

**PROGRESS ACTIVITY REPORT OF THE
SEVENTEENTH SESSION OF THE COMMISSION FOR
AGRICULTURAL METEOROLOGY (CAgM-17)**

(unedited and in official WMO languages when available)



MATERIAL ARRANGEMENTS FOR THE SESSION

Venue

At the kind invitation of the Government of the Republic of Korea, the seventeenth session of the Commission for Agricultural Meteorology (CAGM-17) will be held at the Songdo Convensia, in Incheon, Republic of Korea from 18 to 20 April 2018. The opening ceremony will take place at 9.30 a.m. on 18 April at the Songdo Convensia (website: <http://www.songdoconvensia.com>).

The Women's AgroMeteorology Leadership Workshop will be held at the same venue from 14 to 15 April and the Technical Conference (TECO) from 16 to 17 April 2018.

Working languages

During the session, simultaneous interpretation in the six WMO official languages (Arabic, Chinese, English, French, Russian and Spanish) will be provided in the main conference room. Additional meeting rooms without interpretation facilities will also be available.

The Technical Conference meeting will be in English only.

Documents

Delegations wishing to submit documents before the session are invited to send them to the WMO Secretariat, as soon as possible but not later than 60 days before the opening of the session, in accordance with the provisions of Regulation 190(b) of the WMO General Regulations to allow time for translation. According to Regulation 189 of the WMO General Regulations, session documents should be distributed as soon as possible and preferably not later than 45 days before the opening of the session. Any document presented by a delegation should be submitted in the name of the Member of the Organization and not by an individual person.

Processes and documents workflow

The presentation of session documents and organization of the work of the session will differ this year from the practice of previous sessions, as explained at the [CAGM-17 website](#). (See [Document INF 1\(2\)](#)).

Distribution of documents

Documents will be posted before and during the session on the session website, in line with WMO greening efforts to promote paper-smart meetings. Therefore, participants are kindly invited to bring internet-enabled portable computers capable of handling Microsoft Word 2010 and Adobe PDF formats so that they can work in paper-smart mode during the session.

Provisional abridged report

Approved documents showing amendments in all languages will be posted as soon as possible after the session on the CAGM-17 website in the folder "[Provisional Report](#)".

Registration of participants

Online pre-registration is required for all participants to the CAGM-17. In view of their official status with WMO, Permanent Representatives of WMO Members (PRs) have been given access to an [online Event Registration System](#) allowing the pre-registration of their respective delegations.

More information concerning online pre-registration will be provided in due course on the CAGM-17 session web site (<http://meetings.wmo.int/CAGM-17>).

A conference information and registration desk will be set up close to the meeting rooms to facilitate the registration of participants and provision of general information.

Registration for the TECO and seventeenth session of the Commission for Agricultural Meteorology (CAGM-17) will take place at the conference information and registration desk at the Songdo Convensia and start on 15 April 2018, from 4 to 6 p.m. It will continue throughout the TECO and the session. At the time of registration, participants will receive identification badges, which should be worn throughout the session.

Credentials

Pursuant to Regulation 21 of the General Regulations, prior to a session of a constituent body other than the Executive Council, each Member should, if possible, communicate to the Secretary-General the names of the persons composing the delegation to that body, indicating which of these shall be regarded as its principal delegate. In addition, a letter giving these particulars and signed by, or on behalf of, an appropriate governmental authority of the Member shall be sent to the Secretary-General or handed to his representative at the session. This letter shall be regarded as appropriate credentials for the participation of the individuals named therein in all activities of the constituent body.

Representatives of international organizations invited as observers to the session should provide in advance, or bring to the session, a letter of representation signed by the appropriate authority from their organization.

List of participants

A provisional list of participants will be uploaded on the session website shortly after the beginning of the meeting. This list will be updated on a daily basis.

Videoconference facilities

A videoconference connection will be set up, if possible, between the main meeting room and WMO headquarters in Geneva.

Internet facilities

Wireless Internet connection will be available in the main conference room and at the venue.

Entry requirements

All participants requiring a visa to enter the Republic of Korea should make their visa applications directly to the nearest embassy or consulate of the Republic of Korea, submitting invitation letters issued, if necessary, by the Local Organizing Committee, together with other required documents. Holders of Diplomatic, Service, Official or specified passports from some countries may not require a visa by virtue of bilateral agreements.

Unless coming from one of the visa-exempt countries, all participants requiring a visa to enter the Republic of Korea should apply for their visa directly from the Embassy or Consulate-General of the Republic of Korea in their country, or a designated country in cases where no Korean Embassy or Consulate is available in their own country. Diplomatic and service visas and entry permits, where required, shall be granted free of charge and as speedily as possible to the participants for their effective participation throughout the duration of the meetings, provided the application for the visa is made sufficiently in advance before the beginning of the session.

More detailed information on Immigration Facilities in different countries is available on the Ministry of Foreign Affairs of the Republic of Korea webpage: <http://www.mofa.go.kr/indexen.html>.

If a letter of invitation is necessary for visa application, please send the information page of your passport to the local organizing committee (LOC), **before 16 March 2018**.

Local organizing committee

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Transportation

Participants are recommended to arrive at the [Incheon International Airport \(ICN\)](#), where major companies operate daily flights as destination.

Currency

Currency exchange services are available at Incheon International Airport as well as in all banks (opening hours are 9 a.m. to 4 p.m.). The local currency is the won (KRW).

The average exchange rate in KRW is as follows:

1 Euro = 1 292 KRW

1 USD = 1 110 KRW

1 CHF = 1 110 KRW

Health requirements/medical services

Up-to-date information on international travel and health requirements are provided by the World Health Organization (WHO) at the following websites: <http://www.who.int/ith/en/>
<http://www.who.int/countries/kor/en/>

It is suggested that you take out personal medical insurance for the duration of the trip.

