# 2020-2022 GEO Work Programme Application

# Asia-Oceania GEO (AOGEO)

# February 25, 2019

## *Contents*

## *1. Executive Summary (1 page) updated annually*

- *Full title of the Regional GEO:* **Asia-Oceania Group on Earth Observations**
- *Short title or acronym:* **AOGEO**
- *Proposed or existing category:* **Regional GEO**
- *Overview (summary of section 2 below).*

  Recognizing that Earth observation data, information and derived knowledge are critical for identifying vulnerabilities, monitoring and assessing impacts and informing the decision-makers, and the uneven development of the AO region and complexity of the geographic scope, there is an urgent demand to develop an integrated, shareable, and sustained observation system and to foster its application capacity. AOGEO will engage regional stakeholders, including national agencies and regional intergovernmental organizations, in global GEO activities and coordinate implementation of GEO activities within the AO region.

- *Planned activities (summary of section 4 below).*

  AOGEO will focus on the three areas of GEO's Engagement Strategy, including 2030 Agenda for Sustainable Development (SDGs), Paris Climate Agreement within the UNFCCC (Paris Agreement), and Sendai Framework for Disaster Risk Reduction (Sendai Framework) by implementing three types of activities: Regional Application Activities, Foundational Tasks and Integrated Priority Studies.

- *Points of Contact (primary contact persons for the Regional GEO and their email addresses).*

Points of contact are the four CoChairs:


- Xingfa Gu (China) guxingfa@radi.ac.cn
- David Hudson (Australia) david.hudson@ga.gov.au
- Toshio Koike (Japan) koike@icharm.org
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## *2. Purpose (1 page)*

- *Description of the objectives or priorities for the Regional GEO and how these relate to identified regional needs.*

Ranging from the mountaintops of the Himalaya to small atoll nations in the Pacific Ocean, the Asia-Oceania (AO) region encompasses two-thirds of the world's population, that live in more than 60 countries that vary in size, economy, development status and environmental condition .With continuing development, particularly urbanization, the AO region is subject to rapid and widespread environmental changes that result in environmental deterioration, habitat and biodiversity loss and pollution that even reaches to the farthest waters for the Pacific. Climate related extremes, including earthquakes tsunamis, floods and droughts that result in the highest levels of disaster of anywhere in the world and further endanger the security of water, food, energy, health and ecosystem services. As the world is closely inter-connected, the impact of an event immediately leads to a cascade of consequences, even in geographically remote countries within the AO region. Sustainable development must therefore be based on a comprehensive assessment of disaster and environmental risks, along with their potential ramifications for environmental security and human well-being.

Recognizing that Earth observation data, information and derived knowledge are critical for identifying vulnerabilities, monitoring and assessing impacts and informing the decision-makers, and the uneven development of the AO region and complexity of the geographic scope, there is an urgent demand to develop an integrated, shareable, and sustained observation system and to foster its application capacity. AOGEO will engage regional stakeholders, including national agencies and regional intergovernmental organizations, in global GEO activities and coordinate implementation of GEO activities within the AO region. AOGEO will also:

1. identify regional needs for Earth observation applications and conveying these to global GEO activities;
2. facilitate regionally coordinated Earth observation activities and utilize available infrastructure, resources and capacity to develop integrated and sustained observations in the AO region;
3. provide a platform for regional countries to advance data sharing and services;
4. promote dialogue, communications and cooperation among the AOGEO Members and other participants, as well as with other Regional GEOs; and
5. support sound decision-making at local, national and regional scales by making maximum use of Earth observation data and information.

*Description of the strategy and/or principal means to be used to achieve the objectives.*

AOGEO will focus on the three areas of GEO's Engagement Strategy, including 2030 Agenda for Sustainable Development (SDGs), Paris Climate Agreement within the UNFCCC (Paris Agreement), and Sendai Framework for Disaster Risk Reduction (Sendai Framework) by implementing three types of activities: Regional Application Activities, Foundational Tasks and Integrated Priority Studies.

1. **Regional Application Activities**: To address regional challenges related to the GEO's Societal Benefit Areas and the GEO global Flagships and Initiatives such as GEO BON, GEOGLAM, GFOI, GEO Carbon and GHG Initiative, Blue Planet and GEOGLOWS, AOGEO will enhance Earth observation capacity and their applications through: 1) Asian Water Cycle Initiative (AWCI); 2) Asia-Pacific Biodiversity Observation Network (AP-BON); 3) GEO Carbon and GHG Initiative (GEO-C); 4) Oceans, Coasts, and Islands (OCI); 5) Agriculture and Food Security (AsiaRiCE); 6) Drought monitoring and evaluation; 7) Environmental Monitoring and Protection (EMP); 8) Disaster Resilience(DR); and 9) Himalayan GEOSS.
2. **Foundational Tasks**: To promote regional coordination, AOGEO will implement selected, often enabling, activities including 1) Data Sharing; 2) Data Hubs and Cubes; and 3) User Engagement and Communication.
3. **Integrated Priority Studies**: To exemplify the cross-cutting and inter-related nature of various Societal Benefit Areas (SBAs), AOGEO recognizes that, with respect to SDGs, Paris Agreement and Sendai Framework, special efforts for integrating Earth observations and harmonizing research and operational activities are needed in some specific areas including 1) Mekong River Basin; 2) Small Island States; and 3) Himalayan Mountains.

### *3. Previous Achievements (1 page)*

- Description of the objectives or priorities for the Regional GEO for the 2017-2019 period.
- Summary of the extent to which the objectives were or were not achieved.
- Status of implementation of planned activities and outputs of the Regional GEO for the 2017-2019 period.
- Lessons learned from (or challenges experienced in) the 2017-2019 period and proposed actions for amendments or improvements.

The following list shows the then AOGEOSS's original implementation plan's objectives with our achievements against each nested underneath:

- Engage with coordinate as appropriate all stakeholders, partners and sponsors working together in Earth observation activities in Asia Oceania region;
  - The 11th AOGEO Symposium was held in Kyoto attended by 171 participants and approved "Kyoto Statement" which show the direction of the AOGEO activity in 2019.
  - The 1st AOGEO Workshop was held in Deqing attended by 82 participants from 16 countries
- Utilize infrastructure, resources and capacity to develop integrated and sustained observations;
  - Room for improvement
- Investigate user needs and address gaps on implementation of GEOSS and develop technological approaches;
  - Targeted capacity building activities have been held by AOGEO in Nepal, Laos and China
- Provide a platform for regional countries to advance data sharing and services;
  - In addition to support from Sentinel Asia, AOGEO has projected data to four disasters since 2016
  - Supported the rollout of Open Data Cube (ODC) deployments in Australia, Cambodia, Vietnam and several others with greater than six other countries exploring deployments
  - Spread the development of Analysis Ready Data within the region and have initiated the process of establishing an Asia Oceania Data Hub
  - Development meta-standards and cooperation between national oceanographic centers for the sharing of information
- Cultivate regional collaboration network by providing technical support and knowledge sharing;
  - We have initiated a multi and transdisciplinary case study in the Mekong Rivier Basin which aims to show how all global GEO tasks and the 8 AOGEOSS application tasks can create integrated knowledge.
  - We have hosted a workshop to better define the EO needs of Pacific Island small island states and are progressing the development of regionally based information platform
- Support decision-making and regional sustainable development with earth observation information.
  - Facilitating the development of Communities of Practice in tkey areas such as water management, biodiversity, carbon and GHG monitoring, food security and ocean monitoring through the communications at GEOSS Asia Pacific symposia

The flexible and inclusive activities of AOGEOSS Initiative realized our cooperative contribution to achieve the international and global agenda; SDGs, Sendai Framework and Paris Agreement, which was clearly demonstrated at the latest GEOSS-AP symposium held in Kyoto, Japan in October 2018 (presented in the next section).

