantly destroyed or degraded. Since 1990, approximately 420 million ha of primary forests have been destroyed globally due to accelerating land use changes.

The Lao People's Democratic Republic (hereafter Laos) aspires to restore forest cover to 70 % of the country's terrain by 2035, by restoring 7.3 million ha of protection forests, 4.8 million of conservation forests, 3.1 million ha of production forests and establishing 500,000 ha of industrial tree plantation on degraded land (DOF, 2020a). To achieve this aim, the Government of Laos (GoL) has played attention to a sustainable forest management and put in place policy instruments for the conservation, protection, restoration, development of forests and forest lands in line with the Socio-Economic Development Plan of 2021 - 2025, aiming to establish 200,000 ha of new plantations and restore the remaining 1.8 million ha of natural forests as well as conserving the environment, water resources, biodiversity and livelihoods while generating income sources for the rural communities (MPI, 2021).

In Laos, there are currently 50 areas of upstream forests with an area of over 5.4 million ha, most of which have been located in Northern Laos. Not surprisingly, Laos is considered as the most abundant on water resources per capita in ASEAN by the annual providing capacity of surface water to each of its individual citizen of 55,000 m<sup>3</sup> per capita, while these water sources have played an important role to hydropower development, agriculture, tourism, and service sector.

Over the past few decades, there was a high rate of deforestation and forest destruction affecting biodiversity, upstream forest and ecosystem services. To solve these problems, the government has made great improvements in the policies, approaches, and technologies used for sustainable forest management including innovative models for delivery of community payments for watershed and ecosystem services that had been developed under international project.

This paper aims updating the progress of sustainable Forest management implementation in order to conserve its upstream forest and ecosystem in Lao PDR. It presents state of sustainable forest management, national forest strategy, forest and watershed conservation, social forestry, forest certification, REDD+, FLEGT-VPA and innovative models for delivery of community payments for protecting watershed ecological services in Laos.



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## ABSTRACT

### **The role of a sub-national agency in River Basin Management: The Mindanao Development Authority experience**

The Philippines is undeniably rich in natural resources. The island of Mindanao in southern Philippines is equally blessed with rich ecosystems and dominated by fertile river basins and watersheds. It has eight major river basins and two of them are within my area of responsibility - the Tagum-Libuganon River Basin and the Agusan River Basin which is among the two largest river basins in the island.

The Mindanao Development Authority (MinDA), the lead agency in integrating and coordinating development efforts in Mindanao, recognized the threats of climate change and environmental risks to these river basins. Some of them are the heavy siltation, water pollution, unsustainable farming practices, logging, mining, and destruction of fish breeding grounds which poses threats to food security and economic development. Mindanao's total forest cover has also been rapidly denuded from 70 percent in the 1900s to 23 percent in 1988 and down to six percent in the last decade.

With these, MinDA pushed for an integrated River Basin Development and Management roadmap for Mindanao that will catalyze the conduct of studies as well as formulation of river basin programs and policies. As of date, the 7 river basin master plans have been approved by the regional planning and policy-making bodies while the Agusan River Basin Master Plan is on progress.

This roadmap ensures an integrated approach in river basin development and management in close coordination with local government units, relevant government agencies, private sector groups, NGOs, academe, and other appropriate bodies which also constitute the respective River Basin Management Councils that will oversee the implementation of the plan. It will also take charge of rationalizing and mobilizing public and private investments for river basin development and management in Mindanao.



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## ABSTRACT

### The barriers and solutions to reduce land-based waste leakage hence to protect marine environment and coral reefs

Reduce, Reuse and Recycle to Protect the Marine Environment and Coral Reefs' project (3RproMar) is a joint project coordinated by the ASEAN and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of BMZ. The objective of this project is improving the capacities for reducing landbased waste leakage to protect the seas especially plastic material. Plastic contributes to only 14% of total waste in Indonesia or approximately 7.8 million tons of plastic waste annually. However due to its durability and their existence as microplastics threaten environmental ecosystem, plastic is important to be managed properly.

