DIWPA News Letter

No.35

Message from the Chairperson

Shin-ichi Nakano

I had finally received the AP-BON Book3 at the end of June 2016. The book is compact, but contains unique information about freshwater biodiversity in Asian countries. Some chapters cover a marine system and ecosystem service/socio-economic aspects with special reference to biodiversity, because of its analogy to freshwater ecosystems.

It has come a long way for the book to be published. In November 2012, we held "International Workshop on Freshwater Biodiversity Conservation in Asia" at Kyushu University, Japan, to discuss ways to identify the biodiversity hotspots, appropriate methods to identify the drivers on biodiversity loss of particular freshwater systems and data sharing among Asian countries. Some chapters presented in the workshop are included in Book3. I would like to thank the authors for their script contribution, and I appreciate their patience in waiting for the book publication and the publisher Springer for its tenacious editing of the book.

The AP-BON Book Series present the status quo of Asian biodiversity in the biodiversity research that lacks information from developing countries. In addition, we have included contributions, as well as providing reviews on advances in concepts and methods of biodiversity observations and on the challenges to study spatial variability of biodiversity and ecosystems in the Asia-Pa AP-BON Book Series would be informative for all the stakeholders interested in biodiversity issues.

*S. Nakano, T. Yahara and T. Nakashizuka (Eds) (2016, in press ' The Biodiversity Observation Netw Aquatic Biodiversity Conservation and Ecosystem Service. Springer Tokyo, Tokyo, Japan

Message from the Secretary General

Atsushi Ishida

We conducted "2016 International Field Biology Course (IFBC)", held on 17 to 23 August at Kiso, Nagano. In this year, the main objectives of IFBC focus on the biodiversity and conservation in stream insects. Their activities will be reported in the next volume. Kyoto University is enhancing our academic networks in ASEAN, so that we can be successful in getting new fund from Japan Science and Technology Agency (JST). In return, Kyoto University organizes Kyoto-ASEAN Forum every year in ASEAN countries with the fund. In March 2015 "Kyoto-ASEAN Forum 2015 Kickoff Meeting" was held in Bangkok, as the preliminary meeting. In the future meetings, our partners should tackle common issues, such as securing sustainable funding for research cooperation, fostering next generation scholars and promoting mutual youth exchanges, for a new horizon of academic cooperation between ASEAN and Japan. Although we are in a tough situation, it is important to enhance our partnership to make sustainable society associated with ecosystem service. DIWPA will be a core in such activities, especially in biodiversity and its conservation. Recently, the effects of global climate change have a seriou biodiversity in biomes in various areas worldwide. Thus, I believe that our mission in DIWPA becomes an every more important challenge. To keep our activities, please send your reports to DIWPA Newsletter. We always welcome your papers.

Report 1

IPBES Regional Assessment of Biodiversity and Ecosystem Services for Asia and the Paci[...] Towards the Zero Order Draft (ZOD)

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1. Introduction

The Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES) was established in 2012 as an independent intergovernmental body open to all member countries of the United Nations. The objective of IPBES is to strengthen the science-policy interface for biodiversity and ecosystem services for the conservation and sustainable use of biodiversity, long-term human well-being and sustainable development.

One of the deliverables (Deliverable 2b) is to prepare a regional/sub-regional assessment, following the scoping document accepted at the third IPBES Plenary (January 2015) a[...] for t[...] Asia-Pacific assessment, held in Tokyo, Japan, from 17-21 August 2015.

The entire assessment process will take three years, with the final report, including a summary for policymakers, scheduled for submission to the IPBES Plenary in 2018. Based on existing peer- reviewed literature, grey literature and indigenous and local knowledge, the report will serve as a valuable tool for effective formulation and implementation of policy related to the sustainable use of biodiversity and ecosystem services at the regional, sub-regional and national levels. The report will also become one of the building blocks for subsequent global assessments.