Our main lessons learned since establishment are the vital importance of regional GEO's maintaining independence, so we can remain agile and the importance of valuing all voluntary contributions in any form to maintain our momentum.

### *4. Relationship to GEO Engagement Priorities and to other Work Programme Activities (2 pages)*

- *Description of which activities and/or outputs of the Regional GEO, if any, are expected to inform the achievement of SDG targets and/or the measurement of SDG indicators. Identify which targets and/or indicators are implicated.*

It is critical to end poverty and hunger, achieve gender equality, and make societies and economies resilient to water-related disasters in both urbans and rural areas. AWCI launches full-scale efforts to activate Platforms on Water Resilience and Disasters by promoting dialogues, reinforcing partnership, sharing data, information, models, tools, experiences and ideas, and expanding sustainable practices. AWCI promotes initiative that will address targets in SDG 6 on Water use efficiency and Integrated Water Resources Management as well as SDGs related to Poverty, Food Security and Life on Land.

APBON emphasizes the need to promote the harmonization of activities that contribute to achieving SDGs (13, 14, 15) by identifying the synergies and trade-offs of ecosystem services and societal requirements. In-situ observations and their emerging knowledge will address these issues by taking consideration of the challenges in balancing our natural systems and societal systems. APBON also identifies the importance of long-term monitoring of terrestrial, freshwater, coasts and marine ecosystems to produce the data and knowledge for sound decision making to take balance of natural resources and human activities. Tackling the challenges with regard to climate change needs for cross-disciplinary activities including water resources, carbon management, food production, and also with various platforms of Earth Observations (EO).

In relation to SDG14, OCI will promote better access to marine data through: interoperability of data such as catalogues of state owned-data; standardization of in situ and satellite data through the development and application of standards including Analysis Ready Data (ARD), that provide confidence and consistency, and better validate satellite based marine and coastal products by applying in-situ observation for calibration, validation and algorithm processing. OCI will continue to build upon its user-engagement activities with Oceania states to provide capacity building and training, develop regionally-specific best-practice EO methods and products that are useful to these communities in addressing climate, environment and livelihood issues.

AsiaRiCE directly addresses the issues of SDGs 1, 2, 3, 6, 10, 13, 15 and 17 through better agri-food policy implementation. Compiled agro-meteorology information from various EO systems in Japan (JAXA/JASMIN), India (ISRO/MOSDAC) , GISTDA drought monitoring and other countries and rice crop growth monitoring using SAR such as ALOS-2 and optical sensors such as ResourceSAT in AsiaRiCE under GEOGLAM. AsiaRiCE will greatly contribute to global and regional food security, by improving the outlook of crop production, precision agriculture, development of decision-support systems and early warning systems for biotic and abiotic stresses, in cooperation with the ASEAN Food Security Information System (AFSIS) and Asia Pacific Regional Space Agency Forum SAFE projects..

EMP directly focuses on SDG 15, also investigates ecosystem responses to natural disasters and climate change closely related to SDGs 11, 13 and 17. By integrating multiple source EO data, EMP will monitor and assess terrestrial ecological and atmospheric environments, to generate annual policy relevant reports to support national governments and international organizations to make evidence-based decisions for environmental protection. EMP will provide quantitative remote sensing products for sharing and validation to all AO partners to strengthen cooperation.

- *Description of which activities and/or outputs of the Regional GEO, if any, are expected to support the Paris Agreement and identify which pillars are implicated.*

AWCI accelerates regional coordination to build capacity for identifying, monitoring and predicting the changing probability of water-related disasters and their associated risks. It will develop user-friendly analysis tools and engage all stakeholders in climate change adaptation planning and implementation at the national scale, and fill the gap between adaptation and mitigation by choosing options which are beneficial to mitigation.

GEO-C aims to support the evaluation of the effectiveness of climate change measures, and to provide measurement-based knowledge of atmospheric greenhouse gas (GHG) concentration in support of the evaluation and improvements emission inventories. Separation of natural and anthropogenic source and sink estimations is a key scientific focus. Large uncertainty remains in global or regional source and sink estimations for carbon dioxide. It is urgently needed to harmonize the increasing number of platforms for monitoring GHGs in Asia-Oceania, and to reduce uncertainties in their source and sink estimations. For example, methane emission from agricultural and industrial activities in Asia. Relevant institutions and agencies for GHG observation will cooperate to develop and improve up-to-date analysis systems, using remote-sensing and in-situ observations and to provide the data and knowledge to stakeholders in support of the Global Stocktake Process under the Paris Agreement.

Methane is also a key component of greenhouse gas, and the lowland rice field is one of the major sources of methane emission being measured by AsiaRiCE for optimization and minimization of water use. AsiaRiCE hope to reduce methane emissions without reducing the productivity of rice production in the AO region. AsiaRiCE also not the critical partnership required with the CEOS community.

As vegetation ecosystem is an important carbon sink, EMP is developing products related to vegetation ecosystem status and variation monitoring. The long-time series of quantitative remote sensing products, including the vegetation phenology, Leaf Area Index, Fractional Vegetation Cover, Biomass and Net/Gross Primary Productivity, are used to study the climate change and the ecological effect and feedback of the ecosystem to the GHG, such as the carbon dioxide.

- *Description of which activities and/or outputs of the Regional GEO, if any, are expected to support achievement of the targets of the Sendai Framework and which targets are implicated.*

AWCI facilitates the implementation of Platforms on Water Resilience and Disasters to promote the four priorities for action of the Sendai Framework. AWCI provides usable and actionable information on thematic activities including preparedness and mitigation. AWCI archives disaster damage data and maintains statistics for encouraging investment for water-related disaster risk reduction.

Integrated climate models with EO data and information is critical for improving climate resilience. For risk management of water-related disasters, it is important to understand the impact of drought and flood on agriculture, which can be estimated by the agro-meteorology information and the monitoring of inundated area based on EO data in the activities of AsiaRiCE. This task is closely linked with SDG 13.
The table summarizes the AOGEO Task groups with the GEO Priorities: See the Annex C.