Unfortunately, Indonesia fails and ranks second as the country that produces the largest plastic waste polluters in the world. Plastic packaging accounts crucial number of land-based sources of plastic waste. Approximately more than 60% of plastic land-based waste are still mismanaged, uncollected, burned, buried or disposed in illegal landfill, and dumped in the water stream. Rivers then carry and discharge around 83% of annual plastic debris and leaks into the marine environment from land-based source and the rest 17% is washed off to the coastal areas.

There are two regulations released: Indonesia National Waste Management Policy and Strategy (Presidential Decree No. 97/2017) and the Plan of Action on Marine Plastic Debris 2018-2025 (Presidential Decree No. 83/2018) as the top of national agenda and sets target in 2025 to reduce 70% marine debris especially from plastic waste. Five working group from various ministries are also formed and responsible to implement and achieve the target from behavioural change/awareness, finance-governance-law, land based waste reduction, sea based waste management, and research-development. However this target likely very ambitious because the current achievement is still far below the target with only 3 years left. So the assessment is carried out to determine the barriers between stakeholders/governance and solution to accelerate achieving the target.



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## ABSTRACT

### Application of Remote Sensing for Environmental Monitoring and Natural Resource Assessment in Bangladesh

Bangladesh is located in the lower basin of the Ganges-Bhramaputra delta and is often affected by various natural calamities. The country could be one of the worst victims of global climate change. These catastrophes can affect the huge number of people living in this region and hinder the efforts of poverty reduction and socio-economic development. Satellite remote sensing is a powerful tool capable of detecting disasters and providing early warning to save lives and properties. Bangladesh Space Research and Remote sensing Organization (SPARRSO) has been applying remote sensing for assessing natural resources and environmental monitoring in the country since its establishment in 1980. Tropical cyclones formed in the Bay of Bengal and northern Indian Ocean are tracked using satellite remote sensing till its landfall. Excessive monsoon rainfall in the Ganges-Bhramaputra basin sometimes creates flooding in the region. Flood events are monitored by optical and Synthetic Aperture Radar (SAR) data. SPARRSO is working with the government to generate information on the impacts of global climate change in the various sectors of Bangladesh. The information is very useful to develop adaptation and mitigation strategies to cope with this disaster. Bangladesh has a primarily agrarian economy and agriculture is the single largest producing sector of the economy. SPARRSO is providing country-level acreage of paddy crops for two different seasons and plays a vital role in food security planning for the densely populated country. Tropical forest cover in the country is changing due to both natural and anthropogenic reasons and is monitored using satellite remote sensing. The information is finally disseminated to the policy makers and SPARRSO is successfully participating in the nation building process.



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## ABSTRACT

### Exploring innovative policy tools through analysing multilevel power-interests nexus for forest landscape restoration in the Chittagong Hill Tracts, Bangladesh

Forest landscapes in the Chittagong Hill Tracts (CHT) have been seriously degraded in the last two decades. The CHT region covers 8% of the total land area in the country. Hill forest is the largest forest type i.e. 4.6% of the country area and 36% of the forest area. However, the highest absolute forest loss and degradation happened in the region are due to bio-physical and socio-economic disturbances and poor management. Historically, the CHT carries a unique socio-economic, cultural and institutional pattern. Traditionally established customary rules of the local ethnic communities are the only deciding instruments to control natural resources and other social and cultural activities in most part of the regions. Given such exceptional geographic and socio-political contexts, it is assumed that multilevel power structure and interest pattern and their interaction plays a key role in governing the forest land use. Popularly known, a mixed qualitative-quantitative scientific approach, and a mixed sources of data: key informant/expert interviews, focus group discussion and document analysis will be used to explore innovative policy tools for sustainable management of the forest landscape. The study will systematically analyse that aims to i) understand actor-centered power structure/dynamics in implementing funding programs and making policy decisions, ii) understand historical dynamics of conflict of interests (both formal and informal) with regard to forest land use policy, iii) study current policy tools landscape that have been used in land use planning, and finally, iv) suggest innovative policy tools based on the power-interests of multiple actors and current practices for fostering an integrative forest land use approach. Multiple variants related to social, political, ecological, economic, regulatory and informational elements and their dynamics - could lead to an innovative policy matrix with the aim to greater scientific understanding and decision making.