Electricity and mobile phone connection

Power systems are generally 220 volts and 60 Hz. An adaptor may be necessary.

SIM cards for mobile phones are available. For more details, please visit the websites of the local mobile phone operators, or contact your local service operator.

Local climate in April

Climate data during April in Incheon are listed below:

Mean temperature	20°C
Mean maximum temperature	16°C
Mean minimum temperature	12°C
Mean relative humidity	66%
Mean precipitation	60mm
Mean number of days with precipitation ≥ 1 mm	7 days
Mean duration of sunshine	7.3 h/day

Hotel reservation

A list of recommended hotels with corporate rates is provided in the Appendix. Participants should make their reservation directly to the provided e-mail addresses or URL (for reservation), and need to use CAGM-17 meeting as a reference.

Information and contact details of the local organizing committee (LOC)

For any further information please contact the LOC at the following address:

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**APPENDIX
LIST OF RECOMMENDED HOTELS**

Name of the Hotel	Room Type	Rates per night	Distance from Venue	Website and contact information
Oakwood Premier Hotel	Studio Room	KRW 159,720	Approx: 0.38km (3mins on foot)	Phone: +82 32 726 2001 Web: www.oakwoodpremier.co.kr E-mail: reservations.incheon@oakwoodpremier.co.kr
Sheraton Grand Incheon Hotel	Deluxe Room	KRW 159,720	Approx: 0.05km (1mins on foot)	Phone: +82 32 835 1000 Web: www.sheratongrandincheon.com E-mail: reservation.incheon@sheraton.com
Orakai Songdo Park Hotel	Deluxe Room	KRW 121,000	Approx: 0.57km (6mins on foot)	Phone: +82 32 210 7000 Web: www.orakaihotels.com E-mail: rsvn@orakaihotels.com
Holiday Inn Incheon Songdo	Superior Room	KRW 121,000	Approx: 1.6km (5mins by hotel shuttle bus)	Phone: +82 32 250 0000 Web: www.ihg.com E-mail: reservation.songdo@ihg.com
The Central Park Hotel Songdo	Deluxe Room	KRW 110,000	Approx: 0.93km (11mins on foot)	Phone: +82 32 310 5000 Web: www.centralparkhotel.co.kr E-mail: rsvn@cphotel.co.kr
RAMADA Songdo Hotel	Deluxe Room	KRW 95,260	Approx: 3.17km (8mins by taxi)	Phone: +82 32 832 2000 Web: www.ramada-songdo.co.kr E-mail: rsdfd@ramid.co.kr

For all hotels:

- 10% VAT and 10% service charge **included**
- Breakfast charge **not included**



DOCUMENT PROCESSING FOR THE SEVENTEENTH SESSION OF THE COMMISSION FOR AGRICULTURAL METEOROLOGY

Document types for the seventeenth session of the Commission for Agricultural Meteorology

- (1) The seventeenth session of the Commission for Agricultural Meteorology (CAGM-17) will use two types of documents:
 - **Doc.** (documents) whose contents are listed below; these will appear in the final report;
 - **INF.** (information) papers, which provide additional information relevant to the resolutions/decisions/recommendations adopted at the meeting; these will appear only in Part II of the report.
- (2) The first type of document (**Doc.**) will consist of up to three parts, and every document will contain at least one resolution and/or one decision and/or one recommendation:
 - (a) **Resolutions** (optional) are decisions of CAGM that concern only the internal activities of the Commission, such as actions to carry out its part of the strategic programme of the Organization, the establishment and terms of reference of a working group or the designation of a rapporteur, in line with General Regulation 182(b);
 - (b) **Decisions** (optional) place on record instructions/directives to the Management Group from CAGM, Congress or EC resolutions or decisions, or provide records of CAGM opinions/observations on a specific topic, procedural decisions and other decisions pertaining to the internal matters of CAGM, in line with General Regulation 182(c);

The decision justification is additional information that is essential to support the decision being made. This should be short and should refer, as far as possible, to pre-existing documents. This part of the document will appear in the final report immediately after the corresponding decision;
 - (c) **Recommendations to Congress or the Executive Council** (optional) are decisions of CAGM requiring financial support or implementation by Members, proposals for Secretariat action or requiring coordination with other WMO bodies or with bodies outside the Organization, in line with General Regulation 182(a).

Document processing

- (3) The first version (DRAFT 1) of documents will be published on the CAGM-17 website (meetings.wmo.int/CAGM-17/) and members of the Commission will be invited to send suggestions for improving the document to the Secretariat (cagm17.plenary@wmo.int).

These proposals will be assessed and the second draft (DRAFT 2) will be posted on the CAGM-17 website. These documents will be available in all six WMO official languages.

- (4) Information documents will be posted on the CAGM-17 website, but are not intended for amendment or discussion. These will normally be available in English only.
- (5) During the session, the chairperson for an agenda item will lead the discussion on the documents for that item. Within a document, each decision will be discussed separately. In many cases each component of that decision, such as related annexes, will be discussed individually. Following current practice, component parts of a document may be approved by the session while other components may still need additional debate. Documents amended during the session will be posted successively as DRAFT 2, DRAFT 3, and so forth, and the final approved version will be marked APPROVED.
- (6) Discussion of the document may end in two ways. The complete document may be approved, in which case any agreed changes to the document will be included and the approved version will be published on the [CAGM-17 website](#) in the PROVISIONAL REPORT folder. Alternatively, the chairperson of the session may decide that no further progress can be made with the document at that time, in which case changes to the document will be included in the next draft, and the modified document will be published on the CAGM-17 website in the DRAFTS FOR DISCUSSION folder. This will be published as the next draft in the sequence (DRAFT 2, DRAFT 3, and so forth), whereas the previous draft will be moved to the SESSION ARCHIVE folder.
- (7) Versions of documents created during the session will be available in English only, on the understanding that the revised texts will be read out clearly, with interpretation in all WMO official languages.