- *List of Flagships, Initiatives and Community Activities in the 2017-2019 GEO Work Programme that are relevant to this Regional GEO and a brief description of the relationship or plans for future engagement / collaboration.*

| **Activities in 2017-2019 Work Programme** | **Regional activities involved in AOGEO** |
|---|---|
| GEOGLAM | AsiaRiCE |
| GEO BON | APBON |
| GEOGLOWS | AWCI |
| GEO Carbon and GHG Initiative | GEO-C |
| GEO-GNOME | Himalayan GEOSS |
| GEO-DARMA | Disaster Resilience |
| Blue Planet | Ocean Coasts and Islands (OCI) |
| GCI | ODC, DIAS |
| Advancing GEOSS Data Sharing Principles | Data Sharing |

## *5. Stakeholder Engagement and Capacity Building (2 pages)*

- *Strategy for engaging stakeholders in the co-development / co-production of the Regional GEO, including determining user needs, and for building individual, organizational, and institutional capacity to use the outputs of the Initiative.*

Concerted actions should be taken at local, national and regional scales to respond to the societal challenges, including SDGs, Paris Agreement and Sendai Framework. The stakeholder engagement strategy of AOGEO aims to establish AOGEO as a unique regional organization that ensures that Earth observations (EO) underpins local, national and regional decision-making. AOGEO is strategically positioned to promote Members, Participating Organizations and key stakeholders to cooperate together and establish end-to-end partnership across the various scales in the AO region.

In collaboration with space agencies, national cadastre and mapping agencies, geological surveys, hydrological and meteorological agencies, marine centres, AOGEO puts a priority on the engagement of those entities, including government departments which need Earth observation for drafting, implementing or monitoring national policies in the fields of environment, transport, agriculture or energy; and statistical agencies to facilitate the integration of socio-economic data with Earth observations to multiply their collective value, which have an influential role and/or national mandate with respect to specific international agreements, treaties and conventions. This will leverage the use of Earth observations and sustain their associated infrastructure at the national level. It will also lay the foundation for national and/or regional collaboration to develop indicators and more effective mechanisms to measure and monitor progress towards those global commitments.

The goal of the AOGEO capacity building is to facilitate and develop sustainable mechanisms for the AOGEO Members to use advanced Earth observations systems and associated data and tools, and apply them to sound decision making. AOGEO recognizes three main target groups as;

1) Researchers / Scientists where the emphasize is customizing existing knowledge to suit local conditions supported by global experiences
2) Professional / Practitioners which focuses on introducing new methodologies, tools and standards
3) Administrative / Local governments officials to provide an over view of technology and science

Different capacity development tools and programs will be combined to reflect the relevant emphasize and coverage for each target group. The AOGEO training and capacity building programs consist of elements such as short-term training/long term training, online training materials, examples or modules, research opportunities, technical advice on existing projects, access to data and access to software. It will emphasize on sustainability and the need to customize technologies to suit local conditions by carefully setting up teams in each country made up of leading educational and research institutes and responsible government organizations that would function as core teams to ensure the future development and enhancement of the methodologies and incorporation of them to national programs.

- *Current and/or planned activities to engage stakeholders and/or strengthen individual, organizational and/or institutional capacity and the expected outputs and outcomes of these activities.*

**AWCI (TG1)**

Platform contributes to institutional and infrastructural design and investment including land use management and climate change adaptation and to effective response and recovery. Political impact must be much more significant. H.E. Mr. Palitha Range Bandara, State Minister of Irrigation and Water Resources and Disaster Management of Sri Lanka joined the 11th Global Earth Observation System of Systems Asia Pacific Symposium (GEOSS AP), Kyoto, October 2018, and delivered an opening speech at the AWCI session.

**AP BON (TG2)**

AP BON contributed IPBES regional assessment, which provides options for decision-making across scales and sectors.

TG2 will strengthen biodiversity monitoring networks and promote evidence-based data and knowledge in sound decision – making, policies and actions towards realizing the SDGs through interdisciplinary coordination, capacity building, long-term in situ observations, large coverage high resolution observation technology in the context of an operational data sharing culture.

**OCI (TG4)**

In support of and cooperation with Australian government, OCI will conduct the Oceania states forum for further utilizations of EO data and user engagements. The first forum was held in October 2018, and the second will be planned in 2019.

- *Current and/or planned activities to strengthen the capacity of the participants in the Initiative for successful implementation of the Regional GEO.*

**AWCI (TG1)**

Platform strengthens experts' capability of data collection and archiving, integrated assessment and risk change identification and stakeholders' capacity for making maximum use of these data and information provided from the experts.

Hands-on training workshops:

1) Satellite-based rainfall measurement and the data usage for flood prediction
   Colombo, March 2018
2) Data archiving
   Davao, September 2018
3) Data archiving and climate change impact assessment
   Yangon, February 2019

**AP BON (TG2)**

AP BON (TG2) contributed to capacity building for biodiversity data collection, curation, and management for young researchers and officials involved in biodiversity conservation.

At the 11th GEOSS-AP symposium we learned that biodiversity and ecosystem observations could work together with the other Task Groups in an interdisciplinary manner to achieve many Goals included in the SDGs, Sendai Framework of Disaster Risk Reduction and Paris Climate Agreement, by providing data of biodiversity, ecosystem processes and functions, and assessments of climate and human impacts on ecosystem services, through coordinated and concerted in situ observations with other disciplines focusing on water, carbon and GHG, ocean and coasts systems, and food production. Cross-platform observations by connecting in situ and satellite may also be progressed to fill spatio-temporal gaps and knowledge gaps in our environment. It should be also noted here that APBON will progress the biodiversity observations and knowledge production, by collaborating with BONs in other regions as well as GEO BON.

**OCI (TG4)**

OCI will continue strengthen experts' capacity by participations from IOC/WESTPAC countries and projects under the framework of IOC/UNESCO

## *6. Governance (1 pages)*

- *Description of the governance structure for the Regional GEO, including the relationship with the regional caucus and the mandates of steering/advisory/management committees, if applicable.*
- *Description of the roles of key leadership positions.*

1) **Asia-Oceania Caucus - GEO Principals:** The Asia-Oceania Caucus is the decision-making body consisting of GEO Principals in the Asia-Oceania Region. It provides high-level political support and ensures necessary resources to implement the AOGEO. The Asia-Oceania Caucus meets annually to review reports from the Coordination Board, endorse updates on the work plan and provide guidance to the AOGEO implementation.
2) **AOGEO Coordination Board:** The AOGEO Coordination Board is the executive management body, consists of the experts serving as the representative of GEO Member in AO region or the Task Group. The Coordination Board works by Members' consensus. The Coordination board bridges political and technical guidance and connects AOGEO objectives to implementation by determining mission, goals, long-term plans and high-level policies of AOGEO and its action plan, ensuring the sustainable activities of AOGEO, and communicating about the direction and the activities of the AOGEO to the GEO community and other Regional GEOs. The Coordination Board reports to the Caucus and observes the work plan implementation between Caucus Meetings. It assembles the AOGEO Annual Report based on progress updates from Task Groups. The Coordination Board may make recommendations on new tasks to the Asia-Oceania Caucus and establish subsidiary bodies to support the administrative affairs or specific activities. Communications with other Regional GEOs, GEO Secretariat and Programme Board may also be coordinated by the Coordination Board.
3) **AOGEO Symposium (formerly GEOSS Asia-Pacific Symposium):** The annual regional Forum to exchange broad scientific and technical views on Earth observations and their applications as well as to report progress of tasks in the AOGEO. GEO Principals are invited to the Forum. Inheriting the GEOSS Asia-Pacific Symposium which initiated in 2007,participants deeply discuss and decide the direction of the AOGEO activities, which is published as an Official Statement of the Symposium. The AOGEO Symposium is held annually by Japan, a host country and GEO Secretariat. In 2019 the 12$^{th}$ AOGEO Symposium will be held in Canberra, Australia.
4) **AOGEO Workshop (formerly International AOGEOSS Conference):** The annual AOGEO Workshop held in the first half of each year is a focused meeting with three components: a focus workshop on a priority topic for AOGEO, a capacity building activity and a Coordination Board meeting. This meeting was initially established by China in Deqing. In 2019 the 2$^{nd}$ AOGEO Workshop will be held in Jakarta.
5) **AOGEO User Reference Group:** The AOGEO User Reference Group is a group of end user representatives from each of the Integrated Priority Studies and donors from all levels. The role of this group is to provide advice to the AOGEO Coordination Board on the end user impact of AOGEO activities, requirements for future activities and to advocate for further activity within and outside the GEO community.
6) **Task Groups:** Task Groups implement tasks agreed by AOGEO Members or GEO Participating Organizations. Task Groups will have to contribute to the AOGEO work plan in line with the AOGEO objectives. Task Groups will conduct much of their work by own activities including communications over teleconferences and emails. They meet annually at the AOGEO Symposium and other international conference in Asia Oceania region. Participation in GEO Symposium and GEO Plenary is greatly encouraged. Task Groups will provide progress update to the AOGEO Coordination Board who assembles the AOGEO Annual Report.
7) **AOGEO Secretariat:** AOGEO Secretariat will coordinate and collaborate with AOGEO contributors, representatives of users, supporters and observers, and support the Coordination Board and provide a professional support service to the Task Groups. The Secretariat functions are cooperatively shared by four Members as follows:
   - Liaison and Coordination among AOGEO Members by Australia
   - Public Relation such as making brochure for GEO events by China
   - AOGEO Website management by Japan
   - AOGEO Case Study Project management by Republic of Korea

