28-30 September 2022

15th AOGEO SYMPOSIUM

APBON
Asia Pacific Biodiversity Observation Network

AOGEO Task Group 2:

Asia-Pacific Biodiversity Observation Network (APBON)

Co-chairs

Hiroyuki Muraoka (Gifu University; NIES, Japan)

Runi Sylvester Pungga (Forest Department Sarawak, Malaysia)

Yongyut Trisurat (Kasetsart University, Thailand)

Hiroyuki Muraoka
Gifu University, National Institute for Environmental Studies

Runi Sylvester Pungga
International Affairs Division, Forest Department Sarawak

Yongyut Trisurat
Kasetsart University, Faculty of Forestry

APBON is supported by the Ministry of the Environment Japan;
the Ministry of Education, Culture, Sports, Science and Technology (MEXT) Japan;
National Institute for Environmental Studies (NIES),
and all other voluntary contributions.

http://www.esabii.biodic.go.jp/ap-bon/index.html

APBON established in 2009

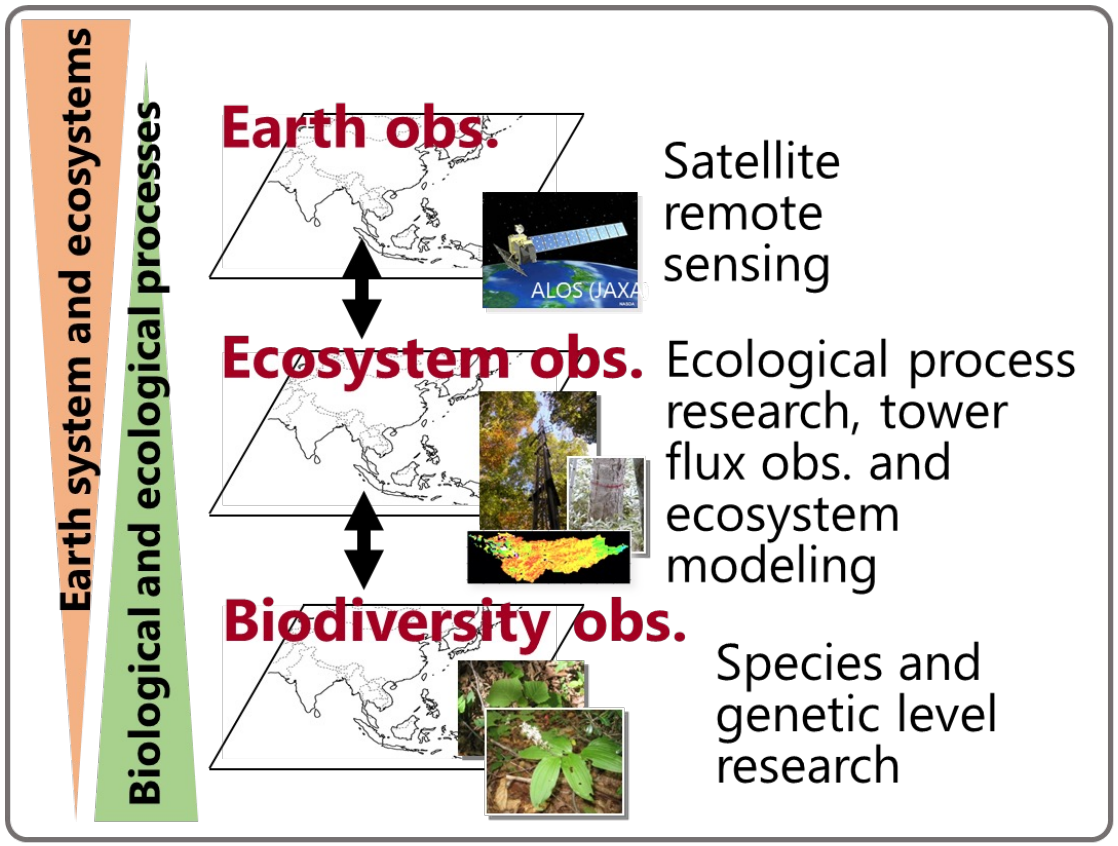
APBON
Asia Pacific Biodiversity Observation Network

Mission

1. Contribution to sound decision making related to biodiversity conservation based on scientific information
2. Facilitation of the utilization of existing biodiversity data
3. Coordination of a regional network

Activities

1. Monitoring changes of biodiversity
   - ✓Biodiversity mapping
   - ✓Identification of key drivers
     Land use change, Climate change
2. Networking of the observation networks
   - ✓Sharing information through the networks
3. Capacity building



