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National Report for
the Convention on
Biological Diversity

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Section I. Information on the targets being pursued at the national level

Country

Thailand

National Targets

Target 1: By 2020, every sector, particularly the general publics and local communities, have understanding and awareness on the importance of conservation and sustainable use of biological diversity

Rationale for the National Target

Thailand has continued to place emphasis on strengthening knowledge and participation of various sectors in conservation of natural resources. By focusing on benefits of the conservation, the interconnection between nature and livelihoods and impacts from destruction of natural resources, the society has gradually gained knowledge and understanding on the importance of nature conservation. Biodiversity is however a recently invented terminology and therefore not widely adopted for general use. The majority of the public has thus remained unable to fully comprehend the term and to recognize the interconnection between biodiversity and the conventional concept of natural resources conservation. To this end, every sector, particularly local communities whose livelihoods depend on biological resources bases, needs to acquire better knowledge and understanding on biodiversity, including its direct and indirect benefits, in order to become more aware and exert their roles in the conservation and sustainable use of biological diversity.

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Level of application

Jurisdiction

National / Federal

Relevance of National Targets to Aichi Targets

Aichi Target components

1. Awareness of biodiversity values

Sub-Aichi Targets or Target components

2. Integration of biodiversity values

Target 2: By 2021, Biodiversity is integrated in curriculums of education institutes at every level.

Rationale for the National Target

Education is required to ensure that learning is consistent to current environments, resulting in adoption of learner's behaviors that are compatible to present settings, particularly in the era with the pressing problem of natural resources and environmental degradation and its impacts on humans and other life on earth. To this end, Thailand has directed national education toward enhancing environmentally sound livelihoods with the view to offer a long-term solution to the problem of environmental degradation. Such directive focuses on enabling learners to acquire knowledge, understanding and awareness on values of natural resources and envisages creation of attitudes and concerns on the need for surveillance and prevention of impacts from their degradation.

EN

Level of application

Jurisdiction

National / Federal

Relevance of National Targets to Aichi Targets

Aichi Target components

1. Awareness of biodiversity values

Sub-Aichi Targets or Target components

2. Integration of biodiversity values

Target 3: By 2020, Biodiversity is integrated in policies and plans of relevance at every level.

Rationale for the National Target

The review of the previous policies and plans on biological diversity revealed that several public agencies were unaware of the development of the policies and plans

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and of the possible involvement of their own missions in the implementation of such policies and plans. Such short-coming was particularly prevalence in local agencies where biodiversity content was found to be lacking in provincial development plans, local development plans and even provincial action plans for environmental management. Actions are therefore needed for ensuring integration of biodiversity issues in both the context and the enforcement of laws, regulations, measures and mechanisms that are related to the promotion of and the creation of incentives for conservation, restoration and sustainable use of biological diversity.

Level of application

Jurisdiction

National / Federal

Relevance of National Targets to Aichi Targets

Aichi Target components

2. Integration of biodiversity values

Sub-Aichi Targets or Target components

17. NBSAPs

Target 4: By 2020, financial mechanisms are available for mobilizing the protection, conservation, restoration and sustainable use of biodiversity.

Rationale for the National Target

Financial mechanism is vital for mobilizing practical management of biodiversity by providing both direct supports and indirect incentives for relevant sectors to collaborate in the protection, conservation, restoration and sustainable use of biological diversity. Therefore, Thailand needs to pursue development and adoption of financial mechanisms that are compatible and effective for implementing under the country's setting and lending themselves to enabling long-term cooperation between the sectors.

EN

Level of application

Jurisdiction

National / Federal

Relevance of National Targets to Aichi Targets

Aichi Target components

3. Incentives

Sub-Aichi Targets or Target components

20. Resource mobilization

Target 5: By 2020, regulations and legislations that obstruct participation in biodiversity management are revised.

Rationale for the National Target

National policies on biological diversity in Thailand are not legally binding and several agencies have therefore remained unaware of their own missions under such policies. This short-coming has resulted in the lack of regulation and legislation that encourage cross-sectoral participation in biodiversity management while pre-existing laws and regulations with focus on stringent control and preservation of biodiversity components have become an obstacle to the participation in sustainable management of biological diversity.

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Level of application

Jurisdiction

National / Federal

Relevance of National Targets to Aichi Targets

Aichi Target components

3. Incentives

Sub-Aichi Targets or Target components

5. Loss of habitats

Target 6: By 2021, management of biodiversity is mobilized with participation at every level.

Rationale for the National Target

With the lack of understanding on biodiversity in various sectors and the obstacle from pre-existing laws and regulations in enabling participation in biodiversity management, Thailand have placed emphasis on elimination of these problems with the view to ensure participatory management of biodiversity from policy-making to planning, implementation, surveillance, benefit-sharing, monitoring and evaluation levels. Such efforts are especially importance at local community level.

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Level of application

Jurisdiction

National / Federal

Relevance of National Targets to Aichi Targets

Aichi Target components

3. Incentives

Sub-Aichi Targets or Target components

15. Ecosystem resilience

Target 7: By 2021, incentives that are harmful to biodiversity are eliminated and/or phased out, and positive incentives for the conservation and sustainable use of biodiversity are promoted.

Rationale for the National Target

Thailand has recognized the cross-sectoral participation in conservation and sustainable use of biological diversity as a driving force in developing mechanisms to eliminate and/or phase out incentives that are harmful to biodiversity and to promote positive incentives for conservation and sustainable use of biodiversity, particularly in local communities. This also takes into account the pre-existing efforts of private sector and research communities that contribute to the conservation and sustainable use.

EN

Level of application

Jurisdiction

National / Federal

Relevance of National Targets to Aichi Targets

Aichi Target components

3. Incentives

Sub-Aichi Targets or Target components

5. Loss of habitats

Target 8: By 2020, the rate of loss of all natural habitats, including forests and coastal ecosystems, is at least halved.

Rationale for the National Target

Continuous change in land use derived from expansion of farming areas for monocropping and urban sprawl has adversely affected various kinds of natural habitats including forests, wetlands and coastal ecosystems. Such impacts have been further exacerbated by the increase in activities that are destructive and harmful to biodiversity the like of farming in head watershed areas and illegal fishing. The continue loss of biodiversity from these activities and the lack of documentation on their impacts have hindered efforts to plan and take actions to combat the problem. Thailand has therefore identified this target with the view to enable relevant sectors to recognize the importance of reducing the rate of loss of natural habitats to a predetermine milestone.

EN

Level of application

Jurisdiction

National / Federal

Relevance of National Targets to Aichi Targets

Aichi Target components

5. Loss of habitats

Sub-Aichi Targets or Target components

6. Sustainable fisheries

Target 9: By 2020, threatened species and endemic species have improved conservation status and measures are in place for conservation and protection of their habitats.

Rationale for the National Target

Threats to biodiversity including encroachment of natural habitats, deterioration of environmental quality and inappropriate use of natural resources, have continuously contributed to the loss of biodiversity in Thailand. Several species have been found extinct in nature while several more are endangered or under threat. Such problem is particularly critical for endemic plant species which are commonly found to have a very limited range. Measures for conservation and protection of the species' natural habitats are therefore urgently required.

EN

Level of application

Jurisdiction

National / Federal

Relevance of National Targets to Aichi Targets

Aichi Target components

12. Preventing extinctions

Sub-Aichi Targets or Target components

13. Agricultural biodiversity

Target 10: By 2021, networks of protected areas and ecosystem representations are interlinked and measures for management of areas in crisis and areas of importance for biodiversity and ecosystem services are developed.

Rationale for the National Target

Thailand has retained a number of relatively undisturbed ecosystems which are of significant importance for biodiversity. These areas including head-watershed forests, wetlands and coastal areas have been partially declared protected areas and enjoyed reduction in the level of threat brought about by their legal protection. Nevertheless, more systematic management of protected areas and areas with critically important ecosystems required not only effective management measures but also networking, supporting research and monitoring on species, integrating management of ecosystems, expanding management landscape and enhancing the areas' ecosystem services.

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Level of application

Jurisdiction

National / Federal

Relevance of National Targets to Aichi Targets

Aichi Target components

11. Protected areas

Sub-Aichi Targets or Target components

14. Essential ecosystem services

Target 11: By 2021, networks of protected areas and ecosystem representations are interlinked and measures for management of areas in crisis and areas of importance for biodiversity and ecosystem services are developed.

Rationale for the National Target

Thailand is an important genetic pool for both plant and animal species as seen in the

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existence of no less than 10,000 varieties of native rice. However, varieties, traits and other genetic materials have continued to be lost due to the failure to enable their re-propagation and their replacement by commercial varieties as well as the loss of farmlands and their natural habitats to natural disasters, encroachment and change in land use. Introduction of exotic breeds and cross-breeding of livestock have been driving native breeds into extinction and reducing genetic pools of livestock even further. To this end, measures are needed to manage, conserve and protect the country's genetic diversity.

Level of application

Jurisdiction

National / Federal

Relevance of National Targets to Aichi Targets

Aichi Target components

13. Agricultural biodiversity

Sub-Aichi Targets or Target components

12. Preventing extinctions

Target 12: By 2020, pollution has been brought to levels that are not detrimental to ecosystem function and biodiversity.

Rationale for the National Target

Pollutions derived from household, agricultural, tourist and industrial activities have had both direct and indirect impacts on ecosystems and biodiversity. The most notable of the pollutions include chemical contamination, poorly disposed hazardous and other solid wastes, water pollution and air pollution at the level that is detrimental to both human health and biodiversity. Controlling emission of pollutants at their sources and taking precaution to prevent contamination in atmospheric and other environments are therefore needed to protect ecosystems and biodiversity from the pollution.

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Level of application

Jurisdiction

National / Federal

Relevance of National Targets to Aichi Targets

Aichi Target components

8. Pollution

Sub-Aichi Targets or Target components

14. Essential ecosystem services

Target 13: By 2020, tools/mechanisms/guidelines on sustainable use of biodiversity are applied in all relevant sectors.

Rationale for the National Target

Relevant sectors in Thailand are still without adequate integration and adoption of tools, mechanisms and guidelines on management of sustainable use of biodiversity. To overcome such short-coming, there is the need to conduct reviews on existing rules and regulations of relevance, establishing mechanisms to monitor and control impacts of pollutions on ecosystems taking into account the ecosystems' carrying capacity, monitoring and reducing impacts of human activities on biodiversity in fragile ecosystems such as coastal areas and wetlands and other ecosystems affected by urban expansion, pollution, overfishing, tourism activities that exceed the carrying capacity of the ecosystem functions and climate change. Thailand has set measures to reduce the impacts of tourism activities on ecosystems that have been effected from climate change. In addition, Thailand is to pursue inclusion of biodiversity maintenance in various standards and criteria.

EN

Level of application

Jurisdiction

National / Federal

Relevance of National Targets to Aichi Targets

Aichi Target components

7. Areas under sustainable management

Sub-Aichi Targets or Target components

4. Use of natural resources

Target 14: By 2021, effectiveness in wetland management is improved at every level.

Rationale for the National Target

Fourteen wetlands in Thailand were enlisted as wetland of international importance or Ramsar Site by the Convention on Wetlands (Ramsar Convention). Additional 69 sites were identified as wetlands of international importance by Thailand's national wetland inventory while 67 wetlands were found to be of national importance. Furthermore, nearly 20,000 sites were noted as wetlands of local importance and/or wetlands in need of protection and rehabilitation. However, effectiveness in management of these wetlands has not been systemically evaluated at all levels and reviews on management tools and mechanisms as well as on assessment of wetlands are therefore required with the view to enhance such effectiveness nationwide.

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Level of application

Jurisdiction

National / Federal

Relevance of National Targets to Aichi Targets

Aichi Target components

11. Protected areas

Sub-Aichi Targets or Target components

10. Vulnerable ecosystems

Target 15: By 2021, loss of wetlands is significantly reduced with the view to ensure ecosystem services and to support climate change adaptation.

Rationale for the National Target

Thailand does not have specific legislation for management of wetlands, including those of international, national or local importance, and instead employs existing laws to regulate activities and prevent encroachment for various usages and development schemes that may adversely impact the wetland ecosystems and their functions as catchments and providers of water supply. An inventory carried out for wetlands at all levels has been accompanied by surveillance and monitoring of all possible threats to wetlands.

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Level of application

Jurisdiction

National / Federal

Relevance of National Targets to Aichi Targets

Aichi Target components

11. Protected areas

Sub-Aichi Targets or Target components

10. Vulnerable ecosystems

Target 16: By 2020, invasive alien species in various ecosystems are identified and enlisted.

Rationale for the National Target

Invasive alien species have been identified as a major threat to biodiversity. No less than 3,500 alien species was found Thailand and more species have continued to be introduced for commercial and agricultural purposes as well as for being used as pets and ornamental plants. Alien species capable of settle and distribute in new environments may become invasive and have adverse impacts on biodiversity as well as cause notable economic and social loss. Listing of invasive alien species is therefore required to enable prevention, control, elimination and utilization of invasive alien species in conservation areas and areas of importance to biodiversity of various ecosystems.

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Level of application

Jurisdiction

National / Federal

Relevance of National Targets to Aichi Targets

Aichi Target components

9. Invasive Alien Species

Sub-Aichi Targets or Target components

13. Agricultural biodiversity

Target 17: By 2020, measures are in place to manage priority invasive alien species and their pathways.

Rationale for the National Target

The impacts of invasive alien species on biodiversity in Thailand required identification of the species' pathways in order to prevent their introduction and settlement in the country.

EN

Level of application

Jurisdiction

National / Federal

Relevance of National Targets to Aichi Targets

Aichi Target components

9. Invasive Alien Species

Sub-Aichi Targets or Target components

13. Agricultural biodiversity

Target 18: By 2021, rules and regulations adhering to the precautionary approach for biosafety are available and applied by

relevant agencies for improvement and development of rules, procedures and mechanisms to regulate transboundary movement of living modified organisms (LMOs) in accordance to the obligations of the Cartagena Protocol on Biosafety

Rationale for the National Target

Despite the development of the national biosafety guideline for activities that involved modern biotechnology in order to provide a national framework which is consistency to both the criteria of internationally recognized organizations and the pre-existing national regulations of relevance, Thailand is still without specific legislation to regulate adverse impacts from modern biotechnology to biodiversity and remains uncertain in addressing liability and redress of biodiversity damage derived from transboundary movement, transit, handling and use of living modified organisms. In addition, further building of biosafety capacity is required for public agencies, private sector and the general publics in implementing the Cartagena Protocol on Biosafety.

EN

Level of application

Jurisdiction

National / Federal

Relevance of National Targets to Aichi Targets

Aichi Target components

13. Agricultural biodiversity

Sub-Aichi Targets or Target components

9. Invasive Alien Species

Target 19: By 2020, mechanisms, rules and regulations on access to and benefit sharing of genetic resources and traditional knowledge are available for Competent National Authorities.

Rationale for the National Target

Thailand has assigned the Competent National Authorities with the tasks of regulating access to and benefit sharing of natural resources and biodiversity by utilizing relevant

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laws and the authorities' own regulations to approve such access as well as actions related to the conservation and sustainable use. However, most of these laws including National Reserved Forest Act (1964), National Park Act (1961) and Plant Variety Act (1975) had long been enacted before the adoption of the Nagoya Protocol on Access and Benefit Sharing (ABS) and therefore need to be reviewed and revised to accommodate specific provisions on the access to and benefit sharing of genetic resources in order to provide practical guidance for current circumstance as well as to meet the need to protect traditional knowledge related to the genetic resources.

Level of application

Jurisdiction

National / Federal

Relevance of National Targets to Aichi Targets

Aichi Target components

16. Nagoya Protocol on ABS

Sub-Aichi Targets or Target components

18. Traditional knowledge

Target 20: By 2020, mechanisms for management of access to, sharing of benefits derived from and monitoring of utilization of genetic resources are integrated.

Rationale for the National Target

Thailand has assigned several agencies for regulating access and benefit sharing of natural resources and biodiversity, including law enforcement agencies and agencies in possession of biological resources for technical purposes. Therefore, mechanisms for managing the access and benefit sharing need to be integrated in order to provide a common directive for protecting national rights and interests over biological resources and enhancing sharing of benefits derived from biodiversity.

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Level of application

Jurisdiction

National / Federal

Relevance of National Targets to Aichi Targets

Aichi Target components

16. Nagoya Protocol on ABS

Sub-Aichi Targets or Target components

19. Biodiversity knowledge

Target 21: By 2021, mechanisms, rules and regulations related to access and benefits sharing of genetic resources are developed by research and local communities.

Rationale for the National Target

The Nagoya Protocol on Access and Benefit Sharing takes into account the interconnection between genetic resources and local knowledge, recognizes the need to ensure sustainable livelihood of communities and pays attentions to the rights of local communities as owners of the knowledge. In meeting such directives, Thailand needs to enhance capacity of local communities and other relevant sectors, particularly the research communities, in ensuring appropriate, fair and equitable access and benefit sharing of genetic resources. They start the community registration system which responses to the (Draft) Biosafety Law B.E. ...

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Level of application

Jurisdiction

National / Federal

Relevance of National Targets to Aichi Targets

Aichi Target components

16. Nagoya Protocol on ABS

Sub-Aichi Targets or Target components

19. Biodiversity knowledge

Target 22: By 2021, measures and mechanisms are available for returning economic revenues from biological products to their origins in order to support conservation and sustainable use of biological diversity.

Rationale for the National Target

Biodiversity has continued to provide benefits to Thailand in various kinds including agricultural produce, forest products as well as applications of biodiversity values and relevant traditional knowledge in utilization its components in ever growing food, cosmetic, health care, herbal and local production businesses. Such benefits have yielded tremendous fiscal returns to the countries and enabling better distribution of wealth to local communities. Therefore, measures and mechanisms for management of benefits derived from ecosystem services and appropriate access to natural resources should be promoted to ensure that the benefits are returned to their origins and used for their conservation in sustainable manner.

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Level of application

Jurisdiction

National / Federal

Relevance of National Targets to Aichi Targets

Aichi Target components

16. Nagoya Protocol on ABS

Sub-Aichi Targets or Target components

4. Use of natural resources

Target 23: By 2021, mechanisms are available for integrating and linking databases on biodiversity and other sources of relevant scientific information, enabling effective use of all existing technical resources.

Rationale for the National Target

Implementation of Thailand's Master Plan for Biodiversity Management involves

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actions by various sectors. In the public sector, major agencies under the Ministry of Natural Resources and Environment, the Ministry of Agriculture and Cooperatives, the Ministry of Public Health and the Ministry of Science and Technology were expected to take the lead in the implementation with supports from the Ministry of Interior, the Ministry of Education, the Ministry of Foreign Affairs, and the Prime Minister's Office and coordination by the Office of Natural Resources and Environmental Policy and Planning. To meet the needs of cross-sectoral and inter-agency actions, effective knowledge and information management are needed and would include conducting inventories, improving biodiversity databases, developing biodiversity meta-databases and enlisting biological resources and relevant local knowledge with reference that adheres to internationally recognized standards.

Level of application

Jurisdiction

National / Federal

Relevance of National Targets to Aichi Targets

Aichi Target components

19. Biodiversity knowledge

Sub-Aichi Targets or Target components

16. Nagoya Protocol on ABS

Target 24: By 2021, databases on priority biodiversity issues are available.

Rationale for the National Target

In Thailand, authority over management of natural resources and the environment was partially decentralized and allocated to local administrations. The local administrators are to cooperate with central authorities (through their local branches) in maintaining and restoring natural resources, increasing urban green areas as well as protecting natural reservoirs, farmlands and natural vegetation. They are also tasked to encourage municipalities to conduct systematic inventory on urban biodiversity with the view to enable more sustainable town management.

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Level of application

Jurisdiction

National / Federal

Relevance of National Targets to Aichi Targets

Aichi Target components

19. Biodiversity knowledge

Sub-Aichi Targets or Target components

2. Integration of biodiversity values

Target 25: By 2021, biodiversity inventories are systematically carried out by municipalities of every level.

Rationale for the National Target

In Thailand, there are several short-comings related to development and utilization of database on natural resources and biodiversity. These include limited scopes of databases developed to meet very specific needs of each specialized organization, the lack of data compatibility and linkage, poor documentation on local and traditional knowledge and the absence of databases on certain priority issues on biodiversity. Therefore, additional databases should be developed to expand coverage of information services vital to protection of biodiversity related traditional knowledge and the rights and interests of the countries and communities over the knowledge.

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Level of application

Jurisdiction

National / Federal

Relevance of National Targets to Aichi Targets

Aichi Target components

19. Biodiversity knowledge

Sub-Aichi Targets or Target components

18. Traditional knowledge

Section II. Implementation measures, their effectiveness, and associated obstacles and scientific and technical needs to achieve national targets

Measure 1: Strengthening awareness and education on biodiversity

Measures taken to contribute to the implementation of your country's national biodiversity strategy and action plan

This measure consists of 2 actions which are; (1) building awareness and providing education on the importance of biodiversity, and (2) promoting and supporting for inclusion of biodiversity content in curriculums of education institutes at every level as well as revising and updating existing curriculum to better accommodate current circumstances, including those on biodiversity. Several public agencies, education institutes, private sectors and NGOs were found to participate in activities or projects related to these actions, particularly in awareness building, promoting education and transferring relevant knowledge.

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National Target(s)

Target 1: By 2020, every sector, particularly the general publics and local communities, have understanding and awareness on the importance of conservation and sustainable use of biological diversity
Target 2: By 2021, Biodiversity is integrated in curriculums of education institutes at every level.

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes

Measure taken has been partially effective

tools or methodology used for the assessment of effectiveness above

Thirty-six point nine percent of respondents in a survey of relevant agencies were found to place an emphasis on building knowledge, understanding and awareness on the values and the importance of biodiversity. They were reported to carry out projects or activities to strengthen awareness, knowledge and understanding on conservation and sustainable use of biodiversity while education institutes in various regions of the country were found to play greater roles in enabling their participation in building public awareness on these issues. Although participation of business and civil sectors was enhanced, integration of biodiversity context in policy-making and planning processes was found to remain lacking at agency, local and community levels.
Nevertheless, both public and private organizations reportedly developed work

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plans to strengthen the awareness of their personnel, provide relevant knowledge including by organizing exhibitions and activities on important days for biodiversity, integrate natural resources and biodiversity context in various subjects of formal curriculums and establish learning facilities such as biodiversity learning centers, natural classrooms and botanical study centers. As far, these actions were implemented by education institutes as well as by a number of private firms including Charoen Pokphand Foods PCL., SCG Cement PLC., and PTT PLC., in association with public organization the like of the National Science Museum, Thailand (NSM).

In addition, the National Education Plan for 2017 – 2036 stipulates development of a strategy for providing education for enhancing environmental sound livelihood and inclusion of biodiversity context in the learning standards and indicators for science and mathematic, geography and social study programs (in the 2017 versions) of the 2008 general curriculum for basic education under the supervision of the Ministry of Education.

Obstacles and scientific and technical needs related to the measure taken

- Limited human resources in agencies undertaking biodiversity actions due to lack of career incentive.
- Knowledge on biodiversity management in several areas has not been adequately compiled and/or sufficient integrated with that in other organizations. Awareness building actions were found to take place only in communities where public agencies had sufficient information.
- Local administrations and the publics were found to be without adequate information on funding sources for local biodiversity actions and required public agencies in their respected regions to provide supervision for their actions.
- Actions are needed to enable exchange of knowledge on biodiversity management between different areas and to use lessons learned form activities to build on such knowledge.

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Measure 2: Integration of and promotion of participation for biodiversity management

Measures taken to contribute to the implementation of your country's national biodiversity strategy and action plan

This measure consists of 3 actions which are; (1) enhancing effectiveness in biodiversity management and in implementation of international obligations of relevance, (2) Integration of biodiversity management through inclusion of biodiversity context in policies and plans at national, sectoral, institutional,

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provincial, local and communities levels as well as in national account, and (3) promotion of community and other cross-sectoral participation in conservation, restoration and sustainable use of biodiversity. These actions were envisaged for implementation by public agencies, particularly in developing capacity of relevant sectors, promoting actions of involved parties on the ground and providing logistic and other supports.

National Target(s)

Target 3: By 2020, Biodiversity is integrated in policies and plans of relevance at every level.

Target 4: By 2020, financial mechanisms are available for mobilizing the protection, conservation, restoration and sustainable use of biodiversity.

Target 5: By 2020, regulations and legislations that obstruct participation in biodiversity management are revised.

Target 6: By 2021, management of biodiversity is mobilized with participation at every level.

Target 7: By 2021, incentives that are harmful to biodiversity are eliminated and/or phased out, and positive incentives for the conservation and sustainable use of biodiversity are promoted.

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes

Measure taken has been partially effective

tools or methodology used for the assessment of effectiveness above

A cross-sectoral survey with focus on local communities and networks involved in protection, conservation, restoration and sustainable use of biodiversity noted networks of communities and community organizations for their contributions to study and research on local knowledge. Networks of public agencies were found be instrumental in installing organizational structures (i.e. committees) for actions and in enabling conventional study and research while networks of education institutes and businesses were reported to play a vital role in providing financial supports to communities for biodiversity protection, including those undertaken with coordinated actions by networks of local forest protection volunteers, marine and coastal resources conservation volunteers, or local environment protection volunteers.

In addition, Thailand has integrated biodiversity management into a number of national policies, plans and measures, including the 20-Year National Strategy (2018-2038), the Twelfth National Economic and Social Development Plan (2017-2021), the 20-Year Strategy of the Ministry of Natural Resources and Environment (2017-2036), the Policies and Plans for Promotion and Conservation of National Environmental Quality (2017-2036), Environmental Quality Management Plan (2017-2021), the National Master Plan for Climate Change Adaptation (2015-2050), the 2017 constitution, the Royal Decree on Fisheries

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(2017) the National Maritime Security Plan (2015-2021).