- *Strategy for communication with participants and stakeholders, including the main communications channels used.*

1) In addition to the annual AOGEO meetings. AOGEO will hold ad hoc meetings, user workshops and training courses. Our day to day communications are maintained through email lists for the Coordination

Board, Task Group Leads and the broader AOGEO community. AOGEO also communicates through existing mechanisms such as the GEO blog and CEOS newsletter.

## *7. Resources (1 page)*

- *Summary of the estimated resources required to implement the proposed activities for the 2020.2022 period, including financial, in-kind participation, and other in-kind resources (e.g. data, equipment, computing capacity, office space).*
- *Extent to which confirmed contributions to the Regional GEO meet the identified requirements.*

*Please note that the details of the contributions will be entered in Table B below* AOGEO needs active resource (financial an in-kind) contributions and social capital input from Members and GEO Participating Organizations. As AOGEO aims to provide an integrated information service of earth observation, it needs the resources from multi-stakeholders, including government (national, provincial, territorial and municipal governments) and private sectors, institution and organizations, not-for-profit organizations and community organizations, professional associations. AOGEO's resources are in-kind and in cash as well. In-kind resource, such as the satellite data and its services, hosting the Symposium and training programme, will be provided by Members.

1) In-kind Supports
- Satellite data and its services: China, India, Japan, Korea, Thailand, Vietnam
- Data sharing and integration services: Australia, China, Japan
- AOGEO Coordination Board: Board Member countries
- AOGEO Secretary: Australia, China, Japan, Korea

2) Financial Supports
- AOGEO Symposium: Japan
- AOGEO Capacity Building Workshop: China
- Task Group Activities: AWCI (Japan, APN), APBON (Japan), GEO-C (China, Japan), OCI (Australia, Japan), AsiaRiCE (Japan), Monitoring and evaluation of drought in Asia-Oceania region (UNESCAP, China), EMP (China), Disaster Recovery (China)
- Cross Cutting Case Study Projects: Mekong River Basin (Korea), Ocean and Small Islands (Australia)
-

- *Strategy for mobilizing additional resources, either to meet gaps in confirmed contributions or to support future requirements.*

Through the engagement of multilateral development banks, such as The World Bank and Asia Development Bank, and donor agencies, AOGEO can demonstrate the value of Earth observations in decision making in developing countries. It can also deepen understanding of country-specific needs as well as developing capacities to use Earth observations and fostering the use of Earth observations in the various project management phases of the development banks. This engagement can be especially instrumental in mobilizing resources to help advance the implementation of the SDGs, Paris Agreement and Sendai Framework in developing countries.

- *Summary of existing commercial sector engagement in the Initiative, if any, and the strategy for engaging commercial sector organizations in future.*

As a strategy for engaging commercial sectors, AOGEO will develop a collaborative framework with private sector entities in areas such as disaster insurance, agriculture, water management or electricity generation from renewable energy, who are end-users of Earth observation data, information and products which can enhance their activities and corporate decision-making processes.

## *8. Data Policy (1 pages)*

- *Policy of the Regional GEO regarding data availability, including degree of adherence to the GEOSS Data Sharing Principles and GEOSS Data Management Principles.*

AOGEO recognizes that the societal benefits arising from Earth observations can only be fully achieved through the sharing of data, information, knowledge, products and services. AOGEO will therefore implement the GEOSS Data Sharing Principles which encourage to make data, metadata and products available *as Open Data by de*fault; *with minimal restrictions on use and at no more than the cost of reproduction and distribution*; and *with minimum time delay*.To further maximize the value and benefit from data sharing by making data and information of different origin and type comparable and compatible, facilitating their integration into models and applying them to decision support tools, AOGEO will promote the implementation of the GEOSS Data Management Principles which are based on *discoverability, accessibility, usability, preservation*, and *curation*.

Noting the complexity of these tasks, AOGEO prioritises access to and recommends the creation of Analysis Ready Data, such as those described in the CEOS Analysis Ready Data for Land or CARD4L standard. AOGEO also recommends the usage of a standardised licence to enact the GEO data sharing, such as the Creative Commons Attribution International 4.0 or CC-BY licence.

AOGEO also ensures that all activities and data it discovers can be accessed via the global GEOSS in addition to regional mechanisms.

- *Description of any data or information infrastructure used (or which is planned to be used) to support the Regional GEO. Description of how this infrastructure relates to the GEOSS Platform and/or other GEO infrastructural components.*

**China GEOSS Data Sharing Network (China GEOSS DSNet):** China GEOSS DSNet has been proposed as a part of China's Plan for Implementing GEOSS (2016-2025) to address the restrictions in distributed resource management and tightly coupled service interoperability and facilitating cross-disciplinary exploration and application. China GEOSS DSNet develops a national GEOSS data sharing framework, including resource integration mechanism, sharing-oriented metadata standards, and lightweight interoperability service to coordinate various Earth observation resources and enhances international cooperation.

**Data Integration and Analysis System (DIAS):** DIAS was launched in 2006 as part of the Earth Observation and Ocean Exploration System. The goals of DIAS are to collect and store earth observation data; to analyze such data in combination with socio-economic data, and convert data into information useful for crisis management with respect to global-scale environmental disasters, and other threats; and to make this information available within Japan and overseas.

**Open Data Cube (ODC)**: ODC, an open source project, was born out of the need to better manage Satellite Data. It has evolved to support interactive data science and scientific computing. ODC will always be 100% open source software, free for all to use and has been rolled out in Australia, Cambodia, Vietnam and several others with greater than six other countries exploring deployments.