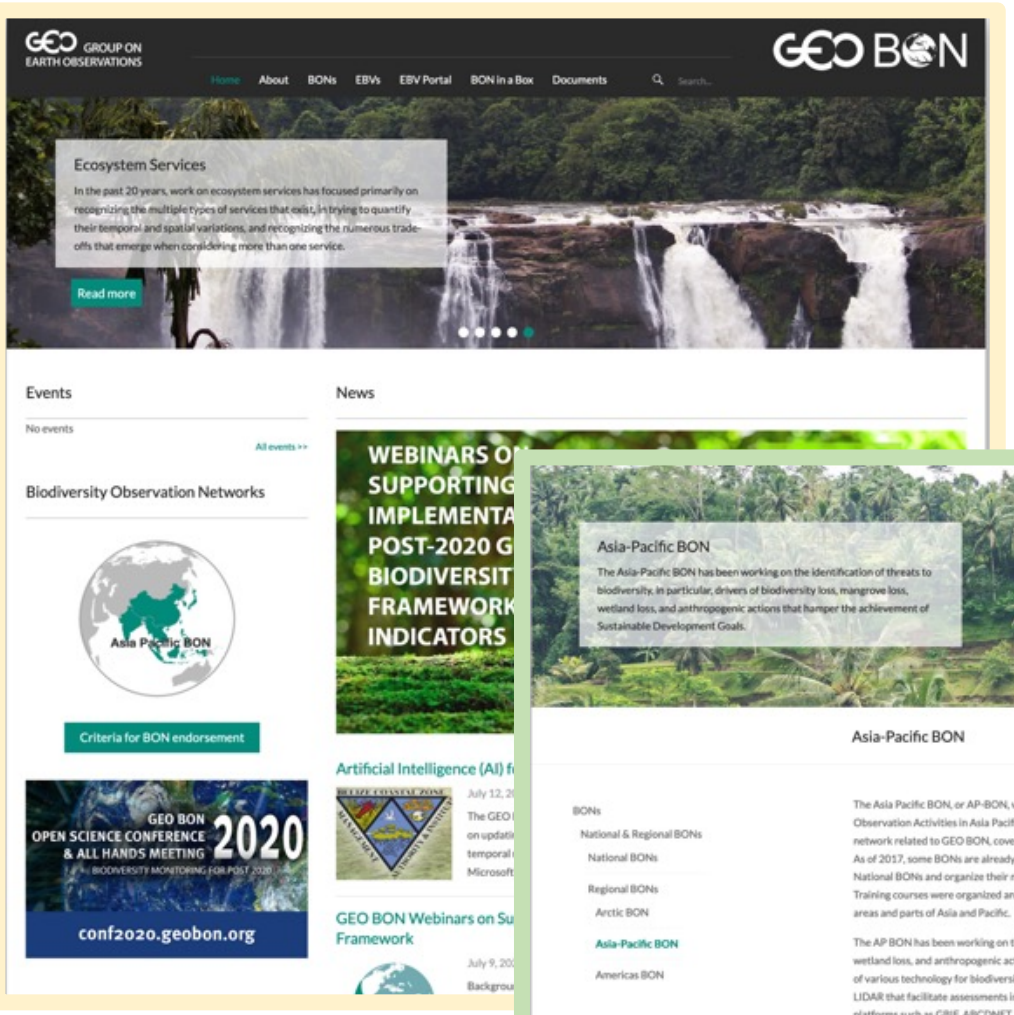
(Muraoka et al. 2012 in APBON book)

