Bangkok Conference on Science, Technology, and Innovation for Addressing Wildlife and Forest Crimes and Attaining SDGs

Collaborators:

- ASEAN Center for Biodiversity
- European Union
- Lusaka Agreement Task Force
- National Institute for Environmental Studies, Japan
- Remote Sensing Technology Center of Japan
- South Asia Wildlife Enforcement Network
- United Nations Development Program
- United Nations Office for Outer Space Affairs
PROCEEDINGS

OF

BANGKOK CONFERENCE ON SCIENCE, TECHNOLOGY, AND INNOVATION FOR ADDRESSING WILDLIFE AND FOREST CRIMES AND ATTAINING SDGs
VIDEO MESSAGE FROM THE RIGHT HONORABLE PRESIDENT OF NEPAL

Ladies and Gentlemen, Greetings from Nepal!

I regret my inability to be present at this important conference which hopes to use science, technology, and innovation to protect forests and wildlife and to prevent criminals from diminishing both. Nepal at present is hosting 4th Summit of the Bay of Bengal Initiative for Multi-Sectorial Technical and Economic Cooperation (BIMSTEC), which keep me from being with you in Bangkok, but I do eagerly await the conclusions that emerge from your deliberations. The theme of this conference is vital for humanity and the globe, as also highlighted in Sustainable Development Goal 15; which pledges to protect biodiversity, ecosystems, and wildlife, and to target poaching and trafficking of protected species. SDG 15 further seeks to increase the capacity of local communities to pursue sustainable livelihoods. Against this backdrop, I appreciate the aim of the organizers to highlight success stories in harnessing science and technology to battle wildlife and forest crimes. Additionally, I do believe in the need for enhanced sharing of information and data within countries and across borders to prevent such crimes.

We know well the importance of improving governance capacities, particularly at the regional and local levels, to promote environmental protection, including in relation to forests and wildlife. My country has a proud legacy in forest and wildlife conservation even though there are looming challenges, from climate change to pollution and loss of species. On the whole, Nepal's success in forest management and wildlife protection is linked to a holistic approach developed over the decades by the Ministry of Forests and Environment of the Government of Nepal, from community-based management of forests to a streamlined judicial system to the deployment of the army personnel in sensitive conservation areas. The success of these efforts can be seen in our ability to protect our rhinoceros, tigers, and elephants, also seen in the fact that there has been zero-poaching of the rhinoceros for continuous four years since 2011. Likewise, we are actively involved in protecting species across the spectrum, from vultures and sarus cranes of the Tarai plains to mountain ungulates, the red panda, the snow leopard, and other species of the High Himalaya. The forests of mid-mountain Nepal have increased coverage in part due to our innovative community forestry programme, which has promoted a participatory approach since the early 1980s. Involvement of local communities in natural resource management process always increases ownership over the resources and ensures equity and justice while sharing forest-benefits. Forty-five (45) percent of the national geographical area of Nepal is now woodland. At this point, I should mention the President’s project for the conservation of the low-lying Chure hill region. To cope encroachment of the forests and loss of species, strong laws and conservation instruments are in place. Nepal’s engagement with forests and wildlife conservation makes it extremely sensitive to the importance of utilizing scientific, technological, and managerial innovations to further promote the goals that are incorporated in SDG 15.

We are also alert to the importance of the cross-border sharing of information and data, and the need for a cooperative spirit in this field. We should be able to overcome reluctance and inertia in
international cooperation. Nepal is committed to the effective implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and strengthening of regional efforts such as through the South Asia Wildlife Enforcement Network (SAWEN).

We must enhance transregional cooperation for conservation among the countries of the Larger South. Forests and wildlife are not just national resources – they have influence over all of our lives as human beings. To address these problems we need technology, information, and most importantly, common understanding, commitment, and strategy in the governmental and non-governmental sectors.

I encourage the conference participants to develop concrete steps towards common solutions, including on the following points:

- How can we build global South-South cooperation in addressing the current challenges in conservation and protection of the species, linking, in particular, the governments and citizens of Africa, Asia, and South America?
- How can we unite for a common approach to gather information so as to track poaching and trafficking?

As I take leave from you, I am confident that this conclave of political leaders, scientists, technocrats, policy-makers, and activists will emerge with creative and practical solutions to address present and future challenges to the safety of our forests and wildlife.

I wish the conference a grand success! Thank you.
Greetings to all the participants of the conference from Islamabad.

First of all, I would like to apologize that I could not attend this auspicious occasion because of the government just coming in place, but I would like to say that our government is really committed to the cause of the environmental conservation across the world and in a broader spectrum which includes various issues such as climate change, pollution, and also issues of illegal wildlife trade and addressing the wildlife and forest crimes that the conference in Bangkok is all about.

I would like to cooperate with your team and I think there is a very strong need for having an international regional forum which is going to address these issues between South-South and between neighbors because these issues sometimes do not recognize man-made boundaries, so it is very important to have a forum where you can enhance your own learning from the experience of others around you, and also cooperate so that you can share knowledge on this forum.

With this, I would like to thank everybody at the conference and wish you a very successful event and I would be looking forward to the results that would come out of the conference.

Thank you very much.
Distinguished Vice President of Asian Institute of Technology, Prof Sivanappan Kumar
Dr. Wijarn Simachaya, Permanent Secretary, Ministry of Natural Resources and Environment of Thailand
Esteemed guests; scientists; academicians; delegates; participants; media friends
Ladies and gentlemen,

Namaste and good morning!

At the very outset, on behalf of the Honorable Minister of Forests and Environment of Nepal, Mr. Shakti Bahadur Basnet, I would like to convey his warm greetings and best wishes for the prolific success of this conference. Indeed, he was very interested to attend this meeting but because of the BIMSTEC conference being held in Kathmandu and also due to various policy-level urgent meetings, he could not attend this event. Anyways, it gives me an immense pleasure to address this august gathering. I would like to extend my sincere thanks to the organizers for giving me this opportunity.

Ladies and gentlemen!

Nepal, a very beautiful Himalayan country with the vast richness of biodiversity, harbors wide ranges of flora and fauna species with high ecological importance. More than Twenty-three (23) percentage of Nepal’s land has been designated as protected areas and also, importantly the community-managed forests have a large share in ecosystems management. Interventions for the conservation of the biodiversity in Nepal have received global recognition including remarkable zero poaching of Greater One-Horned Rhinoceros. More congregate initiatives are in place for accomplishing the holistic objective of conservation.

However, ever-expanding wildlife and forest crimes undermine the long-standing efforts in biodiversity conservation all over the world including Nepal. The crime can lead to the extinction of species, the loss of biodiversity and serious damage to the ecosystems that support our very existence. Therefore, wildlife and forest crime control is a top priority for Nepal. The institutional mechanism we practice in combating wildlife crime in Nepal varies roles of the general public to executive head. The chronological efforts, from community-based anti-poaching units and community forest user groups at the local level to The Right Honorable Prime Minister who chairs the national tiger conservation committee, impact positively in curbing such crimes. Notably, assurance of firm commitment to fight against wildlife and forest crimes has been reflected in the message of The Right Honorable President
of Nepal. I would also like to reiterate the same in the operational level through cooperation and collaboration among the law enforcement agencies and partner organizations.

Ladies and Gentlemen!

I am happy to witness the collaboration of various partner organizations and academic institutions in organizing this important conference. I feel pleasure to share that South Asia Wildlife Enforcement Network (SAWEN), a legitimate regional wildlife enforcement support body of eight South Asian countries, is one of the collaborators of the program. Important to mention here, as representing a member country of SAWEN and host country of the SAWEN Secretariat and also personally the Chief Enforcement Coordinator (CEC) of SAWEN, I would like to emphasize here that conceptualization and development of transcontinental cooperation is becoming a pertinent aspect of recent time referring the illegal trade from one country to other and continent to continent. Information and intelligence exchange, extracted as a result of the robust foundation of the database, is the current demand for effective law enforcement globally. Support offered from each other in terms of knowledge, resources, and technology would enrich the synergized outcome. I, therefore, again call this forum to explore concerted efforts through regional cooperation and collaboration. This, on one hand, supports to minimize wildlife and forest crimes, and on another hand also supports to achieve Sustainable Development Goals (SDGs).

Ladies and Gentlemen!

I am confident that these two days conference will pave a milestone in crafting the wider prospects on information, innovation, and capacity building linking wildlife and forest crime and its control. I encourage all the representatives to participate in the purposeful discussion to deliver insightful outcomes. This conference will add more significance and offers some way out in the backdrop that CITES has introduced a new reporting mechanism, requesting member states to submit an annual illegal trade report each year. In addition, this event could be a productive linkage to upcoming huge events London Conference on illegal wildlife trade 2018 and CITES COP 18 to be held 2019.

Finally, I would like to extend my best wishes for the success of this conference. Working together, we will reach our common destination.

Thank You.
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  - Improving the Effectiveness of Protected Area Management Using the Spatial Monitoring and Reporting Tool (SMART) Approach
  - Wildlife Enforcement Monitoring System: A Transcontinental Platform
  - Global Earth Observation System of Systems
  - Animal-to-Animal Data Sharing Mechanism for Wildlife Monitoring

# SESSION 3: GOVERNANCE AND CAPACITY DEVELOPMENT FOR ADDRESSING WILDLIFE AND FOREST CRIMES

- **Keynote Addresses**
  - Sharing CBCGDF's Experience in Curbing the Illegal Pangolin Laundering Practice in China
  - Capacity Building of Remote Sensing
  - USAID Wildlife Asia Activities
  - Translating Conservation Science into Implementable Policy and Practice
  - South Asia Wildlife Enforcement Network (SAWEN) and Possible Collaborations
  - Regional Framework under the Lusaka Agreement

# PANEL DISCUSSION

# CLOSING SESSION

# CONCLUSION AND WAY FORWARD

# SIDE EVENT: ASIA-AFRICA DISCUSSIONS ON ENHANCED COOPERATION FOR INFORMATION SHARING/TRAINING ON WILDLIFE ENFORCEMENT MONITORING SYSTEM

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CONFERENCE COMMITTEES
Patron of the Conference

H.E. GENERAL SURASAK KANJANARAT
Minister
Ministry of Natural Resources and Environment
Thailand
Honorary Committee

Dr. Pinsak Suraswadi
Deputy Director General
Department of National Parks, Wildlife and Plant Conservation, Thailand

Ms. Simonetta Di Pippo
Director
United Nations Office for Outer Space Affairs

Dr. Theresa Mundita Lim
Executive Director
ASEAN Center for Biodiversity

Prof. Worsak Kanok-Nukulchai
President
Asian Institute of Technology

Prof. Yoshifumi Yasuoka
Professor Emeritus
The University of Tokyo, Japan
Programme Committee

Mr. Ali Saleem
Member
UN Expert Advisory Group on Youth, Peace, and Security

Mr. Bonaventure Ebayi
Former Director
Lusaka Agreement Task Force

Mr. Kaname Ikeda
President
Remote Sensing Technology Center of Japan

Mr. Lorant Czaran
Programme Officer
United Nations Office for Outer Space Affairs

Dr. Manabu Onuma
Senior Researcher
National Institute for Environmental Studies, Japan

Mr. Manesh Lacoul
Deputy Director
WEMS Secretariat
AIT Solutions
Asian Institute of Technology

Dr. Remi Chandran
Research Associate
National Institute for Environmental Studies, Japan

Mr. Robert J. Dobias
Adviser to the Director
Climate Change Research Center
National Research Council of Thailand

Mr. Somkiat Soontornpitakkool
Director
Division of Wild Fauna and Flora Protection
Department of National Parks, Wildlife and Plant Conservation, Thailand

Dr. Werner Balogh
Chief
Space Applications Division
World Meteorological Organization
## Organizing Committee

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### CONFERENCE PROGRAM

**Day 1: Tuesday, 28 August 2018**

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<td>Honorable Madam Bidhya Devi Bhandari, the Right Honorable President of Nepal</td>
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<td>Video Message by H.E. Malik Amin Aslam Khan, Advisor to the Prime Minister on Climate Change, Pakistan</td>
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<td>Dr. Clarissa C. Arida, Director, Programme Development and Implementation, ASEAN Center for Biodiversity</td>
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<td>Report on the “Assessment of Wildlife Crime Information Management” by Dr. Remi Chandran, National Institute for Environmental Studies, Japan</td>
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**SESSION 1A: SCIENCE, TECHNOLOGY, AND INNOVATION FOR ADDRESSING WILDLIFE AND FOREST CRIMES**

Chairperson: Dr. Manabu Onuma, National Institute for Environmental Studies, Japan

Co-chair/Rapporteur: Mr. Faustine Masalu, Ministry of Natural Resources and Tourism, Tanzania

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<td>Tracing the Illicit Wildlife Trafficker through Wildlife Forensic: Lessons Learned from Thailand by Dr. Kanita Ouitavon, Department of National Parks, Wildlife and Plant Conservation, Thailand</td>
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### DNA Forensics in Protected and CITES Forest Tree Case Studies for Enhancing Law Enforcement in Thailand
by Dr. Suchitra Changtragoon, Department of National Parks, Wildlife and Plant Conservation, Thailand

### A Passion for Protection: Communication, Connectivity, and a Shared Ideology
by Mr. Mark Nuttall, INTERPOL

### Advanced Investigation and Anti-Smuggling Techniques
by Mr. Giovanni Broussard, United Nations Office for Drugs and Crime

### Illicit Wildlife Trade and the Role of Customs
by Dr. Tong Hua, World Customs Organization

**Discussions**

**13:15 – 14:30** LUNCH BREAK

### SESSON 1B: SCIENCE, TECHNOLOGY, AND INNOVATION FOR ADDRESSING WILDLIFE AND FOREST CRIMES – GEOSPATIAL TECHNOLOGIES

| Chairperson: Prof. Yoshifumi Yasuoka, Professor Emeritus, The University of Tokyo, Japan |
| Co-chair/Rapporteur: Ms. Margaret Maimba, Deputy Director, National Commission for Science, Technology and Innovation, Kenya |

**14:30 – 14:40** Keynote Address by Prof. Yoshifumi Yasuoka

**Presentations**

- **Wildlife Monitoring by Remote Sensing** by Mr. Kyoichi Ito, Remote Sensing Technology Center of Japan
- **Information Sharing Platform** by Mr. Atsushi Otake, NTT Data, Japan
- **UAV Systems for Aerial Surveillance and Forest Survey** by Mr. Somsak Poopet, Division of Suppression and Protection Strategy, Department of National Parks, Wildlife and Plant Conservation, Thailand and Dr. Chaiwat Klampol, Department of Aerospace Engineering, Faculty of Engineering, Kasetsart University
- **Proactive Technology to Protect Natural Resources in Thap Lan National Park** by Mr. Pakpoom Aramsirirujiwet, Thap Lan National Park, Department of National Parks, Wildlife and Plant Conservation, Thailand
- **Introduction to Drones and its Potential Applications in Wildlife Monitoring** by Dr. Manzul K. Hazarika, Geo-informatics Center, Asian Institute of Technology
- **Spatial Data Best Practices and Standardization for Countering/Combating Wildlife Trafficking** by Ms. Kathleena Mumford, U.S. Department of State, U.S.A.