Post-session publication

- (8) Approved documents from the session will be translated into all six WMO official languages and placed on the CAGM-17 website in the PROVISIONAL REPORT (Approved documents) folder.
 - (9) The approved documents, the agenda and the list of participants will be combined to form the abridged report of the session, which will be edited and published in the six WMO official languages. A second part of the report, consisting of information documents will also be published, in English only.
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REPORT OF THE PRESIDENT OF THE COMMISSION

Summary of Activities in Agricultural Meteorology (2014-2018)

1. Activities of the Commission for Agricultural Meteorology

Focus Area 1 – Operational Agricultural Meteorology

1.1 CAGM experts developed a draft Handbook of Agrometeorology in the Livestock, Poultry and Inland Fisheries sector which was the focus of CAGM Expert Team 1.1 on Livestock, Poultry, and Inland Fisheries: Agromet Services and Products. The Handbook reviews current operational agricultural meteorological services, and the meteorological hazards and agrometeorological factors affecting livestock, poultry and fisheries and related pests and diseases.

1.2 The CAGM Expert Team 1.2 on Crops: Products and Services provided a report on which reviewed existing operational agricultural meteorological services for the crops sector and made a preliminary list of requirements for operational agricultural meteorological services for the cropping sector.

1.3 CAGM experts developed a draft Handbook on Fire Danger Ratings: Revisited which was the output of the CAGM Expert Team 1.3 on Forestry (Fire Weather, Fire danger rating): Agromet Services and Products. This Handbook reviewed the current status of wildland fire danger ratings by WMO region, summarized the impacts of wildland fires, reviewed the indicators of fire danger and provided guidance on the use and delivery of wildland fire danger ratings.

1.4 The CAGM Task Team on Publication of Case Studies prepared a draft publication on *Operational Agricultural Advisory Systems in the World* which has collected over 25 case studies from various countries. This will be published in 2018.

1.5 Experts from the [Joint JCOMM/CAGM Task Team on Weather, Climate and Fisheries](#) were able to complete a synthesis report on “Climate variability and fisheries: background, tools and information” that provides an overview on climate variability impacts on fisheries, the role of the Global Framework for Climate Services, and a policy brief on Climate, Oceanic and Fisheries Information. The Task Team also provided input to the Sixth Meeting of the Regional Fishery Body Secretariats’ Network hosted by FAO in June 2016. A [Proposal For WMO and Regional Fisheries Management Organizations \(RFMOs\)](#) was presented and discussed, which proposed a partnership between FAO and WMO on a number of issues including to explore the possibility of RFMOs informing their members about the advantages of reporting relevant marine meteorological and ocean observations to the various WMO observation and information systems. In addition, CAGM experts and WMO staff made presentations of these proposals to several RFMO meetings. CAGM and JCOMM experts and partners contributed to the [Global Conference on Climate Change Adaptation for Fisheries and Aquaculture](#) held in Thailand in August 2016 which produced a summary of the presentations and recommendations.

Focus Area 2 – Science and Technology for Agricultural Meteorology

1.6 CAGM experts from the Expert Team on WAMIS contributed to the maintenance of the [World Agrometeorological Information Services \(WAMIS\)](#) and developed the plans to redesign the website in 2018. Thematic pages on Drought Products from WMO Members, and food security links were added in 2017. A thematic page on Fire Danger Ratings from WMO members will be added in 2018. As of March 2018, there are agrometeorological products and bulletins from over 80 countries and organizations. In addition, WAMIS is now linked to the WIS Data Collection or Production Centres (DCPC) in the Republic of Korea.

1.7 CAGM experts from the Expert Team 2.2 on Data Issues in Agrometeorology: Observations and Integration have provided input to the various WIS and WIGOS activities. Experts reviewed and revised the agrometeorological sections (2.13) of the WIGOS Manual (WMO-No.1160) and provided input during the Inter Commission Group on WIGOS (ICG-WIGOS) with regards to the WAMIS DCPC (see Item 1.6) and other agrometeorological data issues.

1.8 With the financial support of the Korea Meteorological Administration, an [International Workshop on Agromet and GIS Applications for Agricultural Decision Making](#) was held in the Republic of Korea in December 2016. The first part of the workshop consisted of eight sessions including keynote speeches where scientists presented experiences and results of their research. The second session consisted of CAGM experts from the Task Team on Agromet and GIS Applications for Agricultural Decision Making and a tutorial where participants could learn basics of Quantum GIS for agricultural spatial analysis, the R programming language for statistical downscaling, and a model for dynamic downscaling. The International Workshop produced a tutorial on [Dynamical Downscaling, Statistical Downscaling, and QGIS for Agrometeorology](#) along with a [workshop report](#).

1.9 Experts from the [CAGM Task Team on Soil Moisture Measurements](#) and partners from the George Mason University provided guidance to the South African Agricultural Research Centre (ARC) in the installation of 20 soil moisture sensors at four depths (10, 20, 40, and 60 cm) at each of 18 locations in South Africa. The data were sent to George Mason University (GMU) and inputted into an online database which can be accessed online at <http://wamis.gmu.edu/soilmoisture/> and time series plots of soil moisture for each station can be created. Also, two locations were selected to as inter-comparison sites for several different types of soil moisture sensors. In addition, CAGM experts facilitated stakeholders meetings in South Africa where a soil moisture model developed by the University of KwaZulu-Natal was transferred to the ARC Institute of Soil, Climate, and Water. The first operational products from this model were created in December 2014 and these products have been added to the ARC Monthly Agroclimatic Bulletin ([Umlindi](#)) on an operational basis (see http://www.wamis.org/countries/southafrica/UMLINDI_201601_14.pdf). The funds for many of these activities were mainly provided by the Government of Norway. CAGM experts also provided guidance to several [Satellite Soil Moisture Validation and Application Workshops](#) held from 2014 to 2017.