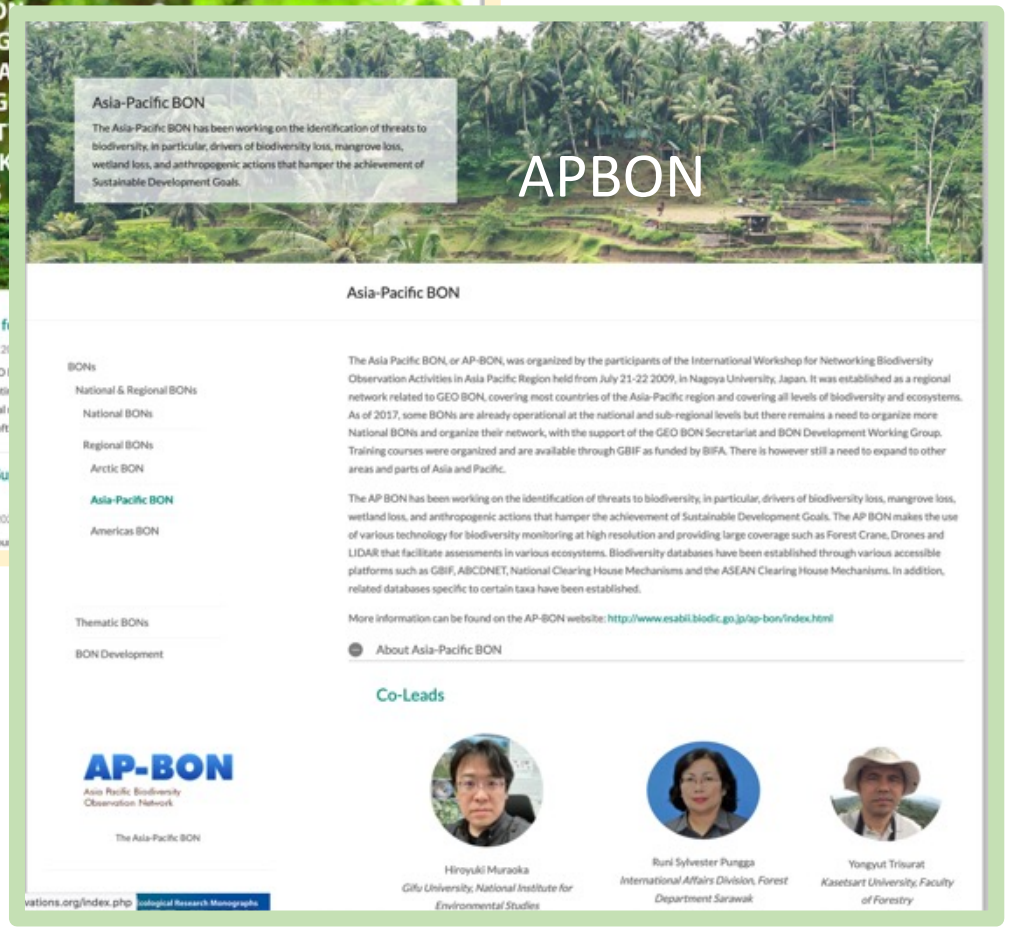
GEO BON, APBON and AP-MBON

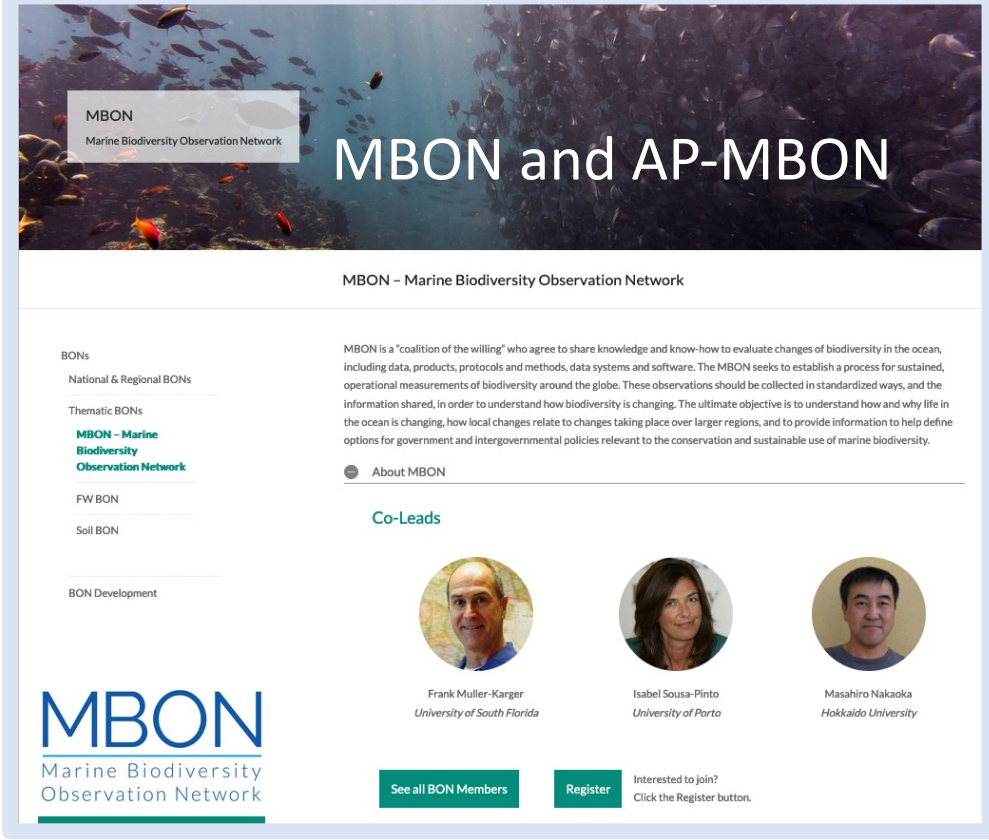
APBON

Platform for regional cooperation and collaboration

Regional contribution to global actions







13th APBON Web Seminar
September 13, 2022

Objectives

1. to review the recent research/engagement outcomes (2020-2022) and discuss activity plan (2023-2025)
2. to discuss what and how do we strengthen the biodiversity observation in our region
3. to discuss the engagement of broader community

Goals of this meeting

- ☐ Sharing the collected ideas and information with the APBON to seek further collaborative studies, outreach activities, etc.
- ☐ Planning collaborative publication (APBON book, Policy brief, etc.)
- ☐ Prepare inputs to the 15th AOGEO Symposium (28-30 September)

APBON
Asia Pacific Biodiversity Observation Network

Program (Time in JST)

15:00 **Welcome / Opening remarks**
APBON Secretariat - Biodiversity Center of Japan
APBON Co-chairs

15:05 **Outline of the meeting**
Hiroyuki Muraoka

15:10 **Session 1: Review the recent research/engagement outcomes (2020-2022) and discuss activity plan (2023-2025)**

16:30 **Session 2: Discuss what and how do we strengthen the biodiversity observation in our region**
- Collaborative research
- Integrative analysis of existing data/knowledge
- Essential Biodiversity Variables
- Link with satellite remote sensing

17:00 **Session 3: discuss the engagement of broader community (academia, data-users, governments, etc.)**

17:20 **Wrap-up: Way forward**
(Moderator: Hiroyuki Muraoka)
15th AOGEO Symposium
APBON Workshop
APBON Web seminar

17:30 **Closing**
APBON Co-chairs

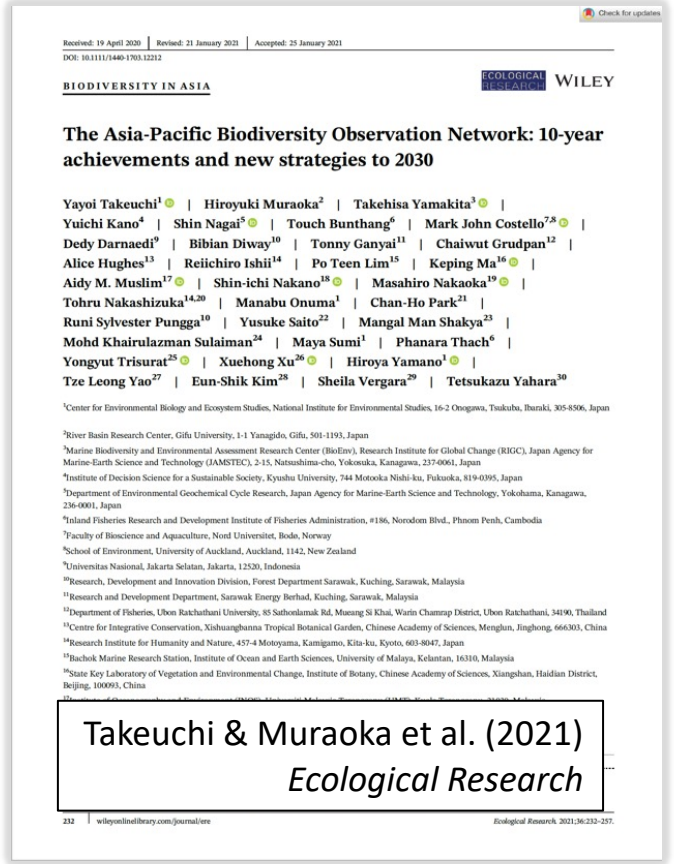
APBON Work Plan update toward 2030

APBON's missions

- ☐ Promoting interdisciplinary research and problem-solving approaches with filling the observational and knowledge gaps,
- ☐ Promoting data sharing and data accessibility through/by networks of the observation networks,
- ☐ Delivering our information and knowledge to stakeholders and global platforms