There are roughly 140 authors with activity and experience in the Asia-Pacific region participating in the assessment including 6 early career Young Fellows. The assessment consists of 6 chapters and follows the IPBES conceptual framework (Díaz 2015a; Diaz 2015b):

Chapter 1: Setting the scene
Chapter 2: Nature's benefits to people
Chapter 3: Status and trends
Chapter 4: Direct and indirect drivers of change
Chapter 5: Integrated and cross-scale [...]
Chapter 6: Policy options for decision-making

This brief project report summarizes my contributions towards producing and reviewing the Zero Order Draft (ZOD) of Chapter 3 documenting the status and trends of freshwater biodiversity in the Asia-Pacifc region. This wor[...] a visiting fellowship funded by the International Research Unit of Advanced Future Studies at Kyoto University, hosted by Professor Shin-ichi Nakano at the Centre for Ecological Research. (Fig. 1)

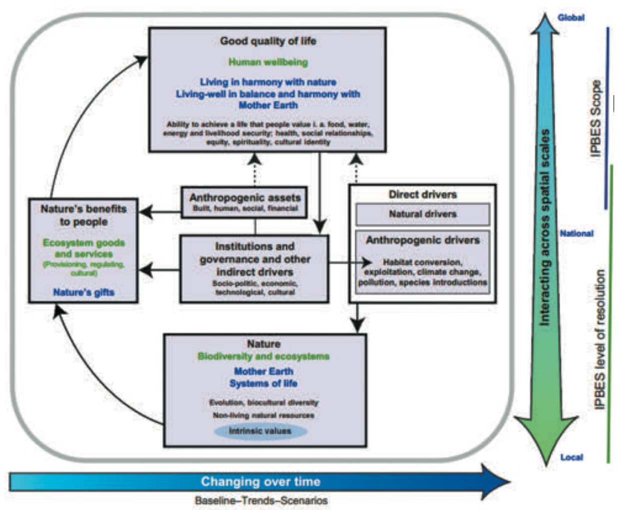

Fig. 1. Conceptual Framework from IPBES (Díaz 2015; Diaz 2015)

2. Methodology

IPBES confdentiality cl[...] draft content from the regional assessments. To avoid disclosure conficts I refer [...] assessment scoping reports already in the public domain (IPBES 2014a; IPBES 2014b).

The generic scoping report for the regional and subregional assessments of biodiversity and ecosystem services (IPBES 2014a) outlines the scope of Chapter 3 as, “Chapter 3 [...] box “Nature”, emphasizing th[...] “Nature's bene[...] assess what is known about the past and current trends

and future dynamics of biodiversity and ecosystems and their positive and negative effects on the key ecosystem goods and ser

will consider both structural and functional ecosystem diversity and genetic diversity and the area and extent of ecosystems and include fragile habitats and hotspots and species of special concern and importance such as Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) species, migratory species and International Union for Conservation of Nature (IUCN) threatened species, taking into account species listed at the national level where relevant. It will also include species that are important for the functioning of ecosystems and livelihoods. Available forecasts on current trends will also be outlined. The chapter will also explore how changes in "Nature" impact "Nature benefit to people". The chapter ref

Strategic Plan for Biodiversity and will address issues related to the three Aichi Targets under this goal (Aichi Targets 11, 12 and 13) as well as relevant aspects of Aichi Target 14." (Table 1)

The complementary scoping report for the regional assessment of biodiversity and ecosystem services for Asia-Pacific (IPBES 2014b) presents the geographic boundary of the assessment (Table 1) and highlights key datasets as, "Relevant datasets from ongoing activities drawn from a wide range of sources, including global, regional, national, subnational and local institutions and organizations will feed into the Asia-Pacific regional assessment. Some examples are national biodiversity and strategic action plans, national reports and data portals in the Global

Facility, the Indian Bio-resource Information Network, the Group on Earth Observa

Observation Network with regional components, the Asia-Pacific Biodiversity Observation Network and subregional or national components, the Japanese Biodiversity Observation Network and the Korea Biodiversity Observation Netw

the Economics of Ecosystems and Biodiversity for Southeast Asia; regional res

International (Asia Pacifc Oc

Resources Institute, the CGIA

Information, the International Centre for Integrated Mountain Development, the International Union for Conservation of Nature, and government research institutes.

and citizen science projects will also be used within the assessment report."