**Discussions**

**15:30 – 16:00** TEA/COFFEE BREAK

**18:00–20:00** OFFICIAL RECEPTION
Hosted BY Department of National Parks, Wildlife and Plant Conservation, Thailand
Day 2: Wednesday, 29 August 2018

09:00 – 09:15 SUMMARY OF DAY 1

SESSION 2: INFORMATION MANAGEMENT FOR ADDRESSING WILDLIFE AND FOREST CRIMES

Chairperson: Mr. Somkiat Soontornpitakkool, Department of National Parks, Wildlife and Plant Conservation, Thailand
Co-chair/Rapporteur: Mr. David Karanja Migwi, Kenya Wildlife Service, Kenya

09:15 – 09:25 Keynote Address by Mr. Somkiat Soontornpitakkool

Presentations
Conservation, Zero Poaching, and Stockpiles Management in Nepal by Dr. Siddhartha B. Bajracharya, National Trust for Nature Conservation, Nepal
Protecting Wildlife: Supporting Local Innovations on Science and Technology to Curb Poaching and Trafficking in the Philippines by Mr. Glenn Forbes, USAID Protect Wildlife, Philippines
Improving the Effectiveness of Protected Area Management using the SMART Approach by Dr. Antony J. Lynam, Wildlife Conservation Society
Wildlife Enforcement Monitoring System: A Trans-continental Platform by Mr. Rehan Ul Haq, WEMS Secretariat, Asian Institute of Technology
Group on Earth Observation: Data Sharing Working Group – Data Sharing Survey Analysis by Dr. Remi Chandran, GEO Data Sharing Working Group
Animal-to-Animal Data Sharing Mechanism for Wildlife Monitoring by Dr. Hill H. Kobayashi, Center for Spatial Information Science, The University of Tokyo, Japan

Discussions

10:30 – 11:00 TEA/Coffee Break

13:00 – 14:30 LUNCH BREAK

SESSION 3: GOVERNANCE AND CAPACITY DEVELOPMENT FOR ADDRESSING WILDLIFE AND FOREST CRIMES

Chair: Dr. Clarissa C. Arida, Director, Programme Development and Implementation, ASEAN Center for Biodiversity
Co-chair/Rapporteur: Assoc. Prof. Philip D. Round, Mahidol University, Thailand

14:00 – 14:10 Keynote Address by Dr. Clarissa C. Arida and Assoc. Prof. Philip D. Round

Presentations
Sharing CBCGDF’s Experience in Curbing the Illegal Pangolin Laundering Practice in China by Ms. Shuya Huang, China Biodiversity Conservation and Green Development Foundation, China
Capacity Building of Remote Sensing by Mr. Masatoshi Kamei, Remote Sensing Technology Center of Japan
USAID Wildlife Asia Activities by Mr. Gary Collins, USAID Wildlife Asia
Translating Conservation Science into Implementable Policy and Practice by Assoc. Prof. Alice C. Hughes, Chinese Academy of Sciences, China
South Asia Wildlife Enforcement Network (SAWEN) and Possible Collaborations by Mr. Pradeep Bhattarai, SAWEN Secretariat

Regional Information Sharing Framework – The Case of Lusaka Agreement by Mr. Edward Phiri, Lusaka Agreement Task Force

Discussions

15:00 – 15:15 TEA/COFFEE BREAK

16:10 – 17:40 PANEL DISCUSSION

Panelists:
Dr. Clarissa C. Arida, ASEAN Center for Biodiversity
Mr. David Karanja Migwi, Kenya Wildlife Services, Kenya
Ms. Margaret Maimba, National Commission for Science, Technology and Innovation, Kenya
Mr. Faustine Masalu, Ministry of Natural Resources and Tourism, Tanzania
Mr. Kaname Ikeda, Remote Sensing Technology Center of Japan
Mr. Ali Saleem, UN Expert Advisory Group on Youth, Peace, and Security
Dr. Abid Qaiyum Suleri, Sustainable Development Policy Institute, Pakistan

Moderator:
Dr. Remi Chandran, National Institute for Environmental Studies, Japan

17:40 – 18:00 CLOSING SESSION

Closing Remarks by Mr. Man Bahadur Khadka, Chief Enforcement Coordinator, South Asia Wildlife Enforcement Network
Closing Remarks by Dr. Pinsak Suraswadi, Deputy Director General, Department of National Parks, Wildlife and Plant Conservation, Thailand
Closing Remarks by Mr. Edward Phiri, Director, Lusaka Agreement Task Force
The vote of Thanks by Mr. Manesh Lacoul, Deputy Director, WEMS Secretariat, AIT Solutions, Asian Institute of Technology


Day 3: Thursday, 30 August 2018

Field Trip to KHAO YAI NATIONAL PARK (07:00-18:00)
Organized by
Department of National Parks, Wildlife and Plant Conservation
On 25th September 2015, through Transforming Our World: 2030 Agenda for Sustainable Development, the member states adopted the United Nations General Assembly Resolution on the Sustainable Development Goals (SDGs) highlighting the global needs to address shared global challenges related to the environment, enforcement, and development. The seventeen (17) Goals and one hundred and sixty-nine (169) Targets signify the universal call for action centered towards communities’ welfare, planet’s wellbeing, sustainable peace, and global partnerships. To convert the lofty aspirations into actions, there is increased emphasis on bilateral, regional and multilateral cooperation on science, technology, and innovation, development of solution-focused strategies, and facilitation of capacity development and knowledge transference. The SDG 15 reflects the pledge to protect biodiversity, ecosystems, and wildlife; and encompasses targets to end poaching and trafficking of protected species and strengthen relevant national institutions in developing countries to combat crime. The SDG 16 calls for commitment in a concerted effort to combat all forms of organized crime, strengthen relevant national institutions for enhancing capacities with the participation of developing countries. In addition, SDG 17 calls for efforts in unison through enhanced cooperation (North-South, South-South, and Triangular) on science, technology, and innovation to enhance knowledge.

One year after the adoption of the SDGs; in October 2016 and its Conference of the Parties, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) introduced a new reporting mechanism, requesting member states to submit an annual illegal trade report by the 31st October of each year. Further, in September 2017, at its 71st session, the United Nations General Assembly adopted a resolution encouraging member states to enhance their enforcement efforts, including strengthening the collection of information on patterns and flows of illicit trafficking in wildlife and to report thereon biennially. The Resolution also requests the Secretary-General of the UN to report to the General Assembly at its 73rd session on the global status of illicit trafficking in wildlife, including poaching and illegal trade, and to make proposals for possible future action.

Though there are good commitment and encouragement at the international level to address the information gaps in tackling wildlife crime, there remain several technical, structural (horizontal and vertical), and response architecture related challenges at the regional and national levels in compiling information critical to undermine the determinants of organized crime and threats to peace and security in the society and globally. This was very well highlighted in one of the United Nations University reports, Bytes Beyond Borders, which mentions that: “the UN system is experiencing the odd circumstance of asking governments from developing countries to control poaching while simultaneously being unable to offer necessary resources (scientific, technological, and financial) for them to bring it under control.” Similar observations were made during the Tokyo Conference on Combating Wildlife Crime held in Japan in 2014 and; the United Nations/Kenya Conference on Space Technology and Applications for Wildlife Management and Protecting Biodiversity held in Nairobi, Kenya in 2016.

Hence, to address poaching and illegal trade and to meet the targets of the SDGs, it is important for all stakeholders to support affected nations through new technological, infrastructural, financial, creative set of tools, technical and governance measures to strengthen their information collection, compilation, analysis, and response process that underpins progress towards improving people’s lives in fundamental ways.

This conference titled ‘Bangkok Conference on Science, Technology, and Innovation for Addressing Wildlife and Forest Crimes and Attaining SDGs’ brought together representatives from governments, industries, civil society and development partners, and scientists and academe chiefly from the Global South. The conference delved into three key issues governments in the Larger South are facing in their efforts to address illegal taking, trading, and trafficking of protected species, and intended to outline the
available (technological, infrastructural, financial and governance) support for national governments and strive to institute an architecture for enhanced international cooperation for developing solution-oriented strategies, devising innovative approaches and tools, and providing advisory services to advance the whole-of-state approach in effectively tackling the transnational organized crime.

1. Science, Technology, and Innovation in Addressing Wildlife and Forest Crimes

The role of science and technology in addressing wildlife and forest crimes is a well-discussed topic and there are ample evidences where spatial and non-spatial information have been used to monitor illegal trade and poaching. Though several technological initiatives have sprouted up showcasing conceptual models on how technology can address a given problem related to illegal trade or poaching, very few studies have been implemented and tested. One of the biggest challenges in the use of technological tools lies in the inherent nature of the issue regarding wildlife crime. Wildlife crime cuts across two policy streams – environment and security. For this reason, on the conservation front, trans-boundary environmental monitoring tools are widely accepted, whereas, on the enforcement or security side, use of technology for trans-boundary monitoring is often constrained due to legal and political challenges. Another important use of science in addressing wildlife crime is through forensic technology. Application of DNA technology is crucial in species identification and is a key tool in the enforcement of national legislation on wildlife protection. DNA based evidence to address wildlife crime is already in use in countries like Japan and South Africa. For example, the RhODIS database of rhinoceros DNA is successfully being used to prosecute poachers and those trading rhino horns. Though all these developments indicate a positive trend in the use of forensics, a survey conducted with the support of UNODC indicates that more need to be done in meeting the quality assurance criteria required to use forensic methods for enforcement actions. The thematic session on Science, Technology, and Innovation focused on bringing together the science and policy experts working on the above-mentioned technologies for addressing wildlife crime to highlight the scientific, social, and political issues that are a concern in the effective implementation of the technology; and to define a broadway forward to support the objectives of SDGs.

2. Information Management in Addressing Wildlife and Forest Crimes

Effective information management across borders and within national boundaries is critical to combat transnational organized crime as well as in reporting progress for governments against their targets and commitments including SDGs. In the context of addressing wildlife crime, the issue regarding trans-boundary information sharing between countries and international agencies is a well-discussed topic. However, until now, a plausible solution remains to be achieved. CITES has been spearheading the matter but there remain big challenges in enforcement information sharing across agencies and members states. Also, as highlighted in the assessment of wildlife crime databases, the major problem in addressing wildlife enforcement at a national level is in the way information is collected. In most cases, information collection is not standardized which makes it unusable for enforcement purposes. Even if it is collected in a standard procedure, it is not stored well. For instance, in most cases, information is first compiled in a field notebook. Although many countries maintain some form of database, the information is often delayed or incomplete. Other problems include issues related to inter-agency conflicts, where the information collection and storage is the responsibility of one agency while actual enforcement action is carried out by another agency; thereby creating silos of unshared information. At the transnational level, sharing of enforcement information can be even more complex as national governments decide on what information must be provided to an international agency responsible for global enforcement. In many cases, names of the criminals are not provided to the international agencies making the transnational investigation a challenge. In addition, conflicting beliefs, competition for garnering funds, and the difference in ideologies can lead to failures of major initiatives such as seen in the case of ASEAN Wildlife Enforcement Network (ASEAN WEN) and Horn of Africa Wildlife Enforcement
Network (HAWEN). Challenges reside at the infrastructural level, too. Very few countries in the Global South have access to secure Information and Communication Technology (ICT) infrastructure that can store confidential information; while some initiatives are project-based and are unable to sustain beyond the project life either due to financial constraints or lack of incentives. In addition, most of the funding for enforcement information activities are planned and channeled through non-state actors. The session on information management is designed to touch upon the above-mentioned issues and examine the work of governments and other stakeholders in information management related to wildlife and forest crimes and the challenges they encounter. Further, it would explore the various technological, policy level and governance options for strengthening information sharing and discuss the need for a common information sharing platform either at regional or transcontinental levels.

3. Governance and Capacity Development for Addressing Wildlife and Forest Crimes

To address illegal wildlife trade, there is a need to identify the gaps in governance, infrastructural, and knowledge initiatives that are important for the enforcement and compliance of wildlife laws. Recently, addressing illegal wildlife trade has garnered good interest from several international stakeholders with good funding flowing in from multiple agencies and governments to countries which are highly affected by the problem. However, investing a large amount of resources on capacity development have not had congruous results in addressing the problems related to wildlife and forest crimes.

The reasons for the failure in addressing illegal wildlife trade has been analyzed by researchers in three schools of thoughts. Firstly, some researchers argue that the capacity development related to illegal wildlife trade is more related to the strategic interest of the donor countries. For example, the considerable interest and financial input towards the establishment of HAWEN despite the existence of Lusaka Agreement Task Force (LATF) is seen as strategic priority overtaking conservation interests. Secondly, channeling of bilateral funding on a project basis require partnering with expert international agencies including UN, NGO’s, and academic institutions. Project-based approaches hamper institution building as seen in the case of ASEAN-WEN programme. Thirdly, studies have also shown that many countries have robust legislation in place that is theoretically capable of combatting wildlife and forest crimes, but such legislation are poorly implemented. In other countries, the state of principal legislation differs greatly, with some being ineffective because important provisions must be implemented through separate regulations; while lack uniformity between regional and national legislation is an issue among others.

Successful implementation of SDGs and monitoring progress are dependent on good governance, capacity development, creative tools, innovative strategies, and organizational strength at all levels. The conference intended to discuss the above issues and thus, help derive at a new framework in governance and capacity development, which incorporates and engages governments and external agencies in a more equal basis, where activities against illegal wildlife trade are carried out based on the needs of the governments. The conference contemplated to also highlight the role of stakeholders in strengthening governance and capacity building in addressing wildlife and forest crimes.
On behalf of Prof. Worsak Kanok-Nukulchai, President of Asian Institute of Technology (AIT), Prof. Sivanappan Kumar, Vice President for Academic Affairs welcomed the participants to the conference and highlighted the role of AIT in the application of science and technology in the systemic development of Asia-Pacific region. He referred to the establishment of Wildlife Enforcement Management System (WEMS) Secretariat in AIT to strengthen transnational collaboration and information sharing on wildlife and forest crimes in Asia and Africa, and its efforts in engaging various stakeholders to identify the challenges in information sharing and governance related to the illicit activities. He called upon the participants to help design a new governance model that enables the Global South to be self-reliant and independent from external financial contributions.

In his inaugural remarks and keynote address, Dr. Wijarn Simachaya, Permanent Secretary, Ministry of Natural Resources and Environment, Thailand thanked the participants and emphasized the importance of the conference as a venue to share knowledge, technologies, and innovations to combat illegal wildlife trade and build lasting relationships among the countries in Asia and Africa. He highlighted Thailand’s efforts to cease poaching and illegal trafficking of protected wildlife species and attaining SDGs through use of science, technology, and innovation. At the national level, he cited examples of implementation of forensic science to establish a DNA database of domestic elephants and development of Network Centric Anti-Poaching System (NCAPS) to protect wild populations of endangered species. He also mentioned the national project under GEF-6 on “Combatting Illegal Wildlife Trade, focusing on Ivory, Rhino Horns, Tigers, and Pangolins in Thailand”. At the regional level, he referred to Thailand’s lead in the ASEAN Working Group on CITES and Wildlife Enforcement. He underscored the importance of knowledge exchange, technology transfer, and partnerships at national, regional, and international scales to combat wildlife crimes.

In the felicitations by collaborators, Dr. Clarissa C. Arida of ASEAN Biodiversity Center highlighted that addressing wildlife crimes is a serious concern in ASEAN, especially due to diminishing biodiversity and increasing sophistication of illegal wildlife trade including proliferation into cyberspace. She emphasized the need for governments to work together, adopt innovative approaches and scientific technologies, and share information to effectively address wildlife and forest crimes.