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## ABSTRACT

### **A case study of ecosystem-based adaptation for climate resilient in the dry zone of Sri Lanka**

Sri Lanka is one of the most vulnerable country to adverse effects of climate change in the world. Among the adverse impacts, prolonged droughts are seriously affected the livelihoods of the community in the dry zone. Agriculture is the dominant livelihood and the majority of livelihoods are associated with paddy cultivation in the dry zone. Paddy is water intensive crop and it is at present highly vulnerable to climate change specially prolonged droughts.

North East Monsoon rainfall is the main source of water supply for the dry zone for agriculture and other purposes. The forecasted rainfall of North East Monsoon as per the emission scenario RCP 4.5 and RCP 8.5 of IPCC AR5 for the periods of 2020-2040, 2040-2060 and 2070-2090 has been shown drastically reduced.

In order to overcome this challenge in the future, the ancient tank cascade system in Sri Lanka (Ellangawa in local language) also known as the Cascaded Tank-Village System which the Sri Lankan agrarian system, was designated as a Globally Important Agricultural Heritage System (GIAHS) by the Food and Agriculture Organization of the United Nations (FAO).

The Cascaded Tank-Village System is described as a connected series of tanks organized within a micro catchment of the dry zone landscape. It is an ancient, widely used and unique traditional agriculture system mainly found in the dry zone of Sri Lanka. It provides water for irrigation, domestic purposes, animals and ecosystems. Indeed, this system has helped rural people in the dry zone to survive under serious turbulent due to the adverse impacts of climate change.

Today some of cascades are abandon and few projects are going on for rehabilitation the system. Rehabilitation and well maintenance this system is the prominent solution for prolonged drought and flash floods in the dry zone of Sri Lanka.



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## ABSTRACT

### Binerean Corridor - Ridges to Reefs Management Initiative in South Bolaang Mongondow District, North Sulawesi, Indonesia

The South Bolaang Mongondow District has a high potential for biodiversity, ranging from Sulawesi endemic animals such as Maleo (*Macrocephalon maleo*), Anoa (*Bubalus sp.*), Babirusa (*Babyrousa sp.*), Yaki (*Macaca nigra*) dwelling in typical Sulawesi forest as well as complete coastal ecosystems, from the estuary, mangroves, coral reefs to marine ecosystems with existing fisheries potential. The complete ecosystems and complex landscape of South Bolaang Mongondow, stretches from the ridge to the reef, that connect the Bogani Nani Wartabone National Park conservation area, 209 watersheds with coastal and marine areas. It is including Binerean corridor which consist of four watersheds area which serves as corridor for Maleo birds from its nesting ground sites at the beach and the forest - it is one and only in the world. Binerean corridor comprises various land uses, multiple interests of multi-stakeholders which become the most challenge of its sustainable management.

A High Conservation Values (HCV) – landscape assessment was completed in 2021, it encompassed 349,746 ha, consisting of 161,586 ha of land and 188,160 ha marine areas along 294 km of South Bolaang Mongondow District coastline. The assessment identified 140,083 ha of the landscape with high concentrations of biological diversity including endemic species, and rare, threatened, or endangered species (RTE) such as maleo, babirusa, anoa, tarsier, and Sulawesi macaque. About 93,336 ha of the area has large, landscape-level ecosystems and ecosystem mosaics that are significant at global, national, or levels. The assessment also revealed that about 121,000 ha of the landscape includes rare, threatened, or endangered (RTE) ecosystems, habitats, or refugia. This includes sea turtle nesting grounds (olive ridley, green, leatherback, and possibly hawksbill) on Binerean beach. It is being suggested to all stakeholders of the South Bolaang Mongondow landscape to apply the pre-cautionary principle in spatial planning and management practices. To sustain and maintain the identified HCV areas, Wildlife Conservation Society Indonesia Program (WCS-IP) along with the stakeholders will need to integrate the protection and management of these areas into the key plans of the District, National Park, and Forest Management Unit (FMU), as well as the natural resources conservation agency.