- *Strategy for longer-term preservation of data and information produced or compiled by the Regional GEO.*

The ability to acquire and generate Earth observation data often outpaces our ability to access, explore, analyze, evaluate and use them for applications. This is a large effort for data experts, and the specialist and technical nature of the skills needed may reduce the number of practical and even scientific users who can interact with such large volumes of data, to the extent of practically excluding large stakeholder groups from making use of the available data effectively. In order to work effectively with Big Data derived from Earth observations we require new holistic and synergistic challenges to be solved between existing data and computing e-infrastructures in terms of access, volume, variety, velocity and veracity of data; computing and data analysis tools and methods; data management, execution and communication models; data provenance; and end-to-end orchestrated workflows.AOGEO will develop an orchestrated high-performance computing and data e-infrastructure which enables scientists, practitioners, decision-makers, citizens and other stakeholders to work together through end-to-end cooperation and guide society to solutions.

## *ANNEXES*

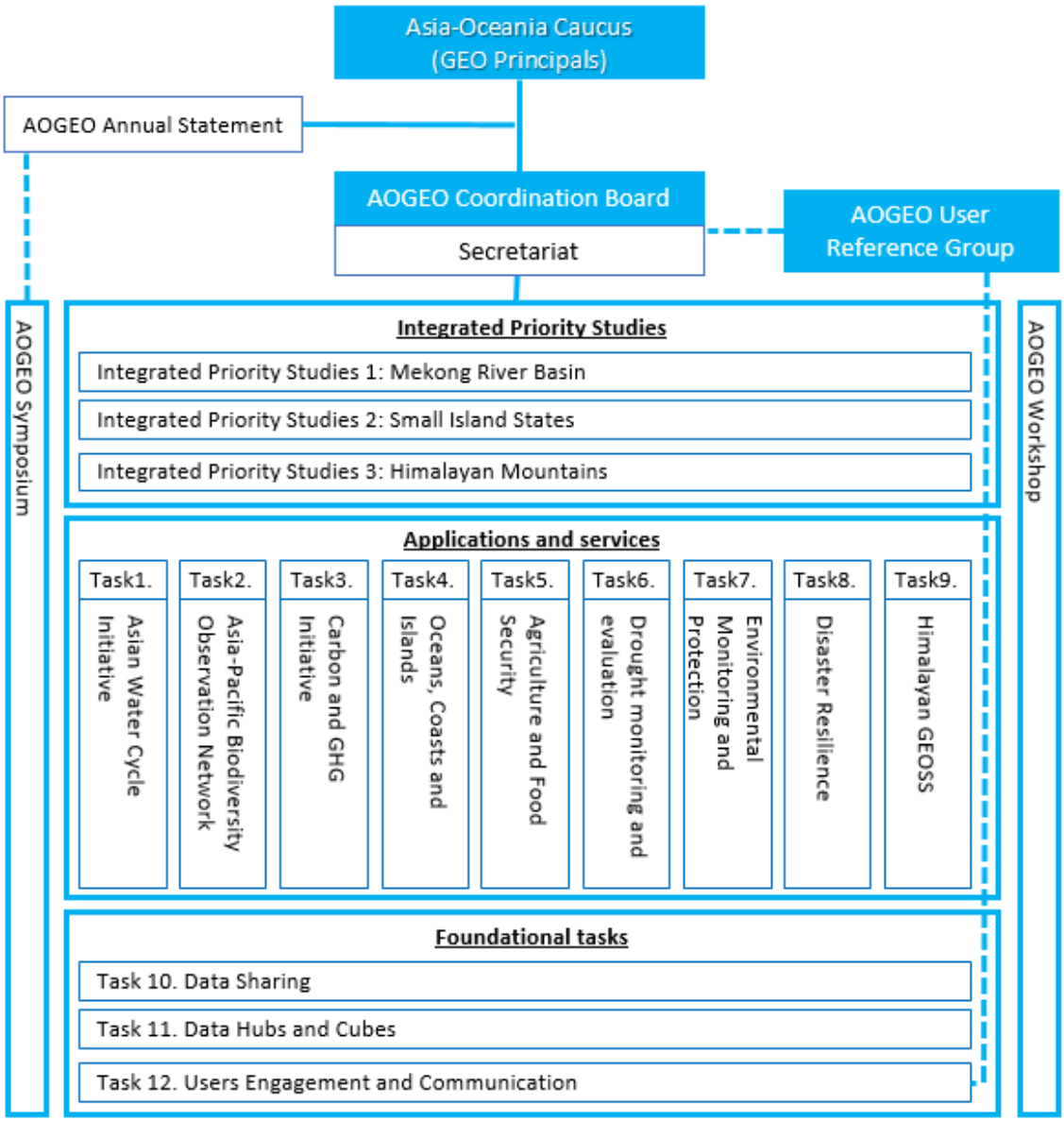
### A. List of references

[1] GEO 2016 WORK PROGRAMME Version v4.
http://www.earthobservations.org/documents/work_programme/geo_2016_work_programme.pd.

[2] GEO Strategic Plan 2016-2025: Implementing GEOSS
http://www.earthobservations.org/documents/GEO_Strategic_Plan_2016_2025_Implementing_GEOSS_Reference_Document.pdf.

[3] Kyoto Statement
https://geoss-ap-symp11.org/_public/Kyoto_Statement_2018_Final.pdf

## B. AOGEO Structure



**C. The AOGEO Task groups with the GEO Priorities (As of October 2018):**

| | |
|---|---|
| TG1: AWCI | TG6: Drought monitoring and Evaluation |
| TG2: APBON | TG7: Environmental Monitoring and Protection |
| TG3: GEO-C | TG10: Data Sharing |
| TG4: Ocean Coasts and Islands (OCI) | TG11: Data Hub and Cubes |
| TG5: AsiaRiCE | TG12: User Engagement and Communication |