1.10 Experts from the CAGM Task Team 2.3 on Agricultural Flux Measurements undertook an inventory of the main agricultural flux measurement sites. A significant proportion of the agricultural flux sites is not affiliated with a network and therefore the [Task Team prepared a poster](#) for the FLUXNET Workshop, which took place in June 7-9, 2017, at Berkeley, USA. They assembled a list of 281 sites measuring flux measurements on rainfed crops: corn, soybean, wheat, sugarcane, canola, rapeseed, sunflower, coffee bean, fava bean, barley, ryegrass, millet, hemp, chickpeas, peas, sorghum, pigeon pea, vegetables, and watermelon. There were sites in irrigated crops areas, forage areas and orchards as well and 145 turbulent flux sites. CAGM experts also participated in the [CAS/CAGM International Workshop on Atmospheric Chemistry and Agricultural Meteorology](#), that was held in Pune, India, in November 2015. One major recommendation from this workshop was to publish a joint CAS/CAGM guidance material on tropospheric ozone impacts on agricultural production

which will be completed in 2018. The workshop participants also agreed to explore opportunities to develop pilot studies which would make use of existing Global Atmospheric Watch (GAW) observations and forecasting systems to develop applications for the agricultural users and identified the need to enhance the observation system especially for trace gases and aerosols in agricultural sensitive areas. CAGM experts also participated in the [CAS Global Atmosphere Watch Expert meeting on Nitrogen Oxides](#) in 2016.

Focus Area 3 – Natural hazards and Climate Variability/Change in Agriculture

1.11 Experts from the CAGM Expert Team on Drought 3.1 contributed and reviewed the [Handbook on Drought Indicators and Indices](#) in collaboration with the [Integrated Drought Management Programme \(IDMP\)](#). This handbook lists drought indices used by WMO members based on a survey on National Progress Reports in Agricultural Meteorology. In addition, these experts prepared a [comprehensive report on Drought](#) which includes recommended definitions for elements of the drought lifecycle that can be used to catalogue drought events with regards to [Resolution 9 \(Cg-17\)](#) Identifiers for cataloguing extreme weather, water and climate events. Based on this report, a video on drought highlighting the drought lifecycle issues was prepared for the World Meteorological Day in 2018 and a IDMP publication on the drought lifecycle and drought definitions will be prepared in 2018.

1.12 Experts from the [CAGM Expert Team 3.2 on Agricultural decision-support and Extension Services on Climate Extremes](#) provided a report on several successful case studies on agricultural decision-support and extension services and identified some of the deficiencies and gaps that need to be addressed. The lessons learned from these case studies will be used by WMO Members and the WMO Secretariat to provide assistance to national agricultural extension services and in developing projects in the various countries.

1.13 Experts from the [CAGM Expert Team 3.3 on Weather and Climate Extremes and Agricultural Industry Needs](#) produced an extensive report. The report identified weather and climate extremes taking into consideration outputs from CCI team on the definition of extreme events; compiled lists of successful case studies and risk management strategies for linking agricultural industry needs and management capabilities in preparations for weather and climate extremes and compiled assessments of future risks and opportunities to agricultural production under climate variability and change for key agricultural industries including wheat, coffee, rangelands, grapes, cotton, sugar, especially including aspects related to climate extremes. Recommendations from the report will be used by WMO Members to provide better weather and climate products for the actors in agricultural value chain such as millers, transporters, brokers and traders. It will also assist the WMO Secretariat in developing projects in various countries similar to the current International Climate Initiative (IKI) project for South-East Asia under consideration by the Government of Germany.

Focus Area 4 – Capacity Development

1.14 Experts from the [CAGM Expert Team 4.1 on Capacity Building](#) produced a report on available agrometeorological training programmes in the WMO regions, and how synergies could be established between these programmes and WMO training activities, and also identify training needs and requirements. The report recommended over 40 existing training activities that could be used in the future and how the Global and National Agrometeorological Society activities could be connected to some of these activities. It also made recommendations on how Global Centers of Research and Excellence in Agrometeorology (GCREAM) could be integrated in the WMO Global Campus Initiative.

1.15 Experts from the [CAGM Expert Team 4.2 on Education and Training in Agromet](#) made progress on developing a new supplement for *Manual on the Implementation of Education and Training Standards in Meteorology and Hydrology* (WMO-No. 1083) for

agricultural meteorology. They provided recommendations on how to transform the existing curricula in (WMO-No. 258) into learning outcomes per WMO-No 1083 and proposed an outline for this new publication. In addition, the report also provided an inventory of existing and available agricultural meteorological textbooks. However, the work to develop a new supplement is still not complete and will be completed by a new proposed Expert Team in Focus Area 4.

Regional Working Groups on Agricultural Meteorology

1.16 Regional CAgM experts and members of the CAgM Management Group participated in the several Regional Association Working Groups on Agricultural Meteorology to develop workplans and to identify the best means of meeting the needs in the Region for information on agrometeorology. A [Meeting of the RA II Expert Group on Agrometeorology \(EG-AgM\)](#) was held in Pune, India in November 2015. A CAgM Report will be published on the presentations from the [Workshop on Agrometeorology for Farmers and Meeting of the RA VI Task Team on Agricultural Meteorology](#) held in Ljubljana, Slovenia in November 2016. CAgM Report No. 105 (in preparation) will be published on Survey on Provision and Use of Climate Information and Services for Agriculture in RA V. Regional Experts from various Commissions in RA III held a Meeting of RA III Working Groups on Infrastructure, Hydrology, and Climate including Subgroup on Agricultural Meteorology in Asuncion, Paraguay in October 2017. This meeting helped foster discussions and lay the framework to developing regional drought project (see Item 2.10 (f) below).