WCS-IP supporting the government to piloting an initiative of a well-integrated multistakeholder management at Binerean corridor from the ridges to the reefs – from upstream to downstream, which can support the development of community livelihoods and nature conservation in South Bolaang Mongondow District in a responsible, sustainable, and integrated manner. This approach aims to provide a holistic and integrated approach for the protection and development of coastal areas by targeting the prevention of environmental degradation in upstream areas through environmentally friendly agricultural or plantation activities as well as sustainable development planning policies that pay attention to high conservation value areas.





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## ABSTRACT

### Multi-stakeholder dialogs as a mechanism to promote the rights of smallholder farmers and indigenous communities for natural resource governance

Myanmar, an ethnically diverse nation that is blessed with rich natural resources, is heavily dependent on those resources for its economy. Agriculture, forestry, fisheries, and oil, gas, mineral and gem extraction have contributed to the country's economy for decades. These activities take place mostly in rural areas where 70% of the country's population lives – most of them smallholder farmers and indigenous communities.

In the name of Myanmar's economic development, over the course of different government eras legislation governing natural resources management has been enacted without listening to the voices of smallholder farmers and indigenous communities who depend on natural resources for their subsistence and management them through traditional practices or paying attention to their needs. To make matters worse, many laws contradict each other.

In the implementation of legislation, there has been weak coordination and collaboration among different government institutions, resulting in conflicts among different groups such as companies, communities, and government institutions.

Multi-stakeholder dialogs provide a mechanism for including smallholder farmers and indigenous communities in policy-making and have the potential to bring about improved actor-based management and natural resource governance.

Land Core Group and other NGOs and civil society organizations have facilitated multi-stakeholder processes contributing to various policy processes, including the development of the National Land Use Policy and land-related legislation. There is evidence that these efforts resulted in greater engagement of smallholder farmers and indigenous communities in the policy process and greater recognition by government officials of the important role they play in natural resource management. Yet there are challenges in overcoming power differences among different actors in multi-stakeholder dialogs and in overcoming bureaucratic resistance to opening up governance to meaningful stakeholder participation.



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## ABSTRACT

### Hydraulic calculation of watercourses with vegetation

The consideration of vegetation in the hydraulic calculation of flowing waters has been included in German regulations since the 1990s. The formulas of these 1D calculations are very practice-oriented and are still valid for simple and compact flow cross-sections. The increased demands on the ecological condition of water bodies on the one hand and the relevance of bush- and tree-like vegetation in and along urban water bodies for flood conditions on the other hand, require today the use of multidimensional flow models, which can represent different plant characteristics and their hydraulic resistance behavior in complex cross sections. In this context, especially the flexibility of plants in the flow plays a major role. Today, 2D hydrodynamic-numerical methods are part of the standard of numerous engineering offices, with most methods using purely empirical approaches for bed roughness and plant resistance. Newer approaches for calculating streamflow with vegetation are available and need to be implemented.



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## ABSTRACT

### Integrated Water Resource Management (IWRM) Practice in Federal Context of Nepal

In the federal context of Nepal, natural resource like water resource distribution, utilization, conservation and controlling them in a legitimate way is crucial to study to mitigate the actor consumption dispute. Water in Nepal is considered as a key strategic natural resource having a high potential to lead all other development and economic growth of the country. The climate change and anthropogenic activities have caused adverse impact on water resource in recent days reducing the stream flow. Reduced water volume is to be distributed among the increased population. Restructuring the local level government on the other hand has increased contradiction on water distribution. IWRM is an integrated approach considering environmental, political, social, cultural, religious and other values. The objective of this study is to identify and analyze the relevant sources of a water related conflict and to find how water is connected to Nepalese people, to explore their role of actor involved natural resource management. The study has been conducted through a comprehensive literature review from the previous studies, government policy document and report related to IWRM and experience of current federalism practice in Nepal. IWRM is an encounter to conventional practices, attitudes and professional certainties since it confronts deep-rooted sectoral interest that the water resources are managed holistically a priority basis covering for the beneficiaries. IWRM is to be considered as fundamental planning and management tool at the state and local government level. A provincial level water use disputes considering the inter basin transfer found to be spatial distribution of water as external conflict. The social behavior of the dispute creators towards water-related conflict, needs to be examined at the level of different groups, social classes, political parties, religious and ethnic entities, alliances and cultural systems.