Table 1. Geographic areas of the IPBES Asia-Pacifc regional assessmen
([a]Overseas territory.) (IPBES 2014a)

Subregions	Countries and territories
Oceania	Australia, Fiji, Kiribati, Marshall Islands, Micronesia (Federated States of), Nauru, New Zealand, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu. Pacifc island territories of Cook Islands, New Caledonia, American Samoa[a], Tokelau[a], French Polynesia[a], Niue[a], Guam[a], Commonwealth of the Northern Mariana Islands, Pitcairn Island[a] and Wallis and Futuna[a]. Oceanic and sub-Antarctic islands in the Pacifc region (or Pacifc and Indian Ocean regions)
South-East Asia	Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste and Viet Nam
North-East Asia	China, Democratic People's Republic of Korea, Japan, Mongolia and Republic of Korea
South Asia	Afghanistan, Bangladesh, Bhutan, India, Iran (Islamic Republic of), Maldives, Nepal, Pakistan and Sri Lanka
Western Asia	Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates and Yemen (Arabian peninsula), Iraq, Jordan, Lebanon, State of Palestine and Syrian Arab Republic (Mashriq)

2.1 Contributions to the Zero Order Draft

Following an extensive literature review of the key datasets listed above, Chapter 3 Lead Authors and Young Fellows prepared candidate key messages for their respective biomes and subregions. Freshwater Lead Authors met for a three-day group meeting from the 3-6th November 2015 at the National Institute for Environmental Studies in Tsukuba to compile their respective contributions across subregions and freshwater subbiomes for the ZOD. This material was then submitted to the Chapter 3 Coordinating Lead Authors and Co-chairs to review for consistency and clarity prior to submission as the ZOD.

2.2 Zero Order Draft Internal Review

In late November 2015,

ZOD was initiated with Lead Authors undertaking to review chapters that they did not contribute to. On the 19th of January 2016 Chapter 3 Lead Authors received a total of 335 reviewer comm

revision of the ZOD.

3. Outlook and future directions

The ZOD of IPBES Regional Assessment for Asia and the Pacific paves the way forward to extend the early work of the Millennium Ecosystem Assessment (MEA 2005) with issues specific to the Asia- Pacific

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and subregions. At a scientific level, IPBES gives the opportunity to bring together the best scientists in biodiversity and ecosystem services and gives access to cutting-edge ideas and concepts for better natural resource management. From a community engagement perspective, IPBES is also providing tools for helping engaging with the wider community, with benefits to help mainstream the ecosystem services framework from science to policy.

IPBES has provided an over-arching framework for ecosystem assessments that link science to policy, but despite this achievement key knowledge and data gaps remain at the regional and sub- regional levels. The selection of appropriate indicators for biodiversity and ecosystems pose a particular challenge to producing a representative assessment of the regions biodiversity status and trends. To address this shortcoming, I recently attended the Future Earth Symposium on “Global Biodiversity Assessment and Monitoring Science, Data and Infrastructure Needs for IPBES and Beyond” in Monte Verità, Ascona, Switzerland from 6-10 March 2016. This was a joint symposium of the Future Earth Clusters ‘Global Biodiversity Assessment and Monitoring, Predictions and Reporting’ and ‘Support for IPBES’. The symposium [illegible] the scientific needs of IPBES, in particular around selection of indicators for biodiversity monitoring. The meeting brought together ~60 invited experts to identify and mobilize new, emerging and non-exploited indicators within the IPBES regional and global assessment work program. A joint synthesis paper on ‘Indicators for IPBES’ is [illegible] of preparation to help address the issues and data gaps identified in ZOD.

The ZOD IPBES Regional Assessment for Asia and the Pacific has now completed a second round of internal review revisions with an expected completion of the First Order Draft in May 2016. The IPBES work plan anticipates the full [illegible] will be completed by November 2017, after which it will be translated into the six languages of the United Nations and be sent for acceptance by governments at the Sixth session of the IPBES Plenary in March 2018.

4. Acknowledgements

I wish to thank the International Research Unit of Advanced Future Studies at Kyoto University for funding my visiting fellowship and host Professor Shin-ichi Nakano at the Centre for Ecological Research. Similarly, I am grateful to the [illegible] Institute for Environmental Studies and hosts Professor Noriko Takamura and Dr Taku Kadoya for arranging the Chapter 3 Freshwater Lead Authors ZOD writing meeting.