Mr. Edward Phiri of Lusaka Agreement Task Force underscored the role of science, technology, and innovative approaches to address wildlife and forest crimes and underlined the successful example of WEMS as a tool for information management and sharing for evidence-based decision-making among member states in Africa as well as transcontinental collaboration between Asia and Africa through partnership with AIT to protect wildlife and conserve forests.

Mr. Kaname Ikeda of Remote Sensing Technology Center of Japan stressed the need of monitoring environment and movement of wildlife and expressed keen interest to support it through developments based on the use of satellites and drones.

In the agenda-setting presentation titled “Addressing Wildlife and Forest Crime to Attain the SDGs: The Roles of Science, Technology, and Innovation”, Mr. Jeffrey McNeely, Former Chief Scientist of the International Union for Conservation of Nature (IUCN) highlighted the current pace of technological advancements and the related pros and cons to human well-being and sustainability. According to him, SDGs provide an important toolbox for adapting to such changes and understanding the inter-linkages including those with biodiversity. Although a lot of conventions and agreements are present to safeguard biodiversity, the number of threatened flora and fauna, and tree cover loss are still increasing. He cited the successful case of Chitwan National Park in Nepal through adoption of soft technology to conserve
biodiversity and protect wildlife species. He emphasized that different SDGs need to talk to each other and understand each other in order to effectively curb wildlife crime as all results are expected to compound to realize sustainable development. Wildlife crimes and climate change are integrally linked with synergies and tradeoffs; and addressing them requires commitment from top leadership. Wildlife and forest crimes often involve violence against humans and biodiversity alike resulting in national security concerns. He concluded that curbing wildlife and forest crimes demand attention to all SDGs.

In the presentation on “Assessment of Wildlife Crime Information Management”, Dr. Remi Chandran, National Institute for Environmental Studies, Japan spoke about the findings of the assessment on wildlife crime databases conducted. Under the United Nations Development Program (UNDP) funding, AIT undertook the assessment across one hundred and twenty (120) countries across Africa, Asia, and Latin America, and regional institutions and enforcement networks across the globe. The findings highlight that assessment of wildlife crime information management require consideration of technical, policy, and politics related challenges. As the protocols for information sharing are different for different countries making a one-size-fits-all approach is not practical. Wildlife crime databases exist in different countries, but the formats vary. Also, databases developed through externally-funded projects that fail to generate government ownerships do not sustain. Majority of Asian and African countries share information mainly with CITES, followed by INTERPOL with reluctance over nominal data. A major challenge in management of wildlife crime information is delay as wildlife practitioners and system managers are separate individuals who lack understanding and appreciation of each other’s work. Majority of the countries also face administrative challenges to manage wildlife crime information. Despite several structures in place, information sharing is disorganized and more often on the case-to-case basis rather than institutionalized process within, across and beyond the national institutions. Further, institutional, financial, and technical challenges remain as the key challenge in the efficacious operation of the Wildlife Enforcement Networks (WENs).

During the press conference, the Government of Thailand expressed support to South-South Cooperation through the Bangkok Initiative and deployment of Wildlife Enforcement Monitoring System (WEMS) in Thailand. The South Asia Wildlife Enforcement Network (SAWEN) and Lusaka Agreement Task Force (LATF) expressed their commitments to combat illegal wildlife trade, establish transcontinental collaboration and advance South-South Cooperation.
SESSION 1A: SCIENCE, TECHNOLOGY, AND INNOVATIONS FOR ADDRESSING WILDLIFE AND FOREST CRIMES

Chairperson
Dr. Manabu Onuma
National Institute for Environmental Studies
Japan

Co-chair/Rapporteur
Mr. Faustine Masalu
Ministry of Natural Resources and Tourism
Tanzania

Speakers

Dr. Kanita Ouitavon
Department of National Parks, Wildlife and Plant Conservation, Thailand

Dr. Suchitra Changtragoon
Department of National Parks, Wildlife and Plant Conservation, Thailand

Mr. Mark Nuttall
INTERPOL

Mr. Giovanni Broussard
United Nations Office for Drugs and Crime

Dr. Tong Hua
World Customs Organization
Keynote address by Dr. Manabu Onuma

The session focused on multitudes of technologies in practice at national and international levels. Wildlife forensics, a relatively new field that plays an important role in biodiversity conservation, is being used to investigate wildlife and forest crimes. Similarly, other technological solutions are being used by international organizations to facilitate their operation as mandated by the member states.

Tracing the Illicit Wildlife Trafficker through DNA Analysis in Japan
Speaker: Dr. Manabu Onuma, National Institute for Environmental Studies, Japan

With the increasing biodiversity loss, there is a strong need to take urgent actions to end poaching and trafficking of protected species of flora and fauna and address demand and supply of illegal wildlife products. Measures to achieve these targets can be enhanced by increasing the capacity of local communities to pursue sustainable livelihood opportunities and by prioritizing the biodiversity hotspots. In Japan, forensics work, especially molecular technology for species identification is needed to investigate cases against the Law for the Conservation of Endangered Species of Wild Fauna and Flora (LCES, enacted in 1993). The common cases on the rise since 2012 are illegal trading of imported body parts of wildlife for fur-coats, and accessories as charms or amulets with nails and teeth. DNA barcoding is applied to identify the species of confiscated items. The successfully obtained sequence data from mitochondrial DNA are compared with registered sequence data using the BLAST program to ascertain the species of specimens.

Tracing the Illicit Wildlife Trafficker through Wildlife Forensic: Lessons Learned from Thailand
Speaker: Dr. Kanita Ouitavon, Department of National Parks, Wildlife and Plant Conservation, Thailand

The Department of the National Park, Wildlife and Plant Conservation (DNP) is encouraging the use of forensic techniques in wildlife crimes, conducting investigations on confiscated, establishing DNA database, establishing wildlife DNA bank, undertaking researches on developing techniques, and establishing wildlife forensics laboratory for the sustainable conservation of the natural resources in Thailand. To address illegal captivation of elephants, DNP is creating a domestic elephant registration database and elephant DNA parentage system. Further, of over fifty (50) confiscated samples, there were six (6) rhino and thirty (30) tiger cases. In 2017, twenty-one (21) rhino horns with a market value of US Dollars Five (5) million was confiscated in one of the biggest hauls for years. Around one hundred (100) illegal elephant ivory cases were identified through one thousand seven hundred and fifty (1750) samples. Officials found hidden in a pickup truck’s cargo bed, twenty-four (24) elephant tusks and sixteen (16) elephant tails, DNA of which did not match with Thailand captive elephant DNA database. Such cases evince the importance of wildlife forensics as a tool to help reduce wildlife crimes.

DNA Forensics in Protected and CITES Forest Tree Case Studies for Enhancing Law Enforcement in Thailand
Speaker: Dr. Suchitra Changtragoon, Department of National Parks, Wildlife and Plant Conservation, Thailand

Even after improved legislation and strengthened law enforcement, illegal logging of high-economic-valued tropical trees still prevails. Hence, DNA forensics is a tool to effectively facilitate and enhance law enforcement. Cases provide ample evidence that DNA markers and DNA profiles are effective tools to identify and verify confiscated timber in national parks or other protected areas of Thailand. Intensive DNA analysis was undertaken in eight (8) cases of seized timber through the extraction of DNA, amplification, and analysis of the data. In four (4) of the eight (8) cases, the DNA results matched with DNA samples of the protected species. The persons involved in the case were convicted of the crime and
sentences in accordance with the law. For enhancing effectiveness in identifying the exact origin of confiscated species, expansion of methodology and intergovernmental cooperation are critical.

A Passion for Protection: Communication, Connectivity, and a Shared Ideology
Speaker: Mr. Mark Nuttall, INTERPOL

INTERPOL investigates criminal activities through means of innovation and technology to revolutionize policing tactics. Realizing each technological advancement brings a greater challenge for policing, Interpol focuses on the knowledge development of law enforcement agencies. INTERPOL recognizes the needs of member states as visionary best practice guidance, technological recommendations, and most importantly a platform to communicate, they connect the global police force and their information and analyze interconnected organized crimes and illicit fund flows. Through the INTERPOL Global Complex for Innovation (IGCI), INTERPOL disseminates knowledge of emerging technologies, best practices, contemporary policing techniques, criminal operators, and networks. Furthermore, it undertakes researches in collaboration with international organizations.

Advanced Investigation and Anti-Smuggling Techniques
Speaker: Mr. Giovanni Broussard, United Nations Office for Drugs and Crime

Technology is proving to be an important tool against wildlife crimes as organized crimes are becoming sophisticated. The use of innovative technologies such as digital forensics, audio and video surveillance, and criminal intelligence software is to be increased against wildlife crimes. Science, technology, and innovative practices are vital to effectively curb criminal activities. There is, also, a need for better enforcement of laws, generation of digital evidence, and identification and development of technological solutions.

Illicit Wildlife Trade and the Role of Customs
Speaker: Dr. Tong Hua, World Customs Organization

World customs organization (WCO) is an intergovernmental organization specialized in customs related affairs, which accounts for 98% of global trade value. The WCO-INAMA project helps in enhancing the enforcement capacity of customs to fight illicit wildlife trade in Sub-Saharan Africa, illegal trade of wildlife (fauna and flora) particularly CITES-listed species. Technologies such as cyber-incentives, cloud-computing support, mobile inspections, car licensing system, human face recognition, and Intelligence Analysis Software help customs officials to control the illegal activities. European Union customs are deploying and conducting research on Automated Comparison of X-Ray Images for Cargo Scanning (ACKIS) with reference materials where the X-Ray alerts the cargo securities to identify anomalies such as liquor. This method could be effective in analyzing the wildlife X-Ray database, reducing the illegal wildlife trade.
SESSION 1B: SCIENCE, TECHNOLOGY, AND INNOVATIONS FOR ADDRESSING WILDLIFE AND FOREST CRIMES – GEOSPATIAL TECHNOLOGIES

Chairperson
Prof. Yoshifumi Yasuoka
The University of Tokyo
Japan

Co-chair/Rapporteur
Ms. Margaret Maimba
National Commission for Science, Technology, and Innovation, Kenya

Speakers

Mr. Atsushi Otake
NTT Data, Japan

Mr. David Karanja Migwi
Kenya Wildlife Service, Kenya

Mr. Somsak Poopet
Department of National Parks, Wildlife and Plant Conservation, Thailand

Dr. Chaiwat Klampol
Kasetsart University, Thailand

Mr. Pakpoom Aramsirujiwet
Department of National Parks, Wildlife and Plant Conservation, Thailand

Mr. Kyoichi Ito
Remote Sensing Technology Center of Japan

Dr. Manzul K. Hazarika
Geo-informatics Center, Asian Institute of Technology

Ms. Kathleena Mumford
U.S. Department of State, U.S.A.
Keynote address by Prof. Yoshifumi Yasuoka
The session focused on the use of geospatial technologies and innovation for collecting data, sharing information, knowledge, and system, and integrating data into the system for modeling poaching and trafficking in the society.

Information Sharing Platform
Speaker: Mr. Atsushi Otake, NTT Data, Japan

National Spatial Data Infrastructure (NSDI) prepares national spatial data, mutually accessible for institutes and consumers as an important social infrastructure. It is a safe, secure, and convenient system which provides one-stop service and helps in preventing from the duplicated investment. NSDI network system is utilized by many ministries in Europe, USA, and Indonesia for disaster prevention, forest management, and wildlife management through spatial analysis in one system. Geospatial information should be promoted as an integrator of information in all phases of the national development cycle and should be utilized by local level and government communities to improve their works.

Application of Science, Technology, and Innovation in Wildlife Conservation, Management and Security in Kenya: Success Stories, Challenges, and Opportunities
Speaker: Mr. David Karanja Migwi, Kenya Wildlife Service, Kenya

With the increasing wildlife crimes, wildlife law enforcement agencies should enhance their security operations to make their work more effective. Leveraging on technology can enable anti-poaching information platform, command and control center, intelligence database analysis, collaring, monitoring, and helps in evidence-based decision making. With the use of technology, Kenya Wildlife Service (KWS) has collected, processed, and analyzed wildlife data more effectively and efficiently, which is helping identify the threats and develop mitigation strategies. For example, the establishment of forensic and genetics laboratory in Kenya has helped in wildlife DNA forensic analysis. KWS proposes that by 2030, there is a need for intensified application of science, technology, and innovation (STI) through research and development initiatives in wildlife conservation, management, and security.

Drones for Monitoring Poaching
Speakers: Mr. Somsak Poopet, Department of National Parks, Wildlife and Plant Conservation, Thailand and Dr. Chaiwat Klampol, Kasetsart University, Thailand

In Thailand, there are different types of Unmanned Aerial Vehicles (UAVs) in use for aerial surveillance and forest survey. Though the UAVs are automated, they still require some human efforts. Such systems are used for military operations, forest survey and 3D mapping, wildlife conservation, plant health monitoring, aerial mapping, mining surveys and mapping, and aerial imagery. The advantages of UAVs in wildlife monitoring are that it is a cost-effective method that provides very high-resolution data to identify the endangered species by mapping habitat and habitat changes over time, helps to find the population of species, detects illegal hunting activities, helps in combating crime scenes, as well as monitors the condition of the animals. However, the development capabilities of such systems are on the rise.

NCAPS for Monitoring Poaching
Speaker: Mr. Pakpoom Aramsirijiwet, Department of National Parks, Wildlife and Plant Conservation, Thailand

Thap Lan National Park is rich in biodiversity but is facing challenges such as land encroachment, poaching, and illegal logging, which have worsened over time. With the collaboration among government agencies and NGOs, camera traps were set up on different locations based on information from the Spatial Monitoring and Reporting Tool (SMART) patrol system. The cameras send real-time information
through the server to the responsible managers, which helps plan the next steps. The hidden GPS trackers help apprehend illegal loggers before they commits any crime.

**Wildlife Monitoring by Remote Sensing**  
**Speaker: Mr. Kyoichi Ito, Remote Sensing Technology Center of Japan**

Satellite data helps in forest management through identification of the areas where illegal logging is happening. Mapping gives information related to land use on geology, vegetation, soil, water, and so on. Drones also support in wildlife monitoring. In fact, the use of drones has supported forest rangers in enhancing crackdowns on poachers.

**Introduction to Drones and its Potential Applications in Wildlife Monitoring**  
**Speaker: Dr. Manzul K. Hazarika, Geo-informatics Center, Asian Institute of Technology**

Development and application of drones at AIT are mainly centered on monitoring of agriculture, highway, and wildlife. There are custom built drones with fixed wings and parachute landing. Mapping through drones has a strong potential as well. Applications of drones can benefit wildlife monitoring through habitat mapping, bird-eye view of habitat, range mapping, population counts, dispersal of nuisance wildlife, capturing wildlife, arrest lawbreakers, and routine autonomous surveillance. However, forest departments are facing difficulties in processing data from drones due to lack of expertise in remote sensing.