Roving Seminars Training Activities in Agricultural Meteorology

1.17 The objective of [Roving Seminars on Weather, Climate and Farmers](#) are to provide a direct dialogue between staff of the NMHSs with farmers, herders and fishers on weather and climate issues. The following activities were funded by WMO during the intersessional period:

- (a) In December 2015, 140 participants attended Roving Seminar in Croatia hosted by the Croatia Meteorological and Hydrological Service (DHMZ),
- (b) From June 2014 to February 2015, Roving Seminars were organized in Kenya by the Kenyan Meteorological Department with funds provided by the United States National Oceanic and Atmosphere Administration. The Seminars were of one-day duration and brought together a grand total of about 300 farmers, agricultural extension officers, media, youth, academia, county administration and operations staff, and other national organizations.
- (c) WMO supported the Armenian Hydromet Service for organizing Roving Seminars on Weather, Climate, and Farmers in Armenia. In July and August 2015, a total of 6 seminars were organized in Armenia with nearly 250 people trained.
- (d) WMO supported the Slovenian Environment Agency for organizing a Roving Seminar in Hoče, Slovenia in December 2015. There were 159 participants of which 94 were farmers. The rest were extension and university staff.
- (e) Three Roving Seminars were held in September 2016 in Santiago del Estero province, Argentina organized by Argentina NHMS, supported by local institutions and funded by WMO. Participants came from Extension Services students, honey producers and goat herders.

Training Activities in Agricultural Meteorology

1.18 During the intersessional period, there are request from countries and regions to conduct training courses on various topics in agricultural meteorology. The following training courses (a-d) were jointly organized by WMO and EUMETSAT and there was support for at least one of the training courses from FAO, FEWSNET, EU-Joint Research Centre (JRC), European Space Agency (ESA), and the Spanish State Meteorological Agency (AEMET):

- (a) [Training Course on the Use of Satellite Products for Agrometeorological Applications](#) in Addis Ababa, Ethiopia in March 2015,
- (b) [Training Course on the Use of Satellite Products for Drought Monitoring and Agricultural Meteorology Applications](#), Tbilisi, Georgia in May 2016,
- (c) [Training Course on the Use of Satellite Products on Drought Monitoring and Applications in Agrometeorology](#), Harare, Zimbabwe from 24 to 28 October 2016,
- (d) [Training Workshop on Satellite Data and Products for Drought Monitoring and Agrometeorology](#), Budapest, Hungary from 24 to 28 April 2017,
- (e) Training workshop on agricultural and hydrological drought monitoring and management, Santa Cruz de la Sierra, Bolivia), from 5 to 9 June 2017 with support of the Spanish Cooperation Agency (AECID). Participants came from 16 Latin American NMHS from WMO Regions III and IV.

METAGRI Operational Project

1.19 The [METAGRI OPERATIONAL project](#) (2012-2015) was developed based on the [previous METAGRI project \(2009-2011\)](#) with new components on training, development of communications skills, feedback and evaluation tools and institutional strengthening. The METAGRI OPERATIONAL project, funded by the Government of Norway, covered the following countries: Cabo Verde, Mauritania, Senegal, Gambia, Guinea-Bissau, Guinea, Liberia, Mali, Burkina Faso, Niger, Chad, Côte d'Ivoire, Ghana, Togo, Benin, Nigeria and Sierra Leone. The project was closed in November 2015 after an [Evaluation Workshop](#) in Abidjan, Côte d'Ivoire. A project proposal for a follow up METAGRI SERVICES project, covering same countries plus Cameroon, was developed and the components were approved with [Decision 47 \(EC-68\)](#).

1.20 The project organized 269 Roving Seminars for farmers (including 19 for fishermen), delivered 4 827 plastic rain gauges and trained 12 499 persons most of them farmers. The fact that only 13% were women, is acknowledged as an area for improvement in future projects. The project organized a [Training Course on the use of satellite products for agro-meteorological applications](#) in Ouagadougou, Burkina Faso in May 2014 for French speaking countries.

1.21 A Training of Trainers Workshop was held in Sierra Leone in May 2014 in cooperation with the Sierra Leone NMHS and the International Fund for Agricultural Development (IFAD). About 40 meteorologists and extension agents were trained by one Roving Seminars expert from Liberia NMHS, and approximately 100 farmers were trained in country on the use of climate and weather information.

1.22 [The project](#) also focused on increasing interaction between NMHSs and the media. A series of meetings with the media were held in Benin, Burkina Faso, Cabo Verde, Chad, Mali, Mauritania, Niger and Nigeria from June 2014 to December 2015. All the meetings were organized by the respective NMHS with the support on planning and facilitation from a consultant. The main outcomes from those meetings were beneficial dialogues between journalists and meteorologists, better mutual knowledge of their respective tasks, and plans to collaborate to be implemented in the following months.

1.23 Since 2014, the project launched a [final evaluation assessment](#) in four pilot countries: Ghana, Mauritania, Côte d'Ivoire and Niger. For this purpose, a methodology for the assessment of climate services impacts at local level was developed. The project evaluation found that the project resulted in a number of significant benefits including the increased value of strategic choices on crop varieties and field sites, improved choice of planting dates avoiding reseeding and additional weeding and avoiding crop losses. In 2016, the evaluation methodology was applied to Mauritania.

1.24 The project provided a set of [communication materials](#) such posters, brochure, manuals and videos to support national or regional activities in agricultural meteorology.