Strategy

1. **Biodiversity research and monitoring**
   a. Monitoring states and changes of biodiversity
   b. Filling gaps in data availability
   c. Increasing access to data (GBIF, ABCDNet, Data paper, OBIS)
   d. Improving knowledge by using cutting-edge technologies
2. **Networking of networks**
   a. Networking of in-situ biodiversity/ecosystem monitoring networks
   b. Science-policy and science-society networks
3. **Capacity building**
   a. Training workshops (students, scientists, users)

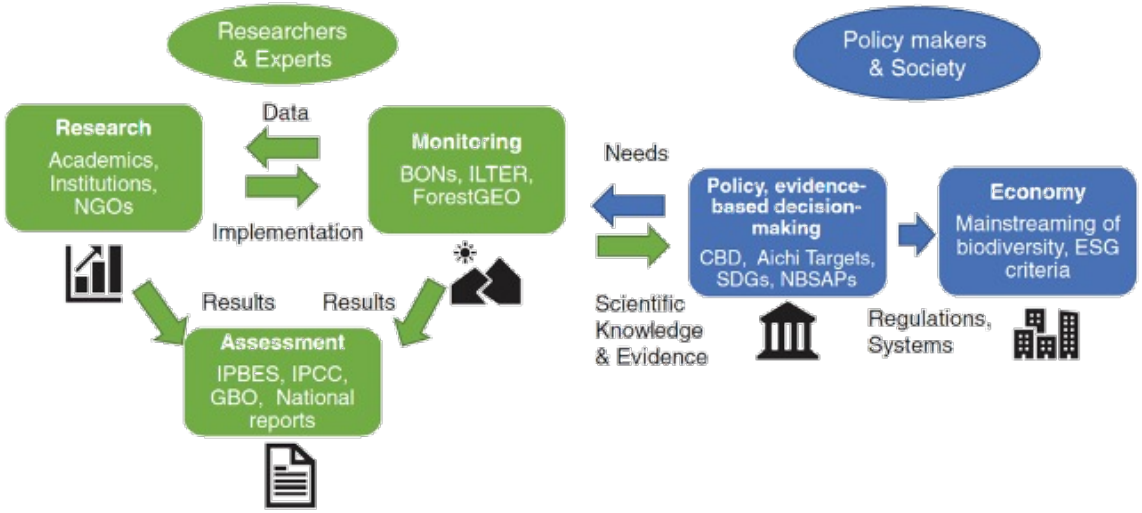

Received: 19 April 2020 | Revised: 21 January 2021 | Accepted: 25 January 2021
DOI: 10.1111/1440-1703.12212
BIODIVERSITY IN ASIA
ECOLOGICAL RESEARCH WILEY

The Asia-Pacific Biodiversity Observation Network: 10-year achievements and new strategies to 2030

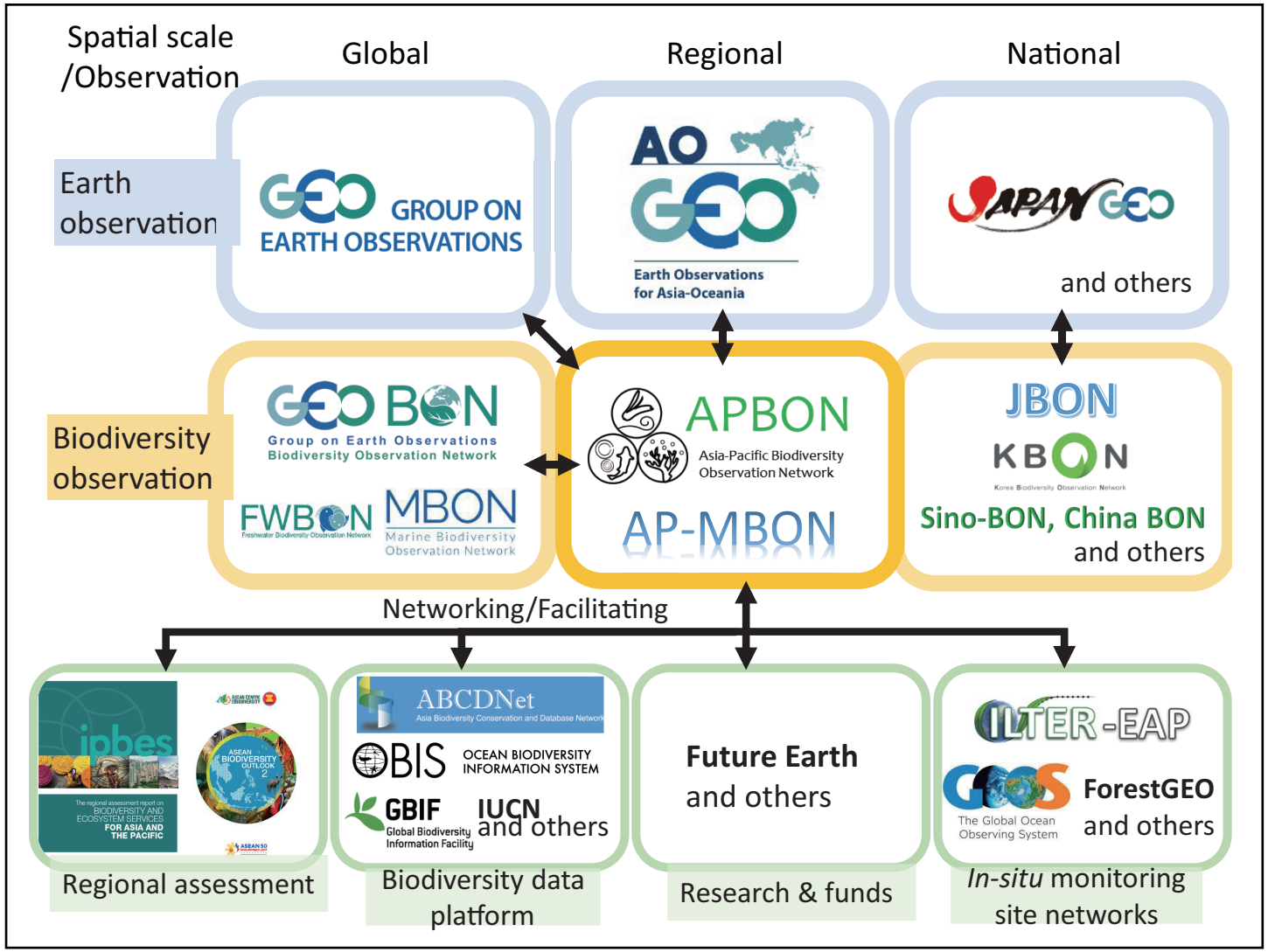
Yayoi Takeuchi[1] | Hiroyuki Muraoka[2] | Takehisa Yamakita[3] | Yuichi Kano[4] | Shin Nagai[5] | Touch Bunthang[6] | Mark John Costello[7,8] | Dedy Darnaedi[9] | Bibian Diway[10] | Tonny Ganyai[11] | Chaiwut Grudpan[12] | Alice Hughes[13] | Reiichiro Ishii[14] | Po Teen Lim[15] | Keping Ma[16] | Aidy M. Muslim[17] | Shin-ichi Nakano[18] | Masahiro Nakaoka[19] | Tohru Nakashizuka[14,20] | Manabu Onuma[1] | Chan-Ho Park[21] | Runi Sylvester Pungga[10] | Yusuke Saito[22] | Mangal Man Shakya[23] | Mohd Khairulazman Sulaiman[24] | Maya Sumi[1] | Phanara Thach[6] | Yongyut Trisurat[25] | Xuehong Xu[26] | Hiroya Yamano[1] | Tze Leong Yao[27] | Eun-Shik Kim[28] | Sheila Vergara[29] | Tetsukazu Yahara[30]