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*The original version of this report is [illegible] yukawa.kyoto-u.ac.jp/~future/icis/wp/wp-content/uploads/2016/04/2016-009-e.pdf

Report 1

The Future Earth Symposium on "Global Biodiversity Assessment and Mo
in Monte Verità, Ascona, Switzerland

New Site 1

Long-term feld research of a of Strobilanthes in Okinawa Island, Japan

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The Ryukyu Islands are at the southwestern part of the Japanese Archi ’s mainland being located in a temperate region, the Ryukyu Islands are in a subtropical region, so that many tropical plants are distributed only in the Ryukyu Islands. The Ryukyu Islands are divided into the northern Ryukyus, the central Ryukyus and the southern Ryukyus. The flora and fauna of these three regions are obviously different affected by geological history.

Okinawa Island in the central Ryukyus is the largest island of the Ryukyu Islands. Although Okinawa Island has the largest population in the Ryukyu Islands, most areas are still covered by natural forests in the northern part. This area is scheduled to become a national park in the near future (26°65'N, 127°91'E). The Motobu Peninsula, located in the northwestern of Okinawa Island, has some limestone mountains. The limestone area is partly preserved and quite a few plant species are endemic. I would like to introduce my study sites where i”MJmpkKE”wv“v*pbKDkp“(Acanthaceae), a 6-year periodical mass fowering plant, grows (Fig. 1; Kakishima *et al.* 2011).

Periodical mass fowering of bamboos (Janzen 1976). For many species of bamboos, almost all individuals in the population bloom together gregariously and die after fruiting. The

Fig. 1. i”MJmpkKE”wv“v*pbKDkp“(Acanthaceae)

Fig. 2. iv*pbKDkp“in the mass fowering year

mass fowering of bamboos occ depending on the species. The lengths of its intervals are 15–120 years. Although the evolution of periodical mass fowering of bamboos has difficult to verify because of its very long flowering interval. In contrast, the genus *Strobilanthes* includes species fowering in 3-16 year Most known species have 6-12 years intervals and it is interesting to note that *Strobilanthes* also has non-area (periodcial perennial polycar interval of *Strobilanthes* is relatively shorter than bamboos, so that *Strobilanthes* is more suitable to study the evolution of periodical m

I have studied periodical mass flowering of *S.* in the Motobu Peninsula since 2008. At the beginning (2008), it was predicted that next mass flowering year would be 2010. So, I firstly examined the distribution and life history of ifkv*pbKDkp“ Okinawa Island. iv*pbKDkp“was distributed in mostly limestone mountains such as Mt. Katsuu, Mt. Yae, Mt. Oppa, and Mt. Nago on the Motobu Peninsula. In their habitats, they were densely growing and covering forest floor. Flowering season of ifkv*pbKDkpwas winter (from November to March). They bore fruits from March to April and their seeds germinated soon. After fruiting, almost all individuals died.

Since 2008, I have examined the number of

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Fig. 3. Synchronous withering a...

fowering individuals ... in 6 populations (study sites): Mt. Katsuu, Mt. Yae, ... Mt. Nag... Awa and Mt. Iyu. In 2008 and 2009, I found that few individuals were fowering in 4 out of 6 populations, ... almost all individuals ... Decembe[r] 2009, I finally found that almost all individuals of *S.* [illegible] had flowers or flowering buds in all study sites (Fig. 2). Fortunately mass flowering had started as expected. A peak of ... was from December 2009 to January 2010. After that, flowers were decreasing but fowering continued to March (or April). In March 2010, a huge number of fruits were observed (sometimes more than 1,000 fruits per an individual). One fruits usually have 4 seeds, so they can produce several thousands seeds in total. After mass fowering, all indiv... numbe[r] of seedlings were observed in their habitats (Fig. 3). Seedlings covered forest floors that were completely opened because all parental individuals died (Fig. 4). Then, they will flower again after 6 years upon germination. Next year ... s were observed in 4 out of 6 populations. On the other hand, other two populations have some fowering individuals

This result means that a 6-year periodicity is common to all populations but synchronicity is variable among populations in Okinawa Island.

A closely related species, *S. tashiroi* is also distributed in Okinawa Island. *S. tashiori* is sometimes growing sympatrically with [illegible]. These two species are very similar but it is possible to identify the species based on pollen, bract and stamen morphology. From observational studies, it was revealed that *S. tashiroi* was not mass fowering sp... polycarpy. This result suggests that evolutionary switching of life history between periodical mass flowering and non-periodical perennial polycarpy occurred within a small taxonomic group.