CAGM Management Group

1.25 The CAGM Management Group developed workplans and Expert Teams terms of references and oversaw the production of deliverables through the following meetings:

- (a) [CAGM Management Group Meeting](#), Geneva, Switzerland, 25 to 27 September 2014,
- (b) [CAGM Implementation / Coordination Team](#), Bucharest, Romania from 7 to 9 October 2015,
- (c) [2nd Meeting of CAGM Management Group \(2014-2018\)](#), Geneva, Switzerland from 17 to 20 October 2016,
- (d) [Meeting of CAGM Implementation Coordination Team \(ICT\)](#), Geneva, Switzerland from 28 to 29 November 2017,
- (e) [Meeting of CAGM Management Group](#), Geneva, Switzerland on 30 November 2017.

1.26 Meetings of the CAGM Focus Areas and other activities can found on the [WMO Agricultural Meteorology Programme](#) website.

2. Additional Projects in Agricultural Meteorology

2.1 CAGM Experts and WMO staff provided technical advice on several additional donor-funded WMO projects.

2.2 The application of improved agrometeorological information to small-sale agricultural production in Tigray, Ethiopia continued under Phase II of a project funded by Irish Aid. This Phase II of the project emphasizes further development of capacity for better interpretation of agro-meteorological products and services, service delivery processes and climate risk management for farmers through provision of location specific products, services and advisories in Tigray and in the Southern Nations Nationalities People's Region (SNNPR).

2.3 There were agricultural meteorology components to the [Severe Weather Forecasting Demonstration Project \(SWFDP\)](#) coordinated by several WMO departments. A two-week SWFDP-Eastern Africa Training Workshop was held in Kigali, Rwanda, 10 to 21 November 2014 and another Training Workshop was held in Addis Ababa, Ethiopia, 16 to 27 November 2015.

2.4 The Agricultural Climate Resilience Enhancement Initiative (ACREI) project for Ethiopia, Kenya and Uganda, was developed by WMO, FAO and the Inter-Governmental Authority on Development (IGAD) focused on improved food security at community level, improved decision making by use of tailored climate and weather information for small holder

farmers and improved production of agricultural advisories and bulletins at regional and national level. The project started in 2017 and will last for three years.

2.5 The 3-year project on “Strengthening national capacities for EWS Service Delivery in Burkina Faso”, funded by Climate Risk and Early Warning System (CREWS) Fund and managed by WMO and Agence Nationale de la Météorologie (ANAM) from Burkina Faso started in July 2017 and aims to improve operational capabilities in Burkina Faso to produce and deliver hydrometeorological services for early warning, with special focus on flood-related risks and improved early warning and risk information for agriculture and food security. Météo-France is the main technical supporting partner.

2.6 Another 3-year project CREWS project on “Weather and Climate Early Warning System for Papua New Guinea” was approved in November 2017. This project aims to provide improved drought monitoring and early warning systems that can foster better decision making for the following sectors: agriculture, disaster management, energy and infrastructure. The Australian Bureau of Meteorology is the main technical implementing partner to assist the Papua New Guinea National Meteorological Service.

2.7 WMO and FAO have agreed the project on “Developing national agrometeorological and agroclimatological capacity for Rwanda and Senegal agencies.” This project will assist both countries to support agriculture decision-makers with appropriate and timely climate information and services to facilitate integration into agriculture policies, plans, strategies and practices and to provide technical assistance on logistical and organizational support to collect, process, store, analyse, disseminate and make available data and information in terms of weather information, climate forecasts and crop calendars. The project duration is only one-year.

2.8 [CLIMANDES](#) is a twinning project between MeteoSwiss and the NMHS of Peru, SENAMHI, which is financed by the Swiss Agency for Development and Cooperation (SDC). In addition to developing climate services, the second phase of the project has a strong emphasis on the Socio-Economic Benefits of climate services for farming communities in the Andean Region.

2.9 The GFCS Office with support of USAID launched a “[Climate Services for Increased Resilience in the Sahel](#)” project in 2017. This project aims to improve climate and weather forecasts at the region and in Senegal, Niger and Burkina Faso and to improve service delivery to climate-sensitive sectors. In that sense, it has activities to support provision of agricultural advisories through mobile phones and roving seminars in Niger.

2.10 The Climate Change Adaptation and Disaster Risk Reduction in Agriculture Project is a training programme with the aim to reduce the impacts of Natural Disaster and Climate Change on the agricultural sector in West Africa. Four training courses will be conducted in Italy and in Niger with topics on include climate change impacts assessment, disaster prevention, and development of agrometeorological services for agriculture. The project will also strengthen the regional network that brings together the community of technical services involved in climate change adaptation and disaster risk reduction. The project is being led by WMO including two WMO Regional Training Centers, the Institute of Biometeorology of the Italian National Research Council (CNR-IBIMET) and the AGRHYMET Regional Center. The project is funded by the Italian Agency for Development Cooperation (AICS).

Drought related capacity building initiatives

2.11 Since CAGM-16, several more National Drought Management Policy Workshops were held in with WMO, FAO, United Nations Convention to Combat Desertification (UNCCD), The United Nations Convention on Biological Diversity (CBD) and the UN-Water Decade Programme on Capacity Development (UNW-DPC). These workshops involved participants from NMHSs from ministries involved with agriculture, environment, water resources and

biodiversity to increase the capacities of the government in drought risk management practices. These workshops also started internal discussions on each country can be better organized with regards to drought management issues. A summary publication was produced from each workshop and a Synthesis Report was completed by the five main organizations.