**Spatial Data Best Practices and Standardization for Countering/Combating Wildlife Trafficking**  
**Speaker: Ms. Kathleena Mumford, U.S. Department of State, U.S.A.**

Data collection is important; however, the challenge lies in the analysis of standard data. Geospatial data analysis, when done with a standard approach, helps identify the specific location of a datum. Geographical Information System (GIS) has been used to find the existing data and is shared with the related persons to mark geographical areas of illegal activities. Data analysis is critical to reducing wildlife trafficking through a focus on awareness raising, conscious consumerism, and ecotourism promotion. Also, it helps in identification of the current patterns of wildlife offenses, outlining gaps in the existing responses to wildlife crimes, understand the effectiveness of existing mechanisms, and propose mechanisms for enhancing the overall capacity of governments to counter wildlife offenses.
SESSION 2: INFORMATION MANAGEMENT FOR ADDRESSING WILDLIFE AND FOREST CRIMES

Chairperson
Mr. Somkiat Soontornpitakkool
Department of National Parks, Wildlife and Plant Conservation, Thailand

Co-chair/Rapporteur
Mr. David Karanja Migwi
Kenya Wildlife Service, Kenya

Speakers
Dr. Siddhartha B. Bajracharya
National Trust for Nature Conservation, Nepal

Mr. Glenn Forbes
USAID Protect Wildlife Philippines

Dr. Antony J. Lynam
Wildlife Conservation Society

Mr. Rehan Ul Haq
WEMS Secretariat
AIT Solutions
Asian Institute of Technology

Dr. Remi Chandran
Global Earth Observation Data Sharing Working Group

Dr. Hill H. Kobayashi
Center for Spatial Information Science
The University of Tokyo
Keynote Address by Mr. Somkiat Soontornpitakkool

Coordination and information management is required for reducing trans-boundary wildlife and forest crimes. Mobile data recording, species identification tools, and mapping software can be helpful to reduce such crimes. Innovation and ideas sharing related to wildlife and forest crimes should be enhanced. This session focused on improved datasets, information management, and information sharing.

Conservation, Zero Poaching, and Stockpiles Management in Nepal
Speaker: Dr. Siddhartha B. Bajracharya, National Trust for Nature Conservation

Wildlife trafficking involves many distinct markets. Each market has its own drivers that cause a significant threat to many plant and animal species. Major reasons for the increase in the trend of wildlife and forest crimes are because of low awareness, limited livelihood opportunities, weak law enforcement, porous borders, and most importantly inadequate trans-boundary coordination. Nepal has achieved zero poaching of rhinos for four years since 2011. Technologies such as SMART patrolling, CCTV based surveillance, GPS-based radio collaring, ID-based rhino monitoring, and use of drones help against anti-poaching activities. Furthermore, buffer zone community mobilization and community-based anti-poaching units are other alternatives. Good stockpile management practices can help prevent leakage of confiscated stockpiles into illicit markets. The Government of Nepal has created a database to manage information of the large volume of wildlife stockpiles accumulated through wildlife products confiscated in wildlife crime cases and death of animals due to natural causes.

Protecting Wildlife: Supporting Local Innovations on Science and Technology to Curb Poaching and Trafficking in the Philippines
Speaker: Mr. Glenn M. Forbes, USAID, Protect Wildlife

Biodiversity hotspots in the Philippines have started much legal protection and wildlife conservation techniques targeted at reducing threats to biodiversity, reducing poaching and wildlife crimes, and improving ecosystem goods and services. There are now rules on punishing the culprits when electronic evidences are found and there are protocols on wildlife law enforcement such as National Enforcement Action Plan. A new system is being developed for wildlife conservation management referred to as Biodiversity Resource Access Information Network (BRAIN). There is a need for community behavior change regarding the importance of wildlife through awareness raising, attitude change, and adopting desired behaviors. In addition, there is a need of adaptation and additional skills, knowledge, systems, strategies, tools, and policies to tackle the increasing sophistication of wildlife traders and traffickers so that the laws can be enforced accordingly.

Improving the Effectiveness of Protected Area Management Using the Spatial Monitoring and Reporting Tool (SMART) Approach
Speaker: Dr. Antony J. Lynam, Wildlife Conservation Society

Globally only 24% of protected areas are considered to have sound management and most protected areas have inadequate or highly inefficient management. There is, as a result, an immediate need for improvement of the protection of wildlife through national planning, dedicated protected area managers, and efficient staffs with an appropriate level of skills to use updated technologies. SMART is an important tool to measure and improve the effectiveness, quality, and management of ranger’s patrol in the protected areas. This will help promote accountability, maintain good governance, and improve standardized reporting of indicators on poaching and other threats. SMART has easy data entry interface and is integrated with GPS, mobile devices, and tools for automated analysis and report generation along with some basic statistics.
Wildlife Enforcement Monitoring System: A Transcontinental Platform
Speaker: Mr. Rehan Ul Haq, Asian Institute of Technology

Wildlife Enforcement Monitoring System (WEMS) is a free (off-the-shelf) web-based information system with GIS functionality, developed by United Nations University to collect, compile, and share wildlife law enforcement information. It is a common platform for sharing information on wildlife crimes among local and national public-sector agencies. WEMS is an action-oriented tool that will lead to the collaborative enforcement of legislation related to biodiversity and species conservation through compiling of the wildlife information. WEMS is a tool that integrates efforts for biodiversity and species conservation both at the local and global level, ensures timely analysis, and helps in policy development. Through the WEMS Secretariat in AIT, currently, trials are being conducted in Asian and African countries to facilitate better cooperation to conserve key affected species such as rhino and elephant. The output from the WEMS platform contains both nominal data and non-nominal data from the spatial analysis and other built-in reporting templates such as INTERPOL’s eco-message and CITES Annual Illegal Trade Report. Thus, WEMS is a helpful tool for customs, forest authorities, police, and defense officials to coordinate efforts against wildlife and forest crimes within and across national boundaries.

Global Earth Observation System of Systems
Speaker: Dr. Remi Chandran, Global Earth Observation Data Sharing Working Group

Global Earth Observation System (GEO) is an intergovernmental partnership working to improve the availability, access, and use of earth observations for the benefit of society. Over 400 million datasets and information resources are already available. This can play a major role in attaining SDGs. An online survey was designed for collecting national data sharing information from national contacts having access to adequate data. There are two main categories of the survey (national level and agency level) and each level has categories of questions for data policies, data portals, national coordination for data sharing, and use cases for data sharing. The collection and analysis of data are critical to support and encourage global earth observation data sharing and the need for accurate geospatial data and technology for real-time monitoring.

Animal-to-Animal Data Sharing Mechanism for Wildlife Monitoring
Speaker: Dr. Hill H. Kobayashi, The University of Tokyo

Using sensor network approaches on animals in interface design studies can help scientists to monitor animals and environment. However, wearable sensors cannot be used due to coverage, operational, and reliability problems. After Fukushima Daiichi nuclear disaster, to receive the bioacoustics information from the 250 stations of the exclusion zone animal wearable systems were consumed. The system only collects the information when two animals or individuals accidently meet each other, system automatically engages in information communication between two animals. Upon reaching the station system automatically upload the information from the animal. Systems on the animals were charged with the help of wireless chargers in the stations (boxes). Jet sound and emergency broadcast are used to estimate the signal location of the animal. The sound are recorded simultaneously and can estimate the location of the device. This technology has been successful to record animal sound and bioacoustics information, covering the coverage problem in the exclusion zone and helps in geo-referencing animals through the idea of interface design studies.

Discussion
Participants from different backgrounds, regions, and cultures have different opinions and ideas about wildlife and forest crime issues, and the sharing of studies and innovative solutions related to the burning topics can help save wildlife and protect biodiversity resources. In addition, the dependency on technology to conserve resources is increasing; making technology an important tool for wildlife
conservation and management. However, this dependency on modern technology is also undermining the human capacity in decision-making. In addition, every technology has a negative effect as well; for instance, mobile phones. As a result, careful consideration should be taken while implementing any technology to wildlife conservation and management.
SESSION 3: GOVERNANCE AND CAPACITY DEVELOPMENT FOR ADDRESSING WILDLIFE AND FOREST CRIME

Chairperson
Dr. Clarissa C. Arida
ASEAN Center for Biodiversity

Co-chair/Rapporteur
Philip D. Round
Mahidol University
Thailand

Speakers

Ms. Shuya Huang
China Biodiversity Conservation and Green Development Foundation

Mr. Masatoshi Kamei
Remote Sensing Technology Center of Japan

Mr. Gary Collins
Wildlife USAID Wildlife Asia

Dr. Alice C. Hughes
Chinese Academy of Sciences, China

Mr. Pradeep Bhattarai
SAWEN Secretariat

Mr. Edward Phiri
Lusaka Agreement Task Force
Keynote Address by Dr. Clarissa C. Arida and Assoc. Prof. Philip D. Round

Dr. Clarissa C. Arida
ASEAN Center for Biodiversity

Wildlife cybercrime is a challenge at this moment with a significantly increased number of organized criminals. Expanded capacity building programs for decision-makers, effective market measures, and change in consumer behavior are required to successfully address the challenges. Also, updated list of protected species, successful prosecution, and use of technology and science can facilitate tracking of illegal wildlife actors. While capacity development and engagement at national and global levels are key, political support is critical to address the challenges around wildlife crimes.

Assoc. Prof. Philip D. Round
Mahidol University, Thailand

The domestic wildlife trade has not received sufficient attention and wider public should be engaged to address this issue. Action plan for conservation of critically endangered species should be formulated to counter the online and physical trading of different bird species that put them in the critical situation. Trading of such birds mainly occurs in the weekend markets of Thailand. For instance, Chatuchak weekend market openly offers owls and kites for sale despite its proximity to DNP. The population of migratory species such as birds like Yellow-breasted Bunting has declined by 90% over the past 10 years, largely due to trapping for food in Thailand and China, pushing them to the critical status. Although DNP is conducting meetings and building collaborations to suppress the trade, raising awareness on the situation amongst the public and other stakeholders is of an essence.

Sharing CBCGDF’s Experience in Curbing the Illegal Pangolin Laundering Practice in China
Ms. Shuya Huang, China Biodiversity Conservation and Green Development Foundation, China

China Biodiversity Conservation and Green Development Foundation (CBCGDF) is an independent Non-Governmental Organization (NGO) focusing on tackling the illegal pangolin laundering practices in China. Pangolins are the world’s most trafficked mammal and are no different in China. Pangolins are trafficked especially for medicinal and food purposes. CBCGDF has undertaken several initiatives and approaches to reduce pangolin laundering in China. For instance, CBCGDF established three community conservation areas for pangolins across the country, conducted workshops to solicit China’s top law experts’ opinions on pangolins, mobilized volunteers for cyber-hunting to identify violators who consume pangolins, raised awareness activities, conducted lectures for students on value of biodiversity, organized public awareness campaigns, and launched education projects. CBCGDF is motivated to continue the protection of wild animals and plants in China.

Capacity Building of Remote Sensing
Mr. Masatoshi Kamei, Remote Sensing Technology Center of Japan

Remote sensing is the acquisition of information about an object or phenomenon without making physical contact with the object. RESTEC has been receiving, processing, assessing, and providing satellite data for various users including those on wildlife and forests conservation. RESTEC provides capacity building programs such as GIS and remote sensing to cater the needs of the users. RESTEC has been supporting the Government of Brazil through a project that allows RESTEC to identify and detect polygons of deforestation in the Amazon. The information is delivered to the Federal Department of Police and Environment Agency in the country, who are primarily responsible to respond with on-site interventions to stop illegal logging. An early warning system named JJ-FAST is currently in use to monitor tropical forests in seventy-seven (77) countries every one and a half (1.5) months. The system is successfully contributing to decelerate the pace of deforestation and stop illegal logging.
USAID Wildlife Asia Activities
Mr. Gary Collins, USAID Wildlife Asia

USAID Wildlife Asia, working primarily in Southeast Asia and China, is using a transnational/regional approach to address wildlife trafficking. Their primarily focus is on four (4) species i.e. elephants, rhinos, tigers, and pangolins. Although capacity building, law enforcement, tightening up legislations, and regional cooperation are all essential to stop wildlife crimes; however, social and behavioral change in the consumer behavior also plays a prime role. In this regard, campaigns such as I AM #IVORYFREE and Digital Deterrent Campaign have been launched. In addition, Interactive Pangolin Species Identification Guide Application and Wildlife Investigator Application are some technological solutions which were launched to help counter illegal wildlife trade. Potential technological innovations such as enhancement of Wildlife Investigator Application and digital dashboard for addressing wildlife crimes, and introduction of decentralization application in addressing wildlife crimes using blockchain technology can help addressing trust deficit among different agencies/stakeholders.

Translating Conservation Science into Implementable Policy and Practice
Assoc. Prof. Alice C. Hughes, Chinese Academy of Sciences, China

The high disparity in biodiversity datasets can lead to wrong generalizations that can influence wrong decisions such as while prioritizing the area for conservation. Appropriate use of biodiversity datasets such as forest cover can provide early warnings useful for conservation-related decisions. Therefore, sensible use of data is critical. Use of poor-quality data should be discouraged to avoid misinformed decisions related to wildlife conservation. For biodiversity conservation, stakeholders including governments and communities should jointly form a sensible framework; while scientists should try to obtain sensible and correct data in order to reach their conservation-related targets. These efforts will help in monitoring protocols and provides corrective feedback. As a result, there is a strong need of a synthesis of community engagement, education, capacity building, communication, collaboration techniques, and tools to generate a relevant and sensible matrix that would actually work for attaining conservation targets.

South Asia Wildlife Enforcement Network (SAWEN) and Possible Collaborations
Mr. Pradeep Bhattarai, SAWEN Secretariat

SAWEN has eight (8) member states from South Asia with the objectives of harmonizing and standardization of laws, documenting, capacity building, partnership, and implementing action plans. Since wildlife crimes are considered as organized, internally, several institutions under various governing bodies are operational to combat wildlife crimes within each member state’s national borders as these crimes are multifaceted and considered organized. However, there are multiple challenges such as those originating from spatial and temporal complications within the countries. Hence, capacity building through education and awareness, the creation of a conducive environment, and training are required for wildlife law enforcement for wildlife protection. This covers important aspects like information gathering, identification of wildlife commodities, investigation techniques and procedures for the handling of seized wildlife, forensics and crime scene investigation, emerging technologies to combat wildlife crime, and internet surveillance. Cooperation among the law enforcement bodies is of utmost importance to combat the wildlife crimes with the use of spatial intelligence.

Regional Framework under the Lusaka Agreement
Mr. Edward Phiri, Lusaka Agreement Task Force

The Lusaka Agreement (LA) works on promoting international cooperation in the fight against wildlife crime (flora and fauna) in Africa. LA member states are obliged to share relevant information and data relating to wildlife crimes. Lusaka Agreement Task Force is linked with the WEMS, which connects law
enforcement agencies in a number of member states together to a common information-sharing platform. Also, LA helps in evidence-based decision-making and policy formulation. It is worthy to pursue the implementation of WEMS and ensure its sustainability, to support and strengthen law enforcement using resources, networking, and multi-agency collaboration at national, regional, and international levels for combating organized transnational wildlife crime and implementing strategies to reduce forest crime.
PANEL DISCUSSION

Panelists

Dr. Clarissa C. Arida
ASEAN Center for Biodiversity

Mr. David Karanja
Migwi
Intelligence Department
Kenya Wildlife Service
Kenya

Ms. Margaret Maimba
National Commission for Science, Technology, and Innovation
Kenya

Mr. Faustine Masalu
Ministry of Natural Resources and Tourism
Tanzania

Mr. Kaname Ikeda
Remote Sensing Technology Center of Japan

Mr. Ali Saleem
UN Expert Advisory Group on Youth, Peace, and Security

Dr. Abid Qaiyum Suleri
Sustainable Development Policy Institute
Pakistan

Moderator

Dr. Remi Chandran
National Institute for Environmental Studies
Japan
The panel discussion was organized as the chapeau of the conference that included the chairs/co-chairs of each session and additional experts in order to synthesize the messages from each session and pave a way forward. Financial situation and political interests of the governments tend to drive the issues or add to the challenges. Hence, the development of a new model of governance based on self-reliance, and innovative and collaborative approaches are essential to address wildlife and forest crimes and attain SDGs in the Global South.