[1]Center for Environmental Biology and Ecosystem Studies, National Institute for Environmental Studies, 16-2 Onogawa, Tsukuba, Ibaraki, 305-8506, Japan
[2]River Basin Research Center, Gifu University, 1-1 Yanagido, Gifu, 501-1193, Japan
[3]Marine Biodiversity and Environmental Assessment Research Center (BioEnv), Research Institute for Global Change (RIGC), Japan Agency for Marine-Earth Science and Technology (JAMSTEC), 2-15, Natsushima-cho, Yokosuka, Kanagawa, 237-0061, Japan
[4]Institute of Decision Science for a Sustainable Society, Kyushu University, 744 Motooka Nishi-ku, Fukuoka, 819-0395, Japan
[5]Department of Environmental Geochemical Cycle Research, Japan Agency for Marine-Earth Science and Technology, Yokohama, Kanagawa, 236-0001, Japan
[6]Inland Fisheries Research and Development Institute of Fisheries Administration, #186, Norodom Blvd., Phnom Penh, Cambodia
[7]Faculty of Bioscience and Aquaculture, Nord Universitet, Bodø, Norway
[8]School of Environment, University of Auckland, Auckland, 1142, New Zealand
[9]Universitas Nasional, Jakarta Selatan, Jakarta, 12520, Indonesia
[10]Research, Development and Innovation Division, Forest Department Sarawak, Kuching, Sarawak, Malaysia
[11]Research and Development Department, Sarawak Energy Berhad, Kuching, Sarawak, Malaysia
[12]Department of Fisheries, Ubon Ratchathani University, 85 Sathonlamak Rd, Mueang Si Khai, Warin Chamrap District, Ubon Ratchathani, 34190, Thailand
[13]Centre for Integrative Conservation, Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences, Menglun, Jinghong, 666303, China
[14]Research Institute for Humanity and Nature, 457-4 Motoyama, Kamigamo, Kita-ku, Kyoto, 603-8047, Japan
[15]Bachok Marine Research Station, Institute of Ocean and Earth Sciences, University of Malaya, Kelantan, 16310, Malaysia
[16]State Key Laboratory of Vegetation and Environmental Change, Institute of Botany, Chinese Academy of Sciences, Xiangshan, Haidian District, Beijing, 100093, China

Takeuchi & Muraoka et al. (2021)
Ecological Research



Networking with observation and user communities



Takeuchi & Muraoka et al. (2021)
Ecological Research

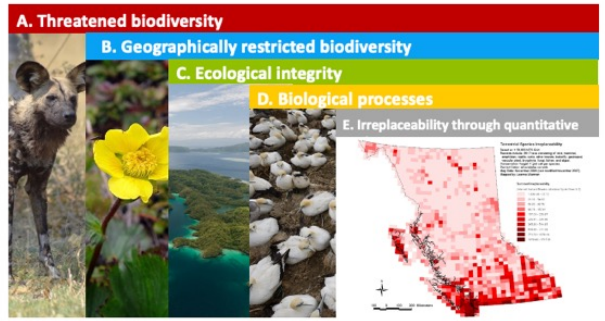
KBAs are defined as:

"sites contributing significantly to the global persistence of biodiversity"

KBA Criteria

KBA criteria are designed to capture biodiversity at genetic, species and ecosystem levels

Collectively, the criteria aim to capture the various ways in which a site can be important for the global persistence of biodiversity



KBAs and APBON

- ✓ Biodiversity data generated by AP-BON can be used to identify KBAs
- ✓ Provision of more accurate range and Suitable Habitat Maps for species to help identify KBAs
- ✓ KBAs provides a means of turning biodiversity data into concrete conservation results at a national level
- ✓ AP-BON efforts can help monitor KBAs and their trigger elements
- ✓ Professor Y. Trisurat (APBON co-chair) – KBA Community Representative for Asia