- (a) [3rd Regional Workshop on National Drought Management Policies for Asia-Pacific](#), Hanoi, Vietnam from 6 to 9 May 2014. 30 participants from 10 countries in the Asia-Pacific region.
- (b) [4th Regional Workshop on National Drought Management Policies for Eastern and Southern Africa](#), Addis Ababa, Ethiopia from 5 to 8 August 2014. 29 participants from 12 countries in the Eastern and Southern Africa.
- (c) [5th Regional Workshop on National Drought Management Policies - North Africa and Near East](#), Cairo, Egypt from 17 to 20 November 2014. 34 representatives from 12 countries.
- (d) [6th Regional Workshop on National Drought Management Policies - West Africa](#), Accra, Ghana from 4 to 7 May 2015. 30 representatives from 12 countries.

2.12 Other drought related activities undertaken and outputs obtained through cooperation between WMO, other UN Agencies and international and national organizations include:

- (a) [Workshop on the Global Drought Information System \(GDIS\)](#) at Caltech, Pasadena, USA from 10 to 13 December 2014. Workshop outcomes included increasing regional drought monitoring systems (see Item 2.10 (f)), updating the GDIS website, and guidance on the use of climate forecasts for better drought predictions;
- (b) [DMCSEE Ad-hoc Working Group Meeting and Workshop on Follow-up drought Activities in South Eastern Europe](#), Bucharest, Romania, from 20 to 22 April 2015. Meetings were organized by Météo-Romania, DMCSEE and IDMP and gathered experts from 9 countries and institutions involved at regional IDMP project in South Eastern Europe. Outcomes included drafting of project proposals which led to DriDanube Project and better links between global IDMP Technical Support Unit in Geneva, DMCSEE, the IDMP / Global Water Partnership project in Eastern Europe;
- (c) African Drought Conference was held in Windhoek, Namibia in August 2016. 400 delegates from across Africa and the world to find solutions to the recurring drought events and associated impacts. The conference was organized by the Namibian Ministry of Environment and Tourism with support from UNCCD in partnership with a number of international organizations and countries. The Conference agreed to the Windhoek Declaration;
- (d) [Sort-out Drought Workshop](#), Dresden, Germany from 16 to 18 November 2016. The objective of this workshop was to present and develop best practices and climate services helpful to deal with droughts. The main workshop partners were: Deutscher Wetterdienst (DWD), Saxon State Office for Environment, Agriculture and Geology (LfULG), National Oceanic & Atmospheric Administration (NOAA), European Commission (EC) and WMO. Outputs included closer links between the organizations and draft documents containing proposals on drought for EC-69 and the 17th Session of RA VI;
- (e) [Workshop on Developing a Drought Monitoring, Early Warning and Mitigation System for South America](#), Buenos Aires, Argentina from 8 to 10 August 2017. Outputs included draft Strategic Plan for regional project proposal and several proposals to donors were made in early 2018;
- (f) Latin America and The Caribbean Regional Conference on Drought Management and Preparedness, Santa Cruz, Bolivia from 14 to 16 August 2017. Co-organized by WMO, FAO, UNCCD and Bolivia Ministry of Environment and Water. The Santa Cruz Declaration was delivered at closure and this conference started internal discussions in each country on how to improve drought management.

2.13 The Integrated Drought Management Programme (IDMP), which is co-sponsored by WMO and the Global Water Partnership, held its annual [Advisory Committee and Management Committee Meetings](#) in Geneva, Switzerland in 2014, 2015, 2016 and 2017 to develop review its activities and develop the workplan for the next year. It also hosted an [IDMP Expert Group Meeting on Action, Inaction for Drought Preparedness, Cost and Benefits](#), Geneva, Switzerland on 16 September 2016. Based on the meeting, a [literature review](#) on the subject was published. The main IDMP strategic directions for 2017/2018 are to focus on finalizing the Integrated Drought Management (IDM) Framework document, continuation of the IDMP HelpDesk, promoting the three IDM pillars and further developing the second pillar, on vulnerability and impacts assessment.

3. Collaboration with International Organizations

Food and Agriculture Organization of the United Nations (FAO)

3.1 In June 2017, WMO and FAO updated their Memorandum of Understanding and the agreed to the following priority areas for enhanced collaboration:

- (a) Strengthening of agro-meteorological services (including crops, livestock, fisheries, aquaculture and forests) in countries,
- (b) Strengthen collaboration related to global frameworks and mechanisms,
- (c) Global monitoring for early warning and response,
- (d) Technical cooperation related to data, tools and methods to improve agro-meteorological products and services and their access by small farmers,
- (e) Joint programmes and project development and joint resource mobilization.

3.2 With regards the above priority areas, WMO and FAO have started a project in Senegal and Rwanda (see Item 2.7) and have collaborated on several training activities (see items 1.18 (c) and (d)). WMO and FAO published "Weather and Desert Locust" in 2016.

3.3 WMO is a member of the Global Framework on Water Scarcity in Agriculture (WASAG) and FAO is a partner in IDMP. Future work will include assisting countries with developing national drought policies and developing a brochure on Drought and Water Scarcity.

3.4 WMO, FAO and other partners co-sponsored the [Global Symposium on Soil Organic Carbon](#) held in Rome, Italy from 21 to 23 March 2017 (see Item 1.10) and the [Global Conference on Climate Change Adaptation for Fisheries and Aquaculture](#) held in Thailand in August 2016 (see Item 1.5).

United Nations Convention to Combat Desertification (UNCCD)

3.5 CAGM experts and WMO staff actively participated in the 12th and 13th Conference of Parties sessions in 2015 and 2017. WMO remained active in the Inter-Agency Task Force in support of the United Nations Decade for Deserts and the fight against Desertification (UNDDD) which promotes the work of various UN Agencies on the issues of drought, land degradation and desertification. WMO is a Member of Science Policy Interface which will allow it to provide direct advice and recommendations to UNCCD (see CAGM-17 Doc 2.1)

Convention on Biological Diversity (CBD)

3.6 The CBD Secretariat played an active role in the various drought activities (see Item 2.10). WMO provided input into various CBD activities including the Guidelines for Ecosystem-based Approaches to Climate Change Adaptation and Disaster Risk Reduction.