| GEO Priorities | | TG1 | TG2 | TG3 | TG4 | TG5 | TG6 | TG7 | TG 10 | TG 11 | TG 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SDGs | 1.NO POVERTY | 3 | 3 | 0 | 0 | 3 | 1 | 0 | 1 | 1 | 1 |
| | 2.ZERO HUNGER | 3 | 3 | 0 | 0 | 3 | 1 | 0 | 1 | 1 | 2 |
| | 3.GOOD HEALTH AND WELL-BEING | 1 | 3 | 1 | 1 | 2 | 1 | 0 | 1 | 1 | 1 |
| | 4.QUALITY EDUCATION | 1 | 2 | 2 | 2 | 0 | 1 | 0 | 0 | 0 | 1 |
| | 5.GENDER EQUALITY | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 2 |
| | 6.CLEAN WATER AND SANITATION | 3 | 3 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 3 |
| | 7.AFFORDABLE AND CLEAN ENERGY | 2 | 3 | 2 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| | 8.DECENT WORK AND ECONOMIC GROUTH | 1 | 2 | 1 | 1 | 3 | 1 | 0 | 1 | 1 | 1 |
| | 9.INDUSTRY, INNOVATION AND INFRASTRUCTURE | 2 | 1 | 1 | 0 | 2 | 1 | 0 | 1 | 1 | 1 |
| | 10.REDUCED INEQUALITIES | 1 | 2 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 1 |
| | 11.SUSTAINABLE CITIES AND COMMUNITIES | 3 | 3 | 2 | 1 | 0 | 1 | 1 | 1 | 1 | 3 |
| | 12.RESPONSIBLE CONSUMPTION AND PRODUCTION | 1 | 3 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 |
| | 13.CLIMATE ACTION | 3 | 3 | 3 | 3 | 3 | 1 | 2 | 1 | 1 | 3 |
| | 14.LIFE BELOW WATER | 2 | 3 | 2 | 3 | 0 | 1 | 0 | 1 | 1 | 1 |
| | 15.LIFE ON LAND | 3 | 3 | 2 | 1 | 3 | 1 | 3 | 1 | 1 | 2 |
| | 16.PEACE, JUSTICE AND STRONG INSTITUTIONS | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| | 17.PARTNERSHIP FOR THE GOALS | 3 | 3 | 2 | 2 | 3 | 1 | 2 | 1 | 1 | 3 |
| Paris Agreement | Adaptation | 3 | 3 | 2 | 1 | 3 | 1 | 0 | 1 | 1 | 2 |
| | Loss & Damage | 3 | 3 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 2 |
| | Capacity Development/Technology Transfer | 3 | 3 | 2 | 2 | 0 | 2 | 2 | 2 | 2 | 3 |
| | National Reporting/Global Stocktake | 0 | 2 | 3 | 2 | 0 | 1 | 1 | 2 | 2 | 1 |
| | Mitigation | 2 | 3 | 3 | 1 | 0 | 1 | 0 | 1 | 1 | 1 |
| Sendai Framework | Understanding disaster risk | 3 | 3 | 3 | 1 | 2 | 2 | 0 | 2 | 2 | 2 |
| | Strengthening disaster risk governance to manage disaster risk | 3 | 3 | 0 | 1 | 2 | 2 | 0 | 1 | 1 | 2 |
| | Investing in disaster risk reduction for resilience | 3 | 3 | 0 | 1 | 2 | 1 | 0 | 2 | 2 | 2 |
| | Enhancing disaster preparedness for effective response, and to "Build Back Better" in recovery, rehabilitation and reconstruction | 3 | 3 | 0 | 0 | 2 | 1 | 0 | 2 | 2 | 2 |

## D. Description of Activities

*Description of each Task Group activities (less than 250 words)*

**Integrated Priority Study 1: Mekong River Basin**

Coordinator: Dr. Yongseung Kim (Republic of Korea) yskim@kari.re.kr

Summary:

The Asia-Oceania GEO (AOGEO) is a GEO regional initiative that aims to strengthen comprehensive ability of Earth observation and applications for sustainable development. There has been an increasing demand for satellite data from countries in Asia-Oceania region to address GEO's three main themes: climate change, disaster risk reduction, and sustainable development. This study seeks to perform the pilot study over the Mekong river basin for these themes, using the Earth observing satellite data and in-situ measurements.

The Mekong river originates from the Tibetan Plateau and runs through China, Myanmar, Laos, Thailand, Cambodia, and Vietnam. Since the beginning of its history, the Mekong river has long been concerned with the human life and the ecosystem in these countries. Human activities and climate change are primary causes associated with environmental changes in the Mekong river basin. For example, human activities due to agriculture expansion and many man-made dams could have affected the river discharge and the local ecosystem. The global climate change could also induce environmental changes such as the sea water intrusion by the sea level rise in the Mekong Delta. The resultant societal impact may be manifested in various fields of water management, agriculture, flood, energy, health, ecosystem, environmental pollution and transportation. It is therefore very important to perform case studies that characterize such environmental changes and eventually help to develop the operational solution for the benefits of our society.

**Integrated Priority Study 2: Small Island States**

Coordinator: Dr. Andy Steven (Australia) andy.steven@csiro.au

Summary:

AOGEO will continue to build upon its previous user-engagement activities (e.g. Earth Observation for Pacific workshop, October 2018, Australia) with Oceania small island states to provide capacity building and the promotion of spatial literacy, champion access to EO data, develop regionally appropriate best-practice EO methods and products that are useful to these communities in addressing climate, environment and livelihood issues. The OCI task coordinates with other AOGEO Task groups, as well as other GEO initiatives, to provide an integrated catchment-to-ocean approach. In April 2019 training workshop on coastal applications will be held the AOGEO Conference and significant participation from Pacific Island Representatives is expected at the GEO Ministerial in November 2010 in Canberra.

**Integrated Priority Study 3: Himalayan Mountains.**

Coordinator: Birendra Bajracharya (ICIMOD) Birendra.Bajracharya@icimod.org

Summary:

Mountain regions cover about 24% of the earth surface and provide important ecosystem services to almost half of humanity around the world. It is estimated that the Hindu Kush Himalaya (HKH) ecosystem alone provide goods and services to about 1.5 billion people living in the mountains and it's downstream. Mountain areas with often difficult terrain and high degree of inaccessibility present a formidable challenge to collect and manage data and information. This Integrated Priority Study will develop a platform for regional collaboration by bringing together all the GEO member organizations and thematic line agencies from the region working on EO and Geospatial technologies. In future the task aims to:

1. Building on these foundations of ICIMOD and its network, ICIMOD can serve as a Himalayan node contributing to the sub-regional implementation of GEOSS with active involvement of the regional member countries and international partnerships;
2. The focal organizations in the GEO member countries in the region will be the main contributors in this initiative. Participation will be sought from the relevant line agencies working in the thematic areas of agriculture, forestry, disasters and climate;
3. Private sector participation will also be encouraged. ICIMOD will host the initiative within its Regional Program - Mountain Environment Regional Information System (MENRIS). Complimentary contributions will be managed through ongoing initiatives within ICIMOD such as SERVIR for co-hosting workshops/ meetings and development of tools and services.

**Task 1: Asian Water Cycle Initiative (AWCI)**

Leads:
Toshio Koike (Japan) email: koike@icharm.org

Summary:

GEOSS/AWCI has stepped into the second phase. Based on the series of discussions at the Asia Water Cycle Symposium (AWCS2016) in Tokyo, March 2016, the 9th GEOSS Asia-Pacific Symposium in Tokyo, January 2017, the 3rd UN Special Thematic Session on Water and Disasters in New York, July 2017, and the series of the predatory meetings held in Myanmar, Pakistan, Philippines and Sri Lanka, AWCI, in collaboration with International Flood Initiative (IFI), established a Platform on Water and Disasters in each country and has launched its second phase activities.

The Platforms envision a future wherein decisions and actions for reducing water-related disaster risk are well supported by coordinated, comprehensive and sustained risk communication. To realize its vision, the Platforms work to connect the demand for sound and timely decisions and actions taken by policy-makers and local communities with the supply of disaster risk information that is generated from integrated risk assessment and risk change identification based on well archived data and statistics. In doing so, the Platforms strengthen water-cycle observation inter-operability, data integration and analysis functions by facilitating data and information accessibility, and application to decisions and actions within and across many different stakeholders. Decisions and actions for reducing risks on water-related disasters, including floods, landslides and droughts, rely, and will continue to rely, on the ability of expert communities to collect and archive data from various sources, combine them with scientific, social and economic analyses, and provide usable and actionable information for societal benefits.