Furthermore, a number of laws and regulation were revised to enable integration of biodiversity management. These include the 2016 National Reserve Forest Act and the 2015 Fishery Act and the Royal Decree on Fisheries (2017). Notable actions taken by the private were those carried out by PTT PLC. and include development of a standard for management of biodiversity and ecosystem services with the view to clarify the process for submission of proposals for management actions in the companies and by its subsidiaries, formulation of guidance on biodiversity and ecosystem services with inclusion of methodologies on assessments of risk to and values of biodiversity and ecosystem services for development of new projects. Several other public firms, such as Bangchak Corporation PLC. and Ratchaburi Electricity Generating Holding PLC., were found to actively participate in conservation and rehabilitation of natural forests and other ecosystems.

Obstacles and scientific and technical needs related to the measure taken

- Information and knowledge on biodiversity remain technically oriented and is not readily comprehensible by the general publics, particularly in enabling understanding of its roles in linking natural environment with livelihoods. Such difficulty has hindered wider understanding of the concept and cross-sectoral participation in planning for and sustainable use of biodiversity, including that at community level.

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Measure 3: Conservation, restoration and protection of biodiversity

Measures taken to contribute to the implementation of your country's national biodiversity strategy and action plan

This measure consists of 5 actions which are; (1) enhancing effectiveness and efforts in management of protected and conservation areas, (2) reducing the rate of habitat loss and rehabilitating deteriorated ecosystems with the view to maintain their ecosystem services for climate change adaption and for combating desertification, (3) developing mechanisms to protect and rebuild populations of endemic species and threatened species identified in Thailand Red Data, (4) conserving and protecting genetic diversity of plants and animals used in agriculture, Including native species, wild relatives and microbes, as well as other species of economic, social, cultural and ecological importance and (5) promoting adoption of landscape and seascape approaches in managing biodiversity in order to enhance conservation and sustainable use of biodiversity as well as to

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maintain ecosystem services. Most agencies identified to carry out these actions had been known to undertake activities on biodiversity conservation, restoration and protection and had continuously initiated projects and program to protect, maintain and rehabilitate natural habitats and ecosystems. Of these, the public agencies were found to play more active roles and undertake more diverse measures than those in other sectors.

National Target(s)

Target 10: By 2021, networks of protected areas and ecosystem representations are interlinked and measures for management of areas in crisis and areas of importance for biodiversity and ecosystem services are developed.

Target 11: By 2021, networks of protected areas and ecosystem representations are interlinked and measures for management of areas in crisis and areas of importance for biodiversity and ecosystem services are developed.

Target 8: By 2020, the rate of loss of all natural habitats, including forests and coastal ecosystems, is at least halved.

Target 9: By 2020, threatened species and endemic species have improved conservation status and measures are in place for conservation and protection of their habitats.

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes

Measure taken has been partially effective

tools or methodology used for the assessment of effectiveness above

Only mangrove forests, coral reefs and wetlands were found to enjoy reduction in the rate of habitat loss. The habitat loss and degradation for forests and seagrass beds remained significant. However, there have been educational activities, promoting local participations in restoration, awareness raising, and annual assessment of seagrass beds. Therefore some positive trends on the loss were reported. The national target of having 40 % of the country as forest areas has not been achieved. Nevertheless, agencies from every sector were found to consistently commit to expanding forest cover, making it possible for the target to be met in the foreseeable future.

An additional protected area was established after the previous national reporting. Tools for assessment of protect area's effectiveness were introduced and applied in selected types of protected areas including environment protected areas, national parks and wildlife sanctuaries.

Continuous conservation efforts reportedly contributed to the increase in population sizes of threatened species of elephants, gaur, tapirs, tigers and leopards. The previously extinct Sarus Crane was reintroduced into the wild after the success in captive breeding of the species.

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Obstacles and scientific and technical needs related to the measure taken

- Economically oriented development policies which are harmful to biodiversity. These include activities that lead to cross-breeding between native and exotic species and introduction of invasive alien species.
- Plans, procedures and measures on conservation were often developed without feed-backs from implementers, resulting impractically and ineffectiveness in their implementation.
- Integration of efforts in conservation and restoration of biodiversity between agencies remained lacking.

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Measure 4: Reducing threats to and enabling sustainable use of biodiversity

Measures taken to contribute to the implementation of your country's national biodiversity strategy and action plan

This measure consists of 4 actions which are; (1) ensuring sustainable and environmentally responsible management of farmlands, aquaculture and forestry by integrating biodiversity in environmental standards of relevance with the view to enable conservation of biodiversity and ecosystems, (2) protecting natural resources of marine and coastal areas, wetlands and other fragile ecosystems from the impacts of urban expansion, pollution, overfishing and climate change, (3) promoting sustainable tourism with local participation and by taking into account ecosystem services and biodiversity conservation and (4) regulating and managing populations of plants and animals, taking into account ecological balance and the need to prevent emerging disease that may adversely affect biodiversity. The majority of these actions were expected to be undertaken by public agencies at both policy-making and implementation levels and supported by the education sector in developing capacity for rehabilitation and sustainable use of biodiversity and by the private sector in enabling actions at local levels.

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National Target(s)

Target 12: By 2020, pollution has been brought to levels that are not detrimental to ecosystem function and biodiversity.

Target 13: By 2020, tools/mechanisms/guidelines on sustainable use of biodiversity are applied in all relevant sectors.

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes

Measure taken has been partially effective

tools or methodology used for the assessment of effectiveness above

Agroforestry and sustainable agriculture system were promoted, particularly in buffer zones of protected areas. In addition, the 6th guideline of the 10 operational guidelines for sustainable agriculture was noted for placing a focus on “utilization of biodiversity to enable diversity of farming activities, mutually supportive combination of production activity, natural based pest control and chemical free farming production”.

Sustainable use of forest biodiversity was promoted with local restoration and conservation of cultural forests as well as development of incentives for conservation and sustainable use through rehabilitation of natural environments of national parks, promotion of ecotourism and enabling community participation in conservation and rehabilitation of forests in several areas. Furthermore, the national work program on forest biodiversity (consisted of 130 activities for 27 objectives of 12 targets under 3 headings) was revised to include guidance on promotion of sustainable use of forest biodiversity for achieving the objective on enhancing use of forest resources to support conservation of forest biodiversity (Objective 1) of the target on promotion of sustainable use of forest resources (Target 4) under the heading on conservation, sustainable use and benefit-sharing (Heading 1).

Public, private and civil sectors jointly made a declaration to “cooperate in improving Longtail Tuna fishing in the Gulf of Thailand for sustainable use of the species”. The declaration aimed to ensure sustainable use of oceans and marine resources as well as to promote and build incentives for their conservation and sustainable use. For freshwater fishery, approximately 400-600 million freshwater fishes were released at 800 sites nationwide in an effort to motivate local communities to conserve the species. In addition, networks of the civil sector were provided opportunities to participate in actions against overfishing and other activities that adversely impact aquatic species and their habitats, including by using mechanisms made available by the provincial committees on regulation and protection of marine and coastal resources in every coastal province.

Sustainable tourism was promoted with development of the national policy and guideline for development of ecotourism (1995-1996) and adoption of the action plan on ecotourism (with 37 projects of 14 work plans) as a national guidance.

Efforts to reduce water pollution included the monitoring of water quality in 59 riparian reservoirs and 6 static reservoirs. Using the Water Quality Index (WQI), the 2017 water quality report found that 17 percents of freshwater reservoirs had deteriorated water quality, indicating a reduction from that in the previous year. No reservoir was reported to have severely deteriorated water quality. Another report on water quality for marine environment utilized Marine Water Quality

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Index (MWQI) and noted that water quality of 4 percents of marine was in the state of deterioration to severe deterioration in 2017 (also a reduction from that in the previous year).

Obstacles and scientific and technical needs related to the measure taken

- Models are required to ensure that expansion of forestlands is compatible with other land-use.
- Providing supports for agricultural researches on value added initiatives and development of biodiversity innovations as a driving force toward bio-economy.

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Measure 5: Wetland management

Measures taken to contribute to the implementation of your country's national biodiversity strategy and action plan

This measure consists of 4 actions which are; (1) integration of wetland issues in relevant policies, plans, tools, mechanisms and networks in order to enhance effectiveness of wetland management, (2) building capacity of public agencies, NGOs and local communities to ensure effectiveness in undertaking the conservation and sustainable use of wetlands, (3) developing inventories of important wetlands and (4) conducting surveillance of and monitoring threats to wetlands as well as promoting their sustainable use. While most of these actions were expected to be implemented by public agencies responsible for integration of wetlands issues into policies and plans at various levels, protection of wetlands at local level would require cross-sectoral participation including contributions of the education sector in building awareness on importance of wetlands and of the private sector in building civil capacity for their conservation and management.

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National Target(s)

Target 14: By 2021, effectiveness in wetland management is improved at every level.

Target 15: By 2021, loss of wetlands is significantly reduced with the view to ensure ecosystem services and to support climate change adaptation.

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes

Measure taken has been partially effective

tools or methodology used for the assessment of effectiveness above

The national mechanism for wetland management is the National Committee on

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Wetland Management and the Technical Working Group on Wetland as well as the Ministry of Natural Resources and Environment who was appointed as the main responsible agency for wetland actions. Wetlands committees were also established at provincial level in order to support activities in local areas and to provide for cross-sectoral participation in supervising and implementing the activities.

Measures were developed for conservation of wetlands of international and national importance and for wetland conservation in general. These measures were endorsed by the cabinet on November 3, 2009 and May 12, 2016 and aimed to reduce the loss of wetland ecosystems, ensure appropriate use of their ecosystem service and enable wetlands to support climate change adaptation.

Ramsar sites in Thailand were mostly supervised by public agencies and found to be relatively unchanged at landscape level, despite impacts of tourism on ecosystems and other environmental quality. For other wetlands, reports by relevant agencies indicated that most of gullies, ponds and natural swamps were loss to other kinds land uses, including urban expansion and farming.

Situation regarding coastal wetlands in 2017 was relatively stable and natural resources found in these wetlands were reported to remain largely intact, contributing to maintenance of the area's unique features and meeting the needs of local and regional populations. Wetlands of Phang Nga Bay were noted for being under-utilized by migratory birds due to intensive tourist activities, particularly those related to water-sport. It's believed that the migratory birds chose to visit adjacent areas of the wetlands instead.

Obstacles and scientific and technical needs related to the measure taken

- Importance of wetlands was inadequately presented and/or highlighted in various aspects of spatial development.
- Uncertainty of wetlands' boundaries.

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Measure 6: Management of invasive alien species

Measures taken to contribute to the implementation of your country's national biodiversity strategy and action plan

This measure consists of identification, classification and prioritization of invasive alien species and their pathways; controlling and eradicating priority alien species and taking measures to manage the pathways with the view to prevent the introduction and settlement of the invasive alien species. The measure was to be mostly implemented by the responsible public agencies, with supports by the education sector on information gathering and inventory and by the private sector in promoting the use of native species (instead of introduced species) for habitat rehabilitation and other relevant activities.

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National Target(s)

Target 16: By 2020, invasive alien species in various ecosystems are identified and enlisted.

Target 17: By 2020, measures are in place to manage priority invasive alien species and their pathways.

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes

Measure taken has been partially effective

tools or methodology used for the assessment of effectiveness above

A revision on the national measures on protection against, control of and eradication of invasive alien species was endorsed by the cabinet on February 2, 2018 and includes an additional operational guidance on invasive alien species identified to be economically viable. The national inventory of alien species was also updated and presently contained 323 species (an increase from 273 species in the 2009 list). In addition, the revised inventory contains guidance on control and eradication of priority alien species in order to provide relevant agencies with a tool for taking effective steps in dealing with invasive alien species. A handbook on invasive plant species was also made available for the general publics.

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Five measures developed for protection against, control of and eradication of alien species consist of (1) development of policies, plans, regulation and budgets for actions, (2) management of alien species, (3) surveillance and monitoring of alien species, (4) providing supports to researches on alien species and (5) building awareness and providing knowledge on alien species. In addition, a guideline on for control and eradication of priority alien species was drafted for both priority alien plants and animal species.

Obstacles and scientific and technical needs related to the measure taken

- Inventories and development of measures on management of invasive alien species in different ecosystems.
- Establishing communication channels and networks for notifying information on alien species and a simple tool for identifying invasive alien species.
- Species identification sometimes can be quite difficult, therefore people will not know exactly if something is an alien species.

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Measure 7: Biosafety

Measures taken to contribute to the implementation of your country's national biodiversity strategy and action plan

This measure concerns establishment of a system to operate processes for living modified organisms (LMOs) and pursuing implementation of the bill on biosafety in modern biotechnology. This measure was to be almost entirely implemented by the responsible public agencies with relatively little participation by the education, private and civil sectors.

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National Target(s)

Target 18: By 2021, rules and regulations adhering to the precautionary approach for biosafety are available and applied by relevant agencies for improvement and development of rules, procedures and mechanisms to regulate transboundary movement of living modified organisms (LMOs) in accordance to the obligations of the Cartagena Protocol on Biosafety

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes

Measure taken has been partially effective

tools or methodology used for the assessment of effectiveness above

Development and revision were made on 4 operational guidelines on biosafety. These include the 2016 revisions of the Biosafety Guidelines for Work Related to Modern Biotechnology and the Biosafety Guidelines for Contained Used of Genetically Modified Microorganisms at Pilot and Industrial Scales, the 2015 revision of the Guidelines on Biosafety Assessment of Living Modified Plants with Stacked Gene and their Derivatives and the development of a Practical Guide to Containment: Plant Biosafety in Research Greenhouses (2013). The revisions were carried out with the view to ensure that the guidelines are consistent to the latest biosafety criteria of international organizations and international regulations of relevance to Thailand.

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Efforts were further made to pursue enforcement of the new rules and regulations on biosafety in modern biotechnology by ensuring their inclusion in the bill on biodiversity, to develop additional ministerial regulations and criteria of relevance and to establish biosafety committees at various levels.

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Obstacles and scientific and technical needs related to the measure taken

- The lack of consistent allocation of national budget for implementation biosafety measures and the lack of attention on biosafety in general.

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Measure 8: Protection of genetic resources

Measures taken to contribute to the implementation of your country's national biodiversity strategy and action plan

This measure concerns the protection of and sharing of benefits derived from utilization of biological and genetic resources in order to maximize national interest. This measure was to be mostly implemented by limited number public agencies with relevant missions and focuses on actions to protect genetic pools and resources and to enable access and benefit sharing in accordance to the Nagoya Protocol. Implementation of the measures is also a part of ongoing efforts in gathering information on good practices, developing legislation to protect genetic pools, regulating access to native plants and wild relatives for research and breeding purposes and ensuring ethics in animal experimentation and other aspects of researches. To this end, the education sector, the private sector, NGOs and local communities have minimal involvement in the implementation of this measure.

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National Target(s)

Target 19: By 2020, mechanisms, rules and regulations on access to and benefit sharing of genetic resources and traditional knowledge are available for Competent National Authorities.

Target 20: By 2020, mechanisms for management of access to, sharing of benefits derived from and monitoring of utilization of genetic resources are integrated.

Target 21: By 2021, mechanisms, rules and regulations related to access and benefits sharing of genetic resources are developed by research and local communities.

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes

Measure taken has been partially effective

tools or methodology used for the assessment of effectiveness above

Of 10 laws and regulation related to biological resources, none was found to stipulate any mandatory sharing of benefits derived from access to and utilization of the resources and no information was reported on any law enforcement that constitute such benefit sharing. The National Center for Genetic Engineering and Biotechnology was noted for its current effort to develop a regulation on access to and benefit sharing of biological resources in its custodian. Taking into account the drafting of the bill on promotion and conservation of native species of domesticated animal and the pre-existing laws and regulations related to access and benefit sharing of natural resources, the scope of current legislations has not covered traditional and local knowledge of relevance as well as components of marine and coastal biodiversity.

The revision of the bill on biodiversity may include concise regulation on access and benefit sharing while local rules/regulations on access and benefit sharing of genetic resources were being drafted to enable pilot implementation of these rules/regulations in selected communities. The rules/regulation were developed in accordance to internationally recognized principles and criteria of relevance and to be accompanied by inventory and mapping of biological resources and associated traditional knowledge as well as by establishment of community committees on protection and maintenance of biological resources and associated local knowledge.

The Patent Act was being revised to accommodate disclosure of origins of genetic resources and associated traditional knowledge while efforts were made to pursue revision of other related laws and regulation including the law on promotion and protection of intellectual heritages and the regulation on access to rice genetic resources.

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Obstacles and scientific and technical needs related to the measure taken

- The lack of management on conservation by and benefit sharing for locals. For example, the need for local participation in tourist operations in coral reefs in order to provide income to local communities and ensure local protection of the reefs.
- The lack of measures to accommodate appropriate tourist activities in conservation areas, including zoning and criteria for public usage of the areas.

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Measure 9: Research and development for bio-economy

Measures taken to contribute to the implementation of your country's national biodiversity strategy and action plan

This measure consists of 3 actions which are; (1) promotion of research on value added, (2) building capacity for development of bio-economy and (3) promoting and developing mechanisms for management of benefits derived from ecosystem services and access to biological resources with the view to use the benefits for the conservation and sustainable use of biodiversity. Implementation of this measure concerns research organizations and their donors in both the public and the education sectors. Although very few organizations were found to be interest on bio-economy, modern information technology has continued to expand knowledge on the issue by enable better access to associate information.

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National Target(s)

Target 22: By 2021, measures and mechanisms are available for returning economic revenues from biological products to their origins in order to support conservation and sustainable use of biological diversity.

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes

Measure taken has been partially effective

tools or methodology used for the assessment of effectiveness above

Researches were conducted to add values to various products including silks and orchid extracts as well as to utilize nano technology to enhance herbal derivatives and to investigate local herbs for their industrial applications. In addition, continuous efforts were made to develop community enterprises for conservation and sustainable use of biodiversity while standards and certification systems were developed to enable bio-economy branding that indicates efficient use of biological resources and their associated local knowledge, returning of revenue toward conservation and restoration of origins of the resources and its contribution to development of sustainable economy. Furthermore, bio-based business centers and bio-based economic institutes were established in association with efforts to build market opportunities for bio-based products and to create networks to return economic benefits to ecosystems in accordance to the PES concept.

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No common format or mechanism was found available for managing benefits derived from ecosystem services and access to biological resources for conservation and sustainable use of biodiversity.

Obstacles and scientific and technical needs related to the measure taken

- In building capacity for development of biodiversity based products, public agencies were often found to provide support to groups with lesser needs for additional capacity and should direct their efforts to other potential producers in need for such capacity.

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Measure 10: Management of knowledge and databases

Measures taken to contribute to the implementation of your country's national biodiversity strategy and action plan

This measure consists of 3 actions which are; (1) development and improvement of biodiversity databases with internationally recognized standards, (2) supporting operations and pursuing establishment of museums and gene banks of plants, animals and microbes with internationally recognized standards and (3) promoting and improving management of biodiversity information, including by applying and transferring technologies associated with sustainable use of biodiversity. Implementation of this measures involved several technical institutions including institutes for taxonomic study of marine organisms, colleges in several regions of the country with research programs on local knowledge and national universities that conducts studies on herbs, local species and other biodiversity components. In addition, public agencies were found to gather information, develop databases and disseminate knowledge on biodiversity while the business sector, NGOs and local communities adopted the knowledge and made use of the databases for actions on sustainable uses.

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National Target(s)

Target 23: By 2021, mechanisms are available for integrating and linking databases on biodiversity and other sources of relevant scientific information, enabling effective use of all existing technical resources.

Target 24: By 2021, databases on priority biodiversity issues are available.

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes

Measure taken has been partially effective

tools or methodology used for the assessment of effectiveness above

Agencies in both the public and the education sectors were found to be involved in development of inventories and databases as the mean of providing technical supports to formulation of biodiversity policies and plans. These include the general inventory on biological resource, the inventory on biological resources and their associated local knowledge for conservation, the lists of species in Thai waters, the database on pests and quarantine plants, the database on Thailand's

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plant genetic resources and the database on herbal plants. These inventories and databases were, however, found to be stand-alone systems and only accessible through web-sites of their custodian agencies. To this end, the Office of Natural Resources and Environmental Policy and Planning was developing the national portal for biological resources information as a hub for connecting the biodiversity databases together, in accordance to a governmental policy on enabling greater use of biodiversity information for development of national economy. Continuous efforts were also made in building technical capacity for taxonomists, despite the fact that database on the taxonomists in several agencies remained lacking.

Obstacles and scientific and technical needs related to the measure taken

- Information incompatibility and the lack of a common system for data management, resulting in diverse systems of data gathering and access and difficulty in utilizing the information for research and economic development.
- Most researches were not made available and/or adopted for their potential applications, resulting in the lack of technical support for planning on sustainable use of biodiversity.
- The measure was not consistently supported by the national budget.

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Measure 11: Preservation and protection of local knowledge associated with biodiversity

Measures taken to contribute to the implementation of your country's national biodiversity strategy and action plan

This measure consists of 2 actions which are; (1) promotion and preservation of local knowledge associated with conservation and sustainable use of biodiversity through continuous use of, transfer of and building on the knowledge and (2) developing database on and enlisting local knowledge associated with conservation and sustainable use of biodiversity in order to enable protection of the national interest derived from the knowledge. This measure was to be mostly implemented by public agencies, with supports from the research and the private sectors and NGOs in transferring the knowledge.

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National Target(s)

Target 25: By 2021, biodiversity inventories are systematically carried out by municipalities of every level.

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes

Measure taken has been partially effective

tools or methodology used for the assessment of effectiveness above

Efforts were made to develop and improve databases on biological resources and associated traditional knowledge, to correlate local knowledge with agricultural innovations and to develop databases on herbal plants for traditional medicine. However, several agencies identified as custodians of information on local and traditional knowledge associated with conservation and sustainable use of biodiversity had not made their information available online or even in digital format. Thus Plant Genetic Conservation Project has been established following Her Royal Highness Princess Maha Chakri Sirindhorn's initiative to encourage and build capacities of local communities in collecting, documenting, and developing database on local resources and keep in the local administrative organizations as well as sharing information through the project. The project would also involve local children to help in the survey and documentation process.

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Other actions on management of local knowledge included promotion of local knowledge for business development, establishment of centers for learning and transferring of local knowledge and integration of information networks on biodiversity and associated local knowledge.

Obstacles and scientific and technical needs related to the measure taken

- Local knowledge was reportedly gathered only when its sources, including its custodian networks, made its available to relevant public agencies. Substantive amount of the knowledge remained undocumented and unavailable while mechanism to access and/or link information on the knowledge in possession of the research sector and NGOs remained lacking.

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Section III. Assessment of progress towards each national target

Target 1: By 2020, every sector, particularly the general publics and local communities, have understanding and awareness on the importance of conservation and sustainable use of biological diversity



2018 - Progress towards target but at an insufficient rate

Targets

Target 1: By 2020, every sector, particularly the general publics and local communities, have understanding and awareness on the importance of conservation and sustainable use of biological diversity

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Category of progress towards the implementation of the selected target

Rate of progresses toward the implementation of the selected target

Progress towards target but at an insufficient rate

Date the assessment was done

31 Oct 2018

Summary of the assessment of progresses toward the implementation of the selected target

A survey of relevant agencies found that several had placed an emphasis on building knowledge, understanding and awareness on the values and the importance of biodiversity. Thirty-seven percent of the respondents noted that plans had been developed by biodiversity related agencies and adopted to strengthen the awareness of their personnel, provide relevant knowledge including by organizing exhibitions and activities on important days for biodiversity, integrate natural resources and biodiversity context in various subjects of formal curriculums and establish learning facilities such as biodiversity learning centers, natural classrooms and botanical study centers. These facilities were reportedly operated by education institutes as well as a number of private firms including Charoen Pokphand Foods PCL., SCG Cement PLC., and PTT PLC., in association with public organizations the like of the National Science Museum, Thailand (NSM).

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There was a reported increase in a number of biodiversity conservation networks initiated by the civil sector as well as activities and projects to campaign for conservation of biodiversity in various sectors. Several kinds of promotional media were developed by various agencies for conservation and restoration of biodiversity and maintenance of ecosystems, including documentaries, books, posters, exhibition sets, e-books and educational games. The internet was employed as the primary channel for communication in order to reach the target groups of working populations and adolescents, while the wireless and the television broadcasting were continued to be used for their accessibility by the mass. Furthermore, events such as workshops, learning camps and corporate social responsibility activities of

relevant were regularly organized to build awareness on biodiversity, including campaigns on biodiversity conservation held on important days for the environment.

A case study of actions taken for this Target is the monitoring on the implementation of a plan for participatory biodiversity management in Khao Mae Kratu Forest of Nakhon Sawan Province. This activity included assessment of community satisfaction on adoption of biodiversity information for management of forests located in adjacent to the communities in order to determine the percentage of the satisfaction on accuracy, comprehensiveness, formats, presentation and applicability of the information in relation to management of the forests. Using questionnaire as a primary tool for data gathering, the assessment reflected views and opinions on local biodiversity information and contributed to development of a integrated plan for biodiversity management of the forests. (Royal Forest Department, 2017)

Indicators and Activities

Indicator(s) used in this assessment

- Percentage or number of agencies and sectors with knowledge and awareness on values and importance of biological diversity.- Guidelines and plans on strengthening awareness on values and importance of biological diversity in public and private agencies.
- Number of activities/networks on biodiversity conservation that initiated by the civil sector.
- The increase in number of projects/activities on conservation and restoration of biodiversity.
- The increase in public relation on conservation, restoration and sustainable use of biodiversity with more channels of communication and accessibility to wider target groups.
- Percentage of awareness and understanding on values and importance of biological diversity in each sector.
- Percentage of understanding on the conservation and sustainable use of biological diversity in each target group.

EN

Any other tools or means used for assessing progress.

Consider the data from the questionnaire.
Gather information from meetings with the parties

EN

Level of confidence

Level of confidence of the above assessment

Based on expert opinion

Level of confidence of the above assessment

Limited sampling group

EN

Adequacy of monitoring information to support assessment

Monitoring related to this target is partial (e.g. only covering part of the area or issue)

Target 2: By 2021, Biodiversity is integrated in curriculums of education institutes at every level.