**Dr. Clarissa C. Arida**

ASEAN Center for Biodiversity

The synthesis by Dr. Clarissa C. Arida as the Chair of the Session 3: Governance and Capacity Development for Addressing Wildlife and Forest Crimes at the end of the session paved way for the panel discussion. The key message from the session is that multi-stakeholder engagements, that is government action supported by civil society, academe, non-governmental organizations, scientists, media and private sectors, form the basis for transparency and good governance, and facilitate effective capacity development. Information-sharing at national, regional and international levels through regional institutions like LATF and SAWEN and tools like WEMS are key to enhanced collaboration and informed decision-making.

**Mr. David Karanja Migwi**

Kenya Wildlife Services, Kenya

Mr. David Karanja Migwi, as the co-chair and rapporteur of the Session 2: Information management for Addressing Wildlife and Forest Crimes, consolidated the key messages from the session. African and Asian countries face similar challenges in the front of wildlife crimes, and addressing such challenges require scientifically and technologically innovative solutions. African countries including Kenya are heavily dependent on the consumption of natural resources for livelihood and economy leading to their depletion. Innovative solutions can help monitor and prevent illegal exploitation of natural resources. Ample evidences of innovative approaches and best practices to curb wildlife and forest crimes are available. There is a critical need of transferring technological solutions, skills, and practices within the countries in the South and from the countries in the North. Successful conservation of wildlife can be realized through technical and financial support to address government’s needs as championed by the leadership in politics through appropriate policy changes.

**Ms. Margaret Maimba**

National Commission for Science, Technology, and Innovation, Kenya

Ms. Margaret Maimba, the co-chair and rapporteur of the Session 1B: Science, Technology and Innovation for Addressing Wildlife and Forest Crimes – Geospatial Technologies, coalesced the key message arising from the session. The use of innovative approaches and appropriate technology is essential to stop wildlife and forest crimes. Countries are using customized and standalone and applications of geospatial technology; which, however, when integrated have potential for synergistic results. Countries in the South face major challenges in effective use of technologies, viz. lack of capacity, unavailability of relevant equipment and software, constrained financial resources, and lack of interagency collaborations. Legal frameworks also require attention to overcome the constraints. Technology transfers, allocation of financial resources to relevant agencies, integration of technology, and need-based capacity building are important steps forward. Also, there is a need of an expert working group to catalyze integration of technologies related to wildlife and forest crimes in different countries. Further, there is a need for a similar forum in Africa to generate the buy-in from other African countries through engagement of the highest levels in politics and governments, and policy-makers to address wildlife and forest crimes.
Mr. Faustine Masalu  
Ministry of Natural Resources and Tourism, Tanzania

Mr. Faustine Masalu, the co-chair and rapporteur of the Session 1A: Science, Technology and Innovation for Addressing Wildlife and Forest Crimes, summarized the key messages of the session. Poachers are often equipped with sophisticated technologies as they belong to organized international networks. Therefore, appropriate technology is essential to combat illicit wildlife trade and corruption, and to counter such transnational criminal networks. Common understanding and sharing of appropriate technology and technical know-how across the countries in the South is imperative to combat poaching and illegal trade and protect wildlife. The plausible way forward for the countries in the South is to share and use a combination of common technologies, conduct joint-capacity building, and undertake collective actions against poaching, illegal trade and corruption.

Mr. Kaname Ikeda  
Remote Sensing Technology Center of Japan

Mr. Kaname Ikeda, the President of RESTEC, presented his views on the issue. Combating wildlife crimes requires knowledge and consideration of the approaches used to address the development of other countries. Dialogues with government officers are required to understand the wildlife and forest crimes and equal efforts are required from developing and developed countries. Issues related with wildlife crimes need to be brought up even in the meetings and conferences like Tokyo International Conference on African Development (TICAD). The United Nations and other multilateral platforms should be availed of to further accentuate the criticality of wildlife and forest crimes.

Mr. Ali Saleem  
UN Expert Advisory Group on Youth, Peace, and Security

Mr. Ali Saleem, Member of the UN Expert Advisory Group on Youth, Peace and Security, pointed out the need to respond to the wildlife issues based on the guidance and pledges from the Right Honorable President of Nepal, Minister from Pakistan, and Permanent Secretary of Thailand, who all called for a South-South collaboration as the means for greater collaboration against wildlife and forest crimes among countries in the Global South. Owing to its complex nature and direct links to national security and sovereignty of states, countering wildlife crime requires strong collaboration among the concerned states and demands that the ownership and the leadership remain with the concerned states. To overcome reluctance in sharing information, build trust and derive at a common understanding, there is the need of a mechanism where Southern states and their leadership could convene on a regular basis. The “South-South Enhanced Collaboration” could support the Southern states to derive at a common need-based agenda, fill knowledge gaps through researches in the South and negotiate appropriate interventions with development partners and other stakeholders. The mechanism could help in establishing enabling environment for developing better policies, reducing crimes, addressing national security concerns, and responding to development concerns. The mechanism could facilitate stronger ties in the South to keep uniformity of articulation as well as secure commitment from the leadership. Therefore, an expert working group should be set up to study the feasibility of an appropriate mechanism.

Dr. Abid Qaiyum Suleri  
Ex-officio Member and Executive Director, Sustainable Development Policy Institute, Pakistan

Dr. Abid Suleri, Executive Director of Sustainable Development Policy Institute of Pakistan underscored the importance of South-South cooperation and understanding of inter-linkages between climate action, biodiversity conservation and combating wildlife and forest crimes for the attainment of SDGs. Failure of Millennium Development Goals (MDGs) due to inherent contradictions among different goals offer
lessons to avoid the pitfalls in case of SDGs. Natural resources support the livelihood of communities and fuel countries’ economic growth; however, there are fundamental differences between needs and greed. Governments and UN agencies have responsibilities to differentiate them and address them in prudent manner for to generate ownership and the success of SDGs in the Global South. Furthermore, South-South cooperation is essential as it facilitates the achievement of social equity and transference of best practices; while science and technological innovations are prerequisites for development of alternative solutions and for addressing sustainable development challenges linked to wildlife and forest crimes. The conference could propose to create a realistic and reliable baseline information on existing flora and fauna for national reporting on SDGs through data collation and analysis and partnerships (South-South, North-South and Triangular). The government of Pakistan will support the outcome of the conference in order to protect wildlife and conserve global heritage in countries in the South.
In the closing remarks, Mr. Man Bahadur Khadka expressed commitment on behalf of the Government of Nepal and SAWEN to take the outcome of the conference forward and emphasized on the need of extended collaboration among participating countries and regional institutions, namely ASEAN Center for Biodiversity, Lusaka Agreement Task Force, and SAWEN.

Similarly, Dr. Pinsak Suraswadi expressed Thailand’s commitment to tackle wildlife and forest crimes nationally and regionally. He announced the “Bangkok Initiative” geared at providing technical assistance and discussing modalities of information sharing among countries in the South. The initiative will be introduced at the ASEAN Ministerial Meeting on the Environment in 2019.

Mr. Edward Phiri expressed readiness for transcontinental collaboration in the fight against wildlife and forest crimes and committed to taking the outcome of the conference forward to engage Greater Africa. He emphasized on scaling up of the political commitments to generate support in the fight against wildlife crimes.

On behalf of the conference secretariat, Mr. Manesh Lacoul thanked all the participants, collaborators, and supporters for their contributions. He underscored the need and expressed commitment to drive the agenda forward, and to create a paradigm shift in ways to tackle wildlife and forest crimes.
1. Science, technology, and innovation play important role in addressing wildlife and forest crimes. Technological innovations in wildlife forensics, digital forensics and audio/video surveillance, and innovative applications of computer vision, artificial intelligence, and cloud-computing are being developed and used to successfully gather intelligence and generate evidence against poachers, traders and traffickers.

The Session 1A identified a clear need for resource sharing among agencies at national and international levels to strengthen capacities of the Global South on applications of science, technology, and innovations.

2. Applications of geospatial technologies like Global Positioning System (GPS), Geographic Information Systems (GIS), Remote Sensing (RS), Unmanned Aerial Vehicles (UAV), etc. are in the rise for monitoring illicit activities and managing wildlife and forests in and around protected areas. Development of geo-spatial infrastructures such as the National Spatial Data Infrastructures (NSDI) and cloud-based geospatial databases that help integrate critical information across national agencies, are on the rise as well.

The Session 1B underscored the importance of standardized practice and common platform for information collection, management and sharing.

3. Effective information management is key for enforcement against wildlife and forest crimes. About half of the countries in the South maintain some kind of wildlife crime databases. Generally, such information management systems are fragmented and in use at grassroots, national, and international levels. Further, information sharing through common platforms at national and international levels are rare. Integration of information management systems, empowerment of communities, and engagement of stakeholders are strategic to effectively propagate wildlife law enforcement and counter wildlife and forest crimes.

The Session 2 indicated the need for right mix of technology, attitude, and enforcement to be supported by appropriate information management system as well as suggested on the establishment of a working group to assess different information management systems in use in different contexts.

4. Good governance depends on the capacity to make timely and right decisions. Science, technology, and innovation can facilitate the decision-making process. This, however, requires availability of right capacity to generate required evidence and execute appropriate actions. As a result, capacity building based on identified needs and through deliberately targeted cooperation among state and non-state actors have lasting impact. Collaboration with media results in positive results, chiefly towards awareness raising and behavioral change among consumers. Transparent disclosure of information and use of innovative approaches to support member states within and across the regional networks are also of importance for reinforced action against wildlife and forest crimes.

The Session 3 outlined the need for a comprehensive evaluation in the Southern states to understand the depth of capacity challenges and on the root causes of noncompliance on the ground. Also, there is need of regular assessments to identify institutional and financial needs in the countries, which will ensure directed interventions at all levels.
5. Asian and African countries remain at the forefront of challenges posed by wildlife and forest crimes. The countries need an architecture that offers them much needed leadership opportunities and derive at common need-based agenda. The multi-layered architecture could connect political levels with the community of practice and international cooperation to articulate challenges to catalyze implementation of activities targeted at multiple SDGs. The architecture entitled “South-South Enhanced Cooperation Initiative” is envisioned to provide a platform at the highest level of politics to regularly convene heads of states and heads of governments from the Global South and articulate the agenda based on their needs in terms of wildlife protection and biodiversity conservation. The entity shall provide support to Track 1 dialogues through a secretariat and demand-driven researches, and will then facilitate a follow up dialogue at the Track 1.5 level, or between States from the Global South and the existing wildlife and conservation stakeholders to align their activities along the agenda articulated by heads of states and heads of governments and the identified needs of the Global South.

The conference unanimously agreed to set up an inclusive and geographically diverse Experts Working Group from countries of the Larger South to define the overall structure of the architecture, mandated within the next six (6) months. This working group would undertake a detailed study to conceptualize South-South Enhanced Cooperation Initiative, particularly assess the focus and location for a South-led mechanism to promote South-South cooperation through a formal intergovernmental set-up. The Experts Working Group’s views would also be elicited to identify core principles of enhanced cooperation; utility of technical facility; and urgent needs requiring collective efforts.

There was also the indication that a wildlife conservation lens be developed as a simplified tool for practitioners and project managers, for SDGs-related projects under consideration or under implementation to evaluate their impacts and utility for wildlife conservation at large. Hence, the interconnectivity between the different SDGs should be explored through development of various overarching tools for practitioners and policy-makers.

The conference also agreed on the need for a similar forum in Africa, which will help engage at a higher level in politics and governments and policy-makers to address wildlife and forest crimes.
Twenty-six (26) representatives from Bangladesh, Indonesia, Japan, Kenya, Lao PDR, Malaysia, Myanmar, Nepal, Philippines, Tanzania, and Thailand, the international organization like INTERPOL and RESTEC, and academic institutes like Chinese Academy of Sciences participated in the side event organized by the WEMS Secretariat in support from ASEAN Center for Biodiversity. The event facilitated interactions between the current users of WEMS from Africa and representatives from pilot countries and potential countries in Asia. The event provided an opportunity for current users to share their experiences of using WEMS including the challenges as a part of knowledge sharing in the community of practitioners. Representatives from Tanzania indicated that a national level training on WEMS will be organized in 2019. During the event, the secretariat unveiled the new features of WEMS, which include CITES Annual Illegal Wildlife Trade Report and an integrated interactive mapping tool.
Representatives of potential countries were provided with credentials to access WEMS. A brief hands-on session was conducted for the participants to experience WEMS. Also, since WEMS is a readily available software, the representatives could continue the use of WEMS upon return to their respective countries and contact the secretariat for customization at national or regional levels. During the event, a representative from DNP, Thailand was selected as the focal point for WEMS in Asia who would help coordinate interests and channel demands from Asian countries on WEMS deployment and customization as well as for credentials to access the dummy environment of WEMS.

The participants expressed an agreement that information management and sharing is key to effective fight against illegal wildlife trade at national and international levels, and tools like WEMS can play integral role to facilitate whole-of-the-state approach through interagency collaborations and enhance international cooperation to dismantle transnational organized criminal networks.

Currently, six (6) countries in Africa and seven (7) countries in Asia have access to WEMS.
APPENDICES
Appendix A. BIOGRAPHIES OF THE CHAIRPERSONS, CO-CHAIRS/RAPPORTEURS, AND SPEAKERS (A-Z)

Dr. Abid Qaiyum Suleri  
Sustainable Development Policy Institute (SDPI), Pakistan

Dr. Abid Qaiyum Suleri has been heading SDPI, Pakistan’s premier policy research think-tank, since 2007. He is the member of different policy-making forums and advisory boards, including National Economic Advisory Council; National Advisory Committee of Planning Commission of Pakistan; Govt of Punjab; Board of Faculty of Social Sciences and Humanities, MNS University of Agriculture Multan; different committees/councils formed by the Higher Education Commission of Pakistan; Ministry of Planning, Development and Reforms; Ministry of Finance; and Ministry of Climate Change among others. He is also serving on different international policy-making forums, including advisory board of intergovernmental organization CAREC (Central Asia Regional Economic Cooperation) Think-Tanks Network; Member of the steering committee of World Commission on Forced Displacement (UK); Member of permanent organizing committee of South Asia Economic Summit; Member of the Board of Climate Action Network South Asia; Vice-President of Board of South Asia Watch on Trade, Economics and Environment (Nepal); and lead expert for World Economic Forum’s “Transformation Mapping” initiative from Pakistan. He is an editor-in-chief of SDPI peer-reviewed journal, “Journal of Development Policy, Research and Practice”. Dr. Suleri earned his Ph.D. in food security from the University of Greenwich, UK in May 2000.