**Task 2: Asia-Pacific Biodiversity Observation Network (AP-BON)**

Leads:
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Sheila Vergara (ASEAN Centre for Biodiversity, Philippines) sgvergara@aseanbiodiversity.org

Summary:

APBON is a network of institutions and research groups in the Asia Pacific region that contribute to and utilize a knowledge resource base for decision making and policy for the conservation of biodiversity and ecosystems in terrestrial, freshwater, coasts and ocean. It was established in 2009, by responding to GEO BON which is currently a Flagship of GEO Work Programme. The core purpose of APBON is to facilitate the organization of and periodically convene a regional network of biodiversity observation institutions to maintain a knowledge base that will support biodiversity conservation. We also promote citizen scientists, e.g., Monitoring Sites 1000 project (Japan) and species monitoring (Republic of Korea). We have organized 10 APBON workshops and 11 GEOSS-AP symposiums since the early stage of the establishment of GEO with contributors from 18 countries/areas. Now our networks and partners include national BONs (JBON, KBON, SinoBON, etc.), ILTER-EAP, AsiaFlux, GBIF, ABCDNet, IUCN, Future Earth, The Regional Clearing House Mechanism of the ASEAN Centre for Biodiversity, and so on. We have already published three books which were described APBON concept, activities, and achievement (2012, 2014, 2016, from Springer). We contributed to CBD COPs by organizing a pre-symposium and side-events, and also to IPBES Asia Pacific regional assessments, and capacity building workshop for young scientists and officials involved in biodiversity conservation activities. APBON will continue to promote broadening networking and contribution to making policies and actions towards realizing the SDGs through interdisciplinary coordination, capacity building, long-term in situ observations, large coverage high resolution observation technology in the context of an operational data sharing culture.

**Task 3: GEO Carbon and GHG Initiative (GEO-C)**

Leads:
Nobuko Saigusa (Japan) n.saigusa@nies.go.jp

Summary:

The aim of the GEO Carbon and greenhouse gasses (GHG) Initiative (GEO-C) is to facilitate cooperation to develop a coordinated system of domain overarching observations for monitoring and evaluating changes in the carbon and other cycles, and GHG emissions as they relate to human activities and global change, and to provide decision makers with timely and reliable policy-relevant information. Asia, as one of the world's largest GHG emitters, has a responsibility to play an important role to turn the

goals of Paris Agreement into reality. Urgent needs are to harmonize the increasing number of platforms for monitoring GHGs in Asia–Oceania, and to reduce their source/sink estimation uncertainties.

The proposed tasks are:

Task 1 – User needs and policy interface: to engage with users and policy makers and ensure the consistency with their evolving needs, to drive the activities of the GEO Carbon and GHG Initiative and address the policy agenda.

Task 2 – Data access and availability: to provide long-term, high quality and open access near-real-time data and data products, complying with the GEOSS principles, from a domain-overarching carbon cycle and GHGs monitoring system.

Task 3 – Optimization of observational networks: to develop and implement on an ongoing basis, a procedure for achieving observations of identified essential carbon cycle variables within user-defined specifications and at minimum total cost.

Task 4 – Budget calculations and breakdown across scales to inform policy implementation: to develop consistent budgets of GHGs (CO2, CH4, and N2O) from local/urban to global scales using a combination of observations, inventories, models and data assimilation techniques.

**Task 4: Oceans, Coasts, and Islands (OCI)**

Leads:
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Dr Aidy Muslim (Universiti Malaysia Terengganu, Malaysia) aidy888@gmail.com
Dr Danling Tang (SCSIO, China) lingzistdl@126.com Summary:

Summary:

Ocean Coast and Islands (OCI) recognises the considerable and shared coastal development and climate challenges faced by many nations in Asia, as well as the particular needs of small island nations in the Indo-Pacific region. Thus, OCI seeks to:

1. provide a regional mechanism to advance and exploit synergies among the many observational programmes devoted to islands, coasts and oceans of the Asia-Oceania region;
2. articulate regional user needs from Earth Observations and raise awareness of the societal benefits of ocean observation;
3. seek to address gaps in user needs in the Asia-Oceania region to evolve a comprehensive and integrated observation data or inventory system for the region;
4. continue development of, and cooperation for, a data inventory system, and facilitate sharing of data, tools and products, and
5. link with other GEO (e.g. Blue Planet) and other (e.g. UNESCAP, WESTPAC IOC, IODE) Initiatives to develop regional data hub and coordinate regional activities and integrated products.

In the new work plan OCI will:

1. Promote better access to marine data through interoperability of data such as catalogs of state owned-data; standardisation of in situ and satellite data through the development and application of standards including ARD, that provide confidence and consistency, and better validate satellite based marine and coastal product by applying in situ observation for calibration, validation and algorithm processing.
2. Continue to build upon its user-engagement activities with Oceania states provide capacity building and the promotion of spatial literacy, develop regionally appropriate best-practice EO methods and products that are useful to these communities in addressing climate, environment and livelihood issues. OCI will work with other AOGEO Task groups and initiatives to coordinate these activities.
3. For the Mekong Basin case study OCI will focus on the Mekong Delta and coastal bay to: (a) develop algorithms for the retrieval of water quality parameters (b) understand how changes in Mekong discharge and landuse activities have affected coastal geomorphology, water quality and fisheries productivity.
4. Training workshop at the 2nd AOGEO Workshop (Jakarta, April 2019) on coastal applications.
5. Applications for joint funding to resource OCI activities

**Task 5: Agriculture and Food Security (AsiaRiCE)**

Leads:

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Thuy Le Toan (Centre d'Etudes Spatiales de la Biosphère, France) thuy.letoan@cesbio.cnes.fr
Summary:

The Task Group (TG) 5 particularly addresses SDG 2 ("End hunger, achieve food security and improved nutrition and promote sustainable agriculture"), SDG 1 ("End poverty in all its forms everywhere"), and SDG 13 ("Take urgent action to combat climate change and its impacts") and indirectly SDG 10 ("Reduce inequality within and among countries") and SDG 15 ("Protect, restore and promote sustainable use of terrestrial ecosystems") by using Asia-RiCE accomplishment since Asia-RiCE is composed of national teams that are actively contributing to the Crop Monitor for AMIS and developing technical demonstrations of rice crop monitoring activities using both Synthetic Aperture Radar (SAR) data and optical imagery in Asia.

Realizing that earth observation at the global/regional/local scale is one of the key factors to address the above issues, several groups have been involved in the satellite and ground-level observations with a collection of statistical information and trying to apply such data to agricultural models for crop yield forecast and assessment of crop damage.

In TG5, participants representing different observation platforms and decision-support systems will discuss the present status and perspectives of multi-platform observations for sustainable food production. TG5 will focus on the use of wide range of observations in different domains such as water management, biodiversity and forest management. The outputs in TG5 will be reflected to the GEO GLAM (Global Agriculture Monitoring) project for G20 action plan, especially Asia-RiCE activity in GEO GLAM and other international projects such as FAO and ASEAN Food Security Information System (AFSIS).