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## ABSTRACT

### Expansion of Oil Palm Plantation in Indonesia: Awareness of conservation issues and which research development do we need

Indonesia has often been criticized by environmentalist groups for giving too much room for palm oil plantation development. Public controversy over palm oil is often opinionated and it is fed by definitive and sometimes exaggerated statements. The rapid development of oil palm cultivation feeds many social issues such as biodiversity, deforestation, ecological impacts. In 2020, the total size of oil palm plantations in Indonesia was around 14.6 million hectares. This was expected to increase in the future to meet growing domestic consumption of palm oil, largely from biodiesel. Increasing capacity to meet domestic biodiesel demand. Since 2015, the Indonesian government has heavily subsidized producers of biodiesel blends using palm oil to keep the prices of such biofuels competitive. This has contributed to an exponential increase in biodiesel consumption in Indonesia. The government's biofuels program aims to eventually replace conventional diesel with a biofuel blend derived completely from palm oil, or B100. To meet the B100 demand, additional 15 million hectares of oil palm planted would be needed, more than double the current area of oil palm planted. Awareness are needed for more environment-friendly policies by the government and involve multi-stakeholders. Oil palm expansion can contribute to deforestation, peat degradation, biodiversity loss, and a range of social issues. But oil palm is also a major driver of economic growth and a source of alternative fuel. The challenge, according to the facts, will be not to prevent the expansion of the palm oil sector, but to encourage forms of development that seek to minimize the negative impacts on biodiversity, to manage land-use and land-cover changes respect to ecosystem services and the well-being of local people.



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## ABSTRACT

### **Towards organic tea production in Vietnam. A case study in Son La province, Vietnam**

Given the detrimental environmental and social impacts of conventional farming cultivation methods, the transition to more sustainable production systems is an urgent priority. To minimize negative environmental effects, the conversion to organic farming practices has been recommended. In Vietnam, tea production is of historic and cultural significance. The country is the fifth-largest global tea exporter and the seventh-largest tea producer, with 124,000 ha of tea estates, over 500 tea processing facilities and 500,000 tons of annual tea production. Cultivating and commercializing tea make up the livelihood for thousands of households in the highlands of northern and central Vietnam. However, the competitiveness of Vietnam's tea in the global market is generally low. Drivers relate to the product's low quality that often does not meet the food hygiene and safety standards of foreign markets. To improve the value of tea products, the Vietnamese government has introduced several policies to stimulate the development of organic tea production. Nevertheless, a comprehensive analysis of this sector is lacking so far.

This study explores the financial and economic performance of the conventional and organic tea production system in Son La province, which is one of the main tea production regions in Vietnam. In-depth interviews with 16 tea farmers, three traders and two processing companies were carried out. The findings were validated through direct observations, and in three focus group discussions and 12 expert interviews.

The results demonstrate the profitability of conventional tea production generating an estimated net benefit of 2,300 USD/ha/year. Respondents confirm significant negative environmental and social effects of the herbicides and pesticides. In contrast, while the organic production model was able to improve land-use efficiency and social benefits, it indicated a financial loss of around 1,500 USD/ha/year. Our results demonstrate the necessity for regulatory action and further support measures aiming to internalize the negative externalities caused by conventional tea production in order to end the structural disadvantage of environmentally friendly farming practices in Vietnam.