2018 - On track to achieve target

Targets

Target 2: By 2021, Biodiversity is integrated in curriculums of education institutes at every level.

EN

Category of progress towards the implementation of the selected target

Rate of progresses toward the implementation of the selected target

On track to achieve target

Date the assessment was done

31 Oct 2018

Summary of the assessment of progresses toward the implementation of the selected target

The National Education Plan for 2017 - 2036 stipulates development of a strategy

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for providing education for enhancement of environmental sound livelihood. The strategy aims to ensure environmental conscience for every age group by making available curriculums, learning facilities and educational tools for promotion of environmentally sound quality of life as well as by providing guidance on development of the curriculums, facilities and tools.

In addition, biodiversity context was included in the learning standards and indicators for science and mathematics, geography and social study programs (in the 2017 versions) of the 2008 general curriculum for basic education under the supervision of the Ministry of Education. For example, the indicators for the curriculum for Grade 9 students consist of the capacity to describe importance of biodiversity in maintaining ecological balance and for human-being (heading 10) and to express their awareness on values and importance of biodiversity as well as on how to be involved in the maintenance of biodiversity (heading 11) (S(science)1.3 Standard in Section 1 of the Ministry's learning standards and indicators).

Education institutions of various levels were reportedly found to include biodiversity context in their curriculums, including...

- Kasetsart University Laboratory School included genetics and biodiversity in the science program for Grade 8 students and produced textbooks and digital learning tools (CD-ROM) on the subject. An assessment was also carried out to determine the effectiveness of the textbooks and the learning on the subject in general.
- Bo Rai Witthayakhom School reportedly offered a biodiversity program for the Grade 12 science course. The program highlights issues related to biodiversity and environmental sustainability, including population density and distribution, principles of natural resources conservation and environmental impacts of alien species.
- Khon Kaen University provided a program on biodiversity and conservation to offer studies on biodiversity loss, biodiversity protection, conservation of local plant and animals, utilization of biodiversity components as well as international and domestic laws related to biodiversity. The university also established a museum on biodiversity and human diversity.
- Faculty of Science and Technology of Thammasat University included biodiversity and evolution science in the curriculum and provided for studies on biodiversity assessment and biodiversity loss in Thailand, sustainable use of natural resources through adoption of appropriate technologies and application of molecular technology for biodiversity studies and evolution science.

It's believed that several curriculums had not been titled "biodiversity" despite offering studies on subjects related to biodiversity and associated local knowledge. These include a curriculum jointly developed by Biodiversity-Based Economy Development Office (Public Organization) - BEDO and technical experts.

Indicators and Activities

Indicator(s) used in this assessment

- Biodiversity issues are integrated in basic and advance curriculums of education institutes at every level.

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Any other tools or means used for assessing progress.

Consider the information search.
Consider the case study.

EN

Level of confidence

Level of confidence of the above assessment

Based on partial indicator information and expert opinion

Level of confidence of the above assessment

Partly existing evidence

EN

Adequacy of monitoring information to support assessment

No monitoring system in place

Target 3: By 2020, Biodiversity is integrated in policies and plans of relevance at every level.



2018 - Progress towards target but at an insufficient rate

Targets

Target 3: By 2020, Biodiversity is integrated in policies and plans of relevance at every level.

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Category of progress towards the implementation of the selected target

Rate of progresses toward the implementation of the selected target

Progress towards target but at an insufficient rate

Date the assessment was done

31 Oct 2018

Summary of the assessment of progresses toward the implementation of the selected target

Notable policies, plans and measures that had explicitly incorporated biodiversity management included...

1. The 2017 Constitution: The Constitution reaffirms the right of citizens and communities to manage, maintain and utilize natural resources, the environment and biodiversity in balance and sustainable manners as stipulated by relevant legislations and the duty of the citizens to cooperate in and provide supports to conservation and protection of the environment, natural resources and biodiversity. The Constitution further stipulate the obligation of the state in managing natural resources, the environment and biodiversity in balance and sustainable manner.
2. The (revised) Royal Decree on Fisheries (2017): Prohibition of illegal fishing by this law was aimed to enable conservation and appropriated management of fishery resources. The law also provides criteria for controlling and conducting surveillance on harvest, transports and import of fishery resources.
3. The Act on Determining Plan and Procedures in Decentralizations to the Local Administrative Organization (1999): The law stipulates authority and responsibility of local administrations in providing public services including development of local development plans, improvement of communities, encouraging public participation in local development, management of public health services and waste disposal as well as

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maintenance and utilization of forest, land and other natural resources and the environment.

4. The (Draft) Biosafety Law B.E.: The bill was expected to provide a unified and effective tool for biodiversity management in Thailand and for meeting the country's obligations under the Convention on Biological Diversity and other related international agreements.
5. The Thailand 20-Year National Strategy (2018-2037): The 5th Strategy of the National Strategy stipulates enabling national growth on the basis environmentally sound quality of life by developing guidance on solutions for the country's natural resources and environmental problems including reduction of forestlands, land degradation, threats to biodiversity as well as poor allocation and potential shortage of water resources.
6. The Plan for National Reform on Natural Resources and the Environment: The plan provides a directive for management of the country's biodiversity with the view to enhance the quality of life while strengthening awareness on values and importance of biodiversity.
7. The 12th National Economic and Social Development Plan (2017-2021): The 12th Plan aims to achieve sustainable development by meeting compatible goals on "security, wealth and sustainability". To this end, the Plan adopted the strategy on enabling growths on the basis environmentally sound quality of life and places focus on conserving, restoring and securing natural resources and environmental bases as well as balancing conservation with sustainable and fair use of the resources.
8. The 20-Year Strategy of the Ministry of Natural Resources and Environment (2017-2036): The Strategy emphasizes conservation and utilization of natural resources and the environment as the basis for development by mobilizing efforts for implementation of strategies and measures on conservation, protection, restoration and utilization of natural resources and the environment, as appropriate.
9. The Policies and Plans for Promotion and Conservation of National Environmental Quality (2017-2036): The policies incorporate provisions for securing fair and sustainable management of natural resources with the view to maintain the resources and biodiversity, ecological balance as well as food, water and energy security.
10. The Environmental Quality Management Plan (2017-2021): The Plan places an emphasis on conservation, restoration and utilization of natural resources in fair and balance manners in order to enable environmentally sound states in various aspects, including in attaining national growth, and to ensure more efficient, cost-effective and sustainable use of natural resources and the environment.
11. The National Master Plan for Climate Change Adaptation (2015-2050): The Plan provides a long-term framework for actions on climate change and

includes measures to promote protection of rights to access to and sustainable use of biodiversity.

12. The National Maritime Security Plan (2015-2021): The Plan was developed to protect and preserve national sovereignty, sovereign rights and jurisdiction in Thai water from every kind of threats.
13. The NBSAPS, (2015-2021): The Plan was formulated to ensure effective integration of biodiversity management and utilization with the view to halt biodiversity loss and enable cross-sectoral participation at every level. Implementation of the National Biodiversity Action Plan, 2017-2021 to facilitate practical adoption of the components of the Integrate Management Plan by relevant agencies.

Biodiversity management was reportedly not being substantively included in policies, plans and measures at provincial and local levels.

Concerning availability of fiscal resources, the 2018 national budget allocated funding for implementation of the water management strategy and actions for enabling national growth on the basis environmentally sound quality of life. This contributed to the increase in budget allocation for biodiversity management by 12.6 percent from that in 2017.

Indicators and Activities

Indicator(s) used in this assessment

- Increase in proportion of allocation from the national budget for biodiversity plans.
- Number of policies, plans and measures with biodiversity management at national, provincial and local level.

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Any other tools or means used for assessing progress.

Consider the information search.
Consider data from statistics.

EN

Level of confidence

Level of confidence of the above assessment

Based on comprehensive indicator information

Level of confidence of the above assessment

Existing evidence can reflect the real situation

EN

Adequacy of monitoring information to support assessment

No monitoring system in place

Target 4: By 2020, financial mechanisms are available for mobilizing the protection, conservation, restoration and sustainable use of biodiversity.



2018 - Progress towards target but at an insufficient rate

Targets

Target 4: By 2020, financial mechanisms are available for mobilizing the protection, conservation, restoration and sustainable use of biodiversity.

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Category of progress towards the implementation of the selected target

Rate of progresses toward the implementation of the selected target

Progress towards target but at an insufficient rate

Date the assessment was done

31 Oct 2018

Summary of the assessment of progresses toward the implementation of the selected target

International financial mechanisms that supported biodiversity actions in Thailand reportedly include Global Environment facility (GEF), the United Nations Development Programme (UNDP), the European Union (EU) and the German Government (through GTZ program). A notable example of the GTZ supports was

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the funding for the project on Enhancing the Economics of Biodiversity and Ecosystems Services in Thailand/South-East Asia (ECO-BEST). Domestically, the Environment Fund established by the National Environmental Quality Promotion and Preservation Act B.E. 2535 was found to provide fiscal incentives for public agencies, local administrations, state enterprises, private organizations and NGOs to participate in protection and maintenance of environmental quality and natural resources, by offering both direct funds and low-interest loans.

Tree Bank was noted as an initiative to promote reforestation in privately owned lands or public lands by allowing the trees to be used as collateral for specific types of lending. The Cabinet's decision of July 14, 2018 endorsed in principle the draft ministerial regulation on alternative business collateral which identifies trees of significant economic values as collateral for lending from financial institutions. Payment for Ecosystem Services (PES) is a mechanism to ensure environmental compensation by having users and other beneficiaries of biodiversity components and ecosystems pay those undertaking the protection, restoration and maintenance of the components. By ensuring that the payment adequately reflects the benefits, the PES can provide economic incentives for the custodians of biodiversity and natural resources. Case studies of the PES in Thailand include...

- Ecotourism at Ban Ko Klang Village in Khlong Prasong Sub-district of Muang (city) District in Krabi Province was organized with establishment of a PES group, comprising of tourist operators and other beneficiaries from tourism. The local mangrove conservation association was identified as a recipient of the PES program, while the local administration supervised the program's implementation in general.
- At Railay Bay and Phra Nang Cape of Krabi Province, the Railay Bay Tourist Association provided payments to local populations for treatment of wastewater. The PES arrangement in the areas also stipulated that the tourist association is responsible for ensuring safety of tourists and maintenance of tourist sites.
- At Chum Kho Sub-district in Pathiu District of Chumphon Province, Charoen Pokphand Foods PCL. reportedly provided supports to locals in replanting, maintaining and conserving mangrove forests. The PES program was supervised by the local mangrove development office.
- At Ban Hua Lao Village of Pa Pae Sub-district in Mae Taeng District of Chiang Mai Province, payments were made by the 9th Regional Waterworks Office and the Chiang Mai Waterworks Office to local Karen for building weirs, maintaining dikes, creating firebreaks, organizing forest fire patrols as well as replanting and protecting forestlands.

A study on Natural Capital Accounting (NCA) was carried out by the

Biodiversity-Based Economy Development Office (Public Organization) – BEDO to provide a framework for identifying, measuring and assessing direct and indirect impacts of businesses from their reliance on natural capital. The framework was expected to made available information for decisions on investments or planning of activities and projects in both public and private sectors.

Other lesser known financial mechanisms for conservation and sustainable use of biodiversity include tax deduction for privately funded studies, researches and other technical activities as well as actions on the conservation and sustainable use of biodiversity, and monetary measures such as the Forest Bond.

Indicators and Activities

Indicator(s)used in this assessment

- Practical financial mechanisms for mobilizing the protection, conservation, restoration and sustainable use of biological diversity.

EN

Any other tools or means used for assessing progress.

Consider the information search.
Consider the case study.

EN

Level of confidence

Level of confidence of the above assessment

Based on partial indicator information and expert opinion

Level of confidence of the above assessment

Partly existing evidence

EN

Adequacy of monitoring information to support assessment

Monitoring related to this target is partial (e.g. only covering part of the area or issue)

Target 5: By 2020, regulations and legislations that obstruct participation in biodiversity management are revised.



2018 - Progress towards target but at an insufficient rate

Targets

Target 5: By 2020, regulations and legislations that obstruct participation in biodiversity management are revised.

EN

Category of progress towards the implementation of the selected target

Rate of progresses toward the implementation of the selected target

Progress towards target but at an insufficient rate

Date the assessment was done

31 Oct 2018

Summary of the assessment of progresses toward the implementation of the selected target

Revisions were made on the rules, regulations and legislations related to biodiversity with the view to bring them up-to-date as well as to provide opportunity for and enable promotion of public participation. The revised regulations and legislations include...

1. Act on the Promotion of Marine and Coastal Resources Management (2015): Provisions of the law's predecessor had been noted for the lack of unity in their substance, for poor integration of issues and actions and for hindering participation of the publics and local communities. The revision was also made to address the ever-growing encroachment and conversion of marine and coastal environments and the findings that coverage of pre-existing laws do not provide for protection of marine and coastal resources in certain areas. The revised act provides criteria for management, maintenance, conservation and restoration of marine and coastal resources, including protection against coastal erosion, as well as enables participation of local populations and communities in maintenance, conservation and restoration of marine and coastal resources in balance and sustainable manners. In addition, the revision enables establishment of provincial committees on regulation and protection of marine and coastal resources in every coastal province with the view to facilitate

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- development of local plan for marine and coastal resources management.
2. The 2016 National Reserve Forest Act: The revised legislation of the original 1964 Act provides for measures on protection and maintenance of natural resources by enabling systematic management of the resources and ensuring public benefits derived from the management. To this end, the revision stipulates establishment of provincial committees for national reserves in order to develop measures that are necessary and appropriate for regulating, maintaining and rehabilitating national reserves as well as promoting reforestation in areas of the committees' supervision. A national committee was also established under the law to recommend measures and provide guidance on the utilization of the national reserves.
 3. The (revised) Royal Decree on Fisheries (2017): Given that the predecessor legislation of 2015 had been noted for placing restriction on rights and freedom over fishery resources, the revision enables greater participation in conservation and management of fishery resources and for sustainable fishery. The revised law also provides for establishment of a committee to effectively and efficiently employ administrative measures to address issues where the use of pre-existing legal actions had been found cumbersome in attaining resolutions and/or led to discord.
 4. The (Draft) Biosafety Law B.E.: The bill was being developed by the National Sub-committee on Biodiversity Law of the National Committee on Conservation and Sustainable Use of Biodiversity. When approved, the legislation was expected to enable integration of laws and regulations related to biodiversity and to provide an administrative tool for biodiversity management in Thailand.

Indicators and Activities

Indicator(s) used in this assessment

- Numbers of revisions on laws and regulations that hinder participation in management of biological diversity.

EN

Any other tools or means used for assessing progress.

Consider the information search.

EN

Level of confidence

Level of confidence of the above assessment

Based on partial indicator information and expert opinion

Level of confidence of the above assessment

Partly existing evidence

EN

Adequacy of monitoring information to support assessment

No monitoring system in place

Target 6: By 2021, management of biodiversity is mobilized with participation at every level.



2018 - On track to achieve target

Targets

Target 6: By 2021, management of biodiversity is mobilized with participation at every level.

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Category of progress towards the implementation of the selected target

Rate of progresses toward the implementation of the selected target

On track to achieve target

Date the assessment was done

31 Oct 2018

Summary of the assessment of progresses toward the implementation of the selected target

The National Committee on Conservation and Sustainable Use of Biodiversity was established in 2003 to supervise actions on and develop policies for biodiversity conservation, biosafety as well as access to and benefit sharing of biological

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resources. The Committee also serves as the principle mechanism for mobilization of efforts in implementing the Convention on Biological Diversity. The Committee is comprised of representatives from various sectors and operates with assistance of the following subsidiaries.

- Subsidiary bodies appointed by the decision of the first meeting of the National Committee on Conservation and Sustainable Use of Biodiversity of 2018. These are (1) the Sub-committee on Mobilizing Bio-Economy, (2) the Sub-committee on Biodiversity Information and (3) the National Sub-committee on Biodiversity Law.
- The Sub-committee on the Convention on Biological Diversity.
- The Sub-committee on the Cartagena Protocol on Biosafety.
- The Multilateral Advisory Group on Protect Area.
- The Sub-committee on Promotion of Conservation and Sustainable Use of Biodiversity in Business Sector.

Cross-sectoral participation on conservation and sustainable use of biodiversity was demonstrated by contributions made by various networks, including community and community organization networks (for research and study of local knowledge), networks of public agencies (for enabling organization for researches and other actions), networks of education institutes (for making available technical resources) and business networks (for providing financial resources). Local communities were found to participate in protection of biodiversity by being involved in networks of forest and environmental protection volunteers at village level. With exception of networks for conservation of marine and coastal resources where participating communities and volunteers were officially registered, significant change in the community participation remained unknown despite the positive trend on involvement of local communities and their networks in protection, conservation, restoration and sustainable use of biodiversity.

Notable actions taken by the private sector were those carried out by PTT PLC.. These include development of an internationally recognized standard for management of biodiversity and ecosystem services with the view to clarify biodiversity management actions of the companies and its subsidiaries, and formulation of guidance on assessments of risk to and values of biodiversity and ecosystem services for development of new projects. A biodiversity action plan was also developed to address the company's and its subsidiaries' actions that have high risks and may have significant impact on biodiversity, including by providing for monitoring and

assessment of such actions.

Actions taken by the Forest Industry Organization provide an example on participation of state enterprises in conservation and sustainable use of biodiversity. By participating in the sustainable forest management project for development of ASEAN Economic Community, ten percents of forest parks were set aside for biodiversity conservation as stipulated by the project's indicator. In addition to enabling preservation of plants and animals in their natural environments, the reserved sections of forest parks allowed for inventory and data collection on plants and animal diversity and consequently, biodiversity conservation of forest parks themselves, with participation of local communities.

Indicators and Activities

Indicator(s) used in this assessment

- Thirty percents increase in number of biodiversity committees at agency, institution and provincial levels.
- The increase in number of networks between public sectors, business sector, education institutes and local communities for actions on biodiversity
- Mechanisms to coordinated biodiversity management between different levels.

EN

Any other tools or means used for assessing progress.

Consider the information search.

EN

Level of confidence

Level of confidence of the above assessment

Based on partial indicator information and expert opinion

Level of confidence of the above assessment

Difficulty of data surveillance at all level

EN

Adequacy of monitoring information to support assessment

Monitoring related to this target is partial (e.g. only covering part of the area or issue)

Target 7: By 2021, incentives that are harmful to biodiversity are eliminated and/or phased out, and positive incentives for the conservation and sustainable use of biodiversity are promoted.



2018 - On track to achieve target

Targets

Target 7: By 2021, incentives that are harmful to biodiversity are eliminated and/or phased out, and positive incentives for the conservation and sustainable use of biodiversity are promoted.

EN

Category of progress towards the implementation of the selected target

Rate of progress toward the implementation of the selected target

On track to achieve target

Date the assessment was done

31 Oct 2018

Summary of the assessment of progress toward the implementation of the selected target

Guidance for phasing out incentives, that are harmful to biodiversity and promoting positive incentives for the conservation and sustainable use of biodiversity was found in both the public and private sectors. These incentives are as follows;

Elimination and/or phasing out incentives, that are harmful to

The Royal Forest Department and the Department of National Parks, Wildlife and Plant Conservation formulated a master plan on rehabilitation and conservation of forests and other ecosystems in 25 watershed areas with the view to unify delineation of forestlands, provide for a common database on forests and establish buffer zones that better meet local needs and circumstances. In addition, a number of forest laws were revised to simplify bureaucratic processes on forest

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management. The most notable of the revision is the lifting of the pre-existing ban on possession of economically valuable trees in privately owned properties in order to promote planting of the species and contribute to efforts to expand forest cover. Special taskforces of the Royal Forest Department, Department of National Parks, Wildlife and Plant Conservation and Department of Marine and Coastal Resources were reportedly consolidated their efforts in conducting patrols and enforcing laws against encroachment and destruction of forest and other natural ecosystems as well as illegal hunting of wildlife nationwide. A 24-hour hotline was made available for reporting by the interest public on these illegal activities.

Promotion of positive incentives for the conservation and sustainable use of biodiversity

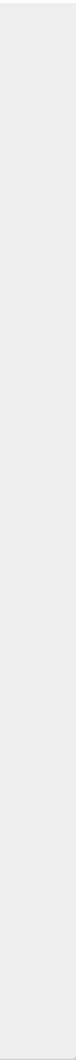
A national master plan on development of Thai herbal plants (2017-2021) was formulated by Department of Thai Traditional and Alternative Medicine and includes the promotion of community-based economic forests to accommodate sustainable management and utilization of herbal plants. Such measure also envisages the protection of herbal plant species and their associated knowledge and minimization of threats to species' genetic diversity in the wild.

Department of Local Administration reportedly developed a policy to support local administrations in managing local resources bases and assigned personnel to supervise the task in at least one sub-district or municipality of every district nationwide. Under the policy, the local administrations were encouraged to conduct inventories on biological, physical and cultural/intellectual resources found in their jurisdictions in order to enable conservation and sustainable use of the resources, including by planning for their utilization for local development. Another notable action at local level is the royal initiative of Her Royal Highness Princess Maha Chakri Sirindhorn on conservation of plant genetic resources. The initiative was noted for gradual expansion of participation and more diverse approaches in implementation at local level.

Supports were reportedly provided to Community BioBanks by the Biodiversity-Based Economy Development Office (Public Organization) - BEDO in building capacity of community organizations for development of processes for gathering and storing information on biological resources and their associated local knowledge in their respective communities. Availability of the information was expected to drive communities' efforts toward becoming a viable mechanism for conservation and sustainable use of genetic resources, contributing to development of the country's Bio-Economy. Another notable activity on local actions is a project on Sustainable Management Models for Local Government Organizations to Enhance Biodiversity Protection and Utilization in Selected Eco-regions of Thailand. The project was jointly implemented by the BEDO, the Ministry of Natural Resources and Environment and the United Nations Development Program (UNEP) with supports Global Environment Facility (GEF). Efforts were also made to encourage local businesses to adopt a concept on Business & Biodiversity Check. The concept was

developed by the Global Nature Fund (GNF) and various organizations in the European Union for detecting impacts of business on biodiversity and can yield information for assessment of environmental management system, developing guidance for sustainable conservation of natural resources and enabling application of the Payment For Ecological Service (PES) concept.

Several actions were reportedly taken by the business sector to promote conservation and sustainable use of biodiversity. These include providing awarding for efforts on the conservation and sustainable use such as the Green Globe Award of PTT PLC. for groups of individuals found to co-exist with and/or contribute to maintenance of natural resources and biodiversity as well as the joint initiative of the Royal Forest Department and Ratchaburi Electricity Generating Holding PLC. on mutual interaction between people, forest and communities, where awards were handed to communities with outstanding community forest management. In addition, commercial firms the like of Charoen Pokphand Foods PCL. were evaluated for their biodiversity responsible business practices. Companies listed in the Stock Exchange of Thailand (SET) were encouraged to gear toward sustainable business practices by being included in the SET's list of Thailand Sustainability Investment. Compiled since 2016, the list has comprised of companies found to meet at least 50 percents of economic, environmental and social indicators and the qualification for listing by Dow Jones Sustainability Indices (DJSI) as well as those with qualified business performance and disclosure on business practices and their social and environmental impacts. Furthermore, PTT PLC. have reaffirmed its commitment to sound management of biodiversity, adopted norms and operational guidance on the issue and assessed effectiveness of biodiversity related actions in consistent manner.



Indicators and Activities

Indicator(s)used in this assessment

- Actions taken to eliminate and/or phase out incentives that are harmful to biodiversity and to promote positive incentives for conservation and sustainable use of biodiversity in at least 2 sectors of relevance.



EN

Any other tools or means used for assessing progress.

Consider the information search.



EN

Level of confidence

Level of confidence of the above assessment

Based on partial indicator information and expert opinion

Level of confidence of the above assessment

Partly existing evidence

EN

Adequacy of monitoring information to support assessment

Monitoring related to this target is partial (e.g. only covering part of the area or issue)

Target 8: By 2020, the rate of loss of all natural habitats, including forests and coastal ecosystems, is at least halved.



2018 - Progress towards target but at an insufficient rate

Targets

Target 8: By 2020, the rate of loss of all natural habitats, including forests and coastal ecosystems, is at least halved.

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Category of progress towards the implementation of the selected target

Rate of progresses toward the implementation of the selected target

Progress towards target but at an insufficient rate

Date the assessment was done

31 Oct 2018

Summary of the assessment of progresses toward the implementation of the selected target

In Thailand, the improvement in rate of loss of natural habitats occurs in the Mangrove areas, Coral Reefs and the Wetland areas, while in the Forest and Sea

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grass areas, there is still increasing in the rate of loss of natural habitats or becomes deterioration. However, at present, Thailand still cannot meet the target rate of loss of the natural habitats in the forest at 40%, but every government agencies has setup their target on increasing the forest area and give the priority to this issue, therefore, in the future, this indicator can promisingly be achieved.

In order to reduce the loss of natural habitats including the forest and coastal ecosystem, both government and private sectors play an important role in operation. The main activities are look after the natural areas, restoration of onshore ecosystem by expand the area (size), restoration of both land and mangrove forest, monitoring the rate of survival of new forest, fire protection zone, put the wooden poles to prevent the erosion of coastal/bank from waves, reduce the burning of the rice stubbles and other agricultural waste, build the weir for slowdown the current, protect the water resources as well as enhance the efficiency of protecting the natural habitats by setting up the protection units and check points that their operation will cover the entire boundary as well as encourage the operation in the vulnerable areas. In addition, there are sessions of training the forest protection civil volunteers, collaboration with various networks in protection and improvement of the forests as well as approve the right to make a living in the conserved forest. The past information shown the rate of loss of natural habitats including forest area and coastal ecosystem as follows:

Area of the Forest in Thailand (2017): total area of 102,156,350.51 rai* (or 31.58% of total area of Thailand). The figure of area seems constant when compare with the area in year 2016 but the rate of loss shown the improving trend if compare with the area of the past 4 years (2014-2017).