APBON Activity Highlights 2020-2022

Key outcome: APBON New Strategy Toward 2030 (published in *Ecological Research*, Jan. 2021)

Terrestrial

- **Phenology** research on forests in East and Southeast Asia
- **Satellite remote sensing of biodiversity**
  - Tropical forests and tree flowering
  - Himawari AHI satellite is useful for phenology observation
  - Mapping forest fragmentation / connectivity by satellite imagery for assessing integrity of forested landscape in Himalayan region in India
- **Impact assessment of climate change** on biodiversity, species distribution
- **Knowledge for biodiversity conservation** in cityscape and region
- SATREPS project for biodiversity conservation in Sarawak, Malaysia
- **Mapping protected areas** in the Hindu Kuch Himalaya
- Collections of herbarium specimens (flora, fauna) in Sarawak.
- **Systematic observation, data center and platform** in SinoBON
- **EBV mapping project** is under planning with EuropaBON
- **'Master site' concept** to connect in-situ and satellite obs. for biodiversity and ecosystem functions (e.g., carbon cycle)

Freshwater

- **3D-model of various organisms** for online electronic specimen database (ffishAsia/floraZia)
- "Mekong integrated water resources management Phase III project" – **Improved community fishery governance in Cambodia**; Illegal fishing and threats to the resource; Socioeconomic and food security benefits; Resource management; Gender and ethnic minorities

Coast & Marine

- Online symposium on healthy oceans as **UN Decade of Marine Science**.
- Review and case study paper on genetic analysis of **marine important areas (EBSAs)** for corals around Japan
- **Species level mapping of seagrass bed using UAV and deep learning** technique

Capacity development

- **APBON web seminar series (13 times) and workshop**
- Monthly or bi-weekly seminars in China, ACB
- **Data management** workshop
- **Training courses** (biodiversity survey, new technologies)
- Seminar series of **MBON** network

Engagement / Networking

- New pamphlet
- **GBIF** (Global Biodiversity Information Facility), **OBIS** (Ocean Biodiversity Information System)
- **Key Biodiversity Areas** (KBA)
- **CBD Post-2020 Global Biodiversity Framework**

APBON Meetings (Webinar, Workshop)

13 September 2022	**13th APBON Web seminar** Special meeting for the 15th AOGEO Symposium
8 July 2022	**12th APBON Web seminar** Dr. Charlie D. Heatubun (Head of the Research & Development Agency, Provincial Government of West Papua) Dr. Nirunrut Pomoim (Department of National Parks, Wildlife and Plant conservation)
4 March 2022	**11th APBON Web seminar (Special)** **Understanding the role and potential of Other Effective Area-based Conservation Measures (OECMs) in the Asia Pacific Region** Dr. Sunita Chaudhary (ICIMOD) Dr. Madhu Rao (Chair, IUCN World Commission on Protected Areas) Dr. Ruchi Pant (Head – Biodiversity, Climate Change UNDP India) Dr. Taku Kadoya (Head – Biodiversity Division, NIES, Japan) Dr. Nakul Chettri (Regional Programme Manager – Transboundary Landscapes, ICIMOD) Ms. Cristina Lazaro (UNEP-WCMC)

23 December 2021	**10th APBON Web seminar** Dr. Tetsukazu Yahara (Kyushu University) Dr. Ai Nagahama (Kyushu University)
10-12 November 2021	**14th Asia-Oceania Group on Earth Observations Symposium**
19 October 2021	**13th APBON Workshop** Scoping collaborative work plan of APBON in the next ca. 4 years (~2025), which is the first half of APBON's strategic plan toward 2030.
30 September 2021	**9th APBON Web seminar** Dr. Alice Hughes (Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences) Dr. Angela Quiros (Akkeshi Marine Station, Field Science Center for Northern Biosphere, Hokkaido University)

8 July 2021	**8th APBON Web seminar** Dr. Po Teen Lim (University of Malaya) Dr. Chaodong Zhu (Chiese Academy of Sciednces)
27 May 2021	**7th APBON Web seminar** Dr. Yuichi Kano (Kyushu University) Dr. Asanee Kawtrakul (Kasetsart University)
25 February 2021	**6th APBON Web seminar** Dr. Eun-Shik Kim (Kookmin University) Dr. Tomoaki Miura (University of Hawaii, JAMSTEC)
22 January 2021	**12th APBON Workshop**
21 January 2021	**5th APBON Web seminar** Dr. Bunthang Touch (Inland Fisheries Research and Development Institute) Dr. Chheang Dany (Forestry Administration, Cambodia)

10 December 2020	**4th APBON Web seminar** Mr. Yao Tze Leong (Forest Research Institute Malaysia) Dr. Takashi Hosono (Japan Agency for Marine-Earth Science and Technology)
22 October 2020	**3rd APBON Web seminar** Dr. Po Teen Lim (University of Malaya) Dr. Laetitia Navarro (GEO BON)
27 August 2020	**2nd APBON Web seminar** Dr. Alice Hughes (Xishuangbanna Tropical Botanical Garden) Dr. Yuichi Kano (Kyushu University)
6–10 July 2020	**GEO BON Open Science Conference & All Hands Meeting**
29 June 2020	**Kick-off Meeting | 1st APBON Web seminar** Dr. Yongyut Trisurat (Kasetsart University) Dr. Sheila Vergara (ASEAN Centre for Biodiversity)

APBON Activity Highlights 2020-2022

APBON
Asia Pacific Biodiversity Observation Network

Understanding the role and potential of
Other Effective Area-based Conservation Measures (OECMs) in the Asia Pacific Region

APBON ICIMOD

Opening Remarks

Madhu Rao
Chair
IUCN World Commission on Protected Areas

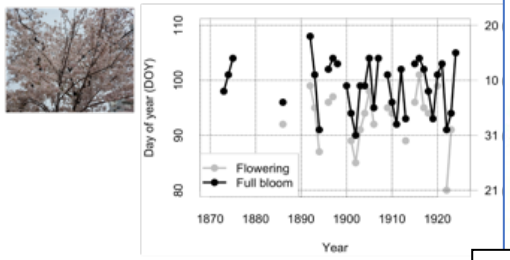
IUCN WCPA

A new method for monitoring plant phenology by social sensing (Google Trends:
https://trend[illegible]m/trends/?geo=JP).