Why did periodical mass flowering evolve? Two major hypotheses for periodical mass flowering, as well as for other mass flow... the predator satiation hypothesis and the pollination efficiency hypothesis. The predation satiation hypothesis is that even though seed predators are satiated to eat seeds (fruits), they cannot eat all seeds in mass flowering years because the number of seed predators do not increase proportionally. The pollination efficiency hypothesis is that pollination efficiency is higher in mass flowering years because many individuals are flowering synchronously. To verify these two hypotheses for [illegible], I examined predation rates of fruits and pollinator visitation frequency (Kakishima et al. 2011). Fruits of [illegible] were predated by larvae of plume moths (Pterophoridae sp.). A fruits predation rate in mass flowering year was significantly smaller than that of other years. One species of hummingbird hawk moths ([illegible]) and honeybees ([illegible]) were recorded as major pollinators of *S.*

Fig. 4 Seedlings covering forest floors ...

New Site 1

Fig. 5. A hummingbird hawk moth (2KbMJTkJ“”DSbJMO”wD“zkK”O*KE”wDS

Fig. 6. A honeybee (zp“Svkkpfvk

(Fig q 5 & 6). Pollinator visitation frequency is clearly higher in mass fowering year than that in years. Therefore, it is suggested that both the predator satiation hypothesis and the pollination efficiency hypothesis contribute to evolution and maintenance of periodical mSa.s sf ef.xo iwœarui lnigs of

In 2016, I had an opportunity to study mass flowering of ifkv*pbKDkpf the Motobu Peninsula for my second time. Periodical mass flowering was very accurate. Even though it takes long time to study periodical mass flowering, I will continue understanding periodical mass fowering. Now, I focus on periodical *Strobilanthes* not only fowering of in Japan but also in Taiwan and Java Island, Indonesia. However, I still need more information of periodical mass flowering of *Strobilanthes* in tropical Asia. If readers have information of periodical mass fowering of *Strobilanthes*, I hope readers would be willing to share them with me.

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New Site 2

A long-term research project on vocal communication of tits (family Paridae) in Karuizawa Wild Bird Forest

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(Japan)

Fig. 1. A nest box for Japanese tits

Fig. 2. A nestling of the Japanese tit

Karuizawa Wild Bird Forest was recognized as the first national bird forest in Japan (36°37'N, 138°60'E). This forest is located about 950-1,100 m above the sea level and approximately 9 km away from an active volcano, Mt. Asama. The forest consists of various tree species, such as the larch ("KMp*kvz"Jkvzp"), oaks (rDvMbD"bMp"zp), Kurulberries (2JMD"mJSmObp"), and giant dogwoods (5JMED"bJE"MJPvMCK). Owing to such plant diversity, species richness of bird community is exclusively high; more than 80 species of birds can be observed in the forest through the year. Residential bird species include forest birds, grass birds and water birds, and many species of birds of prey, such as sparrowhawks (bbpzp"vMEp"), and Northern goshawks (IIvE"pkp"), also inhibit in the forest. From late April to early May, many species of passerines, including blue-and-white flycatchers (pbvjDkKEKMbp"), Siberian blue robins ("D"bpEpKbOK), Japanese thrushes (IDMjD"bKMjp"), Asian stubtails (FMJ"zwvEK"+DKSvpbv), and ashy minivets (IvMpbMJbJ"D"jpPKMp), migrate to the forest for breeding. These birds leave Karuizawa between October and November. In the same season, some birds, such as Eurasian bullfinch (IOMMwDkK), hawfinch (5KMzJjKbD"MJ"), and long-tailed Urosageus sp., migrate from North to the forest for wintering.

Since 2005, I have been studying vocal communication of tits (species in the family Paridae) in this forest (36°37'N, 138°60'E). Four species of tits are inhibited as its residents in the forest; Japanese tits (IKMD"SpEJJ), willow tits (IJvbpkv SJE"KED"), varied tits (IJvbpkvPKMpJ), and coal tits (IvMpzKMD"K"). Among them, Japanese tits, coal tits, and varied tits use secondary cavities for breeding, whereas willow tits excavate nest holes by themselves. For secondary cavity species, it is easy to observe breeding ecology by attaching adequate nest boxes to tree trunks.