Area of Mangrove Forest in Thailand (2017): total area of 2,869,484 rai* which can be divided into “Typical mangrove forest”: area of 1,534,584 rai compare with year 2009 with area of 1,527,761 rai or increasing 0.45% and “area that used to be Mangrove forest”: area of 1,334,913 rai (aquaculture 439,234 rai, agriculture 340,525 rai, salt field 155,772 rai and others 399,382.85 rai) which usually found along the coastal area in the Central, the East and the South (Andaman and along the gulf of Thailand in 24 coastal provinces. During year 2000 - 2014, the area of mangrove forest has been increased which resulted from the strong cooperation among government, private and local communities in continuing conserve and restore the mangrove forest. (Department of Marine and Coastal Resources, 2017)

Wetland in Thailand: total area approximately 36,616.16 sq.km. or 22,885,100 rai which is about 7.5 % of total area of Thailand. The wetland comprises of fresh water area 44.8% and salt water area 55.2%. The benefits of the wetland are water resources, hold the rainwater and river/canal water, prevent the salt water to flow into the mainland, prevent coastal erosion, filter the suspension and minerals, and mitigate the natural disasters. The wetland is the main resources of natural products that human beings can access and utilize such as food sources, herbal medicines since it is the place that gathers the variety of bio-diversity, various type

of plants and animals. Therefore, the wetland has significant impact to the ecology and natural conservation, especially it is the source of food chain (Office of Natural Resources and Environmental Policy and Planning, 2015). During 2015-2016, it is found that the area of wetland was about 3,445,804 rai which comprise of pus, swamp, lake approximately 1,567,580 rai, the lowland approximately 1,482,616 rai and Peat area approximately 395,608 rai (Land Development Department, 2018). In 2013, Office of Natural Resources and Environmental Policy and Planning had evaluated the overall condition of the wetland in Thailand, it was found that the condition of 17 out of 25 representative wetlands was improved.

Sea Grass Land: 13 species of sea grass have been found on the coastal area in 13 provinces. In 2016, there are 159,829 rai of sea grass area in total, where 60,196 rai was on the gulf of Thailand coast and 99,633 rai was on the Andaman coast. The area was increased from year 2012 (which was only 118,665 rai) since in the past few years, the survey and study on sea grass land has been done by more advance equipment as well as more information of the conditions of newfound Sea Grass Land was monitored and reported by the locals. In Thailand, the majority (about 80%) of the Sea Grass Land is still fertile. The coastal development is the main cause that speed the Sea Grass Land deterioration. The Sea Grasses which grown near the construction area of the Piers, Bridges and high-rise seaside Hotels are destroyed rapidly from the mud and sediments that flow from land to the shore especially in rainy season. In addition, there are significant impacts on the Sea Grass in various areas from draining waste water from residential or recreational areas to the sea, the use of large fishing equipment such as Pontoon, Posture and Noor boat as well as natural disasters such as seasonal storm, waves, winds, tsunami on Andaman coast.

Coral Reefs: Due to the development of the detecting equipment and higher technology, the coral reefs that was found in 2015 at 148,954 rai (75,590 rai on Gulf of Thailand coast and 73,354 rai on the Andaman coast) was more than what was found in year 2012 (only 128,256 rai). The increase figure was from the further investigation in the deeper sea and at the pile of rocks where it could not be reached before. The coral reefs spread into 16 coastal provinces. From the survey in year 2015 by Department of Marine and Coastal Resources it is found that, in Thailand, there are 280 species of coral reefs (18 families, 71 genus). The overall condition of coral reefs in Thailand: 5.7% are in good-excellent condition (5.0% on the Gulf of Thailand coast, 6.4% on the Andaman coast).

In summary, the result of evaluation of the operation to reduce the loss of all Natural Habitats is in the level 3 which means there is the progress in operation but still does not meet the indicative national target of 50% of total area of Thailand. But with the strong cooperation from all sectors, there is a high possibility that the area of Natural Habitats, Forest and Coastal Ecosystem will meet the target in the future.

Indicators and Activities

Indicator(s) used in this assessment

- Reduction in the rate of loss of all natural habitats.
- Forest areas cover 40 % of the total area of the country.
- The rate of loss of all natural habitats, including forests and coastal ecosystems, is at least halved of that found in 2004.

EN

Any other tools or means used for assessing progress.

Consider the information search.
Consider data from statistics.

EN

Level of confidence

Level of confidence of the above assessment

Based on comprehensive indicator information

Level of confidence of the above assessment

Existing evidence can reflect the real situation

EN

Adequacy of monitoring information to support assessment

Monitoring related to this target is adequate

Target 9: By 2020, threatened species and endemic species have improved conservation status and measures are in place for conservation and protection of their habitats.



2018 - On track to achieve target

Targets

Target 9: By 2020, threatened species and endemic species have improved conservation status and measures are in place for conservation and protection of their habitats.

EN

Category of progress towards the implementation of the selected target

Rate of progresses toward the implementation of the selected target

On track to achieve target

Date the assessment was done

31 Oct 2018

Summary of the assessment of progresses toward the implementation of the selected target

The evaluation is in the level of meeting the target. The data is on 6 species of animal which are wild elephant, bull, tapir, tiger, leopard (from the result of the operation, numbers of these animals have been continuously increased) and Flamingo, the Thai specie which has already extinct but the successful experiment of reproduction could rescue this specie to live again and at least 5 species, which are nearly extinct or specific local species has increased in the population and the strict measures of conservation and protection are in place.

From the report of situation of wild animal which nearly extinct by Department of National Parks, Wildlife and Plant Conservation, together with the research team of Freeland Foundation and Panthera Foundation, the survey of wild animal in the Dong Phrayayen, Khao Yai National Park, the forest world heritage, indicated that during June 2016 to February 2017, the VDO cameras had recorded the group of 18 tigers (5 males, 7 females and 6 cubs). It is shown that the ecosystem in this forest is still fertile enough that this group of tiger can live and reproduction. From the annual report of Department of National Parks, Wildlife and Plant Conservation, year 2013-2015, the total number of tapir in all 7 conservation forests is estimated at the number of 538-720. The number of Tapir in the Klong Saeng - Khao Sok Forest, Kang Krajarn Forest and The West Forest are estimate to be more than 50 tapir in these forests.

Phu Kheaw Wildlife Breeding Center in the Phu Kheaw Wildlife Conservation Area has successfully breed, take care and return the nearly distinct animals back to the forest such as Hog Deer and Pheasant (more than 100). From the start in 2010, Phu Kheaw Wildlife Breeding Center has released animals of more than 7 species of

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2,900 lives (Wild Deers, Hog Deers and Pheasants) back to the Northeastern Conservation Forest such as Phu Kheaw, Phaphung and Phu Luang). From the survey in 2017, it is found that the Phu Kheaw Conservation Forest that is the habitat of these animals is more fertile. There are more than 150 wild elephants, 100 bulls, more than 200 Hog Deers & Pheasants spread out in Phu Kheaw and Nam Naw area. In addition, the foot prints of Deers, Barking Deers, Tigers and Leopards are found in the area too.

From the Conservation and Protection Measures, it is found that

1. In order to improve the efficiency in protection of natural habitat, 81 areas was announced to be National Park, 38 areas are Wildlife Conservation Area, 48 areas are No-Hunting Zone including the areas that are classified as Level 1 Lowland and Mangrove Conservation Area.
2. The establishment of the various projects of restoration of ecosystem of Sea Grass Ecology, Mangrove Forest, Land Forest, Coral Reefs, Sea Turtles, Dugong, etc.
3. Working Group on Alien Species under the National Sub-committee on Convention on Biological Diversity, has setup the Guidelines to control and prevent the loss of Biodiversity due to the Invasive Alien Species.
4. The Royal Forest Department has started Community Forest Development Project since year 1987.
5. Office of Natural Resources and Environmental Policy and Planning has started the Cultural Forest Project at Maha Sarakam and Surin Provinces.

Indicators and Activities

Indicator(s) used in this assessment

- Increase in population size of at least 5 endangered species and 5 endemic species.
- Measure for conservation and protection of natural habitats of at least 5 endangered species and 5 endemic species found with increase population size.

EN

Any other tools or means used for assessing progress.

Consider the information search.

EN

Level of confidence

Level of confidence of the above assessment

Based on comprehensive indicator information

Level of confidence of the above assessment

Existing evidence can reflect the real situation

EN

Adequacy of monitoring information to support assessment

Monitoring related to this target is adequate

Target 10: By 2021, networks of protected areas and ecosystem representations are interlinked and measures for management of areas in crisis and areas of importance for biodiversity and ecosystem services are developed.



2018 - Progress towards target but at an insufficient rate

Targets

Target 10: By 2021, networks of protected areas and ecosystem representations are interlinked and measures for management of areas in crisis and areas of importance for biodiversity and ecosystem services are developed.

EN

Category of progress towards the implementation of the selected target

Rate of progresses toward the implementation of the selected target

Progress towards target but at an insufficient rate

Date the assessment was done

31 Oct 2018

Summary of the assessment of progresses toward the implementation of the selected target

A new protected area is established including the use of more advance equipment in efficiency evaluation of this and other protected areas such as Environmental Protected Area, National Parks and Wildlife Conservation Zone, etc.

Example of the Case Study of The West Region Ecosystem Management with the cooperation of Department of National Parks, Wildlife and Plant Conservation and Seub Nakhasathien Foundation has shown the expansion of the operation to cover other 17 protected areas in the West Protected Forests. In order to study the potential of each forest, the direction of area management is set by emphasize on strong collaboration and creating the network with local residents in and around the forest. To solve the problem of conflict in land utilization, the clear landmarks are set and mutually accepted. With the natureThe activities that encourage the residents to look after and restore the natural resources, promote the sustainable harmony living with the nature as well as promote the forest management of the area around National Forest to be the Community Forest with the main mutual objective “people can live, forest can exist, tiger can survive”. The regular patrol routine is set to monitor the illegal forest invasion from mutually agreed forest boundary. These activities reduce the conflict between the officers and the locals, reduce the arrested cases which resulted in proper protected area management which operates by the participation of local communities.

The information from the study is used for setting up the Provincial Land Utilization Plan for 4 provinces with the aim to setup the land utilization measures, reduce the land invasion and to manage the suitable area for natural habitats for both plants and animals (Water Onion and Spoon-billed Sandpiper) under the Project of Conservation the natural habitat of Plants and animals that have world significant in the production sector supported by Office of Natural Resources and Environmental Policy and Planning (ONEP) and United Nations Development Program (UNDP) with financial support by Global Environment Facility (GEF).

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Indicators and Activities

Indicator(s)used in this assessment

- Declaring at least one marine protected area in the effort to support marine and coastal conservation.
- Developing at least one ecosystem restoration project in each province.
- At least 30 % of the protected areas are evaluated to be effectively managed.
- Adding at least 5 networks of protected areas and ecosystem representations with inter-linkage for better management to the national

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list of the networks.

- Measures for management of areas in crisis and areas of importance for biodiversity are available in at least 2 sites.

Any other tools or means used for assessing progress.

Consider the information search.
Consider the case study.

EN

Level of confidence

Level of confidence of the above assessment

Based on comprehensive indicator information

Level of confidence of the above assessment

Existing evidence can reflect the real situation

EN

Adequacy of monitoring information to support assessment

Monitoring related to this target is partial (e.g. only covering part of the area or issue)

Target 11: By 2021, networks of protected areas and ecosystem representations are interlinked and measures for management of areas in crisis and areas of importance for biodiversity and ecosystem services are developed.



2018 - On track to achieve target

Targets

Target 11: By 2021, networks of protected areas and ecosystem representations are

EN

interlinked and measures for management of areas in crisis and areas of importance for biodiversity and ecosystem services are developed.

Category of progress towards the implementation of the selected target

Rate of progresses toward the implementation of the selected target

On track to achieve target

Date the assessment was done

31 Oct 2018

Summary of the assessment of progresses toward the implementation of the selected target

Tools, Mechanism and Measures on administrative management, policy or law for Conservation and Protection of Genetic Diversity in Thailand are as follows:

1. Law that relate to the conservation and utilization of genetic resources of plant in Thailand such as Forest Act, B.E. 2484 (1941) National Reserved Forest Act, B.E. 2507 (1964), National Park Act, 2504 (1961). These 3 Acts are the main Law that aims to Protect and Preserve the Natural Resources of Thailand due to the illegal smuggling the woods from the forest and caused the bad impact to the Environment. The Plant Varieties Protection Act, B.E.2542 (1999) is the law that follows the principle in the Convention with the aim to promote the improvement and development of Plant Varieties, to protect the new plant varieties, promote the accessibility, and benefit sharing of utilizing the resources for development and sustainable utilizing the new plant variety. The order of the National Committee on Conservation and Sustainable Use of Biodiversity. On the criteria and procedure of utilizing and the benefit from the Biological Resources Year 2554 (2011).
2. Setting up the Rice Genetic Conservation Center in B.E. 2524 (1981) to manage and keep the stock of National Rice Seeds at the Rice Research Center (Phatum Thani Province). This Rice Genetic Conservation Center is aim to be the place the collect, conserve and utilize the Rice Genetic Resources, Operation Center and keep the National Rice Seeds. From 2525 (1982), the Center has started to survey and collect the varieties of rice seeds around the country. At present, the center has collected over 20,000 sample of rice seeds.
3. Plant Genetic Conservation Project under the Royal Initiation of Her Royal Highness Princess Maha Chakri Sirindhorn (RSPG) with the objective of build up the human capacity, conserve, develop the Plant Genetic Resources and maximize the benefit of utilization of this resource for Thai

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people. The project has started from 1992 until present, there are participate government agencies more than 150 agencies and more than 2,500 schools around the country become Botanical Garden Members.

4. Improve and Revise the Animal Breeding Act, B.E. 2509 (1966) which aims to response to the Conservation and Animal Genetic Development in order to conserve the animal genetic of local animal that almost distinct. The Act follows the Convention of Bio-Diversity. In addition, Department of Livestock Development succeeded in conserve the genetic diversity and develop the genetic improvement of 12 types of local animals such as local bull, Lumpoon white cow, northeast and south bull, red bull, Bali bull, fluff-horn bull, local goat, local pig, local black duck, local white duck, local duck (estuary breed), local duck (Nakorn Phatom breed), goose and local hen. The basic data of condition of local animals in Thailand and these data may be useful in the future.
5. Set up 6 Wild Plant Genetic Gardens “Wanawat Research Center” situated around the country. Main responsibility of this garden is to select the vegetation that has economic value and has good characteristic from the forest for 15 types (300 each). Then distribute this vegetation to plant in each center in the demonstration block, which is permanently display for conservation and for research of plant genetic sources in 7 different natural biological ecologies in the 15 Gardens around the country.

Indicators and Activities

Indicator(s) used in this assessment

- Tools, mechanisms or regulations are available for managing conservation and protection of the country’s genetic resources.

EN

Any other tools or means used for assessing progress.

Consider the information search.

EN

Level of confidence

Level of confidence of the above assessment

Based on comprehensive indicator information

Level of confidence of the above assessment

Existing evidence can reflect the real situation

EN

Adequacy of monitoring information to support assessment

Monitoring related to this target is adequate

Target 12: By 2020, pollution has been brought to levels that are not detrimental to ecosystem function and biodiversity.



2018 - Progress towards target but at an insufficient rate

Targets

Target 12: By 2020, pollution has been brought to levels that are not detrimental to ecosystem function and biodiversity.

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Category of progress towards the implementation of the selected target

Rate of progresses toward the implementation of the selected target

Progress towards target but at an insufficient rate

Date the assessment was done

31 Oct 2018

Summary of the assessment of progresses toward the implementation of the selected target

The evaluation as per indicator of this target has relationship with the quality of water source on land and from the sea. It is found that:

Water quality of water source on land: The monitoring of water quality was done on the main 59 rivers and 6 still water sources by using Water Quality Index (WQI) as indicator. In 2017, about 83% of water source, the water quality was in the

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level of average to good which increases from year 2016 (at 80%).. The water quality in the level of deterioration was 17% which reduced from last year (20%). There was no source in the level of excellent or very deterioration. In comparison of the quality of land water sources by region: it is found that the best quality of water source was in Northeastern region such as Songkram River and She River. The worst of water quality was the water source from Central region, the same as past years such as from Nonthaburi province to Samutprakarn province. Ranking the best quality of water was Songkram River, She River, Nong Harn, upper Ta-pee and Saiburi. The worst 5 quality was lower Chao Phraya River, lower Tha-jeen River, upper Phung raj River, lower Rayong River and Kwang River. In the past 10 years (2008 - 2018), it is found that the water quality of land water sources in Thailand was in the average level and from 2008, there was no source in level of very deterioration. The trend of quality improvement and the increase of water source in the good level starting from year 2014.

Coastal water quality: The monitoring of coastal water quality was done by using Water Quality Index (WQI) as indicator. In 2017, it is found that the quality of sea water was improved and in the level of average to good. About 96% of water source, the water quality was in the level of average to good which increases from year 2016 (at 91%). The water quality in the level of deterioration was 4% which reduced from last year (9%). In the past 10 years (2008 - 2018), it is found that the coastal water quality in Thailand was in the average level. In 2017, the quality of costal sea water was in the level of good to excellent.

Indicators and Activities

Indicator(s)used in this assessment

- Eighty percent of freshwater reservoirs are found to be in good quality.
- Eighty percent of marine areas are found to have good water quality.

EN

Any other tools or means used for assessing progress.

Consider the information search.
Consider data from statistics.

EN

Level of confidence

Level of confidence of the above assessment

Based on partial indicator information and expert opinion

Level of confidence of the above assessment

Partly existing evidence

EN

Adequacy of monitoring information to support assessment

Monitoring related to this target is partial (e.g. only covering part of the area or issue)

Target 13: By 2020, tools/mechanisms/guidelines on sustainable use of biodiversity are applied in all relevant sectors.



2018 - Progress towards target but at an insufficient rate

Targets

Target 13: By 2020, tools/mechanisms/guidelines on sustainable use of biodiversity are applied in all relevant sectors.

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Category of progress towards the implementation of the selected target

Rate of progresses toward the implementation of the selected target

Progress towards target but at an insufficient rate

Date the assessment was done

31 Oct 2018

Summary of the assessment of progresses toward the implementation of the selected target

In Thailand, there are Tools and Rules to drive various activities especially the Prevention of the impact on plant seeds, natural habitat and the excess fishing. For driving mechanism, apart from government officers, there is the network of local

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residents from the encouragement of public participation. For example, The Committee on Protection and Control of Marine and Coastal Resources,

There are many government agencies that give priority to the biodiversity by including this issue in their Standard, Indicator or other criteria for evaluation which result to Target No 8 in the opportunity to add the biodiversity issue in the standard and criteria to meet the target in the set schedule.

From the monitoring of Tools / Mechanism / Guidelines for promoting the sustainable use of biodiversity, it is found that

- The establishment of National Committee on Conservation and Sustainable Use of Biodiversity, from the Regulations of the Office of the Prime Minister in order to define the criteria and direction to access or utilize, biological safety and technology transfer.
- Integrate Master Plan on Biodiversity for year 2015 - 2021. The plan is defined to follow the principle of public participation activities on conservation of Biodiversity both inside and outside the natural habitats, species diversity and sustainable Ecology including promote the activities that encourage the fair and equal benefit sharing from the use of genetic resources.
- The Regulations of the Office of the Prime Minister on the Conservation and Utilization of Biodiversity year 2000. In order to support the adjustment of government offices, the government, therefore, adjust the regulations to "The Regulations of the Office of the Prime Minister on the Conservation and Utilization of Biodiversity (2nd Edition) year 2005."
- The Regulations of the Office of the Prime Minister on the Conservation and Utilization of Biodiversity emphasized on Criteria and Direction of the access to Biological resources and the benefits from using this Biological resources year 2011.
- The setup of "Policies, Measures, Plan on Conservation and sustainable Utilization of Biodiversity" in order to use as guideline for action in National Level (5 years plan). The aim is to create the incentive to locals to conserve the biodiversity as well as to control and to monitor the activities that treat the biodiversity, reduce the loss of Biodiversity, create the conservative network, Conserve & restore the forest and turn to be the community forest for mutual use. Building up the fertility of biodiversity will strengthen the basic foundation of living standard of the Thais together with the valuable research on Biodiversity will lead to the sustainable economic utilization.

Agricultural Sector: The Tools / Mechanism / Guidelines that promotes the sustainable use of Biodiversity in agricultural sector are as follows:
Department of Agriculture promotes "**Agroforestry**" and "**Sustainable**

Agricultural System” especially in the buffer area around the Protected Area. There are 10 guidelines for Sustainable Agriculture; the 6th guideline emphasizes on “use the benefit of Biodiversity to create the variety of activities in agricultural production in the field and blend these production activities to maximize the mutual benefit, natural pest control and create various chemical free activities.

Forestry Sector: The Tools / Mechanism / Guidelines that promotes the sustainable use of Biodiversity in Forestry Sector are as follows:

1. Office of Natural Resources and Environmental Policy and Planning has promoted the sustainable use of by restoration and conservation of cultural forest in Dong Yai forestry area, Maha Sarakham province, Surin province, Sri Saket province and Roi-et province.
2. The Forestry Department has promoted and create the incentive in conservation and the sustainable use by restoration of natural environment in the conserved forest, promote the conservation tourism and promote the activities that encourage the participation of communities in conservation and restoration of forests in various locations.
3. The improvement of work program of Biodiversity of Forestry from the agreement of Parties to the Convention on Biodiversity no.6, year 2002. The work program that required improvement has 3 components, 12 targets and 130 activities. The guideline of promoting the sustainable use of Biodiversity of Forestry are in component 1 of work program (which are the conservation, the sustainable use and the share benefits), in Target 4 (promote the sustainable use of forestry resources) and in Objective no.1 (promote the sustainable use of forestry resources to support the conservation of Biodiversity).

Fisheries Sector: The Tools / Mechanism / Guidelines that promotes the sustainable use of Biodiversity in Fisheries Sector are as follows:

Department of Fisheries collaborate with Southeast Asian Fisheries Development Center (SEAFDEC) World Wide Fund for Nature (WWF) and Thai Tuna Industry Association (TTIA) have signed the MOU on “Collaboration of improvement the Long-tail Tuna Fishing in the Gulf of Thailand to sustainable fishing” for sustainable use of resources from the ocean and the sea as per SDGs Target No.14. In addition, the Department of Fisheries is also promote

and create the incentive in conservation and sustainable use by release about 800,000/year of various species of aquatic in 80 fresh water fish sources around Thailand in order to motivate the locals / community residents to conserve the aquatic species.

Tourism Sector: The Tools / Mechanism / Guidelines that promotes the sustainable use of Biodiversity in Tourism Sector are as follows: Promote the Sustainable Tourism as well as setup the policy and guidelines for Ecotourism in year 1995 – 1996 and Action Plan of National Ecological Tourism which comprise of 14 Action Plans, 37 Projects.

Indicators and Activities

Indicator(s)used in this assessment

- Number of tools, mechanisms and regulations for protection of species and their habitats from impacts of pollution, overfishing, development schemes and climate change.
- Guideline on integrating biodiversity in standards and criteria of relevance.
- Number of tools/mechanisms/guidelines for promotion of sustainable use of biodiversity in each sector (agriculture, forestry, fishery and tourist sectors).

EN

Any other tools or means used for assessing progress.

Consider the information search.

EN

Level of confidence

Level of confidence of the above assessment

Based on partial indicator information and expert opinion

Level of confidence of the above assessment

Difficulty of data surveillance at all level

EN

Adequacy of monitoring information to support assessment

Monitoring related to this target is adequate

Target 14: By 2021, effectiveness in wetland management is improved at every level.



2018 - Progress towards target but at an insufficient rate

Targets

Target 14: By 2021, effectiveness in wetland management is improved at every level.

EN

Category of progress towards the implementation of the selected target

Rate of progresses toward the implementation of the selected target

Progress towards target but at an insufficient rate

Date the assessment was done

31 Oct 2018

Summary of the assessment of progresses toward the implementation of the selected target

From the monitoring of the use of Tools / Mechanism / Guidelines that promotes the Wetland Management in Thailand, there are action as follows:

National Level: The Wetland management in National Level has done by setting up the “Subcommittees of Wetland Management” which Ministry of Natural Resources and Environment (MNRE) is the main responsible agency, Office of Natural Resources and Environmental Policy and Planning (ONEP) is a secretary and coordinate with other agencies and Secretary General of Subcommittees of Wetland Conservation. There are other agencies get involve such as Department of National Parks, Wildlife and Plant Conservation, Department of Marine and Coastal Resources, Department of Fisheries, Department of Agriculture, Royal Forest Department, Royal Irrigation Department and Department of Provincial Administration.

Provincial Level: The Wetland Management in Provincial level has done by setting up the “Committee of Provincial Wetland Management” and “Wetland Working Committee” to support the activities in the target area by promoting the participation from all related parties. The example of the activities are

- Project of Wetland Management along Kong River encourages the participation of the community residents both in Thailand and in Lao. The wetland management promotes the participation of all related sectors either government, private, local communities, national level or network

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of residents along the Kong River Area. The target areas are Kud-ting wetland and Khong-Lhong swap in Nong Kai Province. The guideline of Provincial Wetland Management follows the 13 measures of National Wetland Conservation measures which was approved by the government on 1st August 2000. The activities in this target area encourage the participation of all related sectors.

- The Project of Wetland Restoration of lower Songkram River which promote capacity strengthening and participation of the communities in water resources management and restoration of the Ecology in the Wetland along lower Songkram River, Nakorn Panom Province. The mechanism of the provincial wetland management was to setup the “Songkram River Wetland Managing Committee, Nakorn Panom Province” and “District Working Committee” to be the working team and provide the opportunity for the stakeholders to participate in the project activities.

Indicators and Activities

Indicator(s) used in this assessment

- Tools/mechanisms for wetland management at provincial level are available by 2020.