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## ABSTRACT

### **Analyzing impacts of terrain to forest cover change in identification of priority areas for biodiversity conservation in Ngoc Son – Ngo Luong nature reserve**

Tropical forest ecosystem has been known as high-value areas of biodiversity. It is a complex structure with valleys, mountains, swamps, and river systems. Forest cover is considered an essential factor of biodiversity because it directly affects the habitat of fauna and plants. Topographic factor has been shown as one of the significant factors indirectly linked to forest change.

This study was conducted to show the relationship between the terrain and the forest cover change in Vietnam's Ngoc Son – Ngo Luong nature reserve. The influences of topography were instead by the impacts of altitude and slope. The results initially showed that different-terrain areas in the study area have different-change levels in forest cover area. The change of forest areas is lower in the higher slope areas. Over 72% of the forest area has been found on slopes below 300. From 1986 to 2009, the lost forest area was located under the 600m-altitude area, with more than 80% of change located at 200m-500m altitude, the rest area tended to increase slightly. Particularly for the period from 2009 to 2021, the forest area across the whole region increases sharply. More than 68% of the added forest area is also found at 200m-500m altitude. It shows that the relationship between the terrain and the forest area change is quite clear. It correctly indicates the vulnerable areas that need to be protected for biodiversity conservation in Vietnam's Ngoc Son – Ngo Luong nature reserve.



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## ABSTRACT

### Online Coordination and Communication System for assessing Carbon Net Sink in Forest Management Unit Level

Under the Indonesia's Long-Term Strategy for Low Carbon and Climate Resilience (LTS-LCCR) 2050, the country is targeting a Forest and Other Land Uses (FoLU) Net Sink in 2030 by allowing certain level of planned deforestation which will be compensating by sustainable forest management and managing low carbon development within other land use. The project, called the Forest Investment Project – II (FIP-II), operates in Indonesia in ten (10) selected Forest Management Units (FMUs) to implement the program of reducing emission from deforestation and forest degradation (REDD+) through community based sustainable forest management and enhance livelihood of the forest dependent communities. With the close alignment, there is an ongoing initiative to exercise the national program of Net Sink 2030 in selected FMUs. FMU as a key element of the Indonesian decentralized forest governance showcases potential to coordinate accurate assessment of the improved low carbon land use activities involving the concession companies and relevant forestry institutions located in their respective areas. Despite the risk of decline from those land users/stakeholders to declare the information on annual and monthly harvest, forestry rehabilitation and illegal timber activities to the FMUs, a form of decree could be provided as a legal basis to enforce the data reporting and analysis. The best practices and lesson learned of FoLU Net Sink 2030 implementation at the FMU scale under this proposed activity is expected to contribute to the design of a National Program for the implementation of the FoLU Net Sink Operational Plan at national level until the year 2030.

# PROJECT COORDINATION



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<p><b>Moonlight Champa</b> 13 Pangkham Road, 01000 Vientiane</p>	<p>Ireneo Silverio Piong, Jr. La Thi Tham Le Thien Duc Nguyen Thanh Phong Nguyen Thi Thuy Duong Tran Van Hiep Vu Xuan Dinh</p>
<p><b>V Hotel Vientiane</b> Rue Nokeokoummane, 01000 Vientiane</p>	<p>Sunimal Jayathunga</p>
<p><b>VLao Poet Hotel</b> Rue Hengbounnoy, 01000 Vientiane</p>	<p>Daniel Karthe Jürgen Stamm</p>
<p><b>ibis Vientiane Nam Phu</b> Pankham Road, 01000 Vientiane</p>	<p>Saw Doh Wah</p>

# JOIN THE ALUMNI NETWORK

Over the past decades, postgraduate training programs in the field of environment and natural resources have developed in the greater Dresden area. With more than 700 alumni, doctoral students and thousands of other participants in continuing education courses, a large network has been established.

We now want to establish an alumni network "**Integrated Natural Resources and Environmental Management**", which aims at bringing together alumni from all over the world for strengthening interdisciplinary and holistic approaches on complex environment and development policy issues.

We will notify you as soon as the platform is created and look forward to welcoming you to join the expert network of environmental management and the sustainable use of resources once it is established.



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