**Task 6: Drought monitoring and Evaluation**
Leads:
Name (Country) email
Summary:

**Task 7: Environmental Monitoring and Protection (EMP)**
Leads:
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Xingfa GU(China) guxf@aircas.ac.cn
Summary:

Task 7 inherits the previous AOGEOSS implementation plan in the past term. Ecosystem degradation and environmental pollution are challenge issues due to the rapid urbanization and economic development in Asia-Oceania region. This task is set up to improve the regional cooperation to monitor the terrestrial ecosystem status and atmosphere environmental qualities, and to provide decision-making support knowledge for human being health and environmental protection. It is also actively promoted cooperation with other global, regional, and national organizations to participate in GEO for environment monitoring and protection.

Task 7 EMP aims to:

1. Advocate for the Open Analysis Ready Data, by integrating multiple EO data to generate the common products for environmental monitoring and protection;
2. Promote the cooperation for land use, ecosystem status, and air quality monitoring and assessment;
3. Provide the decision-making knowledge for human being health and environmental protection in AO region;
4. Release the Annual Report for the environmental monitoring to support the GEO proprieties, including the SDGs and Paris Agreement;
5. Provide data sets and training courses for the Integrated Priority Studies.

In the new work plan EMP will focus on:

1. The long-time series quantitative remote sensing product generation, validation, and sharing,
2. Demonstration applications include the Land Degradation, the Forest Cover and Forest Fire Impact, Ecosystem status and eco-service Function, Atmosphere Environmental Quality and human being healthy;

3. Release the Annual Report for environmental monitoring and assessment to provide decision-making support knowledge for human being heathy and environmental protection.

**Task 8: Disaster Resilience (DR)**

Leads:
Suju Li (China) lisuju@ndrcc.gov.cn
TBA (Japan)?
Rob Deakin (New Zealand) rdeakin@linz.govt.nz

Summary:

Asia Oceania is the region most exposed, prone and impacted by natural disaster hence AOGEO's need for a Disaster Resilience (DR) task. DR seeks to:

1. Improve availability of Earth Observation for natural disasters
2. Support the use of Earth Observation to address the Sendai Framework.
3. Strengthen links with International Charter Space and Major Disasters.
4. Provide training and a focal point for natural disasters focused Earth Observation in Asia Oceania

In the new work plan DR will:

1. Provide Earth Observations and emergency mapping assistance to natural disasters in Asia Oceania
2. Improve Earth Observation's contribution to disaster resilience through extending AO International Disaster Charter Calls from AOGEO members into the prevention and recovery phase
3. Advocate for and develop Analysis Ready Data standards, pipelines and public hubs for common disaster Earth Observation data types
4. Improve connections between the Earth Observation and post disaster lesson learning research community
5. Share lessons and experiences between countries on using earth observations for disaster related indicator monitoring particularly related to the Sendai framework
6. Capacity building of Earth Observation tools for DRR within Asia Oceania

**Task 9: Himalayan GEOSS**

Leads:
Birendra Bajracharya (Nepal) Birendra.bajracharya@icimod.org
Basanta Shrestha (Nepal) Basanta.shrestha@icimod.org

Summary:

This task builds on the previous Himalayan GEOSS community activity focusing on the Hindu Kush Himalaya (HKH) mountain region. With a geographic scope in the HKH countries, this Task will address the gaps in EO applications in the field of Agriculture and food security, Water resources, snow and glacier, Disaster risk reduction, Land use, land cover change and Ecosystem services. Financial and in kind resources will be leveraged through on-going initiatives like SERVIR and other regional and country programs. Capacity building and fostering regional cooperation are other strategic focus areas of the Task.

Partnerships with the space agencies in the regional countries will help in building synergies and building capacities across the region. In the past, initiatives such as GFOI and GEOGLOWS have leveraged experiences and resources from SERVIR-HKH hosted at ICIMOD.

The work plan for Himalayan GEOSS will be targeted to:

1. Extending institutional participation from the region
2. Design pilot projects the priority areas listed above to demonstrate application of EO data
3. Develop regional online platform to connect existing platforms and facilitate data sharing and building regional level EO data access and processing.
4. Design and implement training and knowledge sharing activities to enhance capacity and promote use of EO information
5. Collaborate with other thematic initiatives of GEO to address mountain specific needs and gaps

**Task 10: Data Sharing**

Leads:
Li Guoqing (China) ligq@aircas.ac.cn
David Hudson (Australia) david.hudson@ga.gov.au

Summary:

Data Sharing Task Group inherits the previous AOGEO implementation plan of in the past term. It is set up to improve regional EO data cooperation in Asia-Oceania area. Geospatial data are the fundamental resource for the e-infrastructure of this regional ecosystem, social-economic, environment, sustainable development, climate change and disaster mitigation. It is also actively promoted Geospatial data service cooperating on with other global, regional, and national and international organizations and mechanisms and participated in GEO as a regional GEOSS data platform.

Data Sharing (DS) recognises the maturity path Earth observations move through before it becomes Open Analysis Ready Data and aims to:

1. support data providers who are maturing their Earth observations towards Open Analysis Ready Data
2. advocate for Open Analysis Ready Data
3. provide training, materials, examples and support for tools which aid the provision of Open Analysis Ready Data such as the AOGEO preferred standardised open licence the Creative Commons Attribution International 4.0 or CC-BY licence
4. support the data requirements of our region and particularly the Integrated Priority Studies

In the new work plan DS will:

1. engage with AO data providers and advocate for Open Analysis Ready Data
2. update the GEO community on the state of Open Analysis Ready Data in Asia Oceania
3. marshal resources to support data providers who wish to provide Open Analysis Ready Data

**Task 11: Data Hub and Cubes**

Simon Oliver (Australia) simon.oliver@ga.gov.au
Xiang Zhou (China) zhouxiang@radi.ac.cn
Japan(TBD)Summary:

Data Hubs and Cubes (DHC) recognises the critical role of data platforms in enabling access to Earth observations and the importance of local system development to ensure national capacity is sustainable. Thus, DHC seeks to:

1. provide a regional mechanism to advance and exploit synergies among the many data platforms of the Asia-Oceania region including ODC, Spectrum Earth and DIAS;
2. articulate regional user needs from Earth Observations and raise awareness of the societal benefits of shared data platforms;
3. seek to address gaps in user needs in the Asia-Oceania region by developing a hub of Analysis Ready Data in an open commercial cloud environment, the Asia Oceania Data Hub;
4. continue development and sharing knowledge between local, national and regional ODC deployments, and
5. link with other GEO (e.g. GEOSS) and other (e.g. CODATA, WDS, International Charter, Sentinel Asia) Initiatives working to increase the sharing of Earth observations through open platforms such as hubs and cubes.

In the new work plan DHC will:

1. increase the development of Analysis Ready Data in our region through increased uptake of CARD4L from data providers in Asia Oceania and development of new ARD standards for SAR, Oceans and coasts
2. establish broadAsia-Oceania Data Hub ncluding roll out of ARD for Landsat and Sentinel in the region, establishment of regional governance and membership model and include ARD data from AO data providers
3. build data platform capacity in our region through running greater than three training courses each year and developing of greater self-service materials (Webinars, wikis, forum)
4. develop of products to aid reporting of GEO's three priority engagements
5. further cooperate with ODC, Spectrum Earth and DIAS
6. explore operational deployments of ODC for AOGEO's Integrated Priority Studies
7. ensure that all activities and data it discovers can be accessed via the global GEOSS

**Task 12: User Engagement and Communication**

Leads:
Name (Country) email
Summary: