

Terms of Reference (TOR)

ASEAN Weather Modification Centre (AWMC)

1. Background

On 24 April 2019, the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) through its press release revealed more dry years ahead for Southeast Asia. Future drought scenarios in many parts of Southeast Asia are expected to become more frequent and intense unless immediate actions are taken to build resilience to the scenario.

Weather modification is a method to enhance precipitation in drought areas. Additionally, weather modification is growing beyond its general use and is beginning to be incorporated into other disaster response efforts. It helps mitigate adverse effects caused by severe droughts or devastating forest fire.

The Department of Royal Rainmaking and Agricultural Aviation (DRRAA), Thailand, had organized the ASEAN Workshop on Weather Modification in 2018, followed by a Training on Understanding of Cloud Nature and Weather Modification for Water Resources Management in ASEAN in 2019 under the ASEAN SCMG framework. The workshop aimed to share experiences of ASEAN Member States (AMS), especially in weather modification technology, by promoting active cooperation and mutual support in research and development. The workshop explored strategies to develop effective rainmaking programmes for sustainable management of water resources in the region. Representatives from the China Meteorological Administration (CMA), the Korean Meteorological Administration (KMA), and the World Meteorological Organization (WMO) were also present during the 2018 workshop.

As agreed at the 41st Meeting of the ASEAN SCMG on 6 to 8 October 2019, in Singapore, Thailand has been requested to submit a full concept note for the establishment of the ASEAN Weather Modification Centre (AWMC). The AWMC is expected to improve the capacity building of AMS personnel in the field of weather modification through workshops, training, joint research activities, and field studies. As such, the Term of Reference of AWMC has been drafted with collaboration of Indonesia, Malaysia, the Philippines, and Thailand.

2. Goal

The ASEAN Weather Modification Centre is a regional platform to accelerate the improvement of weather modification technology and the integration of innovative techniques for atmospheric water management. This is intended to mitigate droughts and other water-security-related disasters in order to ensure well-being of ASEAN in a sustainable manner.

3. Objectives

- 3.1 To promote the exchange of scientific information and Standard Operating Procedures (SOPs) on weather modification among participating Member States.
- 3.2 To facilitate collaborative research and development of weather modification techniques, emerging technologies, and best standard practices through the use of combined resources, expertise and experiences among participating Member States.
- 3.3 To enhance AMS weather modification personnel capacity building via transfer of knowledge and experience from relatively more advanced Member States.

4. Scope of Responsibilities

- 4.1 The exchange and sharing of knowledge about weather modification technology
 - 4.1.1 Identify necessary information and data related to weather modification for sharing among participating Member States.
 - 4.1.2 Circulate information on weather modification and other relevant documents or scientific data among the participating Member States. Any confidential information, document, or data received as part of AWMC shall not be disclosed or distributed to any third party, except to the extent authorized in writing by the respective providing participating Member State.
 - 4.1.3 Develop a website as an accessible centralized knowledge database based upon user requirements as agreed by the participating Member States and relevant parties.
 - 4.1.4 Raise public awareness on weather modification and its role in ensuring water security and forest-fire-driven haze reduction.
- 4.2 Research and Development of Weather Modification Technology
 - 4.2.1 Plan weather modification research and development activities in compliance with laws, regulations, and policies of participating Member States, notwithstanding regional and international regulations and laws.
 - 4.2.2 Study, research, and improve existing weather modification technology, as well as develop innovative weather modification techniques applicable to the regional topography/condition of participating Member States.
- 4.3 Capability enhancement and knowledge transfer
 - 4.3.1 Arrange field study, training, seminar, workshop, hands-on practice, and/or academic lecture to improve personnel capability and share best standard practices in weather modification operation.
 - 4.3.2 Design academic curriculum and support the establishment of an educational venue to consolidate the collective body of knowledge, expertise, and experiences in weather modification from participating Member States.

5. Key Structure

5.1 Status

The AWMC is a voluntary cooperation platform with regard to on knowledge sharing of weather modification in ASEAN under ASEAN SCMG. It does not, and is not intended to, create any legally binding rights or obligations on the participating Member States.

5.2 Composition

The AWMC comprises of the Chairman, Vice-Chairman, Secretariat, and participating Member States.

5.2.1 Membership and its responsibilities

5.2.1.1 The Members of the ASEAN Weather Modification Centre are ASEAN Member States, on a voluntary basis.

5.2.1.2 The World Meteorological Organization, other International Organizations, Countries and Entities may join as cooperating partners or collaborators in order to contribute technical expertise and support. They may also participate as an observer to the AWMC upon request of AMS, according to ASEAN Standard Practices.

5.2.1.3 Each participating Member State of the AWMC will designate a focal point who will be in charge of facilitating the information sharing and official communication. Additionally, the AWMC should meet as deemed appropriate, or when necessary, to discuss impending challenges and follow-up activities.

5.2.2 Chairmanship and its responsibilities

5.2.2.1 The Chairmanship of the AWMC will operate on the basis of rotation and have a two-year term.

5.2.2.2 The rotation of the chairmanship will follow the alphabetical order and have consensus among participating Member States.

5.2.2.3 The appointment of Chairmanship from the participating Member States is under the prerogative of the respective participating Member States.

5.2.2.4 The Chairperson shall:

- 1) Provide leadership and guidance;
- 2) Chair the AWMC meetings and other relevant meetings;
- 3) Appoint Vice-Chairperson with consensus from participating Member States;
- 4) Maintain regular communications and enhance links with National AWMC focal persons, ASEAN Secretariat, other sectoral bodies, and counterparts in participating countries;
- 5) Plan and coordinate all activities required for convening of meetings, in coordination with the host country and AWMC Secretariat. These activities include the following:
- 6) Preparation of agenda and its annotations, such as information papers on policy issues and other related documents for discussion during the meeting;
- 7) Issuance of meeting announcement and invitation letters;
- 8) Preparations of draft reports of the meeting for adoption;
- 9) Represent the AWMC, where and when deemed necessary, at meetings of ASEAN SCMG or relevant forum;
- 10) Submit an annual report to the ASEAN SCMG;

11) At the end of chairperson's term, prepare the handover report and hand over the chairmanship to the new chairperson;

5.2.3 Secretariat

The Department of Royal Rainmaking and Agricultural Aviation, Thailand, offers to serve as the Secretariat with the following duties:

5.2.3.1 Provide AWMC with an office;

5.2.3.2 Host online platforms;

5.2.3.3 Coordinate communication and information sharing based upon confidentiality clauses agreed upon by consensus among participating Member States;

5.2.3.4 Bring relevant issues to the attention of AWMC;

5.2.3.5 Provide the necessary secretarial support, i.e., conduct meetings, develop an annual work plan, and draft an annual budget for AWMC approval.

6. Modalities

6.1 Decision Making

6.1.1 The AWMC decisions shall be based upon consultation and consensus among participating Member States.

6.1.2 In the situation of being unable to proceed with the meeting due to unforeseen circumstances, the AWMC decisions may also be made on an ad referendum basis via other suitable medium of communications.

6.1.3 Any inter-sessional decisions received from ASEAN Secretariat shall be confirmed by the chairperson of AWMC prior to addressing all National AWMC focal persons.

6.2 Meetings

The AWMC shall have one (1) meeting in a year and the meeting shall be organised as follows:

6.2.1 The AWMC meeting shall deliberate on issues requiring decisions and/or guidance. However, matters relating to policy and finance will need to be endorsed by the respective internal agency of the respective participating Member States. To facilitate discussion of these issues, the chairperson or his/her designated representative is required to be present in the particular AWMC meeting.

6.2.2 The AWMC shall plan ahead the schedule of its meetings.

6.2.3 The AWMC may consider the use of tele-conferencing or video conferencing to conduct the meetings, if necessary.

6.2.4 The AWMC may conduct special meetings/retreats to discuss issues requiring additional/urgent intervention.

6.2.5 All participating Member States of AWMC should be represented. Representatives of AWMC should have the appropriate mandate to make

decisions, subject to clause 6.2.1. In the event where a representative of any participating Member States is unable to travel and be present at the meetings in person, then

6.2.5.1 Comments on documents for discussion at the meeting are to be submitted and circulated prior to the meetings, at least two (2) weeks in advance;

6.2.5.2 Participation may be conducted through teleconferencing or videoconferencing;

6.2.5.3 The summary record of outcomes of the meeting are to be adopted on an ad referendum basis.

7. Main Key Outputs of the Centre

The AWMC will develop its work programme to achieve the designated outcomes as follows:

7.1 Platform to disseminate Information and Technology

7.1.1 Setting up and maintaining a digital interactive platform for sharing information, knowledge and best standard practices

7.1.2 Developing guideline on sharing, access to and usage of AWMC-related information

7.1.3 Disseminating related information and best standard practices on weather modification among AWMC subject to confidentiality requirements of relevant AWMC Member State

7.1.4 Building a collaboration network between the respective public sectors, private entities and communities.

7.2 Research papers and best standard practices

7.2.1 Developing and implementing collaborative projects

7.2.2 Evaluating project and report writing

7.2.3 Adopting new techniques to improve weather services at AMS

7.3 Capacity building

7.3.1 Monitoring capacity building initiatives for AWMC personnel to identify required capacity, gaps and obstacles to combat drought and natural disasters

7.3.2 Developing programme (training course/workshop/academic activities) to increase the proficiency and efficiency of weather modification personnel

7.3.3 Provision of technical and operational advice to enhance capacity-building efforts

7.3.4 Supporting implemented programs through mobilization of resources (financial, technical, and human resources), inclusive of technical and assistance provision.

8. Funding

The funding for AWMC activities could be achieved via:

8.1 Internal Sources

8.1.1 Any participating Member States proposing to host the activities shall allocate its budget for domestic expenditures, while other participating Member States will bear the cost of international expenditures, if agreed; or

8.1.2 Participating Member States can share the expenditures to organize the activities, if agreed.

8.2 External Sources

8.2.1 AWMC to coordinate with Third Parties and other International Organizations and Donors, subject to support/agreement of ASEAN and ASEAN SCMG.

8.2.2 AWMC to submit budget requirement to the Committee on Science, Technology, and Innovation (COSTI) with the support of ASEAN SCMG.

9. General Provision

9.1 Validity

This Terms of Reference will come into effect on the date it is endorsed by the Committee on Science and Technology, and Innovation (COSTI).

9.2 Amendments

The TOR may be amended by AWMC as deemed necessary, subject to approval of ASEAN SCMG. However, the amended TOR must be endorsed by the participating Member States before coming into effect.

9.3 Interpretation

Interpretation of the TOR, which cannot be resolved within the AWMC shall be referred to ASEAN SCMG.

**Concept Note on the Establishment of the ASEAN Weather Modification Centre (AWMC)
under the ASEAN Sub-Committee on Meteorology and Geophysics
(ASEAN SCMG)**

1. Rationale

Based on impending climate change situations, international organizations in the know-how have been lending their support towards achieving water security. In 2003, the UN had pointed an interagency mechanism on water security as in the Millennium Development Goals (MDG), in which the UN had forged a common approach to provide substantive and coherent assistance for water security projects in terms of regional and country level reach. Continually in 2016, the UN had then placed a goal explicitly related to integrated water resources management through transboundary cooperation by 2030, under the pretext of Sustainable Development Goals (SDG).

UN ESCAP revealed on the 24 April 2019 that more dry years have been projected for South-East Asia. Future scenarios of drought in many parts of South-East Asia may become even more frequent and intense if mitigative actions are not taken now to build resilience. This is in accordance of the latest joint study conducted by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) and the Association of Southeast Asian Nations (ASEAN).