EN

Any other tools or means used for assessing progress.

Consider the information search.

EN

Level of confidence

Level of confidence of the above assessment

Based on partial indicator information and expert opinion

Level of confidence of the above assessment

Partly existing evidence

EN

Adequacy of monitoring information to support assessment

Monitoring related to this target is adequate

Target 15: By 2021, loss of wetlands is significantly reduced with the view to ensure ecosystem services and to support climate change adaptation.



2018 - Progress towards target but at an insufficient rate

Targets

Target 15: By 2021, loss of wetlands is significantly reduced with the view to ensure ecosystem services and to support climate change adaptation.

EN

Category of progress towards the implementation of the selected target

Rate of progresses toward the implementation of the selected target

Progress towards target but at an insufficient rate

Date the assessment was done

31 Oct 2018

Summary of the assessment of progresses toward the implementation of the selected target

In Thailand, the Policies, Measures and Wetland Management Plans have been established with the aim to reduce the loss of ecology of the wetland and to ensure that the use of wetland ecosystem services support the Climate Change Adaptation as follows;

1. The Policies, Measures and Wetland Management Plans, year 1997-2003 comprise of 28 Plans, 43 Projects from 14 Agencies which were approved from the cabinet on 15th July 1997. The Wetland Management Plan year 2003-2007 was combined with the Policies, Measures and Sustainable Biodiversity Conservation Plans which comprise of 4 sub-Action Plans, 168 Projects from 41 Agencies which were approved from the cabinet on 11th June 2003. The Wetland Management Plans year 2008-2012 was approved under the Conservation and sustainable use of Biodiversity Plans year 2008-2012 which give priority to the impact of the development which ignore the sustainable Biodiversity Resources that caused significant damage to the Biodiversity which becomes Global problems. The Plans comprise of 2 main measures 1) Conservation of

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Ecosystem of Seashore and Islands 2) Protect the Ecosystem of the Wetland and promote sustainable use.

2. The Measures of Wetland Conservation become significant issue in both National and International Level: From the cabinet approve on 3rd November 2009 for 17 Measures, there was an announcement that all Wetland around the country became the public area especially the fresh water wetlands are the “Green Area” and not allow any government agencies to use that the area is reserved only for receiving the water and keep water as reservoir. The registered wetlands which are important to the locals in receiving & keeping the water, are regularly monitored and looking after. These wetlands are also registered as National water resources for public use. In addition, the cabinet approve on 12th May 2015, assigned Office of Natural Resources and Environmental Policy and Planning together with National Sub-Committee on Wetland Management, setup the list of Project List (type & size) that do not require EIA as per Article 46 of National Environmental Quality Promotion and Preservation Act B.E. 2535 but are vulnerable and potentially can cause significant damage to the Wetland as well as define additional measures to prevent and solve the environmental impact.
3. The Convention of United Nation on Climate Change and the Convention on Biodiversity for Work Program of Ecosystem of Water Resources of Land, Sea and Coastal. The Agreement of Alliances on Habitat Conservation of Migrate Birds route East Asia - Australia: from the cabinet approved on 20th July 2010, Office of Natural Resources and Environmental Policy and Planning was assigned to be coordinator of this project and the main mission of this project is propose the migrate area to be include in this project.

Indicators and Activities

Indicator(s) used in this assessment

- Management plans/measures are available for at least a half of wetlands of international importance by 2021.

EN

Any other tools or means used for assessing progress.

Consider the information search.

EN

Level of confidence

Level of confidence of the above assessment

Based on partial indicator information and expert opinion

Level of confidence of the above assessment

Uneasily assessment

EN

Adequacy of monitoring information to support assessment

Monitoring related to this target is adequate

Target 16: By 2020, invasive alien species in various ecosystems are identified and enlisted.



2018 - On track to achieve target

Targets

Target 16: By 2020, invasive alien species in various ecosystems are identified and enlisted.

EN

Category of progress towards the implementation of the selected target

Rate of progresses toward the implementation of the selected target

On track to achieve target

Date the assessment was done

31 Oct 2018

Summary of the assessment of progresses toward the implementation of the selected target

In Thailand, the agencies that are responsible for updating the database of Invasive Alien Species are Royal Forest Department, Department of National Parks, Wildlife and Plant Conservation and Department of Livestock Development but the invasive

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routes have not been included yet. In parallel Office of Natural Resources and Environmental Policy and Planning, and Department of Agriculture are responsible in producing the Handbook of list of invasive alien species as well as the invasion manner. With the existing database, it is possible to update and extend the information of invasive alien species of animals and the invasion routes/manners of both Plant and Animals.

For the action on defining the types and updating the database of invasive alien species in Thailand, the cabinet has approved on 20th February 2018 to add the additional Register and became 4 Registers in total for invasive alien species that should be prevented, controlled and got rid of including the specific measures in each Register. The 4 Registers are as follows;

- **Register No.1:** The Alien Species that have already invaded and are increasing numbers (from 81 to 138 species). While 16 species are the species that are promoted for economic use and specific measures shall be applied.
- **Register No.2:** The Alien Species that tend to invade. The number is increasing from 52 to 58 species. While 15 species are the species that are promoted for economic use and specific measures shall be applied.
- **Register No.3:** The Alien Species that have already invaded other countries but still have not found the invasion in Thailand. Due to the adjustment of the category from this list to list no. 1 or 2, therefore, the number of species is decreasing (from 49 to 45 species). While 4 species are the species that are promoted for economic use and specific measures shall be applied.
- **Register No.4:** The Alien Species that have not found in Thailand. The number is decreasing (from 91 to 82 species) due to the scientific proof that some species are local species in Thailand, therefore those species are moved to list no 1, 2 or 3.

Indicators and Activities

Indicator(s)used in this assessment

- Listing of invasive alien species and their major pathways.
- At least one list of invasive alien species is available for important ecosystems of Thailand with measures on prevention, control, elimination and utilization of invasive alien species.

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Any other tools or means used for assessing progress.

Consider the information search.

EN

Level of confidence

Level of confidence of the above assessment

Based on comprehensive indicator information

Level of confidence of the above assessment

Existing evidence can reflect the real situation

EN

Adequacy of monitoring information to support assessment

Monitoring related to this target is adequate

Target 17: By 2020, measures are in place to manage priority invasive alien species and their pathways.



2018 - Progress towards target but at an insufficient rate

Targets

Target 17: By 2020, measures are in place to manage priority invasive alien species and their pathways.

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Category of progress towards the implementation of the selected target

Rate of progresses toward the implementation of the selected target

Progress towards target but at an insufficient rate

Date the assessment was done

Summary of the assessment of progresses toward the implementation of the selected target

The action on management of high priority Invasive Alien Species and invasion pathways in Thailand are as follows;

1. The Preventive Measures, Control and Destroy the Invasive Alien Species (Plant, Animals, Microorganisms): The Ministry of Natural Resources and Environment (MNRE) has adjusted and define new Measures and Guidelines for the species that claim to use for economic purposes including the adjustment of registered database for the species that should protect, control and destroy in Thailand in register No. 1-4 to match with current situation as well as adding the additional guidelines for control or destroy the species that are prioritize as dangerous. This updated measures and guidelines will be the tools for related agencies to follow all the actions efficiently and match with current situation.
2. (DRAFT) Preventive Measures, Control and Destroy the Invasive Alien Species comprises of 5 measures as follows;
Measure no.1: Define the Policies, Action Plans, Laws and Budgets
Measure no.2: Manage the Invasive Alien Species
Measure no.3: Stay Alerted and Closely Monitor the Invasive Alien Species
Measure no.4: Support the research on Alien Species and Educate the Invasive Alien Species
Measure no.5: Publish, Create Awareness
3. (DRAFT) Control Guidelines and Destroy Methods the Invasive Alien Species that are classified as very dangerous in Thailand are as follows;
(1) High Priority Alien Species (Plants)
(2) High Priority Alien Species (Animals)
There are 4 action guidelines as follows;
3.1) Update the register and prioritize and define the measures to control, destroy or use the Alien Species that are invading in the conserved area of Biodiversity and in other ecosystem.
3.2) Gathering the study analysis, Invasion Pathways and/or important directions of invasion in Thailand, Risk Assessment and Measures of managing pathways and /or type of invasion.
3.3) Support the Research on utilizing the Alien Species that are invading or tend to invade
3.4) Publish the knowledge of Alien Species Management and promote the capacity of related Agencies, Officers, Local Administrative Offices and Publics to access to the information, monitor, prevent, stay alerted, control and destroy the Invasion Alien Species understand the pathways and prevent the smuggling into the country/area.

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Indicators and Activities

Indicator(s) used in this assessment

- Measures for managing at least 5 invasive alien species found in important ecosystems of the country.
- Means and/or measures for eliminating pathways of alien species.

EN

Any other tools or means used for assessing progress.

Consider the information search.

EN

Level of confidence

Level of confidence of the above assessment

Based on partial indicator information and expert opinion

Level of confidence of the above assessment

Partly existing evidence

EN

Adequacy of monitoring information to support assessment

Monitoring related to this target is partial (e.g. only covering part of the area or issue)

Target 18: By 2021, rules and regulations adhering to the precautionary approach for biosafety are available and applied by relevant agencies for improvement and development of rules, procedures and mechanisms to regulate transboundary movement of living modified organisms (LMOs) in accordance to the obligations of the Cartagena Protocol on Biosafety



2018 - Progress towards target but at an insufficient rate

Targets

Target 18: By 2021, rules and regulations adhering to the precautionary approach for biosafety are available and applied by relevant agencies for improvement and development of rules, procedures and mechanisms to regulate transboundary movement of living modified organisms (LMOs) in accordance to the obligations of the Cartagena Protocol on Biosafety

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Category of progress towards the implementation of the selected target

Rate of progresses toward the implementation of the selected target

Progress towards target but at an insufficient rate

Date the assessment was done

31 Oct 2018

Summary of the assessment of progresses toward the implementation of the selected target

The Enforcement of Laws and Regulations on the control of negative impact on Biodiversity from advance biological technology is still unclear due to there are no specific law to control. However, in the past, there is a movement to propose the Biosafety Law. But it was resisted by Public Network, Farmers, Scholars, therefore, the proposal was withdrawn.

From the Survey, it is found that, Thailand had adjusted "Guidelines for Biological Safety for Activities that related to new Biological Technology, revised edition, year 2016" which The Committee on Biosafety Technic, has developed from Biosafety Guidelines Operation B.E. 2556, by updating the content to follow the latest international criteria for Biological Safety such as Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules year 2016 of National Institute of Health (NIH) and Biosafety in Microbiological and Biomedical Laboratories, 5th edition of Centers for Disease Control and Prevention; CDC, USA, etc. The adjustment was also complied with Thailand Rules & Regulations in order to gain the confident that the activities related to new biological technology are safe for operators, Communities and Environment and to encourage the operators on new biological technology to use this new guidelines to apply for permission to evaluate and define risk level of the research. In addition, there is the preparation and update of other guidelines of biological safety control such as

1. Guidelines for Biological Safety for using controlled genetic modified

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microorganism for the use in Pilot Plant and Industry, revised edition year 2016 to be the guidelines for Researchers, Operators and Evaluators that do activities related to Genetic Modification to understand the steps of safety evaluation and the controlled environment that suitable for their activities for safety of operators, communities and environment.

2. Guidelines for biological safety evaluation for Genetic Modification of Plants (Stack Gene type) and its Products, revised edition 2015: To use as the guidelines for biological safety evaluation of plant genetic modification (Stack Gene type) which developed from conventional breeding between genetic modification plants (male-female parents) and environmental safety evaluation (food aspect) and preparation of the use of Genetic Modification (Stack Gene type) and future invented products.
3. Guidelines for establishing the pilot school for Genetic Modification, year 2013 base on A Practical Guide to Containment: Plant Biosafety in Research Green houses where the Rules are applied from US Regulatory Agency in charge of Research and Use of Genetically Modified Organisms, together with the information from the conference of experts on various occasions. From the mentioned source, the information and guidelines are applied for the establishment and consideration of suitable context for test/pilot school in Thailand for Researchers and Project evaluators that related to Genetic Modification that experiment in the test/pilot school.
4. Draft Biodiversity Act, year ... is the law that are drafting by National Sub-Committee on Biodiversity Law under the National Committee on Conservation and Sustainable Use of Biodiversity, which included the of biological safety measures.

For the application of future precaution on Biosafety in the improvement and development of Rules & Regulations and Mechanism to follow on control the trans-boarder of Biological Genetic Modification. In year 2016, Office of Natural Resources and Environmental Policy and Planning together with National Center for Genetic Engineering and Biotechnology, National Science and Technology Development Agency (NSTDA) started the "Project of Guideline Preparation for biosafety Precautions to support the AEC" Development of Precautionary Principle in Biosafety; for Entering ASEAN Economic Community project, to be the guidelines for responsible agencies and related agencies in developing and improving their Rules and Mechanism on controlling the trans-border of Biological Genetic Modification to support AEC. At present, Thailand does not have the specific Rule but applying the existing Act Plant Quarantine Act B.E. 2507 to control the trans-border of Biological Genetic Modification and Food Act B.E. 2522, to control the package label of genetic modified Corn and Soy Beans However,

Thailand still apply other existing Acts or Laws to control the trans-border Plants such as Export And Import Of Goods Act, B.E. 2522 Agricultural Standards Act, B.E. 2551 and Administrative Procedure Act, B.E. 2539, etc. But at present, the government has never apply the above Acts to control the genetic modification and other related activities.

Indicators and Activities

Indicator(s) used in this assessment

- National tools and mechanisms in ensuring biosafety for agencies and sectors of relevance.
- Improved guidance for actions and utilization of tools and mechanism to ensuring biosafety in modern biotechnology for agencies and all sectors of relevance in Thailand.
- The precautionary approach for biosafety is applied by relevant agencies for improvement and development of rules, procedures and mechanisms to regulate transboundary movement of living modified organisms (LMOs).

EN

Any other tools or means used for assessing progress.

Consider the information search.

EN

Level of confidence

Level of confidence of the above assessment

Based on partial indicator information and expert opinion

Level of confidence of the above assessment

Partly existing evidence

EN

Adequacy of monitoring information to support assessment

Monitoring related to this target is partial (e.g. only covering part of the area or issue)

Target 19: By 2020, mechanisms, rules and regulations on access to and benefit sharing of genetic resources and traditional knowledge are available for Competent National Authorities.



2018 - On track to achieve target

Targets

Target 19: By 2020, mechanisms, rules and regulations on access to and benefit sharing of genetic resources and traditional knowledge are available for Competent National Authorities.

EN

Category of progress towards the implementation of the selected target

Rate of progresses toward the implementation of the selected target

On track to achieve target

Date the assessment was done

31 Oct 2018

Summary of the assessment of progresses toward the implementation of the selected target

Thailand currently has the following laws and regulations that include and cover the administration, monitoring and supervision of the access and the sharing of benefits from the genetic resources:

- The Act on Forestry B.E 2484 to control and stop wood logging and to accelerate forest condition restoration,
- The Act on the National Park B.E. 2504 to determine the protection of the existing natural resources, assuring their unchanged and unspoiled traditional natural condition conservation,
- The Act on the Conservation and Protection Wild Animals B.E. 2535, defining the access and the utilization in restricted areas, as well as types of related actions allowed by this act that emphasizes the conservation and protection with no mention on the sharing of any benefits,
- The Act on Plants B.E. 2535, restricting their access and protection, sales, importing, as well as exporting their seeds for commercial purposes which shall be permitted only by competent agencies,
- The Acts on the Plant Protection B.E. 2542, promoting the plant improvement and development, as well as the conservation and utilization development of endemic plants to ensure local participation in their care, attention, sustainable conservation and utilization,
- The Act on the Protection and Promotion of Thai Medicine Wisdom B.E.

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2542, defining appropriate measures for protecting and promoting individuals, communities and private organizations, ensuring their recognition of the values of the Thai medicine and herbal wisdom and participation in their sustainable conservation, development and utilization,

- The Act on Pathogens and Animal Germs B.E. 2558, defining criteria, methods and conditions for safety protection and danger prevention for the general public against animal germs and pathogens, improving and assuring their control with high proficiency, adding provisions related to civil liabilities, as well as additional amendments on proper penalties and fee rates,
- The National Forest Reserve Act (Copy 4) B.E 2559, defining that the competent authorities to be authorized to confiscate or attach properties acquired or utilized in committing crimes or subject to reasonable grounds to suspect in being used for committing crimes, and to improve the provisions related to penalties, fee rates, royalties and forest conservation fees,
- The B.E. 2554 Regulations of the National Conservation and Utilization of the Bio-diversity Committee on the criteria and methods in accessing the resources with bio-diversity and the acquisition of benefits from the resources with bio-diversity, defining criteria and methods in accessing the resources with bio-diversity and the acquisition of benefits from the resources with bio-diversity, thus ensuring their similar directions and coherence with the B.E. 2535 Convention on the Bio-diversity, and
- The National Research Council's B.E. 2550 Regulations on the Permission Granting for Foreign Researchers to Conduct Researches in Thailand.

However, in the course of the past years there have been 2 legal developments in relation to the access and the sharing of benefits covering the related endemic biological resources and wisdom. These include a bill on the B.E.Promotion and Conservation of Endemic Animals, which is related to the access and sharing of benefits covered in the types of animal resources, and the Regulations of the National Genetic Engineering and Biotechnology Center, related to the access and the sharing of benefits from bio resources kept therein, once together with the old laws or regulations concerning the access and the utilization of the natural resources, which are found that they still do not include the biological resources and the related local wisdom, and still exclude the marine and coastal resources, as well as local wisdom.

Apart from these, another study was done on development of tools and mechanisms for accessing biological resources and the fair and just sharing

of benefits, mainly based on the access of biological resources and sharing of benefits, that is, through an advance notice, a mutual agreements on fair and just sharing of benefits highlighting conservation, defining agreements on the transfer of certain materials under the formulation project of the provisos under the bill on the bio-diversity B.E..... so as to serve as a common standard for the conservation of the bio-diversity, the access, the utilization and the sharing of benefits from the genetic resources to ensure the biological safety and the active community participation. There has currently been progress in the improvement and amendment of the bill on the bio-diversity B.E.... and the draft provisos and the draft local regulations and provisions on the access to the biological resources and the sharing of the benefits from genetic resources coherent with the universal principles and international criteria that are on the registration of the related biological resources and local wisdom, as well as (preliminary) maps. A committee has been set up to protect and supervise the biological resources and local wisdom at the community level (Office of Natural Resources and Environmental Policy and Planning, 2018)

Indicators and Activities

Indicator(s) used in this assessment

- Rules and regulations related to the access and benefit sharing are available and used by the Competent National Authorities (CNA) who responsible for regulating access to and benefit sharing of genetic resources.
- Mechanisms are available for implementation of the Nagoya Protocol.
- Legislation related to the access and benefit sharing of biological resources and traditional knowledge of relevance is developed.
- Mechanisms for approval of access to and sharing of benefits derived from utilization of genetic resources and traditional knowledge are developed or revised in 80 percents of the Competent National Authorities.

EN

Any other tools or means used for assessing progress.

Consider the information search.

EN

Level of confidence

Level of confidence of the above assessment

Based on partial indicator information and expert opinion

Level of confidence of the above assessment

Partly existing evidence

EN

Adequacy of monitoring information to support assessment

Monitoring related to this target is partial (e.g. only covering part of the area or issue)

Target 20: By 2020, mechanisms for management of access to, sharing of benefits derived from and monitoring of utilization of genetic resources are integrated.



2018 - On track to achieve target

Targets

Target 20: By 2020, mechanisms for management of access to, sharing of benefits derived from and monitoring of utilization of genetic resources are integrated.

EN

Category of progress towards the implementation of the selected target

Rate of progresses toward the implementation of the selected target

On track to achieve target

Date the assessment was done

31 Oct 2018

Summary of the assessment of progresses toward the implementation of the selected target

Regulations related to the access, the benefit sharing, monitoring and control of the

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genetic resource utilization include the following:

- **The National Forest Reserve Act B.E. 2559**, defining measures in protecting, preventing and conserving natural resources, requiring systematic natural resource administration and management to ensure public benefits through a committee in charge of the utilization of the national forest reserves to be authorized and permitted by the competent authorities,
- **The National Park Act B.E. 2504**, emphasizing the protection and conservation of the existing natural resources, such as plants, forest products, wild animals, as well as wild landscape views and mountains, so that they are kept in their original conditions, unspoiled or unchanged, to facilitate their benefits - direct and indirect - for the continual benefits of the state and the general public,
- **The Acts on Plant Varieties B.E. 2535**, controlling the access and providing protection for certain kinds of plants: seed control, preserved seeds and plants, conserved plant varieties, restricted non-natural propagation of certain plant varieties, of which the collection, sales, importing and exporting have to be authorized by competent authorities; plant varieties that have to be registered, guaranteed in cases where promotion for innovative identification and improvement are involved so as to become beneficial for the country's further development,
- **The Plant Varieties Protection Act B.E. 2542**, defining the conditions for accessing common plants, wild plants and endemic plant species and their benefit sharing: (1) Accessing common plants, wild plants for breeding, study, test, or research for commercial purposes, it shall be authorized by competent officers and due agreements be made on the benefit sharing, (2) Accessing common plants, wild plants for non-commercial ones, shall be notified using letter format as attached (3) Accessing endemic plants for breeding, study, test, or research for commercial purposes need agreement for benefit sharing. The authorization and development of agreement on benefit sharing shall be led by either concerned local administrative organizations, or the concerned farmers' groups or cooperatives previously authorized for such endemic plants to perform legal acts on behalf of local communities, and need prior approval from the Plant Variety Protecting Committee with which benefit sharing shall be made and based on the allocations set by local provisions,
- **Protection and Promotion of Traditional Thai Medicine Wisdom Act, B.E. 2542**, defining the processes for accessing the Thai medicine and herb wisdom as follows: (1) As for traditional Thai medicines, their

commercial utilization shall be authorized, along with the restriction of rights and remunerations which shall follow the set criteria, (2) As for Thai general medicines and Thai general medicine texts, no permission is required to access, (3) As for the personal Thai medicine books and the personal Thai medical textbooks, the permission shall be sought from the registered patents holders (4) Herbs under certain control: their access requires permission, (5) As for the origins of the controlled herbs, permission is required for the access to the controlled area and necessary actions be complied with the stated regulations,

- **The Fisheries Decree (Copy 2) B.E. 2560**, defining criteria in controlling and keeping surveillance the fisheries and sea animal transportation, as well as importing, notification of the docking of non-Thai fishing boats, measures in conservation and fishing boat administration, fishery gears and sea animals, sea animal products suitable for each fishery category,
- **The Act on Pathogens and Animal Germs B.E. 2558**, whereas pathogens is referred to microorganisms, biological substances and other germs that can generate diseases in humans, livestock, draught animals, and animal toxins referred to toxic from animals that cause defective function of the body in humans, livestock, and draught animals. Access and utilization including production, import, export, selling, entering or possession of pathogens or animal toxins shall follow the existing laws depend on the risks level or danger associate with such pathogens or animal toxins. Pathogens or animal toxins with low risk does not need notification or authorization, medium risk requires notification, high risk requires authorization, and any actions are not allowed for the pathogens and animal toxins with very high risk. Time frame for assurance letter and permission will be determined, as well as competent authorities, coupled with increased power for authorized personnel, supported with provisions concerning appropriate penalties and fee rates will be considered,
- The regulations of the **National Sub-committee on Convention on Biological Diversity** on the criteria and methods for accessing the biological resources and acquiring benefits from these biological resources B.E. 2554, define criteria and methods in accessing these biological resources and in acquiring benefits from them for related state agencies that they compile appropriate guidelines and agreements for the access of those biological resources and the acquisition of returned benefits from those biological resources among state agencies and the permitted agents,
- **The regulations of the National Research Council** on the permission for foreign researchers to conduct research works in Thailand B.E. 2550,
- **The (Draft) Biosafety Law B.E.** which is a draft in the drafting

process of the law sub-committee on the bio-diversity under the National Committee on Conservation and Sustainable Use of Biodiversity. This draft has several sections dealing with the access to and the utilization of benefits.

Apart from these, there has been a new development on the Community-ABS (C-ABS), which highlights the various communities as care-takers and supervisors of biological resources who can claim benefit sharing in the forms of cash and in kind, thus underlining the fair and just income distribution principle.

Indicators and Activities

Indicator(s) used in this assessment

- Mechanisms for management of access to, sharing of benefits derived from and monitoring of utilization of genetic resources are integrated.

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Any other tools or means used for assessing progress.

Consider the information search.

EN

Level of confidence

Level of confidence of the above assessment

Based on partial indicator information and expert opinion

Level of confidence of the above assessment

Partly existing evidence

EN

Adequacy of monitoring information to support assessment

Monitoring related to this target is partial (e.g. only covering part of the area or issue)

Target 21: By 2021, mechanisms, rules and regulations related to access and benefits sharing of genetic resources are developed by research and local communities.



2018 - Progress towards target but at an insufficient rate

Targets

Target 21: By 2021, mechanisms, rules and regulations related to access and benefits sharing of genetic resources are developed by research and local communities.

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Category of progress towards the implementation of the selected target

Rate of progresses toward the implementation of the selected target

Progress towards target but at an insufficient rate

Date the assessment was done

31 Oct 2018

Summary of the assessment of progresses toward the implementation of the selected target

Thailand has now developed the Community BioBank, highlighting the local community's participation and consent, as well as the just and fair benefit sharing through the various communities' networks and cooperation, youth networks, local administration organizations, intellectual agencies currently supporting new knowledge and developing various resources that their values are highly upheld. This action has been carried out by the Community BioBank, acting as their common information center for the national and the community resources. Besides this, this can further develop into a small learning center on bio-diversity and local wisdom for urban dwellers. It can very aptly serve as a center for learning community development, cultural histories and local resources, a local public site where the community can easily access and use to further protect other types of local resources, thus helping crystalizing their locally striking identity due to be registered for their geographically own uses. One that can be exemplified is like a center for collecting banana varieties recently carried out by Pakchong Research Station in Nakhon Ratchasima in collaboration with Kasetsart University acting as an information center, another example is the development example plot in the botanical garden of Kasetsart University in Mae Rim District, Chiangmai. It is based on banana varieties collected as part of the

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community biobank. Another one is the integrated Longan variety collection garden in Lampoon Province carried out in collaboration with a number of local learned village persons and researchers, thus capable of developing a community-ABS (C-ABS) to a very high level of scalability to other similar areas' interests, highlighting the just and fair distribution and sharing of accrued benefits based on biological resources - in cash and in kind.