Mr. Ali Saleem  
UN Expert Advisory Group on Youth, Peace, and Security

Mr. Ali Saleem is a senior professional with 20 years of progressively responsible experience in complex political mediation, negotiations, national dialogues, and peacemaking/peacebuilding processes. Currently, he independently works for various peace processes in the region and is a member of UN Expert Advisory Group on Youth, Peace, and Security. During his previous jobs, he has served as Senior Mediation Advisor for UN Department of Political Affairs, Country Representative Philippines at Centre for Humanitarian Dialogue, Country Director Pakistan at Search for Common Ground, Conflict Prevention, and Peace Forum, NY, United Nations Office of the High Commission for Human Rights, United Nations Peace Keeping Operations, and many regional and international organizations. He holds a master’s degree in Post War Recovery Studies with specialization in Mediation and Negotiations. He has been a fellow at Fletcher School of Diplomacy (Feinstein Institute) from 2008-2012.
Dr. Alice C. Hughes
Chinese Academy of Sciences, China

Dr. Alice is an Associate Professor and head of the Landscape Ecology Group at Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences. She holds numerous positions for ecological and conservation societies and NGOs including the IUCN and China Green Foundation (CBCGDF). She has worked extensively across the tropics, and previously held positions in Thailand, Australia, Costa Rica, and the UK before moving to China, and have worked actively in the Australasian region for around 12 years. Her research focuses on patterns of biodiversity and drivers of biodiversity change, at various spatiotemporal scales in order to develop proactive management strategies that aim to mitigate the impacts of human activities on biodiversity. All her work seeks to better understand natural systems, and to use that information to develop priorities for conservation and management, this also includes the development of tools for monitoring biodiversity across space and time and evaluating conservation priorities and risk and outlining strategies to try to best maintain biodiversity into the future.

Dr. Antony Lynam
Wildlife Conservation Society

Dr. Antony Lynam has 30 years of experience implementing wildlife conservation and protected area management projects in Australia, Bangladesh, China, Cambodia, Indonesia, Lao PDR, Mongolia, Myanmar, Malaysia, Russian Far East, South Sudan, United States (California), Tanzania, and Thailand. He wrote and helped implement recovery programmes for tigers, Asian elephants, and Asian tapirs, and served as the Sub regional Support Officer to the CITES Monitoring the Illegal Killing of Elephants (MIKE) Programme in Southeast Asia from 2010-2014. He leads the Training Taskforce for the Spatial Monitoring and Reporting Tool (SMART). He serves as a co-chair of the Conservation Committee for the Association for Tropical Biology and Conservation (ATBC) Asia, and President of the Society for Conservation Biology (SCB) Asia Section.

Mr. Atsushi Otake
NTT Data, Japan

Atsushi Otake is the Senior Manager of Earth Observation business at NTTDATA Corporation, where he is leading the business development of satellite imagery products and GIS related systems. He joined the Indonesian NSDI project as a project manager from 2010 to 2015 and succeeded to develop a nationwide map sharing system with BIG, Indonesian mapping agency. Also, his team has completed the world’s first 5m-resolution 3D map of the Earth, AW3D, in 2016. AW3D has received the several awards including Japanese Prime Minister’s Award in the Space Development and Application Awards in 2016 and Asia Geospatial Technology Innovation Awards 2017.
Dr. Chaiwat Klampol
Kasetsart University, Thailand

Dr. Chaiwat Klampol is a Lecturer and head of Intelligent System and Automatic Control Laboratory (ISAAC LAB) at the Department of Aerospace Engineering, Faculty of Engineering, Bangkhen Campus, Kasetsart University. He obtained his Ph.D. from the University of Colorado, United States of America. His research interests are aerospace systems design and structural dynamics. He holds the position of the Deputy head and the Head of Aerospace Engineering Department, Faculty of Engineering from Oct 2010 to Oct 2011 and Oct 2011 to Sep 2015, respectively.

Dr. Clarissa C. Arida
ASEAN Center for Biodiversity

Dr. Clarissa Arida joined the ASEAN Centre for Biodiversity in May 2008 as the Director for Programme Development and Implementation. She is responsible for the overall management of ACB’s programme portfolio particularly to assist the ASEAN Member States on capacity building and programme and policy development on biodiversity. Clarissa has substantial experience in programme management and monitoring on the environment and natural resources management. Prior to joining ACB, Clarissa was Programme Manager for Environment for about 12 years at the United Nations Development Programme in the Philippines where she handled programmes on global environmental issues such as biodiversity conservation, climate change, and marine and coastal resources management. Clarissa also worked with the Department of Environment and Natural Resources and the Marine Science Institute of the University of the Philippines. Clarissa had extensive involvement with governments, the academe and the donor community in promoting environmental management. Clarissa obtained her Master of Science Degree in Environmental Science and Technology in 1992 at the Institute for Hydraulic and Environmental Engineering in Delft, The Netherlands and a Bachelor of Science Degree in Biology, Major in Ecology in 1985 at the University of the Philippines at Los Banos.

Mr. David Karanja Migwi
Kenya Wildlife Service, Kenya

Mr. David Karanja Migwi is the Chief Information Officer in Intelligence Department under the Director General’s Office of the Kenya Wildlife Service, the State Corporation charged with the conservation and management of wildlife in Kenya. He has 17 years of experience in park management and wildlife law enforcement having previously served as a Security Research Analyst and Crime Analyst. He is Kenya’s WEMS focal person having attended the initial WEMS training in May 2011 in Nairobi, the Tokyo Conference on Combating Wildlife Crime in 2014, and the United Nations/Kenya Conference on Space Technology and Applications for Wildlife Management and Protecting Biodiversity in 2016.
Mr. Edward Phiri  
**Lusaka Agreement Task Force**

Mr. Edward Phiri is acting director at Lusaka Agreement Task Force (LATF), the Secretariat as well as the operational arm of the Lusaka Agreement. Lusaka Agreement is a regional multilateral environmental agreement that promotes law enforcement cooperation in combating illegal trade in wild fauna and flora in Africa. He has more than 18 years’ experience in wildlife conservation and management as well as in executing instruments related to Multilateral Environment Agreements (MEAs) such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Before joining LATF in 2012, he served in the CITES Management Authority of Zambia, where he coordinated international obligations relating to the effective implementation of CITES. Mr. Phiri also served as a Monitoring the Illegal Killing of Elephants (MIKE) focal officer in Zambia responsible for monitoring the illegal killing of elephants between 2008 and 2011.

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Mr. Faustine Masalu  
**Ministry of Natural Resources and Tourism, Tanzania**

Mr. Faustine Masalu is the acting director of Tanzania wildlife division, Ministry of Natural Resources and Tourism.

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Mr. Gary Collins  
**USAID Wildlife Asia**

Mr. Gary Franklin Collins, a native of Virginia and a member of the Maryland State Bar Association, is a Bachelor of Arts in History (cum laude) & Juris Doctor. He is also qualified to practice before the United States Court of Military Appeals. After serving as an active duty Judge Advocate with the rank of Captain in the US Army in Germany, Italy, and Northern Iraq, he joined the United Nations in 1992 as the Legal Officer for UNRWA in Palestine’s West Bank. He worked as a Senior Legal Adviser for the UN’s Department of Peacekeeping Operations in the former Yugoslavia and as a Senior Adviser & Criminal Justice Programme Manager for UNODC in Afghanistan. He has also managed various rule of law projects for Denmark, the EU, and USAID in Bangladesh, Lebanon, and Serbia, respectively. He has twice served as a Chief of Party for USAID funded projects, including a tiger conservation project in Bangladesh. Recently, he assumed the position as Chief of Party of USAID Wildlife Asia.
**Dr. Giovanni Broussard**

*United Nations Office for Drugs and Crime*

Dr. Broussard is Regional Coordinator of the UNODC Global Programme for Combatting Wildlife and Forest Crimes in Southeast Asia. His work focuses on building capacity to tackle transnational organized crime in the environment sectors, such as illegal wildlife trade, timber trafficking, and fisheries crime. He has 13 years of experience in the field of project management related to criminal justice, organized crime, and law enforcement. He worked in Afghanistan, Namibia, Macedonia, and he is now based in Thailand. He holds a Ph.D. in Development Studies with a focus on the environment; a master’s in International Relations with focus on corruption; and an undergraduate degree in Economics with focus on drug markets.

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**Mr. Glenn Forbes**

*USAID Protect Wildlife, Philippines*

Mr. Forbes is an Environmental Law Enforcement expert with 19 years of experience in implementing environmental advocacy and media campaign including 15 years of experience in actual law enforcement involving forestry, fisheries, wildlife, waste and pollution laws with emphasis on inter-agency collaboration. Mr. Forbes served as team leader of Isabela Task Force on Forest Protection, supervising field operatives composed of military, PNP personnel, staff from DENR, PG-ENRO and Tanggol Kalikasan. Also worked with Quezon Task Force Matatag, Joint Task Forces linked with Save Lingayen Project, Quezon Task Force Bantay Likas Yaman, Batangas Task Force Taal, different Bantay Dagat and Bantay Gubat groups, and the National Environmental Crime Task Force (NAECTAF) under Oplan Baykuran. Other earlier experience involved community-based law enforcement activities with People’s Organizations.

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**Dr. Hill H. Kobayashi**

*The University of Tokyo*

Dr. Kobayashi is an Associate Professor in the Division of Joint Usage and Research at the Center for Spatial Information Science, The University of Tokyo. His research interests are nonverbal interaction, sustainable interaction design, nature conservation interface, soundscape live streaming and visualization, smart fashion, wildlife tracking, destructive animals, and carrier pigeon. Dr. Kobayashi received his B.S. in Computer Science from California State University, USA, 2005; M.S. in Geosystem Engineering from The University of Tokyo, Japan, 2007; and Ph.D. in Interdisciplinary Engineering from The University of Tokyo, Japan in 2010.
Mr. Jeffrey McNeely
International Union for Conservation of Nature (Former Chief Scientist)

Mr. McNeely has been working on conservation and development internationally since 1968, starting with 12 years in Asia, including seven years in Thailand, two years in Nepal, and three years in Indonesia. He joined the International Union for Conservation of Nature (IUCN) in 1980 and worked in over 100 countries on issues including agriculture, health, climate change, energy, biodiversity, and resource economics. On retiring in 2009, he returned to Thailand and have provided consultancy services to the Asian Development Bank, Thailand’s Department of National Parks and Wildlife Conservation, the Government of China, and UNEP (among others). He has written or edited over 40 books and published 500 scientific papers.

Dr. Kanita Ouitavon
Department of National Parks, Wildlife, and Plant Conservation, Thailand

Dr. Kanita Ouitavon is a Scientist of the Senior Professional Level. She is the chief of DNP Wildlife Forensic Science Unit (DNP-WIFOS Laboratory), Wildlife Conservation Office, Department of National Park, Wildlife and Plant Conservation, Bangkok, Thailand since 2009. Her research interests and skills are in wildlife forensics, wildlife molecular genetics, and ecology. She attended multiple pieces of training and meetings related to wildlife crimes.

Ms. Kathleena Mumford
U.S. Department of State, U.S.A.

Kathleena Mumford is a Geographer at the US Department of State focusing on South Asia. Ms. Mumford specializes in geospatial analytics and methods in Geographical Information Systems and Science and is completing her MS in Geography at The George Washington University.
Mr. Kyoichi Ito  
Remote Sensing Technology Center of Japan

Mr. Kyoichi Ito is the Special Assistant to President of Remote Sensing Technology Center of Japan. He has been working for the dissemination of remote sensing technology including satellite data utilization not only in Japan but also in foreign companies for more than 20 years. He also has been involved in capacity buildings in more than 10 countries funded by JICA (Japan International Agency), JAXA (Japan Aerospace Exploration Agency), World Bank, and others. He was a secretariat of APRSAF (Asia-Pacific Regional Space Agency Forum) and participated in/made presentations at many international conferences on Space Technology and Remote Sensing Technology in order to introduce Japanese Space Technology.

Dr. Manabu Onuma  
National Institute for Environmental Studies, Japan

Dr. Onuma is currently serving as Senior Researcher at Center for Environmental Biology and Ecosystem Studies, National Institute for Environmental Studies, Japan. He is currently involved in the research on reproduction and genetic diversity of endangered species. His research activities involved ecological risk assessment and countermeasure for the artificial disturbance. In 2018, he focused on the evaluation of ecosystem functions and services and their sustainable use, and genetic resource banking for the endangered species. He is involved in harmonization with nature research program and coordinating the research activities at the climate change strategy collaboration office. He was heading the project for the promotion of environmental genomics studies while heading the establishment of the ex-situ conservation research center for endangered species. His research work involves the development of methodologies for species and functional diversity assessment in Southeast Asian tropical forests using high-resolution 3D monitoring technique.

Mr. Manesh Lacoul  
WEMS Secretariat, Asian Institute of Technology

Mr. Manesh Lacoul is Deputy Director of WEMS Secretariat under AIT Solutions. He was instrumental in its establishment through agreements with United Nations University and Lusaka Agreement Task Force in 2016. Prior to this, he held the position of Technical Adviser at Regional Resource Centre for Asia and the Pacific in AIT. He worked in partnership with United Nations Environment Programme (UNEP) in managing a programme to catalyze grassroots innovations for sustainable Asia-Pacific and supported the joint UNDP-UNEP Poverty Environment Initiative in Asia. He has over fifteen years of experience in managing programme, operations, monitoring and evaluations and finances in both AIT and UNEP. He attained his Master of Business Administration from Assumption University, Thailand and Bachelor of Science in Biology from the Tribhuvan University, Nepal.
Dr. Manzul K. Hazarika
Geo-informatics Center, Asian Institute of Technology, Thailand

Dr. Manzul K. Hazarika is the Director of Asian Institute of Technology’s Geo-informatics Center (GIC). Prior to assuming this position, he was serving as Director (Project Operations) at GIC. Currently, he and his team are involved in the development and application of drones at the Asian Institute of Technology, which are mainly centered on monitoring agriculture, highway, and wildlife. Over the past 13 years, he has extensively worked in disaster management issues in more than 20 developing countries from the Asia-Pacific as well as the Caribbean regions. His work includes a multi-hazard risk assessment, early warning, emergency mapping and damage assessment, community-based disaster management, and capacity building. While working, he interacted and worked closely with stakeholders at various levels including high-level government officials and donor agencies/governments and he has developed a rich network of professionals and institutions through partnerships and inter-agency liaisons. He has also published several research articles on applications of Remote Sensing and GIS in disaster management and related topics. He holds a Ph.D. degree in Civil Engineering from the University of Tokyo, Japan, an M. Eng. Degree in Remote Sensing and GIS from the Asian Institute of Technology (AIT).

Ms. Margaret Maimba
National Commission for Science, Technology, and Innovation, Kenya

Margaret Maimba is a Deputy Director In-Charge of Earth and Space Sciences at the National Commission for Science, Technology, and Innovation (NACOSTI), Nairobi, Kenya. She has 16 years’ work experience with policy advice to government, coordination, and promotion of Earth and Space sciences. She has spearheaded the development of space science policy, strategy and space order that oversaw the establishment of the Kenya Space Agency in 2017. Margaret is a member of the Management Committee of the San Marco Tracking and Launching Satellite Programme, coordinated by the Ministry of Defense. In liaison with UNOOSA, Ms. Maimba organized the 4th African Leadership Conference for Space Science and Technology (ALC) in Kenya in 2011 and assisted in the organization of the 5th ALC in Accra, Ghana in 2013. In addition, Ms. Maimba, in liaison with UNOOSA, Ministry of Environment and Natural Resources (Kenya) and UNEP organized the Wildlife Management and Protecting Biodiversity Conference – the 1st one of a type in Africa in 2016. Margaret was a member of the organizing committee of the 2nd International Space Forum (ISF) at Ministerial Level - The African Chapter, 2018, Nairobi, Kenya. She holds a B.Sc. (University of Nairobi) and M.Sc. (Geochemistry, Leeds University-UK) and is currently a Ph.D. finalist (University of Nairobi –UoN).
Mr. Mark Nuttall
INTERPOL

Mark is currently contracted to the Environmental Security Directorate within INTERPOL (IGCI). Prior to this, he was the director and chief consultant of a bespoke international risk management and investigations agency and executed several senior leadership contractual roles. His background derives from his long-term appointment as a detective within New Scotland Yard, London, where he dealt with complex criminal and civil matters, inclusive of international serious and organized crime, involving traditional recidivist crime (drugs/firearms/murder/kidnap/fraud/money laundering, et al). He has extensive experience in the field of enterprise risk management, data protection / GDPR, KYC, compliance, financial crime, POCA, ABC, due diligence, digital reviews, e-discovery, training, project and change management. He is an accredited fellow of the ‘Institute of Paralegals’, and the ‘Chartered Management Institute’, alongside having Tier 4 status of the ‘Professional Paralegal Register’.