Google Trends

▼ Relationship between time-series of RSV searched by Google Trends, and flowering information published on the website at Miharu Takizakura in Fukushima, Japan

Importance of sharing the past records and papers i
– We should promote data mining and translating of
written in the language of each country into English.



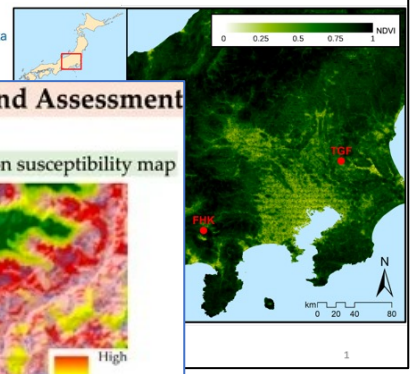
▲ Time series of cherry flowering and full-bloom dates r
Atomi Kakei's diary in Tokyo, Japan
[Shin et al., in press, Jpn. J. Biometeorol., in Japanese].

Article | Open Access | Published: 30 October 2019

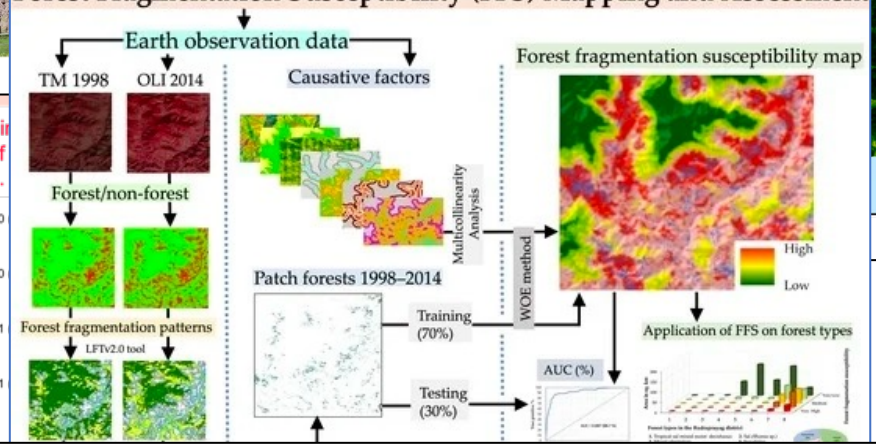
Improved Characterisation of Vegetation and Land Surface Seasonal Dynamics in Central Japan with Himawari-8 Hypertemporal Data

Tomoaki Miura, Shin Nagai, Mika Takeuchi, Kazuhito Ichii & Hiroki Yoshioka

Scientific Reports 9, Article number: 15692 (2019) | Cite this article



Forest Fragmentation Susceptibility (FFS) Mapping and Assessment

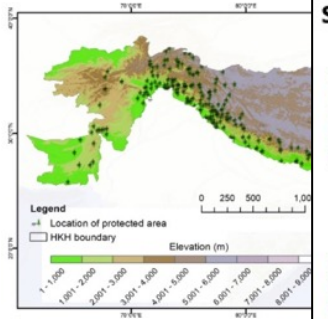


SCIENTIFIC IMPACT PAPER

Conservation Science and Practice | WILEY

Protected areas in the Hindu Kush Himalaya: A regional assessment of the status, distribution, and gaps

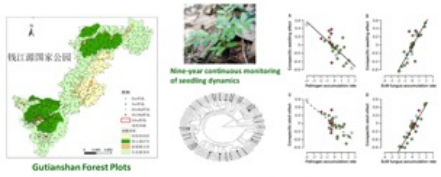
Sunita Chaudhary[1,2] | Kabir Uddin[1] | Nakul Chettri[1] | Rajesh Thapa[3] | Eklabya Sharma[1]



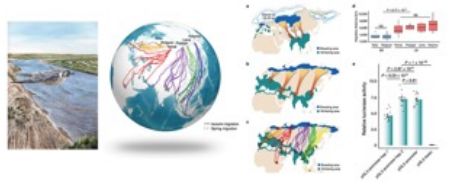
Sino BON : Scientific discoveries

APBON

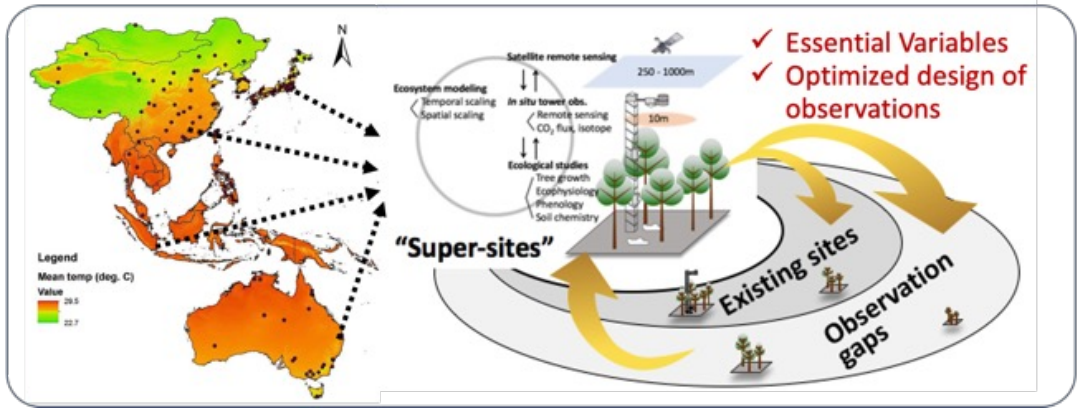
☐ **Revealing plant-fungi interactions regulating the coexistence of species in subtropical forests (Chen et al., 2019, *Science*)**



☐ **Revealing the reasons for the formation of bird migration routes and key genes for long-distance migration (Zhan et al., 2021, *Nature*)**



Master site concept to link in-situ and satellite obs.