Apart from these, genetic resources cooperation networks have been set up among 25 agencies, mostly overseas, to highlight international meetings on intellectual activities based on bio-diversity. Such certainly includes international expositions. In this collaboration some 38 Rajabhat universities are included. This is to support and help develop local knowledge already and currently collected by the various local communities and biobanks that one day they will be located in various locations and can aptly nurture their close cooperation.

Indicators and Activities

Indicator(s) used in this assessment

- Mechanisms, rules and regulations related to access and benefits sharing of genetic resources are developed by research and local communities.

EN

Any other tools or means used for assessing progress.

Consider the information search.

EN

Level of confidence

Level of confidence of the above assessment

Based on expert opinion

Level of confidence of the above assessment

Limited sampling group

EN

Adequacy of monitoring information to support assessment

No monitoring system in place

Target 22: By 2021, measures and mechanisms are available for returning economic revenues from biological products to their origins in order to support conservation and sustainable use of biological diversity.



2018 - On track to achieve target

Targets

Target 22: By 2021, measures and mechanisms are available for returning economic revenues from biological products to their origins in order to support conservation and sustainable use of biological diversity.

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Category of progress towards the implementation of the selected target

Rate of progresses toward the implementation of the selected target

On track to achieve target

Date the assessment was done

31 Oct 2018

Summary of the assessment of progresses toward the implementation of the selected target

Thailand has already formulated and has got in place a 20-year (A.D. 2017-2038) strategic economic development plan based on bio-diversity. This has already served as the guidelines for main future tasks integrated with all other related agencies. 3 main strategies have thus been set to be applied for the sustainable utilization and conservation of bio-diversity. They are to 1) Strengthen the community's business sector, 2) Promote and support participation with and from the various sectors, and 3) Formulate data-bases and knowledge bodies based on bio-diversity to protect and prevent the commercially based conservation and utilization of the bio-diversity. One key strategy to strengthen the community business sector is to create various value-added lines based on bio-diversity and apply the accrued economic values for the community's bio-diversity conservation and restoration in the community's existing ecosystem. Based on a case of a successful community, the community can easily collect a certain amount of money from sales of bio-diversity products for its community forest conservation fund.

There have been several ways for the spending of the incomes earned in the eco-

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system. One is called the payment for the ecosystem services - PES. In this case volunteers and tourism entrepreneurs currently support the community's Mangrove Conservation Forum under the local administration organization's care which involves the coastal resource management through waste management and tourists' safety care. Another case involves a regional waterworks distribution station. Therein waterworks service beneficiaries are supporting the retarded flow of raw waters through the construction of small earthen dikes, the cleanliness and healthy condition care of water courses, preventing fires capable of burning woods and planted trees in the watershed areas along the waterworks water courses. Apart from this, campaigns have been launched to encourage tourists to cooperate with the involved communities to carry out certain activities in touristic sites to conserve, protect and restore coral reefs. The selected activities carried out called for participation from the educational sector, the private sector, and the general public. These are Project: Coral reef cleaning (Fish Homes), Project: Boat buoy installation, and Project: Restoring coral reefs and other related ecosystems. Activities related to conservation: Raising the youth and children's ecosystem awareness in various occasions: Children's Day, and World Sea's Day, etc. To do these, there will first be effective training for diving volunteers for reef watching to encourage active participation in coral reef supervision on the part of the children or youth trainees after their training.

Indicators and Activities

Indicator(s) used in this assessment

- Measures and mechanisms for returning economic revenues from biological products to their origins in order to support conservation and sustainable use of biological diversity.

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Any other tools or means used for assessing progress.

Consider the information search.

EN

Level of confidence

Level of confidence of the above assessment

Based on partial indicator information and expert opinion

Level of confidence of the above assessment

Partly existing evidence

EN

Adequacy of monitoring information to support assessment

Monitoring related to this target is partial (e.g. only covering part of the area or issue)

Target 23: By 2021, mechanisms are available for integrating and linking databases on biodiversity and other sources of relevant scientific information, enabling effective use of all existing technical resources.



2018 - Progress towards target but at an insufficient rate

Targets

Target 23: By 2021, mechanisms are available for integrating and linking databases on biodiversity and other sources of relevant scientific information, enabling effective use of all existing technical resources.

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Category of progress towards the implementation of the selected target

Rate of progresses toward the implementation of the selected target

Progress towards target but at an insufficient rate

Date the assessment was done

31 Oct 2018

Summary of the assessment of progresses toward the implementation of the selected target

Progress has been achieved in the development of the scientific data base systems to support the policy formulation and bio-diversity action plans. Moreover, new biodiversity taxonomists have been trained to increase their capabilities in new challenge areas. More have been recruited into new organizations dealing with biodiversity operations that the related organizations and personnel can more aptly

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apply bodies of scientific knowledge of some specific areas into the policy and action- plan formulation that they can successfully make needed progress and achieve the biodiversity-specific as planned.

Office of Natural Resources and Environmental Policy and Planning (ONEP) does have a number of agencies in charge of collecting biodiversity databases. These agencies function in various ministries, as well as in certain data sections of educational and research institutions. The private sector does also have some databases. At present, it has been indicated that the ONEP is in charge of the integration and connectivity of biodiversity databases of the whole country. However, all these are still in the preliminary and temporary development phase and not all the designated databases can fully and aptly be interconnected. And, in that connection, not all objectives and indicators have been achieved and can be applied for the biodiversity purposes.

The driving roles and efforts to make use of the databases for conservation and biodiversity purposes have not yet been fully accomplished by any agency yet. However, the ONEP has recently started a new course of action when it got in touch with the Biodiversity-Based Economy Development Office (Public Organization) – BEDO. Lots of innovative measures have yet to be invested to ensure that a driving force will achieve the biodiversity-based goals.

The connectivity and the extension of mechanism networks to publicize and disseminate bio-diversity databases to cover and include related agencies to ensure the effective biodiversity data utilization for maximum benefits in accordance with Section 18, Paragraph 3 of the Convention on the Biodiversity require that necessary mechanisms be established to disseminate data and information to promote and facilitate the good scientific and technological cooperation, as well as the transfer of technical and expertise data cooperation. In this regards, the ONEP, as the coordinating agency, has set up its webpage with necessary mechanisms to disseminate biodiversity data and information to serve as a Clearing House Mechanism to further work in coordination and cooperation with other related agencies' database systems which include the following:

- The biodiversity database systems of the Department of National Parks, Wildlife and Plant Conservation,
- The biodiversity database systems of the Department of the Royal Forestry,
- The biodiversity database systems and local wisdom of the BEDO
- The central database system and the standards for the marine and coastal resources of the Department of the Marine and Coastal Resources,
- The plant databases of the Botanical Organization,
- The international buffalo databases, Kasetsart University, and
- The economic insect databases, the Agricultural Promotion Department.

It was found there are many more agencies that are collecting biodiversity data and information. However, it should be noted here that this connectivity is based only on the web addresses of the agencies.

The strategies on the research work based on biodiversity have been identified in order to help conserve, restore, and develop the local ecosystems so as to enhance the clever and efficient utilization of their biodiversity benefits to further sustain their ecosystem and natural affluence to the maximum. This will serve as the secure base for Thai society's future living conditions supported by the biodiversity of which the value is greatly increased by the biodiversity-based research which further helps distribute fair and just benefits in Thailand's overall economy at the local and national levels.

Indicators and Activities

Indicator(s) used in this assessment

- Databases on scientific information supportive to development of biodiversity policies and plans.
- Greater proportion of taxonomists in rosters of technical personnel in agencies that undertake actions on biodiversity.
- Mechanisms for integrating and linking biodiversity databases.
- Clearing houses agencies are available for mobilizing and utilizing existing databases for conservation and sustainable use of biodiversity.
- Expanding biodiversity clearing-house mechanisms to every agencies of relevance.
- Mechanisms to deliver scientific knowledge for development of biodiversity policy and plans.

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Any other tools or means used for assessing progress.

Consider the information search.

EN

Level of confidence

Level of confidence of the above assessment

Based on comprehensive indicator information

Level of confidence of the above assessment

Existing evidence can reflect the real situation

EN

Adequacy of monitoring information to support assessment

Monitoring related to this target is partial (e.g. only covering part of the area or issue)

Target 24: By 2021, databases on priority biodiversity issues are available.



2018 - On track to achieve target

Targets

Target 24: By 2021, databases on priority biodiversity issues are available.

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Category of progress towards the implementation of the selected target

Rate of progresses toward the implementation of the selected target

On track to achieve target

Date the assessment was done

31 Oct 2018

Summary of the assessment of progresses toward the implementation of the selected target

Thailand has made available national databases on local wisdom and folklore that includes and covers local wisdom, Thai medicine and alternative medicine. Various forms of local wisdom have been compiled into several forms of encyclopedias. In each region there are agencies that collected biodiversity data, mostly those that are of high priorities to them like the following:

- Plants databases, collecting data and information about plants on display in the Queen Sirikit Botanical Garden. Plant samples are kept dry. The plants on display are those written about in the books published by the

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Botanical Organization and those from other data sources. At present, plants data are subdivided into groups differentiated by ways of collection means and their origins which are categorized into alive and dry groups, endemic and threatened or near-extinction groups;

- Islands databases-all the islands of Thailand; islands representing varieties of plants: drifting with waters; once stuck on the island's limited land, forced to be differently evolved; a number, quite outstanding in terms of genetic sources and deriving into plants with special genetic characteristics in terms of sizes and shapes-stunted, losing their internal self-protecting organisms, genetic variety distribution, population size distribution within limited spaces,
- Biodiversity databases systems: Based on the study and the designing for the 6 biodiversity database systems-forest insects, forest and fungus microorganisms, plants, climate and plant growth, soil, and forest genetics, the results of the studies were formulated into an applied program to process and collect the data accumulated, displaying them in the management information system (MIS) and in the geographic information system (GIS) for public usages and access to the forestry data and information sites.

Moreover, in order to correspond to Thailand's revolution plan in terms of biodiversity, a number of indicators are identified. The central databases should serve as a one-stop service processing spot. The various biodiversity databases should be centralized, based on their various national priorities and dimensions. Mechanisms should be available to connect the various database systems in order to drive them for the conservation purposes and the sustainable utilization of the biodiversity benefits. In addition, there should be a comprehensive protecting system for the registered data, as well as for the right to access these resources, bodies of knowledge, and local wisdom. This action plan should be operational during 2018-2023. The guidelines for all these actions should be:

- Prioritize and update all the biodiversity resources data, based on their national significance. Each plant category should be detailed as much as possible. Node systems can help identify data groups which should be at least of 2. The first are those that can have high potential in Thailand's socio-economic development growth. These are thus of high priorities and should be kept away from foreign access and utilization. The second are those that are threatened by extinction and those alien plants that can have strong negative effects on Thailand's existing biodiversity conditions and status.

- Data verification shall be maintained, evaluated and sustained on a continual basis for their updated reliability.
- A coordinating biodiversity center is a must for connecting the various nodes of regional biodiversity databases, including those attached to or in the various agencies and organizations - administration or educational.

Indicators and Activities

Indicator(s) used in this assessment

- Numbers of databases and inventories on traditional and local knowledge that is supportive to conservation and sustainable use of biodiversity.
- Databases on priority biodiversity issues.

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Any other tools or means used for assessing progress.

Consider the information search.

EN

Level of confidence

Level of confidence of the above assessment

Based on partial indicator information and expert opinion

Level of confidence of the above assessment

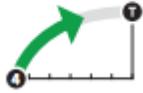
Partly existing evidence

EN

Adequacy of monitoring information to support assessment

Monitoring related to this target is partial (e.g. only covering part of the area or issue)

Target 25: By 2021, biodiversity inventories are systematically carried out by municipalities of every level.



2018 - On track to achieve target

Targets

Target 25: By 2021, biodiversity inventories are systematically carried out by municipalities of every level.

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Category of progress towards the implementation of the selected target

Rate of progresses toward the implementation of the selected target

On track to achieve target

Date the assessment was done

31 Oct 2018

Summary of the assessment of progresses toward the implementation of the selected target

Based on the survey, it was found that 8 municipalities which have collected urban biodiversity data and applied them in their urban development action plans in the past years have greatly achieved in uplifting the people's quality of life. These are Bangkok Metropolis, Chiangmai Municipality, Chiangrai Municipality, Krabi Municipality, Srisaket Municipality, Pitsanuloke Municipality, Nakhon Sawan Municipality, and Sakhon Nakhon Municipality.

Bangkok Metropolis collected data on green areas and the number of bird varieties; Chiangmai collected data on green areas, and the urban ecosystem; Chiangrai collected data on biodiversity, green areas, urban ecosystem, forests, and wetlands; Krabi collected data on green areas; Srisaket collected data on endemic plants and local animals; Pitsanuloke conducted a registration for plants, big trees in various communities, big trees in the municipality, conducted and collected data on plant seeds and animal categories in the municipal area; Nakhon Sawan collected data on endemic plants; Sakhon Nakhon collected data on endemic plants and green areas. (Office of Natural Resources and Environmental Policy and Planning, 2012, 2013)

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Indicators and Activities

Indicator(s) used in this assessment

- Number of municipalities with inventory on urban biodiversity.

EN

Any other tools or means used for assessing progress.

Consider the information search.

EN

Level of confidence

Level of confidence of the above assessment

Based on partial indicator information and expert opinion

Level of confidence of the above assessment

Partly existing evidence

EN

Adequacy of monitoring information to support assessment

Monitoring related to this target is partial (e.g. only covering part of the area or issue)

Section IV. Description of national contribution to the achievement of each global Aichi Biodiversity Target

1. Awareness of biodiversity values

2. Integration of biodiversity values

3. Incentives

4. Use of natural resources

5. Loss of habitats

6. Sustainable fisheries

7. Areas under sustainable management

8. Pollution

9. Invasive Alien Species

10. Vulnerable ecosystems

11. Protected areas

12. Preventing extinctions

13. Agricultural biodiversity

14. Essential ecosystem services

15. Ecosystem resilience

16. Nagoya Protocol on ABS

17. NBSAPs

18. Traditional knowledge

19. Biodiversity knowledge

20. Resource mobilization

Section V. Description of the national contribution to the achievement of the targets of the Global Strategy for Plant Conservation

Thailand has national targets related to the GSPC Targets

Details on the specific targets

Thailand biodiversity targets are segregated into three phases, to be reached in 2016, 2020 and 2021, covering 11 issues, that consistent with the targets of the Global Strategy for Plant Conservation (GSPC).

1) Raising awareness and education

- By 2016 National, provincial and local agencies understand and are aware of values and importance of biodiversity.
- By 2020 Every sector of society, particularly the publics and local communities, has basic knowledge on biodiversity and are aware of the importance of the conservation and sustainable use of biodiversity.
- By 2021 Biodiversity is included in curriculums of the institutions for learning and education at all levels.

2) Integration and promotion of participation in the management of biodiversity

- By 2016 Every sector of society, particularly local communities and their networks, significantly increase their participation in the conservation, restoration and sustainable use of biodiversity.
- By 2016 Guidelines are in place for reduction and elimination of harmful Incentives for biodiversity and for promoting positive incentives for the conservation and sustainable use of biodiversity in relevant sectors.

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- By 2020 Biodiversity is integrated in relevant policies or plans at all levels.
 - By 2020 Financial mechanisms are place for mobilizing the conservation and sustainable use of biodiversity.
 - By 2020 Regulations and laws that obstruct participation in biodiversity management are revised.
 - By 2021 Biodiversity management is mobilized with participation at all levels.
- 3) Conservation restoration and protection of biodiversity
- By 2016 The rate of habitat loss, including forest and coastal ecosystems is reduced.
 - By 2016 Protected areas and ecosystems are effectively managed to ensure their ecosystem services.
 - By 2016 Conservation status of threatened species and endemic species as well as the management of these species are improved.
 - By 2020 The rate of habitat loss, including forest and coastal ecosystems is reduced by 50 percent.
 - By 2020 Conservation status of threatened species and endemic species as well as the management of these species are improved with measures for conservation and protection of their habitats.
 - By 2021 Protected areas are connected by networks, provide adequate ecological representation and have measures for managing critical habitats, biodiversity hotspots and areas of significant importance for ecosystem services.
 - By 2021 Mechanisms and measures are in place for the management as well as policy and legal actions for conservation and protection of the national genetic resources.
- 4) Threat Reduction and Sustainable biodiversity Utilization
- By 2016 The threats from anthropogenic activities to species and habitats, particularly the coral reefs and other vulnerable ecosystem impacted by climate change are minimized.
 - By 2016 Guidance is in place for mainstreaming biodiversity in relevant standards and criteria.
 - By 2020 Pollutants are kept at the levels that would not damage ecosystem functioning and biodiversity.
 - By 2020 Tools/mechanisms/guidance for sustainable use of biodiversity iare applied in every relevant sectors.
- 5) Wetland management
- By 2016 Effectiveness in managing wetlands is increased at all levels.
 - By 2021 The loss of wetland ecosystems is significantly reduced in order to enable ecosystem services and facilitate ecosystem-based adaptation of climate change.
- 6) Management of alien species
- By 2016 Invasive alien species and their major pathways are identified and

registered.

- By 2020 Measures for managing priority invasive alien species and major pathways of the species are in place.

7) Biosafety Management

- By 2016 Laws and regulations for controlling modern biotechnologies and preventing their adverse impacts to biodiversity are enforced.
- By 2021 Regulations based on the pre-cautionary principle for supervising biosafety are in place and adopted by relevant agencies for improvement of rules and mechanisms for transboundary movement of living modified organisms in accordance to the provisions of the Cartagena Protocol on Biosafety.

8) Protection of genetic resources

- By 2016 Responsible agencies have mechanisms and regulations for access and benefit-sharing of genetic resources in order to meet the Obligations under the Nagoya Protocol.
- By 2016 Laws related access and benefit-sharing are developed for genetic resources and traditional knowledge of relevance.
- By 2020 A focal point for manage access, benefit-sharing and monitor usage from genetic resources is established.
- By 2020 By 2021 Research community and local communities formulate their mechanisms and regulations for access and benefit-sharing of genetic resources.

9) Bio Economy Research and Development

- By 2016 Biodiversity-based competitiveness is increased.
- By 2021 Measures and mechanisms are in place for returning economic benefits from biological products to their origins in order to support the conservation and sustainable use of biodiversity.

10) Knowledge management and database

- By 2016 Scientific knowledge is managed in the manner that contributes to the formulation of biodiversity policies and plans.
- By 2016 Mechanisms are in place to integrate and link biodiversity databases and therefore enable effective use of their resources.
- By 2016 A focal point for mobilizing and utilizing resources of existing database for the conservation and sustainable use of biodiversity is identified or established.
- By 2020 Mechanisms are in place to ensure contribution scientific knowledge to the formulation of biodiversity policies and plans.
- By 2021 Specific databases are created for priority biodiversity issues.
- By 2021 Clearing-house mechanisms of every relevant agency are connected in an ever expanding network.
- By 2021 Every municipality systematically collected information on their urban biodiversity.

11) Preservation of local Biodiversity wisdom

- By 2016 National records and registers on local knowledge and traditional wisdoms supportive to the conservation and sustainable use of biodiversity are established.
- By 2021 Specific database on local knowledge related to biodiversity are created to provide resources for protection of the country's and the communities' right over the knowledge.

Information on any active networks for plant conservation

Based on a networking system to conserve plants, Thailand has under taken the following initiatives:

- 1) The Flora of Thailand Project, under DNP, researches the taxonomy of vascular plants in Thailand, estimated at 11,000 species. The project also publish plants in Thailand in a book form, and it hosted a conference called 17th Flora of Thailand between 21 - 25 September 2017 in Krabi Province.
- 2) The Botanical Society under the Royal Patronage of Her Majesty the Queen is Thailand's national focal point on plant science, and related fields. To be an academic excellent center, it promotes all forms of collaboration in research, survey, exchange of data and information, dissemination of knowledge and new findings to all stakeholders, within and outside Thailand. It hosts annual conferences and seminars on plant science.
- 3) The Conservation of Plant Genetics Project, of the Crowned Princess aims to conserve and develop plant genetic resources. It hosts 8 activities: protection, survey and collection, propagation and replanting, conservation and sustainable use, data and information systems, planning, awareness raising and other special activities supporting conservation of natural resources. These activities are conducted in close collaboration with other entities and networks, with broad spectrums of stakeholders and learning institutes. It also establish school-base botanical gardens to raise awareness in conservation for students in 939 schools across Thailand.
- 4) Thai Ornamental Plant Society functions as a medium for parties interested in ornamental plants so that exchange of knowledge, experience, ideas and information could be shared and imparted, through various activities on regular basis.
- 5) A specific conservation group called Siamensis is a volunteer group of varied stakeholders who are interested in biodiversity and environmental conservation. It aims to be a forum of exchange to raise awareness and appreciation for natural resources and environment.
- 6) A network of taxonomists and students in the field of plant science has been voluntarily formed to provide a forum for exchange of information and knowledge, including name coding for plants.
- 7) The Save Some Seeds group is a formal grouping of individuals from various relevant organization, which aim to collect domestic and wild seeds, sending them to seed banks in Thailand (one managed by the National Science and Technology Development Agency) and abroad.

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Major measures taken by your country for the implementation of the Global Strategy for Plant Conservation

Thailand has given high priority the GSPC and other activities to conserve biodiversity, through a national integrated master plan, already mentioned. Each of them has specific targets and indicators, given priorities to awareness raising, biodiversity education, participation, conservation, rehabilitation and prevention of biodiversity loss, reducing pressure of drivers and alien species. These also include conservation of genetic resources, knowledge and information systems, and local traditional knowledge. It also established a conservation and sustainable use committee to oversee and formulate policies related to conservation and sustainable use of biodiversity resources. Similarly, biosafety and access and benefit sharing are important mechanisms to drive towards national goals.

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At the national level, the 20-year National Strategic Plan (B.E. 2561 – 2580), which contains six principal strategies, also has biodiversity as its 5th strategy. It aims at promoting quality growth that is environmentally friendly, thereby, for instance, increasing share of forests and reducing threats to biodiversity, enhancing ex situ and in situ conservation, conservation of habitats and promoting sustainable consumption. Green areas will be increased to 55 percent, composed of natural forest (35 percent), timber forests (15 percent) and urban green (5 percent).

1. An online flora of all known plants

Category of progress towards the target of the Global Strategy for Plant Conservation at the national level

On track to achieve target at national level

Explanation on category of progress towards the target of the Global Strategy for Plant Conservation at the national level

The Flora of Thailand Project, managed by the Department of National Parks, Wildlife and Plant Conservation (DNP), projected that Thailand is home to over 11,000 species of vascular plants. To be completed by 2024, the surveyed results are disseminated through online systems, indicating those with and without Thai names 11,104 species 2,465 genera and 287 families (The Forest Herbarium, 2557) Thailand Plant Encycropedia also contains 1,612 species 807 genera and 208 families (Rachun Pooma, 2016) DNP manages its own herbarium which has 280,000 of plant specimens, (website <http://web3.dnp.go.th/botany>. All of these sites are linked to the Plant List (www.theplantlist.org), International Plant Names Index: IPNI (<https://www.ipni.org>) and World Flora Online Consortium (www.worldfloraonline.org)

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Furthermore, the Botanical Garden Organization has created and managed an internet-based data system that has specific details of collection methods and sources,

compiled in a book that has a list and description of physiology, ecology and dissemination, with pictures, of 229 families 1,886 species. The Botanical Garden Organization hosts real plants in its Sirikit Garden showing 8,980 lists; its has 107,475 specimens in its herbarium. Its local plants data base has details of 944 plants. Moreover, the Department of Thai Traditional Medicine and Alternative Medicine, through its database, DTAM, shows 3,874 lists. Last, but not least, the Department of Agriculture is creating and working on its internet system.

2. An assessment of the conservation status of all known plant species, as far as possible, to guide conservation action

Category of progress towards the target of the Global Strategy for Plant Conservation at the national level

On track to achieve target at national level

Explanation on category of progress towards the target of the Global Strategy for Plant Conservation at the national level

In 2015 the Bangkok Forest Herbarium, DNP assessed that out of the 11,000 known plants, there were 964 threatened species of which 737 species were vulnerable; 207 endangered, and 20 critically endangered species. (Department of National Parks, Wildlife and Conservation, 2017), or 8.76 percent of all known plants, based on International Union Conservation of Nature (IUCN) version 1994 for endemic and rare plant species, and version 2001 for vulnerable and endangered species.

In addition, the expert from Botanic Garden Organization, one of the cooperation institute in the Flora of Thailand project, had participated in the conference on plant assessment by IUCN and worked out on plants in the families Maranthaceae, Orchidaceae, Ericaceae, Zingiberaceae, Violaceae, Balsaminaceae, Fagaceae, Arecaceae, Parnassiaceae, Juglandaceae, Moraceae, Asparagaceae, Amaryllidaceae, and Fabaceae, including the consideration on the limestone habitats which were now risky to be lost by illegally rock explosion in various provinces in Thailand, where i.e. Phetchabun, Chiang Rai, Mae Hong Son, Sukhothai, Kanchanaburi and Prachuap Khiri Khan.

Identifying priority plants for conservation in Thailand uses this above data, including ex situ conservation, seedbank collection at Kew Royal Botanic Gardens in the UK, based on its Memorandum of Collaboration with the DNP, Science and Technology Research Institute and the Forest Restoration Research Unit: FORRU of Chiang Mai University, Northern Thailand.