Since 2006, I have placed more than 100 nest boxes in the forest and monitored the breeding ecology and behavior of Japanese tits (Fig. 1). Japanese tits start building their nests in early May and females complete their clutches (6-13 eggs) in the middle of May. Nestlings typically hatch from the end of May to the early June and fledge from June (Fig. 2).

In this forest, jungle crows (5JMPD"SKbMJMwOEJbwJ") and Japanese rat snakes (ekKzwvbkpSKbJzwJMK) are two major predators of nestlings of Japanese tits. Jungle crows use their beaks to attack the nestlings from outside of the nest cavity. In contrast, Japanese rat snakes invade the nest cavity and then typically prey on all of the nestlings. Japanese tits use an ingenious way to avoid nest predation by these predators; parents

New Site 2

Fig. 3. A willow tit with color-rings for indivisual identifcation

produce acoustically discrete types of acoustic warning signals in response to different predator species. They produce "chicka" calls in response to crows, whereas they produce "jar" calls in response to snakes. Upon hearing "chicka" calls, nestlings crouch down inside their nest cavity, allowing them to evade the attack by the crow's beaks. In contrast, upon hearing "jar" calls, nestlings jump out of the nest cavity, leading them to avoid a snake's invasion. Thus, warning calls by the Japanese tits apparently function as "words" that denote different types of predators.

From autumn to winter, tits live in flocks with conspecific and heterospecific individuals. In such flocks, tits also use a variety of call types to transmit information. Tits produce "pi-tsu-pi" calls to warn about a general threat whereas they produce "di-di-di" calls to attract other fock members. Interesti two calls into fxed-seq of when leading other birds to approach and harass (i.e., mob) a predator. Field experiments show that the tits respond to "pi-tu-pi" calls by scanning for the danger, "di-di-di" calls by approaching the sound source, and "pi-tu-pi di-di-di" calls by a combined response, i.e., scanning and approaching. When the ordering of notes was artifcially reversed ("di-di-d tu-pi"), tits showed neither scan nor approach. This is the frst demonstration that "syntax" to provide a compound message to the others.

In such focks, communica a species, but also across species. For example, willow tits (Fig. 3) produce "tää" calls when discovering food source, thereby attracting both conspecific and heterospecific individuals to the patch. While this behavior may attract food competitors and may reduce the food intakes by willow tits, it would benefit the tits since they can reduce the risk of predation through foraging in mixed-species flocks and through the recognition of mutual warning calls. In fact, willow tits can recognize and understand the meanings of "chicka" (crow!) and "jar" calls (snake!) of Japanese tits and exhibit appropriate anti-predator behavior to them.

These studies are the outcome of my 11-years field study. The biodiversity of Karuizawa Wild Bird Forest promises to provide more findings and insights into the ecology and evolution of birds and other animals. As such, I will continue the research on vocal communication between birds in this forest. If you are interested in joining my research project, please feel free to contact me.

2016 International Field Biology Course (IFBC)

We held 2016 International Field Biology Course at Kiso, Nagano, Japan in August. The activities will be reported in the next DIWPA News Letter in March, 2017.

CALL FOR NEW MEMBER OF DIWPA

We are now calling for membership of DIWPA. Membership fee is no charge. When you become a member, you can;

1. Receive the DIWPA News Letter
   You can receive the News Letter by post or e-mail. News Letter contains various information of biodiversity research in Asia Pacifc area, especially (Asia–Pacific Biodiversity Observation Network) as w Network), IPBES (Intergovernmental Science and Policy big project which is “Observation, Evaluation and Pre Research and Technology Development Fund. All you can Letter except that AP-BON provides them in its own web

2. Apply for the Field Biology Course
   You can apply for the Field Biology Course sponsore participate the Field Biology Course which is organiz initiatives which conduct educational activities such as DIWPA even though some of the initiatives carry out biodiversity research.

3. Run your articles regarding your biodiversity activities in DIWPA News Letter
   DIWPA introduces our member’s various activities in DIWPA News Letter. Your activities would spread throughout the world, and you may receive more information about biodiversity conservation as well as the supports.

4. Build up a circle of friends within biodiversity res
   Ask DIWPA when you want some information of foreign c
   DIWPA can introduce people who have information you want. More than 400 members in 4 / countries belong to DIWPA network.

If you would like to join DIWPA, please contact to "DIW

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