Findings by APBON

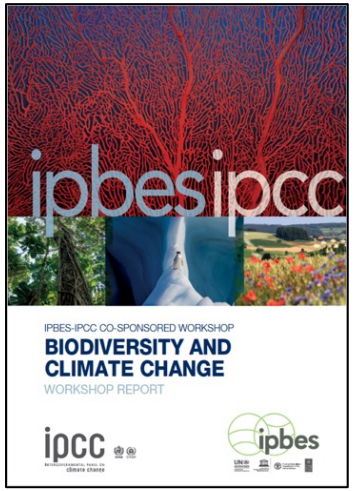
Issues in biodiversity/ecosystem and needs of research

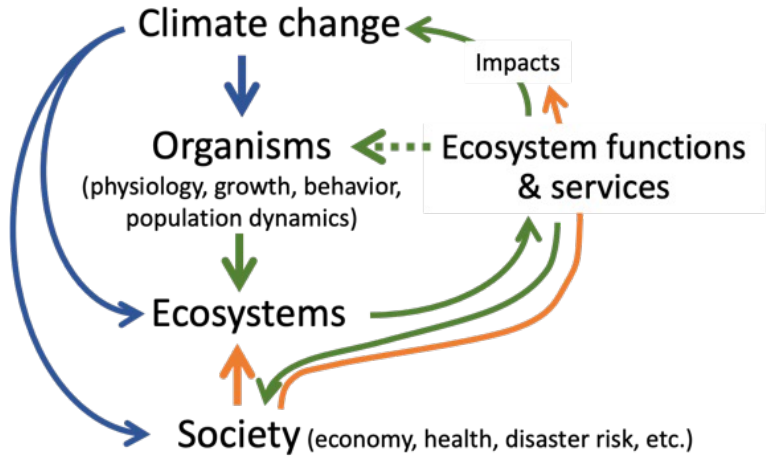
APBON Asia Pacific Biodiversity Observation Network

Terrestrial	Freshwater	Coast & Marine
• **Nature-based solutions** to global climate change mitigation and adaptation • Possible tradeoff in infrastructure for carbon neutrality and biodiversity • **Forest landscape integrity is key** for biodiversity conservation and ecosystem functions, services • **Valuable ecosystems** such as peatlands, rangeland and wetlands are degrading with climate crisis. Climate change-induced impacts on biodiversity assessment is urgent • **More research** to be carried out on carbon, issues **relevant to climate change and addressing the SDGs**.	• Understanding the **implications of water infrastructure development and climate change on fish yield** and welfare value in Cambodia • Impacts of illegal fishing, environmental change, population growth, hydropower dams on fish biodiversity in Cambodia	• Projects in response to the **UN Decade of Marine Science** (deep sea, **seagrass** and **mangrove mapping, pole to pole biodiversity**) • Decline of **seaweed bed** due to climate and plant eaters is an emerging threat. • Sudden red tine in Hokkaido

PARIS2015 UN CLIMATE CHANGE CONFERENCE COP21·CMP11

SUSTAINABLE DEVELOPMENT GOALS





APBON – Plan for 2023-2025

APBON Asia Pacific Biodiversity Observation Network

Strengthening observations and proceeding data sharing to respond national, regional and global needs

- **Continuing observations of biodiversity and ecosystems** for assessing status and changes under environmental changes
- **Phenology and carbon** cycle as the interface of **biodiversity and climate change** issues
- **eDNA and high throughput DNA sequencing** for species identification and monitoring for national and regional scale
- **High resolution satellite data** are key for biodiversity indicators and metrics, assessing impacts of climate and land use change
- Verification and implementation of **Essential Biodiversity Variables** are key for continuous observations
- **Assimilating observations across scales** (e.g., from laboratory, in-situ field to remote sensing, and modeling).
- **Master site concept** to enable multi-disciplinary and multi-platform observations.

Stakeholder engagement, and contribution to national, regional and global efforts

- **Governments**, **private sectors**, **citizens**, **next generation**
- Academia, earth observation institutions, citizen science
- **Translating and digitizing data/knowledge in local language to English** for rescuing historical local data, and comprehensive, fair assessment and conservation of biodiversity and Nature's contribution to people (e.g., resources, cultures, etc.) in the Asia-Oceania region
- **Development of networks within countries (→ National BONs)**, regional and global.

- **Sustainable Development Goals** (6, 12, 13, 14, 15)
- CBD **Post-2020 Global Biodiversity Framework**
- Taskforce on Nature-related Financial Disclosures (**TNFD**)

Capacity development and Youth engagement

- Encouragement and support the **education** / **training** / **meeting** / workshop opportunity
- **More academia and youth networks** from the region and beyond APBON is expected

Cooperative, coordinated action plans

- **Coordination and cooperation among all relevant stakeholders**
- **Sustainable mobilize resources** to achieve long term plans
- Joint research implementation and publications
- **Cooperation with AOGEO**

Climate change x Biodiversity **Nature-based Solutions (NbS)** **Connecting in-situ and satellite obs. and modeling**

Cooperation with AOGEO for multidisciplinary observations and assessment, youth and stakeholder engagement

For more information of APBON
http://www.esabii.biodic.go.jp/ap-bon/index.html
APBON on-line seminars
http://www.esabii.biodic.go.jp/ap-bon/meetings/index.html

APBON Secretariat:
Biodiversity Center of Japan, MoE-J