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3. Information, research and associated outputs, and methods necessary to implement the Strategy developed and shared

On track to achieve target at national level

Explanation on category of progress towards the target of the Global Strategy for Plant Conservation at the national level

Thailand has seven floristic regions, all have been surveyed, including forests within and outside protected area systems; results of the plant species have been published in Flora of Thailand. The database could be freely accessed from DNP's database. In addition, there are projects on status of threatened plants and status of use for local plants and herbs.

Since 1970 Thailand has three occasions revised its plant data contained in Tem Smithinan, namely in 1980, 2001 and 2014. The revision added, corrected and created new systems of arrangements. In addition, the DNP succeed in using tissue culture technique for plant conservation and returned it into nature for one of the vulnerable species, Plap Phlueng Than (*Crinum thainum*) and the Department of Agriculture disseminates a handbook on sustainable harvest, including those of medicinal plants, e.g. Buk, Thao Yai Mom, Kwao Khrua Khao etc.

Other parties, including offices of the state, private sector and educational institutions also play an active role in disseminating data and information obtained from research to individuals, agencies and researchers so that added knowledge to fulfil the GSPC goals are promoted. Here are a few examples:

? DNP disseminates such documents as Flora of Thailand vol. 13 and Thai Forest Bulletin (Botany) vol. 46 (1) reporting on plant varieties in limestone ecosystems of Phu Khiao- Nam Nao; new discoveries in Thailand; Tissue Culture and Rehabilitation of Plup Phlueng Than and others.

? Botanical Garden Organization produces and disseminate easy reading documents, such as pamphlets on Magnoliaceae; Orchids and Ericaceae. Moreover, Romkroa Botanic Garden publishes documents on plants in protected areas of the North; Uses on Zingiberaceae in Thailand, Thai Orchidaceae, and Ethonobotany and hosts a website on academic papers (http://www.qsbg.org/Database/Article/index_exp.asp).

? Department of Thai Traditional and Alternative Medicine, through its Herbal Museum Development Project, disseminates knowledge on traditional and alternative medicines. It publishes three volumes of herbal references; herbal properties, Volumes 1 and 2, and Herbs in ASEAN Basic Health.

? Department of Marine and Coastal Resources produces manuals on seagrass rehabilitation, and others, and disseminates them through its website, www.dmor.go.th and others, including research papers.

? Biodiversity-based Economy Development Public Organization (BEDO) publishes encycropedia on biodiversity knowledge, bio-accounting, and other forms of publications, including multimedia, disseminated through its website.

? PTT Public Company promotes the use of vetiva grass based on His Majesty the King, Rama 9 Initiative.

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? Faculty of Science, Silpakorn University hosts a database on five species of Fabaceae, four species of Annonaceae, published in Flora of Thailand.

4. At least 15 per cent of each ecological region or vegetation type secured through effective management and/or restoration

Category of progress towards the target of the Global Strategy for Plant Conservation at the national level

On track to achieve target at national level

Explanation on category of progress towards the target of the Global Strategy for Plant Conservation at the national level

Most of Thailand's geocology of plants fall under protected areas systems, using specific laws and regulations. As a result, forests are well maintained and protected. Forest statistics in 2017, for example, report that 31.58 percent of the country are forest areas. Protected areas maintain at 64.89% of the forest areas in the same year. These are national parks, forest parks, wildlife sanctuary, no-hunting areas, botanical parks and gardens.

Plants living outside protected areas disperse in national parks, community forests, coastal forests and seagrass patches. Obviously, they come under severe pressures, and have been systematically handled through such measures as environmental and health impact assessment for projects that may have severe impacts on them.

Protection is an approach, but rehabilitation is also prescribed to areas already impacted by development. Since 2017, for instance, the Department of Basic Industry and Mining, started its rehabilitation projects for ten sites that were mined. This is to reforest and turn the project areas in alternative new use, such as public parks, viewpoint and recreation areas. Of major move is the current government's initiative to recall encroached forests to revive them to their previous natural state.

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5. At least 75 per cent of the most important areas for plant diversity of each ecological region protected with effective management in place for conserving plants and their genetic diversity

Category of progress towards the target of the Global Strategy for Plant Conservation at the national level

On track to achieve target at national level

Explanation on category of progress towards the target of the Global Strategy for Plant Conservation at the national level

Out of its total 102 protected areas for plants, 52 fall into national park systems; 19 wildlife sanctuary; 5 national parks, 5 no-hunting areas, and 4 botanical gardens. The rest, five are managed by local governments, only one awaits for some form of protection, averaged 83.34 percent of the forests are adequately protected, each by different laws and regulations: for example, 50.98 percent of the areas are protected by forest laws, national park law of B.E. 2507, and wildlife conservation and protection law of B.E. 2535.

Despite the institutional arrangement threats remain visible. 73 forests come under stress from tourism; 51 from development; 50 from agriculture; 71 from over extraction, and 4 from invasive alien species.

The Division of Forest and Plants Conservation, DNP conducts research on plant diversity in key protected areas through such projects as:

- Status of threatened plant species in Phu Wao- Phu Lanka Forests
- Assessing status of threatened plant species in limestone ecology
- Research on plant biodiversity in major areas of the northeastern Thailand, to be completed by 2019

These important conservation areas have been under the management of DNP, which aims to step up its surveillance to be enhanced by reconnecting forest complexes.

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6. At least 75 per cent of production lands in each sector managed sustainably, consistent with the conservation of plant diversity

Category of progress towards the target of the Global Strategy for Plant Conservation at the national level

Progress towards target at national level but at an insufficient rate

Explanation on category of progress towards the target of the Global Strategy for Plant Conservation at the national level

Cropping systems of Thailand have been dominated by monoculture, sometimes encroaching into highlands such as the case of corn in the north, rice intensive farming in central plain and pararubber and oil palm in the south. Such patterns have long-term negative impacts on the ecosystems and biodiversity. Today, the government has shifted its support for sustainable agriculture, which is more environmentally friendly and better for livelihoods. Specifically, this system contains five subsystems, namely, agroforestry, integrated farming, net theory agriculture, organic agriculture and natural farming systems. However, these new emerging forms remain limited and confined to certain areas, increased to 284,918.45 rai in 2015 from 235,523.35 rai in 2014, or 20.97 percent increase. Most of the increases are found in rice (27.99 percent) and vegetables (187.31 percent) (Earth Net Foundation, 2016) Organic farming areas are very low, only 0.19 percent of total agricultural land of 149,242,393 rai. (Office of

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Agricultural Economics, 2560) The 12th National Economic and Social Development Plan (B.E. 2560–2564) ambitiously increases the area to 5.0 million rai by 2021, while the national organic agricultural development, 2017-2021 sets its target to no less than 600,000 rai by 2021.

A recent monumental change in government policy now enables enhanced role of the private sector in increasing forest cover. Any interest party could now register its land for forest growing activities, with an aim to increase timber and non-timber products and services, including growing protected species, timber processing and licence for trade and export.

A quantitative assessment for this goal is not yet possible, due to both data availability and assessment processes.

7. At least 75 per cent of known threatened plant species conserved in situ

Category of progress towards the target of the Global Strategy for Plant Conservation at the national level

On track to achieve target at national level

Explanation on category of progress towards the target of the Global Strategy for Plant Conservation at the national level

Over 90 percent of threatened plant species are in protected area systems, numbered 964 species in 2015 (Department of National Parks, Wildlife and Conservation, 2017). To a large extent, these are well protected, but some species are also distributed outside the protected area systems, thus coming under great pressures-the estimated impacts of which need systematic and well-designed assessment. There is a question of capacity, human, financial and time to properly conduct reliable assessments. Examples of such scattered species outside the former protected systems are, but many not be limited to:

- Phlup Phlueng Than (*Crinum thaianum* J.Schulze) which occurred outside the protected area of Khlong Nakha Wildlife Sanctuary has been conserved by private sectors which are in the community, government sectors and educational institutions. They propagated the plant in various ways and returned it into nature.
- Sirinthorn Walli (*Phanera sirindhorniae* (K.Larsen & S.S.Larsen) Mackinder & R.Clark) DNP initiated the project of Upper Northeastern Forest Plants Conservation at Bueng Kan province for conserving and propagating rare plant species, which Sirinthorn Valli is one of those.
- Mo Khao Mo Kaeng Ling (*Nepenthes mirabilis* (Lour.) Druce) grows in moist lowland or swamp forest, close to village or in governmental area. When there were constructions in such areas, the plants were moved to grow or conserve in near by habitats, construction of new prison in Surat Thani province, for instance.

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- Pha Daeng Project, Mae Sot, Tak Province. The concession mine area of Pha Daeng mine was expired. The Forest Department and other departments are during developing the area to establish the botanical garden, by using the model of Eden Garden in UK. There will be many different species of plants, including rare wild plants in western region, and also threatened species, planted in the forest area. There is also recreation area for tourism.

In addition, the Royal Forest Department plans to designate another 4.3 million rai of recovered forest for protection, thus increasing the conservation forest cover by another 7.35 percent. DNP also steps up other measures to ensure management sustainability such as seasoning tourism and use of forest resources in Phu Kradueng and Kaeng Krachan National Parks. Zoning of use has been made for forest recovery, especially during rainy season. Zoning in certain areas, such as Doi Hua Suea of Inthanon National Park and Phu King in Phu Khiao Wildlife Sanctuary requires special permit to access the areas. Designated paths have been used to ensure tourists' off-limit, such is the case of Curcuma plantation in Hin Ngam National Park, Doi Hua Suea and Doi Ang Ka in Doi Inthanon National Park and nature trail in Kok Nok Kraba in Phu Luang Wildlife Sanctuary.

8. At least 75 per cent of threatened plant species in ex situ collections, preferably in the country of origin, and at least 20 per cent available for recovery and restoration programmes

Category of progress towards the target of the Global Strategy for Plant Conservation at the national level

Progress towards target at national level but at an insufficient rate

Explanation on category of progress towards the target of the Global Strategy for Plant Conservation at the national level

At this moment, there has been no initiative to estimate the ex situ collection of threatened species. All of the 964 identified threatened species, (Department of National Parks, Wildlife and Conservation, 2017) are live collection dispersed ex situ in various sites all over the country. The Botanical Gardens collects more than 450 plant species and have long-term plans to continue the collection. It is estimated that this together with that being collected by the DNP, the ex situ collect could be half of all the threatened species in Thailand.

It should be mentioned that Thailand has had an MoC with the Kew Royal Botanical Gardens, UK, to collect seeds of trees. This is a five-year project (2015-2020), collaborated by DNP, Thailand Science and Technology Institute and the Forest Restoration Research Unit: FORRU of Chiang Mai University from the Thai side, aims to support the seedbank, starting with economically significant and rare species, such as Siamese rosewood and teak. The National

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Biotechnology and Genetic Engineering Center started a seedbank project, which starts its operation in 2019. Thailand ex situ conservation selects critically threatened species and reintroduce them into natural habitats, in situ later on. Examples are numerous.

- The DNP collected wild seeds and propagated 85,000 rare orchids and reintroduce them through a high-profile project during 2011- 2017.
- Plup Plueng Than (*Crinum thaianum* J.Schulze). Seed germination, tubers segregation, and tissue culture are done by DNP and private sector in local administration, in Ranong and Phangnga province.
- Mok Rachini (*Wrightia sirikittiae* D.J.Middleton & T.Santisuk) and Kanchanika (*Santisukia pagetii* (Craib) Brummitt). Seed germination, grafting and budding are done by Phu Khae Botanic Garden.
- Maha Phrom Rachini (*Mitrephora sirikitiae* & Chalermglin) Maha Phrom (*M. winitii* Craib) and Krai (*M. keithii* Ridl.). Seed germination, grafting and budding are done by Thailand Institute of Scientific and Technological Research (TISTR).
- Champi Sirinthorn (*Magnolia sirindhorniae* Noot. & Chalermglin). Seed germination is done by TISTR, distributed to different institutions and return to nature.
- Ueang Fa Mui (*Vanda coerulea* Griff. ex Lindl.). Seed germination and tissue culture are done by Suranaree Technology University for both community income and returning to nature.
- Ruang Phueng (*Schoutenia glomerata* King subsp.peregrina (Craib)Roekm.). The propagation of the plants are done by volunteers of Pracharat government project.
- Department of Plant Science, Faculty of Science, Mahidol University is working on conservation and reproduction of Daeng Dara (*Gymnocladus burmanicus* C.E.Parkinson), Nuat Suea (*Tacca plantaginea* (Hance) Drenth), Dok Din Muaeng Kan (*Curcuma candida* (Wall.) Techaprasan. & Skornick.) and other two species cooperated with Rama 9 Botanic Gardens, i.e. Thanon Chai (*Buchanania siamensis* Miq.) and Makak (*Spondias bipinnata* Airy Shaw & Forman).
- Orchids, back to the forest Project, considered Aueng Sae (*Dendrobium scabrilingue* Lindl.) and Fa Mui (*Vanda coerulea* Griff. ex Lindl.) as the species to work together with the community in Doi Po Koe Si Cho, Muaeng district, Mae Hong Son is under Highland Research Organization.
- Compilation of research study on 14 rare plants propagation and

rehabilitation in local community e.g. Tin Hung Doi (*Paris polyphylla* Sm.), Hong Pha Kham (*Rhynchanthus beesianus* W.W.Sm.), Noi Na Khreua (*Kadsura* sp.) and Dok Trae Wong (*Lilium primulinum* Baker var. *burmanicum* (W.W.Sm.) Stearn) are under Highland Research Organization.

In 2017 the DNP continued its rare orchid project with additional 26 species, for reintroduction to the wild. At the same time, it collate and disseminate associated knowledge and raise awareness and interests of stakeholders in this initiative, to ensure its sustainability. (Department of National Parks, Wildlife and Plant Conservation, 2017)

In addition, Botanic Garden Organization established Queen Sirikit Botanic Garden and 5 branches in many regions of Thailand. Moreover, two botanic gardens are being prepared for establishment. The goals of all botanic gardens are to improve the habitats of plants for the living collections and conservation of threatened plant species. Nowsaday at least 450 species are conserved. Additional species are in the continuously plan for conservation to reach the target of at least 50 percent of threatened species are protected. The propagation of 53 species are being prepared for returning back to their habitats. Eight species have already been returned to their habitats for rehabilitation and at least 47 species are further planned. Returning back of 21 threatened species for increasing their population in nature between 2018-2021 are also planned.

9. 70 per cent of the genetic diversity of crops including their wild relatives and other socio-economically valuable plant species conserved, while respecting, preserving and maintaining associated indigenous and local knowledge

Category of progress towards the target of the Global Strategy for Plant Conservation at the national level

Progress towards target at national level but at an insufficient rate

Explanation on category of progress towards the target of the Global Strategy for Plant Conservation at the national level

Thailand has accumulated and registered the agricultural plant species, wild species and economic species. The ex-situ conservation are done in many different ways as in Seed Bank, planting crop, glass tube, freezing and GeneBank. All of these conservation are implemented by:

Rice Department established Operation center for collecting the good breed of rice seed in National Rice research in Prathum Thani. There are now more than 24,000 collections, divided into native rice of 17,000 collections, good variety rice more than

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1,300 collections, introduced rice more than 3,000 collections and wild rice more than 1,000 collections. Moreover, wild variety are in-situ conservation in plantation in Ban Sang subdistrict, Prachin Buri, in the area of 87 Rai and in Po Daeng subdistrict, Sakon Nakhon, in the area of 25 Rai.

Department of Agriculture implements the work by:

? GeneBank of Biotechnology Research and Development Office. This conserves gene plants as seed bank, nowadays of 161 genes are conserved and 32,866 specimens are collected. Of which are seeds of rice, corn, wheat, barley, different kinds of beans, sesame, saffron, cotton, castor bean, Job's tear, rape seed, commelina seeds including seeds of flowering plants, trees, vegetables etc. The office has the control room of moderate temperature of 5 degree celsius, the room height is as 4-storied building, 86 by 24 square meter, controlled by automatic bullet crane system with high capacity of 150,000 collections and the long-termed conservation room of minus 10 degree celsius for more than 50 years gene conserved, the area of 76 square meter, for about 400,000 gene collections.

? Cassava gene bank, International Center for Tropical Agriculture. Thailand was selected to establish Cassava gene bank in 2000, by Columbia, which is the second world Cassava gene bank. Currently, 859 varieties of cassava are conserved in the experimental field for observing the morphological and physiological characters and 800 varieties are in tissue cultures in laboratory.

? Bangkok Herbarium, Sirindhorn building, Department of Agriculture is the herbarium for keeping the historical collections which including dried plant specimens, spirit collections, carpological and seed collections. It is one of the most important herbaria in Thailand for historical references on genetic resources and useful information. In 2017, 887 dried specimens and 195 spirit collections were prepared, curated of well preserved 103 carpological and seeds.

? Conservation in Field collection are implemented in various centers of Department of Agriculture, of 19,219 accession are planted in the field of 69 centers of the department all over Thailand. These collections are used for researches and genetic resources conservation. The department are divided into 3 main groups:

1) Field and Renewable Energy Crops Research Institute, with 9 centers., preserving of 6,205 accessions, of which are bean family, sugar cane, kenaf, Chinese grass cloth, oil palm, asiatic bitter yam, and medicinal plants, for instance.

2) Horticulture Research Institute, with 10 centers, preserving 8,081 of plant genetic resources, which are red roselle, banana, coffee, roses, cacao, orchids, torch ginger, durian, lotus, macademia, citrus, mango, vegetables, bamboo, curcuma, chili and solanum, medicinal plants, fruit trees, and fragrant/flowering ornamental plants.

3) Office of Agricultural Research and Development, with 50 regional centers preserving 4,933 of plant genetic resources. Mostly are tea, durian, taro, bamboo, macademia, plum mango, cassava, rubber plant, physic nut, pineapple, medicinal plants, fruit tree, fragrant/ ornamental plant and vegetables.

Conservation of plant genetic in Thailand is very inclusive; many parties have involved, sometimes for various objectives. The Plant Genetic Conservation, under the Patronage

of the Crowned Princes uses seedbank to store seeds, DNA and cultured plant tissue, to conserve and develop genetic resources. BEDO established a Community BioBank to conserve both the bioresources and local knowledge, using a participatory approach. With multiple goals and objectives, the project conserves, propagates, being a biodiversity learning and research center, leading to protection, conserve and sustainable use. An inventory for some plants such as bananas, orchids, fern, local flowers, and wild gingers. Moreover, the Institute of Highland Development further enhance the participation of upland and highland communities plant conservation for local food bank, by building and maintaining plant nursery. Selected plants are propagated and reintroduce into the wild. Already 88 communities have collected 950 species, planted by 5,170 households, on 135 rai and in 2,188 rai of the community forests.

10. Effective management plans in place to prevent new biological invasions and to manage important areas for plant diversity that are invaded

Category of progress towards the target of the Global Strategy for Plant Conservation at the national level

Progress towards target at national level but at an insufficient rate

Explanation on category of progress towards the target of the Global Strategy for Plant Conservation at the national level

Thailand has had management plans for invasive alien species. In the process, there are revision and update of alien species, together with control and surveillance, to reduce impacts on local plants and ecosystems. The OEPP, in 2017, OEPP drafted Thailand's priority alien species, thereby selecting high-priority alien species using indices developed for the purpose. It identified 11 species.

Moreover, it came up with a critical list, that requires close surveillance and additional research, to gain better understanding.

The project came up with four approaches to prevent, control and get rid of invasive species: 1. Create an inventory of the significant impacts in biodiversity hotspots. 2. Study, trace and analyze potential impacts of alien species into the country, gauging its risks and prescribe measures to manage those risks. 3. Promote research on the optional use of invasive species. 4. Disseminate knowledge on invasive alien species, and build capacity of related government agencies, local governments and people to participate actively and efficiently in the use data, being an active surveillance agent in control and eliminate invasive alien species. This effort also includes illegal trade and imports of alien species.

In addition, the Department of Plant Science of the Faculty of Science, Mahidol University, with Rama 9 Public Park revised the 3,500 list of plants imported into Thailand, with an aim to manage risks from invasive alien species. The DNP, in this

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regard, also continue to support its inhouse research, with focuses on crucial protected areas, such as Kangkachan forest complex, Thai Prachan National Park, and Phukiew-Nam Naw forest complex. The ultimate goals are to equip on-site officials with information in monitoring and control of invasive species in their areas of responsibility- and perhaps eventually to eradicate them. Here are some relevant examples:

- Activity on taking off Sap Suea from grassland in Nong Phak Chi, Khao Yai National Park. Sap Suea (*Chromolaena odorata* (L.) R.M. King & H. Rob.) is one of the tenth of very harmful alien species which totally destroy the ecosystem investigated by the Global Invasive Species Database (GISD), IUCN (International Union for Conservation of Nature). Sap Suea is the herb which grows in large straggling shrubs, controlling other plants growth, releasing chemical substance which stop nearby plants to grow.
- The study on the biological control plan for Krathin Hang Kra Rok (*Prosopis juliflora* (Sw.) DC.) in Hat Wanakon National Park, Prachuap Khiri Khan by the Office of Forest Research and Plant Conservation, Department of National Parks, Wildlife and Plant Conservation has provided dissemination and develop effective communication for public relation with pictures and data of the violence of Krathin Hang Kra Rok in ecosystem. The people will be aware and stay alerted to get rid of the seedlings of this plants before they produce the stiff spine, preventing the widely distribution.

11. No species of wild flora endangered by international trade

Category of progress towards the target of the Global Strategy for Plant Conservation at the national level

On track to achieve target at national level

Explanation on category of progress towards the target of the Global Strategy for Plant Conservation at the national level

Thailand became a member of CITES and has actively been participating in implementing measures and commitments called for by the convention. The Department of Agriculture is the focal point, undertaking the following measures and activities:

- 1) Establish a committee on plant varieties and plant conservation, empowered by the Plant Variety Law, B.E. 2518 to establish criteria, approaches and conditions for control of conserved plants.
- 2) Establish measures to implement the Plant Variety Law, B.E. 2518, later revised in 1992.
- 3) Establish plant quarantine check points all over Thailand.
- 4) Take strict control measures to regulate import, export and reexport of Siamese rosewood and its families, and orchids, appeared in the 2nd list.
- 5) Compile and publish annual reports on trade statistics for wildlife and plants, also sent annual reports to the CITES Secretariat.
- 6) A CITES research group is established in the Department of Agriculture to analyze

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risks associated with Non-detriment finding

7) Register growers of conserved plants, listed in CITES

In international front, Thailand actively collaborates with the international community in controlling and preventing all forms of illegal trade, especially, the Siamese rosewood. Cross-border cooperation is promoted, such in the case of Thailand and Malaysia.

12. All wild harvested plant-based products sourced sustainably

Category of progress towards the target of the Global Strategy for Plant Conservation at the national level

Progress towards target at national level but at an insufficient rate

Explanation on category of progress towards the target of the Global Strategy for Plant Conservation at the national level

Thailand has harvested non-timber products from its forests, for food, ornamental and medicinal use. The Thai Medicine Act, B.E. 2542 designates areas under protection based on origin and biodiversity richnesses. This is to reduce and mitigate risks associated with human interference into those habitats, as well as to ensure species survival in the wild. Most of these areas are already protected under different legal regimes. Examples are Phulanka National Park in Nakhon Phanom province, Pangsida National Park in Sakaeo province. The Department of Thai and Alternative Medicine designated 60 community forests to be in situ sites for the production, conservation and sustainable use of herbs, and has started an Herbal City project to steward the initiative.

Existing laws strictly prohibit extraction of plants from the wild, except for research and academic purposes-which requires official permits, as necessary. On 22 May 2018 the Cabinet passed a resolution to approve a draft Community Forest, B.E. ... proposed by the Ministry of Natural Resources and Environment. Consequently, this law will open an opportunity for local communities to participate in conservation and sustainable use of forest resources, both for home consumption and limited commerce-as mutually agreed by members of the said communities. It is expected that all of the 21,850 villages covering an estimated area of 19.1 million rai will join the already practiced 10,795 villages covering 5.98 million rai, under the previous law.

Harvest from the wild of orchids is allowed by the Forest Law, B.E. 2484, limited to 20 plants maximum. Commercialization of the orchids, however, is only for those from farms. During 2020-2024, the Botanical Gardens Organization wishes to work with local community in Mehongson province in northern Thailand to reproduce and use wild orchids in sustainable ways, through sustainable tourism and various forms of product

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development.

13. Indigenous and local knowledge innovations and practices associated with plant resources maintained or increased, as appropriate, to support customary use, sustainable livelihoods, local food security and health care

Category of progress towards the target of the Global Strategy for Plant Conservation at the national level

On track to achieve target at national level

Explanation on category of progress towards the target of the Global Strategy for Plant Conservation at the national level

Recognizing the importance of biodiversity-related wisdom and traditional knowledge, Thailand undertook an initiative to collect and collate them into a series of encyclopedias. These are: four regional themes around food, use of herbs, local Thai wisdom local Thai rice, local health wisdom, local beauty wisdom and a manual for wisdom collection. Moreover, a “family forest” project was initiated to convert a monocrop plot to be integrated forest, for family use as food and medicine sanctuary. This organic forest suffices family demand, and excess supply could be commercialized, based on Sufficiency Economy Philosophy of Rama IX. A certification scheme, called BIO Economy, has also been promoted.

The Highland Research and Development Institute, and independent body, also collects and collates wisdom and traditional knowledge of local plants use. Five series have been produced for five highland communities in Chiangmai, Nan, and Tak provinces.

The Royal Project Foundation also collates knowledge on use of 1,489 wild plants in northern Thailand. Knowledge from local upland and ethnic groups. The inventory registers local names, botanical names, physiology, site and alternative usages, including food and fiber.