Weather modification is an important approach that can be undertaken to augment precipitation over the dry areas and to also disperse haze and smog at locations severely affected by the drought or the burning of forest. In 2018, the Department of Royal Rainmaking and Agricultural Aviation (DRRAA), Thailand, organized the ASEAN Workshop on Weather Modification under the ASEAN SCMG framework aiming at sharing experiences of ASEAN Member States in cloud seeding, promotion of active collaboration and mutual assistance in research and developing weather modification technology, and exploring strategies for overcoming constraints towards an effective rainmaking programme, therefore resulting in sustainable water resources management in the region. Invited resource persons from China Meteorological Administration (CMA), Korea Meteorological Administration (KMA) and World Meteorological Organization (WMO) were also in attendance.

In 2019, as a further step to the 2018 workshop, the Training on Understanding of Cloud Nature and Weather Modification for Water Resources Management in ASEAN was organized to enhance weather modification related expertise of participants, transfer and exchange of knowledge on weather modification, as well as to promote collaboration in research and development of weather modification technology relating to sustainable water resources management in the region.

As agreed in the 41st Meeting of the ASEAN SCMG held during 6 - 8 October 2019 in Singapore, to put such a collaboration on the ASEAN platform, the ASEAN Weather Modification Centre (AWMC) would be established to collaborate among ASEAN Member States (AMS) in order to build up the expertise of related personnel through workshops, trainings, joint research activities and study visits. The overall goal of this AWMC initiative is to increase precipitation under extremely dry conditions due to climate change and to combat the issue of air pollution and regional haze.

2. Objectives

- 2.1 To share information and technology on weather modification among member states;
- 2.2 Exchange of weather modification experience, specialists, research activities;
- 2.3 To pull together resources and man power for joint projects (comply with existing laws, regulations and policies of member states);
- 2.4 To seek for technical assistance to support weather modification projects;
- 2.5 To provide standard and operating procedures on weather modification to members.

3. Partners of AWMC

The AWMC will comprise the AMS, namely Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam. The World Meteorological Organization, and other International Organizations, Countries and Entitles can be cooperating partners or collaborators to provide support and technical assistance. They may also participate as an observer to the AWMC upon request of AMS according to ASEAN Standard Practices.

4. Work Scope of AWMC

4.1 The AWMC will be a voluntary operational framework of cooperation on weather modification with the following guiding principles:

- 1) The AWMC will be an operational framework for cooperation on weather modification, and not an operational instrument, which will have due legal implications.
- 2) The AWMC should not be a legally binding instrument.
- 3) The AWMC should not be mandated as an enforcement instrument.
- 4) The AWMC will function as a communication platform for cooperation and capacity building, and sharing of information and technology on weather modification.
- 5) The AWMC will provide support towards strengthening the capacity of some AMS that are establishing National efforts to perform weather modification.

4.2 To accomplish the objectives of the AWMC, the following works may be covered:

- 1) Each country member of the AWMC will designate a focal point who will be in charge of facilitating information sharing and exchange. Additionally, the AWMC should meet as deemed appropriate or as when necessary to discuss impending challenges and follow-up activities.
- 2) The AWMC should set up a framework for the criterion and organization of its activities. If requested by Members, case-specific assistance may be provided to them, which may come in the form of technical support, operational support and advice, etc.

- 3) The AWMC will support a wider network including internal agencies of the AWMC countries to further enhance their weather modification performance capacity.

5. Funding for activity implementation

- 5.1 ASEAN Secretariat and AMS will coordinate with the Third Parties and other International Organizations and Donors, such as WMO, to support AWMC activity implementations.
- 5.2 AMS hosting the activities, such as workshop, training, etc., will allocate its budget for domestic expenditures, while others will bear the cost of international expenditures, if agreed; or
- 5.3 AMS share the expenditures to organize the activities, if agreed.

6. Endorsement of the establishment and implementation

The establishment and the actions of the AWMC should be agreed upon by the ASEAN SCMG and will be conducted in accordance with the protocol of ASEAN. The establishment of the AWMC will be endorsed by the Committee on Science, Technology and Innovation (COSTI) and report to the ASEAN Ministerial Meeting on Science, Technology, and Innovation (AMMSTI). However, COSTI may wish to adopt the concept note as to establish the AWMC and request ASEAN SCMG to work with the ASEAN Secretariat to develop the Terms of Reference and Rules of Procedures, including the Cooperation Framework of the AWMC.