Mr. Masatoshi Kamei
Remote Sensing Technology Center of Japan


Mr. Pakpoom Aramsirirujiwet
Department of National Parks, Wildlife and Plant Conservation, Thailand

Mr. Pakpoom Aramsirirujiwet is serving as an Assistant Chief of Thap Lan National Park, Prachinburi Province, Thailand. He did his Bachelor of Science in Forestry from the Department of Forestry Biology, Kasetsart University from 2001 to 2005. He worked as a Research Assistant in Tiger Conservation Project and was responsible for the population survey of tiger preys using the line transect method at Khoa Nang Rum Wildlife Research Station, Huai Kha Khaeng Wildlife Sanctuary, Uthai Thani Province, Thailand. Previously, he also worked for the Wildlife Conservation Society, Thailand.
Assoc. Prof. Philip D. Round  
Mahidol University, Thailand

Mr. Philip Round is currently serving as an Associate Professor at Mahidol University. He has researched widely on the ecology, taxonomy, status, and conservation of wild birds. His area of specializations are ornithology and forest birds. He is Member of FAO/Wetlands International Working Group on Migratory Water Birds and Avian Influenza since 2007. He is also a regional representative of The Wetland Trust, UK since 2005. He made remarkable contributions to Handbook of the Birds of The Thai Malay Peninsula in 2 volumes during 1999 and 2007. His research activities include research on threatened or endangered bird species; updating knowledge on the distribution and conservation status of all bird species throughout Thailand; preparing inventories for all protected area; and preparation of a new field guide to the birds of Thailand. Since 1981 to present, he organized and implemented biological surveys in many national parks, wildlife sanctuaries, and other forest blocks in Thailand. He is the Principal Investigator in a project on ecology and seasonality of migrant land birds wintering in the Sunda sub-region crossing the Gulf of Thailand at Ko Man Nai, Rayong.

Dr. Pinsak Suraswadi  
Department of National Parks, Wildlife and Plant Conservation, Thailand

Dr. Pinsak Suraswadi is currently serving as Deputy Director General at Department of National Parks, Wildlife and Plant Conservation, Thailand. He completed his Ph.D. from Odense University, Denmark. For four years, he worked as Director of Marine and Coastal Resources Research and Development Institute. Coastal Resources Institute He worked as Director of Marine and Coastal Department of Marine and Conservation and Rehabilitation Coastal Resources Division for six years.
Mr. Pradeep Bhattarai  
**South Asia Wildlife Enforcement Network Secretariat**

Mr. Bhattarai is a Senior Environment Officer in the South Asia Wildlife Enforcement Network (SAWEN) Secretariat, based in Kathmandu, Nepal. He has been working at the Secretariat since 2014 and contributing for the upbringing of the organization including legitimization of this intergovernmental organization. He worked independently to carry out various activities under the theme of the environment in national level and associated with various organizations before joining the SAWEN. He has received a fellowship from Nepal Academy of Science and Technology (NAST), an apex body of science and technology in Nepal. He has published field related articles in national and international journals and co-authored some books. His recent contribution is in the book ‘Wildlife Stockpiles Management in Nepal’. He pursued a master’s degree in Natural Resource Management.

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Mr. Rehan Ul Haq  
**WEMS Secretariat, Asian Institute of Technology**

Rehan Ul Haq currently works as a Research Associate at WEMS Secretariat. He is a Higher Education Commission (HEC) Scholar and recipient of Ph.D. Scholarship at Asian Institute of Technology. He recently defended his Ph.D. at the Department of Natural Resources Management (NRM), Asian Institute of Technology. He is also an Erasmus Scholar and completed his Erasmus Exchange at the University of Granada, Spain. He worked as a Junior Consultant at FAO and is also a Visiting Lecturer at Mahidol University International College (MUIC). His areas of research interest are waterbirds ecology, wetlands, forestry, and wildlife and forest crimes.

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Dr. Remi Chandran  
**National Institute for Environmental Studies, Japan**

Dr. Chandran, Ph.D. in Public policy from University of Twente in Netherlands and MSc from University College Dublin, Ireland, is a public policy researcher. He works with National Institute for Environmental Studies in Japan. He carries with him 20 years of experience working with Governments and UN organizations where he has managed several national and international development projects. His areas of expertise are on environmental governance, enforcement of multilateral environmental agreements, and information management to support an evidence-based policy approach. His research particularly investigates the role of evidence and science in decision-making process. He was also an observer to CITES Conference of Parties and attended CITES COP meetings from 2004-2013. In 2003, he initiated WEMS and supported its implementation in six African countries through LATF. Dr. Chandran is a recipient of the UNU-IAS Ph.D. fellowship (2012-2013), Erasmus Mundus Scholarship (2010-2013), and The Irish Government fellowship (1995-97).
Ms. Shuya Huang
China Biodiversity Conservation and Green Development Foundation

Shuya Huang is working as the Department Manager of the Office of International Affairs in the China Biodiversity Conservation and Green Development Foundation (CBCGDF). She is also a member of International Union for Conservation of Nature and Natural Resources (IUCN) and the World Commission on Protected Areas (WCPA), which dedicated to biodiversity conservation and environmental protection.

Dr. Siddhartha B. Bajracharya
National Trust for Nature Conservation, Nepal

Dr. Bajracharya is currently serving as Executive Officer at National Trust for Nature Conservation, Nepal. He did his Ph.D. from University of Edinburgh, Scotland, UK while he completed his master’s degree from AIT, Thailand. He mainly worked on developing the Guidelines for Biodiversity Assessment and Monitoring for Protected Areas” (2005), which he conceptualized and co-authored in Kathmandu, Nepal. He worked as Project Chief for Strengthening Regional Cooperation for Wildlife Conservation in Asia Project funded by the World Bank, 2011; Project Chief – Bagmati Environmental Protection Project funded by UNEP and UN-HABITAT. He worked as Project Director Annapurna Conservation Area Project, King Mahendra Trust for Nature Conservation for 14 years. He was mainly involved in Planning and implementation of Integrated biodiversity conservation and sustainable development, and ecotourism. He specialized in community-based conservation and climate change, and biodiversity and international network facilitation.

Prof. Sivanappan Kumar
Asian Institute of Technology, Thailand

Prof. Kumar, Vice President for Academic Affairs, is a Professor in Energy Studies at the Department of Energy, Environment and Climate Change, School of Environment, Resources and Development, AIT. He has extensive experience in carrying out research and research collaboration in South Asia (Bangladesh, India, Nepal, and Sri Lanka), South East Asia (Cambodia, Indonesia, Laos PDR, Malaysia, Myanmar, Philippines, Thailand, and Vietnam), Central Asia (Kazakhstan, Uzbekistan, Moldova), China and Mongolia. Prof. Sivanappan Kumar received his B. Eng (Honours) in Mechanical Engineering from Government College of Technology (Coimbatore), University of Madras, India; Master of Engineering (Energy Technology) from Asian Institute of Technology (AIT), Thailand; and Ph.D. from Institut National Polytechnique de Toulouse, France.
Mr. Somkiat Soontornpitakkool
Department of National Parks, Wildlife and Plant Conservation, Thailand

Mr. Somkiat Soontornpitakkool is currently serving as Director, Division of Wild Flora and Fauna, Department of National Parks, Wildlife and Plant Conservation, Thailand. Prior to that, he has been working as Director, Tak Training Center in the same department. He possesses specialized skills in national park management, wildlife law enforcement, and CITES management authority. He was extensively involved in wildlife trafficking investigations and wild enforcement network. He has been an important contributor to regulatory wildlife trade effluent control, management, and administration. He worked as a program Manager in strengthening Andaman Protected Area Network (SAMPAN) Program.

Mr. Soomsak Poopet
Department of National Parks, Wildlife and Plant Conservation, Thailand

Mr. Soomsak Poopet is a Forestry Technical Officer, Senior Professional Level for Director of Suppression Division, Forest Protection and Fire Control Office at The Department of National Park, Wildlife and Plant Conservation, Ministry of Natural Resources and Environment. He holds a Bachelor of Science in Forestry from Kasetsart University and Master of Art in Political Science from the Ramkhamhaeng University, Thailand. He used to be the Head of Phitsanulok Forest Fire Operation Center and Chachoengsao Forest Fire Operation Center. His specializations are in the prevention, suppression, and control of forest fires.

Dr. Suchitra Changtragoon
Department of National Parks, Wildlife, and Plant Conservation, Thailand

Dr. Suchitra Changtragoon is working as Director at Forest Genetics and Biotechnology Division, Department of National Park, Wildlife and Plant Conservation. She has an expertise in forest conservation research, she has been working as head of Forest Genetics and Biotechnology Division, Forest and Plant Conservation Research Office, Wildlife and Plant Conservation Department. Prior, she was heading the Convention and International Agreement Section, International Cooperation Division, Planning, and Information Office, WPCD. She has been coordinating the Thailand FCPF (Forest Carbon Partnership Facility) since 2011. She has been a qualified negotiator on REDD+ and forestry-related issues under United Nations Framework Convention on Climate Change (UNFCCC) since 2007. In addition, she is also working as a member on the national subcommittee on plant biosafety as well she is on the academic committee of National Park Wild and Plant Conservation Department since 2005. She is also an invited lecturer at Faculty of Graduate School, Kasetsart, Chulalongkorn, Konkaen and Mahidol Universities since 1992 to present.
Dr. Tong Hua
World Customs Organization

Dr. Hua is the Policy Research Secretary and Foreign Affairs Coordinator of the President’s Office in Shanghai Customs College (SCC). He is also a member of the China Customs Academic Association and an assistant researcher. He was awarded his Ph.D. in Pedagogy by East China Normal University. Tong Hua’s research is focused mainly on customs higher education and capacity building, and the strategies of different nations to develop effective and efficient customs management. He has published many research papers and taken part in PICARD and other WCO projects. Over the past few years, Dr. Hua has drafted documents, such as strategies for the National Conference of Customs Regional Directors and submitted more than 40 proposals for ministerial decisions. From 2011 to 2013, he was a member of the committee responsible for building the Research Center of the General Customs Administration of China. He has taken part in research programs at ministerial level including ‘The New Development Trend of International Customs within the Framework of Trade Facilitation and Safety’, ‘The Comparative Research of Customs Institutes of Different Nations’, and ‘The Customs Development Strategy in the New Era’.

Dr. Wijarn Simachaya
Ministry of Natural Resources and Environment, Thailand

Dr. Wijarn Simachaya is the Permanent Secretary of the Ministry of Natural Resources and Environment, Thailand. He is also a representative of various UN, Sub-regional, and ASEAN forums. He has worked as a leader of green growth and government reform strategy development for Thailand. Besides, he serves as a chairman of the long-term strategy (20-year plan) on natural resources and environmental management, including water resources management, sustainable forest management, together with pollution control management, and environmental governance for the Ministry. He has been a supervisor of 16 departments and public organizations of the ministry, along with the 76 provincial offices for natural resources and environment throughout the country. Dr. Simachaya joined the Office of Environmental Policy and Planning Board in 1984 and the Pollution Control Department in 1992. He used to serve as a director of the Environment Division of the Mekong River Commission Secretariat (International Organization) in Lao PDR during 1997-1998. Dr. Simachaya holds two bachelor’s degrees in Chemical Education and Laws from Chiang Mai University and Ramkhamhaeng University, respectively, a Master’s in Environmental Science from Kasetsart University and a Graduate Diploma in Sanitary Engineering from Chulalongkorn University. His highest degree is a Doctorate in Philosophy (Ph.D.) in Environmental Engineering from the University of Guelph, Canada in 1990.
Prof. Yoshifumi Yasuoka
The University of Tokyo, Japan

Prof. Yoshifumi Yasuoka received the B. Eng., M. Eng. and Ph. D degree in Applied Physics from The University of Tokyo in 1970, 1972 and 1975 respectively. He was with the National Institute for Environmental Studies (NIES), Japan from 1975 to 1998, serving as a researcher, a senior researcher, and section head. In the last two years at NIES, he served as a Director of the Center for Global Environmental Research. In 1998, he moved to The University of Tokyo as a Professor at the Institute of Industrial Science. In 2007, he moved to NIES and served there to 2011 as an Executive Director (Vice President). He is currently with Japan Science and Technology Agency (JST) as a Research Supervisor of the Program “Science and Technology Research Partnership for Sustainable Development (SATREPS)”, and with Association of International Research Initiatives for Environmental Studies as a Program Director for the Ministry of Environment Research Fund. His major research field is remote sensing, GIS, and spatial data analysis (geo-informatics) for the environment and disaster assessment.
APPENDIX B. CLOSING STATEMENT OF THE CONFERENCE

Closing Statement by AIT

Bangkok Conference on Science, Technology and Innovation for addressing Wildlife and Forest Crimes and Attaining SDGs

BANGKOK, 1st September 2018 – Scientists, policy-makers and technocrats from thirty (30) countries of Africa and Asia assembled at the Asian Institute of Technology (AIT) for the ‘Bangkok Conference on Science, Technology and Innovation for addressing Wildlife and Forest Crimes and Attaining SDGs’. The objective of the conference was to highlight the pressing problems in tackling wildlife and forest crimes and outline innovative technologies and cooperative policy frameworks in implementation to address them.

Addressing the conference, the Right Honorable President Bidya Devi Bhandari of the Federal Democratic Republic of Nepal expressed a firm commitment to counter transnational wildlife crime and emphasized the need for common understanding, commitment and stressed for a strategy to enhance South-South cooperation among countries from the larger south, to build a common platform, information-sharing modalities, and derive at creative and practical solutions to address the current challenges and attain SDGs.

According to H.E. Malik Amin Aslam, Adviser to the Right Honorable Prime Minister on Climate Change, Islamic Republic of Pakistan, as illegal trade has become more sophisticated and rampant, there is a need for broader cooperation and an international cross-regional mechanism to address the problem. He further highlighted the importance of a sustainable means of transboundary cooperation and transboundary collaboration at a regional and global level.

Dr. Vijarn Simachaya, Permanent Secretary of the Ministry of Natural Resources and Environment of the Kingdom of Thailand underscored the need to enhance intergovernmental cooperation for meeting the technological commitments in addressing wildlife crime.

On behalf of Mr. Shakti Bahadur Basnet, Minister of the Ministry of Forests and Environment of the Government of Nepal, Mr. Man Bahadur Khadka, Director General of Department of National Parks and Wildlife Conservation stressed on transcontinental cooperation among law enforcement agencies and partner organizations for synergized outcome.