Traditional medicine in Thailand has been revived, recently, to be part of the main-stream health care, and as an approach. Thailand has an extensive list of herbs in its main official lists in its universal health care system. Of note, the Chaophraya Phubhate hospital plays a pivotal role in this regard, managing the full cycle of supply chain and health services using herbs and Thai alternative treatments. Its operations have consequential positive impacts on the society, and global, in terms of generation of new and revived knowledge, awareness raising, raising product and health practice standards, as well as increasing added values for biodiversity resources.

Last, but not least, the Thai governments and agencies in the development and promotion of Thai herbs, wisdom and traditional knowledge. Hence, it conceived

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Thailand's first Thai Herbal Development Master Plan, B.E. 2560-2564. The aim is to conserve and promote valuable knowledge and wisdom of Thai herbs, estimated 11,625 varieties. Only a fraction of this, 15.5 percent of these are fully and efficiently used. (Ministry of Public Health, 2017)

14. The importance of plant diversity and the need for its conservation incorporated into communication, education and public awareness programmes

Category of progress towards the target of the Global Strategy for Plant Conservation at the national level

On track to achieve target at national level

Explanation on category of progress towards the target of the Global Strategy for Plant Conservation at the national level

Thailand has given very high priority to education and awareness raising. It aims to use activities to lay a solid foundation for plant conservation among youth. Specifically, for example, the Promotion of Science and Technology Institute of the Ministry of Education created the 2008 core basic biodiversity curriculum together with learning standards and indicators. Within this, plants are an integral part. The knowledge on plant diversity and conservation gradually progresses to higher level of education, in biology. Moreover, 12 agencies collaborate in extra-curriculum activities and summer camps aiming to enhance awareness. Many other agencies work with at least 939 schools across the country in teaching, curriculum development and botanical garden projects—all to increase awareness, implant bioethics and appreciation for local wisdom.

The private sector also has an important role to play in this regard. The TV channel called Now 26, in collaboration with a private company continues to produce quality documentary in four series. These contain subject matters on biodiversity and plants. There are other programs, such as Wetlands and Forest Citizen; all of which aim to provide entertainment and essence of biodiversity conservation, use and benefits.

Botanic Garden Organization established the Natural History Museum for the main purpose of how important of plant biodiversity to human. The botanical garden grew plants into groups in the greenhouse and natural area for the public awareness on plants. The nature trails in the garden were also built, not only the knowledge on plants but also the wildlives and ecosystem. In every year, huge amount of students and people come to visit for they will realize of the national resource conservation and environment.

The ONEP has been proactive in public communication for biodiversity, using short documentary, direct communication, to be disseminated through TV channels and

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public transports, including mass transit systems and organization of summer camps for youth.

Besides, annual meetings and conferences have been organized to exchange information and knowledge on biodiversity and conservation. Meetings on biodiversity management, plants science, plant expos and annual pomology conferences, for instance, are organized to enhance broad stakeholders collaboration.

15. The number of trained people working with appropriate facilities sufficient according to national needs, to achieve the targets of this Strategy

Category of progress towards the target of the Global Strategy for Plant Conservation at the national level

On track to achieve target at national level

Explanation on category of progress towards the target of the Global Strategy for Plant Conservation at the national level

All 156 state-owned universities in Thailand have actively been researching on various aspects of plants, forest resources and environment. Some of these are parts of the 'normal' education, by various relevant subjects of studies such as field crops, biology, pomology, and so on. Specifically, the efforts in this human resources development have been fruitful to ensure sound policy making and sustainable development for Thailand.

Between 2016-2018 relevant agencies focused on building capacity of those who are involved and invested in equipments and instrument necessary for facilitating learning, research and experiments in laboratories and experiment plots. Despite challenges in human development, the efforts are strived to fulfill set goals.

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16. Institutions, networks and partnerships for plant conservation established or strengthened at national, regional and international levels to achieve the targets of this Strategy

Category of progress towards the target of the Global Strategy for Plant Conservation at the national level

On track to achieve target at national level

Explanation on category of progress towards the target of the Global Strategy for Plant Conservation at the national level

Thailand has a botanical network that is fully participated by the government and

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private sectors. There is at least one annual national plant conference. The conservation network also includes school botanical gardens, Thailand Ornamental Plants Association, biodiversity and environment conservation group (Siamensis), network of plant inventory experts, and the independent Save Some Seeds group. There is no formal group that supports GSPC. Between 2016-2018 Thailand a project to enhance the capacity of networks of institutions and partners at various levels:

? National level

- BEDO innovates a smart media project to improve access of youth to biodiversity resources data and information, called "BIOGANG", to raise awareness and recognition of biodiversity resources, consistent with the Integrated Biodiversity Master Plan, 2015-2021. The school educational network will play an important role in engaging students in survey, conducting an inventory of bioresources, also to increase learning, research skills and 'buy in' to biodiversity conservation, development, and cherish local wisdom and knowledge.
- Thailand Botanic Gardens hosts an academic conference on collaboration, in order to create and raise the level of collaboration in Thailand. 26 participants from 11 multi-stakeholder agencies are involved in this initiative.
- The Department of Marine and Coastal Resources created a database on relevant stakeholder network. Presently, 508 groups with 10,765 members are on the list, including activities to enhance their capacity and link with 200 members of voluntary groups and network supported by the Department.
- Thailand Plant Science Association supports research, education and disseminates academic and professional works, in collaboration with other relevant entities in and outside Thailand.
- The Flora Association coordinates and disseminate data and information among members and network of growers, traders, and the relevant public sector.
- The various voluntary networks of the DNP, such as national network, forest fire network and citizen network for forests protection continue to function effectively.
- The Highland Research and Development is an independent entity that also supports local community networks in the collection of local seeds and tubers. Five local community seedbanks are created for local vegetables and high-land rice.
- The Plant Genetic Conservation Project, under that patronage of the Crowed Princes has been working closely with all stakeholders to promote school botanic gardens and conservation of other local plant genetics.

? Regional level

- BEDO creates partnership and collaboration with other agencies in the region on economic benefits from biodiversity-with Vietnam, for instance, on herbs, and specifically with its National Institute of Medicinal Material (NIMM) on the development and production of herbs.
- In 2018, a research project on Payung Trees in Mekong subregion was initiated. Researchers from China, Laos PDR., Cambodia, and Vietnam collaborate on conservation of Payung genetic in natural forests and plantations.

- The Mekong WET: Building Resilience of Wetlands in the Lower Mekong Region project enhances the adaptive potential of wetlands, especially the Ramsar designated entries in Cambodia, Laos PDR., Thailand and Vietnam.

? International level

- BEDO conducted a workshop with China, Belgium and South Korea to establish a BioBank. This initiative will enhance international collaboration in conservation and sustainable use, participation and raising awareness. The Payment for Ecosystem Service; PES, was also promoted in collaboration with offices in Japan and Sophia University.

- The National Science and Technology Development Agency (NSTDA) besides its regular active functions, is set for its 2019 international conference in May to enhance mutual learning, relations and collaboration in biodiversity conservation, to be participated by all international botanical gardens representatives.

- The Department of Thai and Alternative Medicine enhances its collaboration with similar agencies from Myanmar, Bhutan, India and China.

Section VI. Description of the national contribution to the achievement of the targets of indigenous peoples and local communities

Thailand has committed to enabling cross-sectoral participation, particularly by local communities, for management of biodiversity. Such emphasis was legitimized by Article 43 of the current 2017 constitution which reaffirms the right of citizens and communities to manage, maintain and utilize natural resources, the environment and biodiversity in balance and sustainable manners as stipulated by relevant legislations. In addition, Article 57 of the constitution further indicates that the state is obligated to conserve, protect, maintain, restore, manage and utilize (or arrange for utilization of) natural resources, the environment and biodiversity in balance and sustainable manner by ensuring that relevant citizens and local communities participate in and are benefits from such actions in accordance to provisions of relevant legislations.

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Participation of local communities in mobilizing biodiversity management in Thailand has contributed to the efforts to achieve the following 3 Aichi Targets;

- B5: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.
- C13: By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained,

and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

- E18: By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

B5: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.

Notable contributions of direct and indirect participation of local communities in maintaining and restoring natural habitats include management of community forests, restoration of coastal resources, surveillance on destruction of natural habitats and development of local networks for conservation.

Community forest management: Local communities in several areas have maintained their community forests in accordance to both their traditional practices and the official guidance issued by the Royal Forest Department. This action included conducting survey and delineation of the forests, formulating local committees to oversee activities, developing rules on forest utilization and maintenance as well as mapping of forests' area. Local communities can file for official registration of their community forests and have their registrations renewed every 5 years. Filing for and renewing of the registrations have increased gradually and the official registry of the community forest was found to contained 2,757 sites in 2018, covering the total area of 3917 square kilometers nationwide.

Restoration of coastal resources: Coastal communities regularly participated with public and private organizations in activities on mangrove rehabilitation. As the result, mangrove forests were found to increase in size in several areas while positive trend was observed in the rate of change in mangrove forests nationwide. In addition to action on mangrove forests, local communities were reportedly taking part in building bamboo fences as a measure against coastal erosion, working with public organization in designating marine and coastal conservation areas, conducting surveillance on encroachment of mangrove forest and exploitation of coastal resources, restocking fishery resources and disposing solid waste in coastal areas.

Surveillance on destruction of natural habitats: Local communities were found to play a vital role in conducting surveillance and reporting on encroachment and destruction of animal and plants habitats. Such destructive activities were reported to include those derived from quarry concession, the use of illegal fishing tools, discharge of untreated wastewater into natural reservoirs and dredging of waterways.

Development of local networks for conservation: Formal and informal organization of networks was undertaken by local communities with the view to enable spatial management of habitats. Networks operated by the communities with supports from public organizations and NGOs were found to include the Community Forests Network of Nan Province, the Network for the "Fish-Hook" Coastal Areas of the Gulf of Thailand,

the Tha Chin Watershed Network, the Network of Community Forests in the Corridor of the 5 Eastern Provinces and the Western Forest Complex Network.

C13: By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

Participation of local communities in safeguarding genetic diversity mostly consisted of activities on conservation of plant and other valuable species.

Plants inventory, specimen collection and re-propagation of plants species: Local communities, which are largely consisted of farmers, were reported to participate in the royal initiative of Her Royal Highness Princess Maha Chakri Sirindhorn on conservation of plant genetic resources. The participation included becoming volunteers for surveying and documenting plants species found outside forest areas of their communities as well as protecting plant genetic resources of the forests themselves. The initiative also undertook activities to collect specimens and re-propagate native orchids, wild orchids and other native plant species.

Conservation of rice: Genetic diversity of rice is of tremendous importance to the country's food security and contributes significantly to agricultural biodiversity as a whole. Conservation of native varieties of rice and their genetic materials by local communities could be considered as an in-situ conservation of biodiversity and was found to include collaborative collection of native rice seeds, maintaining traditional farming practices, preserving local traditions related to rice as well as tourist promotion (i.e. visits to Sao Vi Tee Rice Breeding and Farming Center located in Muang District of Khon Kaen Province, Chuea Phloeng Rice Conservation Group at Chuea Phloeng Sub-district, of Prasat District in Surin Province, the native rice seed production facility of Phon Ngam Ta Village located in Ban Paen Sub-district of Phon Na Kaeo District in Sakon Nakhon Province, Praya Lerm Kang Rice Breeder Group located in Nam Nao District of Phetchabun Province). In addition, efforts were made in enabling conservation of endemic rice varieties including Luem Pua Glutinous Rice of the Northern Region, Purple Rice of the Northeastern Region, Sao Hai Rice of Saraburi Province, Sung Yod Brown Rice of Phatthalung Province and Leuang Patew Rice of Chumphon Province.

Conservation of herbal plants: Herbal species have been interconnected with traditions, culture and beliefs of local communities since the ancient time. However, intergenerational accumulation and transfer of knowledge on the species were often without any documentation, resulting in the loss of such knowledge and the decline in its application. With aging demography and the increase in environmentally related illness, local communities in several areas were reported to pay more attention to herbal and other edible plants known to provide effective remedy and cure and to replant and/or preserve these plants in local forests, public areas and their residents.

E18: By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological

resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels. Local knowledge for conservation and sustainable use of biodiversity was found to be mostly conveyed through local practices, traditional culture, and oral interpretation. Existence of such knowledge would therefore depend on ensuring that local communities continue to carry out practices that contribute to maintenance of biodiversity. Most of these practices were found to include activities that are not harmful to biodiversity and/or are supportive to maintenance of biodiversity and ecosystems, such as organic farming, applying the ecosystem approach to exploitation of natural resources, enhancing soil fertility with manure and other organic fertilizers and protecting natural reservoirs. Local respect on the nature was found to derive from the deep-rooted belief that divinities reside in earth, water, forests and mountains and that the divinities would only grant permission to use natural resources in respectable and appropriate manners. Such belief was reflected in local rituals on water, rice, forests, mountains, animals and households and has provided an intrinsic foundation for living in harmony with nature as well as for meeting long-term goals (2050) of the Aichi Targets. Local knowledge on conservation and sustainable use of biodiversity was reportedly recognized in a number of following areas

Knowledge on herbal plants: Better inventory and documentation of herbal species were reported with identification of their local names, possible benefits and methods of usage. In addition, biotechnology was utilized to search, extract, purify and replicate active ingredients of herbal plants in order to conduct experiments on pharmaceutical and other properties of the ingredients as seen for those derived from Aloe Vera and Lakoocha (*Artocarpus lacucha*). Such experiments would allow for further development of cosmetics, medicines, food supplements and other products from herbal plants.

Knowledge on traditional farming and fishery: Traditional know-how on soil maintenance, breed selection, farmland management and farming practices were found to be of significant value in pursuing organic farming, while multi-cropping, management of water and other resources at farming level and adoption of ecosystem approach were identified as contributors to implementation of the natural policies to promote traditional based organic farming, reduce and remove the use of chemical in agriculture and promote multi-cropping. In fishery, local knowledge was credited for development of traditional fish traps (“Tsong”) and for local practices of building artificial shelters and spawning grounds for aquatic species with biodegradable materials such as coconut leaves and braches.

Knowledge on management of reservoirs: Local knowledge was found to play a prominent role in modify weir systems to better accommodate traditional practices of water allocation. Such action included appointment of leaders and oversight committees to ensure that water resource is fairly allocated in accordance to the need of each area, providing for equitable sharing of the resource from upstream to downstream areas and ensuring peaceful co-existence among all users.

Community practices related to conservation and sustainable use of

biodiversity: Practices found to contribute to conservation and sustainable use of biodiversity included taking formal and informal steps to formulate local rules on forest harvest and re-plantation, decide on the method for harvesting bamboo shoots, schedule periods for harvest of bamboo shoots and wild mushroom, designate a period when the use of local forests is prohibited, ban fishing during breeding seasons, prohibit any catch that found to be below the allowed minimum size and designate a spawning ground for protection. In addition, several communities were found to individually or collectively initiate community-based ecotourism by organizing sight-seeing of local landscapes and notable plants and animal species such as Water onion (*Crinum thaianum* J. Schulze.) and migratory birds as well as offering local foods and products. These activities were noted to have minimal impacts on natural habitats and biological resources, while providing income to the communities and enhancing their livelihoods.

Local communities in Thailand were found to be able to participate in conservation of biodiversity by combining their own knowledge with technical know-how offered by public agencies and NGOs. Biodiversity management carried out by the public agencies had previously been noted for the constraint in both human and financial resources and for being inadequate in tackling the entire scope of biodiversity conservation. By taking actions in the manners that are compatible to local setting, local communities could alleviate the above-mention short-coming while installing the sense of ownership and ensuring benefits to the communities themselves.

Public sector was reported to having taking actions to support and encourage local communities in managing and building on their knowledge relevant for conservation and sustainable use of biodiversity. These include drafting of a bill on herbal products, developing databases on traditional knowledge, supporting development of derivatives from local biological resources, enabling value added utilization of biodiversity and relevant traditional knowledge and utilizing interdisciplinary approach to build bio-based business.

Section VII. Updated biodiversity country profile

Biodiversity facts : Status and trends of biodiversity, including benefits from biodiversity and ecosystem services and functions:

The content of this biodiversity profile is still draft. The text below has been prepared by SCBD and remains subject to final approval by the Party concerned. Thailand is one of the most biodiversity-rich countries in Southeast Asia. It is located within two major biogeographical regions - the Indochinese region in the north and the Sundiac region in the south. With 15 mountain ranges throughout the country, the watersheds and main river basins connected to the Mekong River, Gulf of Thailand and Andaman Sea form a juncture of distribution for various plant species, such as

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temperate plant species and sub-alpine flora species from China and the Himalayas, tropical plant species from Indo-China and tropical species from other parts of Asia. In consequence, this area is one of the most biodiverse in the world. Thailand contains around 15,000 plant species, representing 8% of the world's total. Forest area covers at least 33% of the country's total area, with at least 18% comprised of conserved forests.

Threatened species in Thailand are numerous, consisting of 121 mammals, 184 birds, 33 reptiles,

5 amphibians, 218 fishes and no fewer than 1,131 plants. For instance, the number of wild elephants is between 1975 and 2380, wild buffaloes remain between 50 and 70, tigers between 200 and 500, while guars and bantengs remain at around 200. The kouprey, eld's deer and java rhino have not been reported in the wild for a long time. The number of irrawaddy dolphins is plummeting as well. Some freshwater fish species have become extinct and there are more than 20 endangered species. The number of indigenous livestock is also decreasing due to the introduction of alien animals.

Thailand's unique biodiversity is supported by a large variety of ecosystems, landscapes and habitats, most of which are also greatly threatened by human activity. In 1961, Thailand had a lush forest covering 53.35% of the country however, in 2009, terrestrial forest coverage had decreased to 32.1%. Several wild plant species have been irretrievably lost, including some species indigenous to the Toe Daeng peat swamp forest. Furthermore, hundreds of thousands of wild orchids were poached between 2003 and 2005 and sold to orchid farms and collectors. The agricultural ecosystem in Thailand harbors a rich diversity of species. The country is a sanctuary for world rice species. However, at the moment, there is rapid genetic erosion of rice due to urban rice paddy cultivation and farmers preferring to grow prolific species (with less conservation of indigenous crops). A large number of indigenous cultivated plants have also disappeared following the destruction of farmed areas as a result of natural disasters, urbanization, industrialization and dam construction.

Thailand possesses unique coastal and marine biodiversity. Along the coastline, mangrove forests comprise approximately 36% of the coastline. Currently, mangrove forests are threatened by illegal wood cutting, shrimp farming, construction of residential areas and industrial factories. Beach forests have been heavily devastated due to tourism, community settlement and port activities. At present, only a few lush beach forests exist in Thailand, most of which are located in the national marine parks. A survey undertaken in 2006 revealed that 40% of the seagrass bed in the Gulf of Thailand was in good condition, while this figure was only 20% in the Andaman Sea. These decreasing trends are a result of erosion by the current flow, net fishing and trawling, shrimp farm sewage and residues from estuaries. The largest area of coral reefs, equivalent to 25% of the total coral reef area nationwide, is located in the Suratthani Province. A survey conducted in 2007 indicated that only 5% of coral reefs in the Suratthani Province is considered in good condition, 24% in fair condition, 52% in poor condition and 13% in very poor condition.

Thailand derives large benefits from ecosystems. In particular, the country recognizes the important environmental role performed by watersheds, river basins and coastal areas, as well as their significance in supporting livelihoods linked to fisheries,

recreation and tourism, among many others. For instance, a watershed with adequate forest cover provides water that supports lowland agriculture, sustains the supply of surface and ground water for domestic use, and prevents soil erosion and the siltation of coasts and water bodies. Likewise, the forest ecosystem provides ecological services that benefit agriculture, industries, water and power needs.

Main pressures on and drivers of change to biodiversity (direct and indirect)

The content of this biodiversity profile is still draft. The text below has been prepared by SCBD and remains subject to final approval by the Party concerned.

Threats to biodiversity in Thailand include illegal hunting, crop and forest burning, livestock overgrazing, forest clearance/illegal logging, destructive fishing practices, disturbance caused by tourism and transportation activities, environmental pollution, forest fires, introduction of invasive alien species, coral bleaching and the loss of wetlands. The threats to biodiversity differ from one ecosystem to another. In regard to forest ecosystems, the shrinking of habitats for local plants and animals due to urbanization has resulted in the loss of indigenous plant and animal species. Urban and industrial growth has led to a critical decrease in (and deterioration of) agricultural ecosystems. Coastal ecosystems are threatened by illegal logging, overfishing, community settlement, industrialization and tourism development. Biodiversity ecosystems located near tourist attractions are threatened by rubbish, pollution, boat anchors and the collection of seashell and ornamental fish. In the past decade, overfishing and the deconstruction of coastal habitats, such as the mangrove forest, have reduced the quantity of marine animals available from natural sources. Notably, the amount of shell fished in the past ten years has declined by 70%. As a result, most of the large marine fish, such as shark, sawfish and ray, are now vulnerable.

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Implementation of the NBSAP

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Thailand has developed three NBSAPs to date, with the third formulated in the light of achieving the 2010 Biodiversity Target. National policies, measures and plans are grouped into 5 strategies and 17 action plans, which serve as a framework for implementing the NBSAP over a five-year period (2008-2012). The five strategies aim to: 1) protect the components of biodiversity 2) encourage the sustainable use of biodiversity 3) minimize threat to biodiversity 4) promote research, training, education and public awareness and networking on biodiversity and 5) strengthen national capacity for implementing biodiversity-related international agreements.

A process to further update the NBSAP, which will include a suite of national targets, was initiated in May 2011. Notably, the Aichi Biodiversity Targets have been integrated into Thailand's 11th National Economic and Social Development Plan (2012-2016).

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Overall actions taken to contribute to the implementation of the Strategic Plan for Biodiversity 2011-2020

The content of this biodiversity profile is still draft. The text below has been prepared by SCBD and remains subject to final approval by the Party concerned.

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Among the major achievements toward the 2020 Aichi Biodiversity Targets is the increase of protected areas. At least 20% of the marine and coastal areas in Thai waters have been designated as protected areas and at least 5 sites of wetlands of international importance have been designated as Ramsar sites. Regarding threatened species, at least 10 endangered endemic species have been protected and restored in situ and increased in population. In addition, 98 areas were identified as important plant areas. Awareness-raising campaigns through various activities and media have promoted knowledge on biodiversity issues. The Biodiversity Clearing-House Mechanism (CHM) and the Biosafety Clearing-House (BCH) are fully operational and linked to one another.

The National Center for Genetic Engineering and Biotechnology has cooperated with the Ratchamangkala University of Technology to implement a project on rice seed production technology transfer, with the full participation of local farmers, using fragrant rice with high resistance to blast disease. The Center has also cooperated with several universities and research institutions to implement a project on the management and improvement of hot chili varieties, resulting in a collection of 752 species of hot chili from around the world. The Office of Natural Resources and Environmental Policy and Planning (ONEP) has compiled, documented and published a series of 17 books (checklists) entitled “Biodiversity Series”, containing the names of and some information on important taxa in Thailand. The development of a national inventory on traditional knowledge and/or local wisdom related to the conservation and sustainable use of biodiversity is ongoing. The royalty-initiated projects with institutions of higher education have synthesized existing knowledge into practical models to be used as methodologies in plant conservation, using biotechnology for the reintroduction of endangered plants.

Support mechanisms for national implementation (legislation, funding, capacity-building, coordination, mainstreaming, etc.)

The content of this biodiversity profile is still draft. The text below has been prepared by SCBD and remains subject to final approval by the Party concerned. In 2009, Thailand adopted the National Biodiversity Policy which focuses on the protection and restoration of conservation areas. Further mechanisms include the Country Management Plan (2008-2011), promoting the sustainable use of biodiversity, and the NBSAP (2008-2012). Thailand has also established practical guidelines to facilitate activities related to biodiversity impact assessment, sustainable use and access and benefit-sharing. The country has also established criteria and regulations to control and mitigate threats from invasive alien species, namely through quarantine measures. The Biodiversity Bureau serves as a national focal point for access to and transfer of biological resources. Some departments have put mechanisms in place for access and benefit-sharing, through implementing provisions in relevant laws and policies, such as the Plant Varieties Act, Fisheries Act and the Protection and Promotion of the Thai Traditional Medical Intelligence Act.

Many departments, institutions and organizations in Thailand are emphasizing community engagement and empowerment. The Community Organization Development Institution (CODI) is the leading agency to promote and mobilize capacity-

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building and empower indigenous and local communities. CODI has developed a tool for strengthening local capacities called “community mapping”. As a result, local communities are able to identify the status and trends of traditional knowledge, as well as the vision and priorities required for protecting traditional practices. Thailand’s Research Fund (TRF) provides funds for research activities and facilitates the exchange of experiences for biodiversity conservation at local levels. In addition, the Population and Community Development Association (PDA) is promoting community participation in forestation by establishing local community networks, facilitating the exchange of experiences, promoting organic farming and soil conservation and providing training to local communities.

Mechanisms for monitoring and reviewing implementation

The content of this biodiversity profile is still draft. The text below has been prepared by SCBD and remains subject to final approval by the Party concerned. Although endowed with rich and diverse biodiversity in various tropical ecosystems, Thailand is unfortunately faced with threats due to the loss of natural habitats, overexploitation, as well as from the lack of public concern and inconsistent and non-systematic biodiversity research and study. To solve these problems and facilitate the achievement of the 2010 Biodiversity Target, the ONEP has cooperated with the Kasetsart University in the conduct of a survey and inventory of Biodiversity Important Areas (BIAs) and Biodiversity Hotspots in Thailand, based on seven thematic ecosystems, with particular emphasis put on species contained in Thailand’s Red List, and endemic species. The National Center for Genetic Engineering and Biotechnology (BIOTEC) has collaborated with the Department of National Parks, Wildlife and Plant Conservation to implement a project on the Inventory and Collection of Flowering and Ornamental Plants in the Forests of the Southern Region, and established the “Cooperative Natural Research Center” at Hala Bala Peatswamp Forest, to facilitate research and networking among all related organizations. The main purpose of the project is to facilitate sustainable development in areas based on scientifically- and technologically-sound research and study. The BIOTEC group has also implemented and supported projects related to insect fungus.

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