During the plenary sessions, National Institute for Environmental Studies, Japan and Department of National Parks, Wildlife and Plant Conservation, Thailand showcased technological innovations through DNA and Molecular technology that can be used to track potential crimes. United Nations Office for Drugs and Crimes, INTERPOL and World Customs Organization shared concrete experiences to demonstrate utility, challenges, and the limitations of such technologies. The session established the need for resource sharing among agencies at national and international levels to strengthen capacities of the global south on applications of science, technology and innovations.

Scientists and policy-makers also discussed about the use of geospatial infrastructures such as the National Spatial Data Infrastructures (NSDI) and cloud-based geospatial databases; while learning about applications of Unmanned Aerial Vehicles for day-to-day monitoring and anti-poaching alert technologies for round-the-clock monitoring. The session identified the importance of standardized common platform for information collection, management and sharing.

Practitioners and researchers presented information management systems currently in use at grassroots, national and international levels, and data-sharing platforms, and highlighted integration of technologies and
empowerment of communities to effectively propagate wildlife law enforcement and counter wildlife and forest crimes. The session emerged with the need for right mix of technology, attitude and enforcement to be supported by appropriate information management system as well as suggested on the establishment of a working group to assess different systems in use in different contexts.

The conference participants also recognized the importance of capacity building through deliberately targeted cooperation among state and non-state actors and media for awareness raising and behavioral change among consumers. Transparent disclosure of information and use of and innovative approaches to support members states within and across the regional networks were also outlined. As several African and Asian countries remain unequipped on infrastructural gaps in combating transnational crime, there is a need for a comprehensive evaluation to understand the depth of capacity challenges and on the root causes of noncompliance on the ground. Experts underlined the value of regular assessments to identify institutional and financial needs in the countries, which will ensure directed interventions at all levels.

The assessment conducted by AIT supported by UNDP, confirmed the fact that there remain cumbersome technocratic and policy-oriented challenges in data management and data-sharing. Even though there has been large flow of funding to meet the infrastructural demands in the global south, the lack of skilled persons, disruptive power supplies and challenges of connectivity remain as a major hurdle in timely information exchange. In addition, species-specific problems concerning the trade of Rhino horn and Pangolins were also discussed during the conference.

A proposed creative modality was to develop a wildlife conservation lens, a simplified tool for practitioners and project managers, for SDGs-related projects under consideration or under implementation to evaluate if their impacts and utility for wildlife conservation at large. Hence, the interconnectivity between different SDG’s should be explored through development of various overarching tools for practitioners and policymakers.

As Asia and Africa remain at the forefront of challenges posed by wildlife and forest crimes, it was proposed to understand and explore the need for an ‘enhanced south-south cooperation architecture’ to advance collaboration towards information sharing and skills enhancement between the countries. The Royal Government of Thailand, co-host of the conference, announced the “Bangkok Initiative” geared at providing technical assistance and discussing modalities of information sharing among countries in the south. The initiative will be introduced at the ASEAN Ministerial Meeting on the Environment in the mid-2019.

Panelists in the final panel discussion presented the concept of a multi-layered architecture connecting political levels with the community of practice and international cooperation in the South. The architecture entitled “South-South Enhanced Cooperation Initiative” is envisioned to provide a platform at the highest level of politics to regularly convene heads of states and heads of governments from the Global South and articulate the agenda based on their needs in terms of wildlife protection and biodiversity conservation. This entity, which has yet to be structured and defined, shall provide support to Track 1 dialogues through a secretariat and demand-driven researches, and will then facilitate a follow up dialogue at the Track 1.5 level, or between States from the Global South and the existing wildlife and conservation stakeholders to align their activities along the agenda articulated by heads of states and heads of governments and the identified needs of the Global South.
Representatives from participating countries backed up the proposal and underscored the need of such mechanism where the countries from the South (which are mainly facing the brunt of wildlife and forest crimes) provide much needed leadership and articulate challenges to catalyze implementation of activities targeted at multiple SDGs.

Subsequently, representatives of participating countries agreed to set up an Experts Working Group from countries of the larger South to define the overall structure of the architecture and mandated within the next six (6) months. It was stressed that the group must be inclusive and representative of diverse regions of larger south. This working group would undertake a detailed study to conceptualize South-South Enhanced Cooperation Initiative, particularly assess the focus and location for a south-led mechanism to promote south-south cooperation through a formal set-up. The Experts’ Working Group’s views would also be elicited to identify core principles of enhanced cooperation; utility of technical facility; and urgent needs requiring collective efforts.

In the closing remarks, Mr. Man Bahadur Khadka expressed commitment on behalf of the Government of Nepal and South Asia Wildlife Enforcement Network to take the outcome of the conference forward and emphasized on the need of extended collaboration among participating countries and regional institutions, namely ASEAN Center for Biodiversity, Lusaka Agreement Task Force and South Asia Wildlife Enforcement Network. Similarly, Dr. Pinsak Suraswadi expressed hope that the key wildlife enforcement networks would take turns to hold regular meetings for knowledge transference on wildlife and timber trafficking in the global south. Mr. Edward Phiri expressed readiness to collaborate transcontinentally in the fight against wildlife and forest crimes and committed to take the outcome of the conference forward to engage greater Africa.
APPENDIX C. CONCEPT NOTE ON SOUTH-SOUTH ENHANCED COOPERATION INITIATIVE

South-South Enhanced Cooperation Initiative:
Policy, practice and excellence sharing to address Forest and Wildlife Crime and Biodiversity Protection

By
Mr. Ali Saleem, Member, UN Expert Advisory Group on Youth, Peace and Security
and
Mr. Manesh Lacoul, WEMS Secretariat, AIT Solutions, Asian Institute of Technology

Background

CITES is an international agreement that sets the rules governing international trade in wildlife. Since CITES promulgation, the good news is that due to the efforts of so many over the past five years, there is a global collective effort underway to combat illegal trade in wildlife – one that works right across the illegal supply chain and takes a three-pronged approach of: enhancing enforcement, including tackling corruption; addressing livelihoods and how local people can benefit from wildlife; and demand reduction.

In addressing wildlife and forest crimes, the International Consortium on Combating Wildlife Crime (ICCWC) is the collaborative effort of five inter-governmental organizations working to bring coordinated support to the national wildlife law enforcement agencies and to the sub-regional and regional networks that, on a daily basis, act in defense of natural resources. ICCWC’s mission is to strengthen criminal justice systems and provide coordinated support at the national, regional and international level to combat wildlife and forest crime.

Due to the efforts of many actors, matters related to wildlife law enforcement, and pillars of response are becoming functional in countries in Africa and Asia. More and more cases are being reported, sincere efforts are being made to and share intelligence and develop reciprocal arrangements within the countries. Given the developments since CITES came into force, we have reached a point that countries of the South, or those from Africa and Asia, begin to demonstrate their leadership and commitment individually and collectively.

Nevertheless, enforcement and compliance to national wildlife laws and with the CITES convention, has been a subject of discussion for quite a long period. Countries though adhere to the principles of the convention; practically enforcing it at times remains a challenge due to several factors. For instance, strategies and corresponding mechanisms of support for enforcement efforts against wildlife crime are primarily based on a design developed by international actors, which requires states in the larger South to follow to gain access or be part of the funding mechanism. Furthermore, support is only available through third-party interventions which might inhibit a state from maximizing the utilizing of international cooperation.

Though there are several existing international initiatives, such as the ICCWC, formed to address the above-mentioned problems, the state or party on its own must practically implement the regulations on enforcement. The unquestionable right of state sovereignty puts a hold on international commitments where a one policy one approach fails to work. Also, the crisis in conservation can also be attributed to over-accumulation of efforts from the Global-North (mainly European and US initiatives) which are
channeled through designated non-party stakeholder for designated purposes and not entirely serving the conservation efforts required by the state.

South-South Enhanced Cooperation Initiative

Hence, what is required is now is for the Global South to share experience, knowledge, skills, expertise, and resources for strengthening its national enforcement structures and transboundary cooperation to address illegal trade and meet sustainable development goals. This ‘collective self-reliance’ will, in turn, reduce the burden and the efforts at the global north to support financially and institutionally to address the problem and in the attainment of internationally agreed development goals, including the 2030 Agenda for Sustainable Development.

During the Bangkok Conference on Science, Technology, and Innovation (BCSTI) for Addressing Wildlife and Forest Crimes and Attaining SDGs held from 28 to 29 August 2018, the concept of a South-South cooperation was proposed for discussion and consensus for an initiative led by the states from Africa and Asia. This South-South Enhanced Cooperation Initiative is not just the usual sharing and cooperation among networks and INGOs in the Global South (see Figure 1 below for framework).

South-South Enhanced Cooperation Initiative

![Diagram of the South-South Enhanced Cooperation Initiative]

- **Locus**
  - States
  - Inter-governmental Organizations
  - MNCs
  - INGOs
  - Academia
  - NGOs
  - Local Governments
  - Communities

- **Focus**
  - **Track 1**: Provide a platform for States from the Global South to set the agenda
  - **Track 1.5**: Facilitate dialogues between States from the Global South and the broader wildlife stakeholders

*Figure 1: South-South Enhanced Cooperation Initiative*

It is envisioned to provide a platform at the highest political level for heads of states and heads of governments from the Global South to come together and articulate the agenda based on their needs in terms of wildlife protection and biodiversity conservation. This entity, which has yet to be structured and defined, shall provide support to Track 1 dialogues by providing secretariat and research and will then facilitate a follow up dialogue at the Track 1.5 level, or between States from the Global South and the existing wildlife and conservation stakeholders (Inter-governmental Organizations, Multi-National Corporations, International Non-Governmental Organizations and the academe and various think tanks).
to align their activities along the agenda articulated by heads of states and heads of governments and the needs of the Global South.

Way Ahead

It should be emphasized that the objectives of South-South cooperation are already outlined in the Buenos Aires Plan of Action (BAPA) for Promoting and Implementing Technical Cooperation among Developing Countries and endorsed by the United Nations General Assembly in 1978 (resolution 33/134). Nevertheless, given the political nature of the initiative, an incremental approach is proposed. This implies that the process is divided into complementary political milestones and each and every milestone is achieved in an exclusive process with a specific outcome in mind.

![Diagram](image)

*Figure 2: Timeline of Immediate Steps*

There is a need to set up a working group of technical and political experts on various aspects of wildlife protection and biodiversity conservation who will define the how this initiative will be structured and mandated within the next six (6) months. This working group would undertake a detailed study to conceptualize South-South enhanced cooperation initiative, particularly study the need for a South led mechanism to promote South-South cooperation through a formal intergovernmental set up shall be highlighted. The working group’s views would be elicited to identify core principles of enhanced cooperation; the utility of technical facility; and urgent needs requiring collective efforts.

After the study has been completed, their recommendations will be presented to the core group of States from the Global South for discussion and adoption. This entity will then prepare for the first gathering of States from the Global South within the next 6-9 months to set the agenda on wildlife protection and conservation.
## APPENDIX D: CONFERENCE PARTICIPANTS

### Bangladesh

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
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<tbody>
<tr>
<td>Md. Modinul Ahsan, Mr.</td>
<td>Bangladesh Forest Department</td>
</tr>
<tr>
<td>Md. Rezaul Karim Chowdhury, Mr.</td>
<td>United Nations Development Programme (UNDP)-Bangladesh</td>
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### China (People’s Republic of)

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<th>Name</th>
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<tbody>
<tr>
<td>Alice C. Hughes, Dr.</td>
<td>Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences</td>
</tr>
<tr>
<td>Shuya Huang, Ms.</td>
<td>China Biodiversity Conservation and Green Development Foundation</td>
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### Indonesia

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<tbody>
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<td>Alya Faryanti, Ms.</td>
<td>Ministry of Environment and Forestry of Indonesia</td>
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<tr>
<td>Dicky Komar, Mr.</td>
<td>Embassy of Indonesia in Thailand</td>
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<tr>
<td>Sulaeman Narowi, Mr.</td>
<td>Embassy of Indonesia in Thailand</td>
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### Japan

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<tr>
<td>Manabu Onuma, Dr.</td>
<td>National Institute for Environmental Studies</td>
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<td>Remi Chandran, Dr.</td>
<td>National Institute for Environmental Studies</td>
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<tr>
<td>Tomohiro Okadera, Mr.</td>
<td>National Institute for Environmental Studies</td>
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<tr>
<td>Kyoichi Ito, Mr.</td>
<td>Remote Sensing Technology Center</td>
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<td>Masatoshi Kamei, Mr.</td>
<td>Remote Sensing Technology Center</td>
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<td>Kaname Ikeda, Mr.</td>
<td>Remote Sensing Technology Center</td>
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<td>Hill H. Kobayashi, Dr.</td>
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<td>Yoshifumi Yasuoka, Prof.</td>
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<td>Thura Soe Min Htike, Mr.</td>
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<td>Noor Khan, Dr.</td>
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<td>Glenn Forbes, Mr.</td>
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<td>Anuj Jain, Dr.</td>
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Tanzania

Faustine Masalu, Mr. 
Joachim Tesha, Mr. 
Martin Loibooki, Mr. 
Nyamakumbati Mafuru, Mr. 
Renatus Thomas Kusamba, Mr. 
Mabula Misungwi, Mr.

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Tanzania National Parks
Tanzania National Parks
Tanzania National Parks
Tanzania Wildlife Authority

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Pakpoom Aramsirujiwet, Mr. 
Philip D. Round, Assoc. Prof. 
Pinsak Suraswadi, Dr. 
Pramote Chonkolwanitsuk, Mr. 
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Ronasit Maneesai, Dr. 
Rung-rawn Chaisri, Ms. 
Sadudee Punpugdee, Mr. 
Somkiat Soontornpitakkool, Mr. 
Somsak Poopet, Mr. 
Suchitra Changtragoon, Dr. 
Supitcha Suwannaporn, Ms. 
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Nosrat Ravichandran, Ms.  ASEAN Centre for Biodiversity
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Atsushi Otake, Mr.  **NTTDATA Corporation**

Pradeep Bhattarai, Mr.  **South Asia Wildlife Enforcement Network (SAWEN)**

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Sara Litke, Ms.  **U.S. Department of State/U.S. Embassy, Kathmandu**

Charlotte Hicks, Ms.  **UN Environment World Conservation Monitoring Centre**
Ali Saleem, Mr.  UN Expert Advisory Group on Youth, Peace, and Security

Emeline Pluchon, Ms.  United Nations Environment Programme (UNEP)

Giovanni Broussard, Mr.  Magali Lapouge, Ms.  United Nations Office on Drugs and Crime (UNODC)

Gary Collins, Mr.  Tanawat Likitkererat, Mr.  USAID Wildlife Asia

Anthony J. Lynam, Dr.  Wildlife Conservation Society (WCS)
Tong Hua, Dr.  

World Custom Organization

Others:

Fred Ancend, Mr.  Independent
### APPENDIX E. SIDE EVENT PARTICIPANTS

<table>
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<tr>
<th>Title</th>
<th>First Name</th>
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<td><strong>Resource Person:</strong></td>
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<td>Mr.</td>
<td>Viet Khoi</td>
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<td><strong>Participants:</strong></td>
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<td><strong>Government Representatives</strong></td>
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<td>Lusaka Agreement Task Force</td>
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APPENDIX F. PHOTOGRAPHS
CONFERENCE ON SCIENCE, TECHNOLOGY AND INNOVATION FOR ADDRESSING WILDLIFE AND FOREST CRIMES AND ATTAINING SDG'S

WE FOR THEM

28-30 AUGUST, 2018
ASIAN INSTITUTE OF TECHNOLOGY
BANGKOK