Group on Earth Observations

3.7 CAgM experts and WMO staff actively participated in several GEO activities. WMO provides technical assistance to the GEO Global Agricultural Monitoring (GLAM) initiative through regular monthly meetings. WMO and GEOGLAM will focus on integrating soil moisture measurements, WAMIS products, and drought monitoring products into GEOGLAM activities.

World Food Programme (WFP)

3.8 WFP and WMO organized a two-day Dialogue on Strategic Priorities for Food Security and Agriculture in January 2016 in Rome, Italy which brought together the key organizations in the GFCS priority area of agriculture and food security.

World Farmers' Organization (WFO)

3.9 WMO and WFO organized the a Workshop on Climate Smart Farming in June 2015 in Milan, Italy and the Workshop on the Role of Forestry for Farmers and Their Organizations in a Changing Climate in Helsinki, Finland in June 2017. In addition, the WMO Secretary-General attended the WFO General Assembly Meeting in 2017. WMO and WFO jointly published "Climate Easy" for distribution at WFO events and at UNFCCC COP-21.

Regional Centers

3.10 CAgM Experts and WMO staff were involved in several training sessions which involved the AGRHYMET Regional Centre, ACMAD, and SADC.

Other workshops and meetings co-sponsored by WMO

3.11 The following are other workshops and meetings co-sponsored by WMO during the intersessional period:

- (a) International Symposium on Weather and Climate Extremes, Food Security and Biodiversity at Fairfax, CA, USA on 20-24 October 2014. Outcomes included identifying technologies and training needed to enable decision makers to improve the adoption and management of local sustainable technologies and to develop an effective inter-connected network of global academic centers of excellence to collaborate and communicate on issues of mutual and timely interest;
 - (b) International Conference on Weather/Climate Modelling and Remote Sensing Applications for Sustainable Agriculture and Food Security Community, Jeju, Republic of Korea, on 25-28 November 2014. The conference identified remoting sensing needs and WIS requirements for WAMIS (see Item 1.6).
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REPORT OF THE PRESIDENT OF THE COMMISSION

GENDER MAINSTREAMING IN CAgM

STATISTICS ON THE PARTICIPATION OF WOMEN AND MEN IN CAgM ACTIVITIES

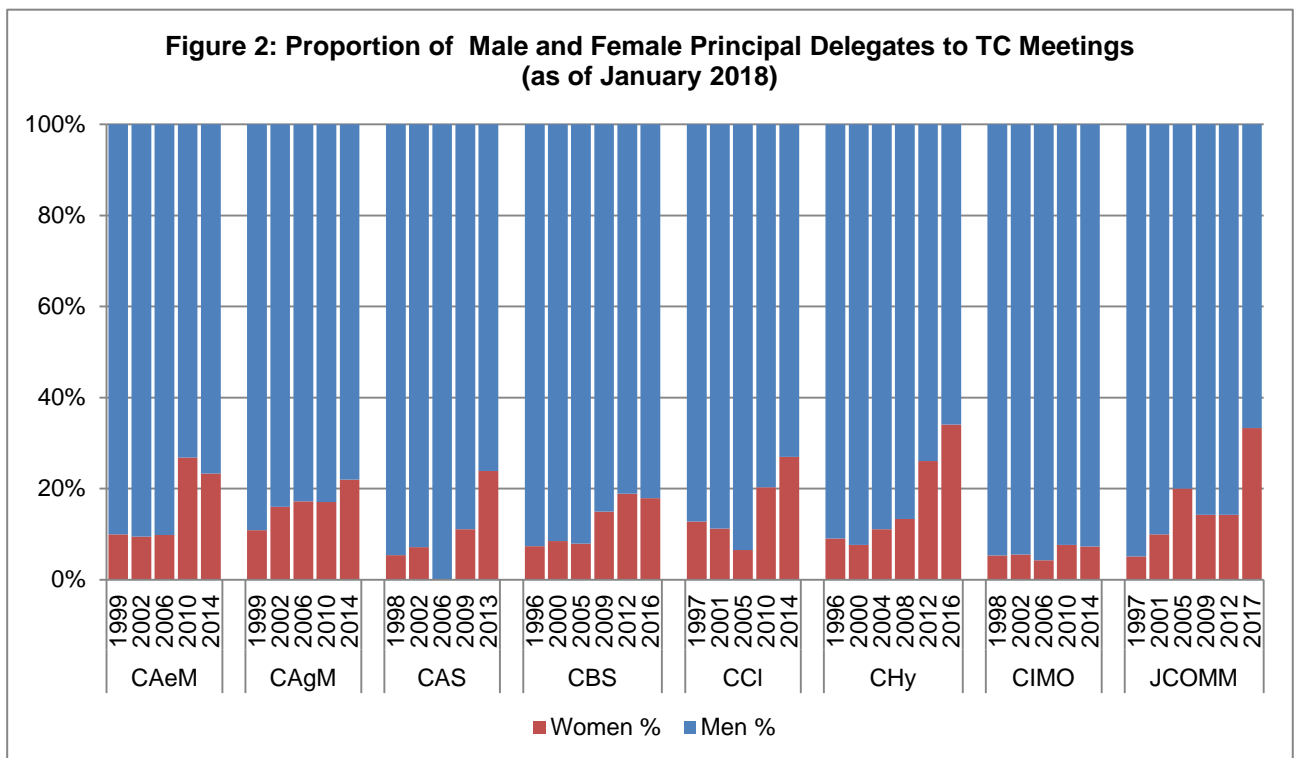
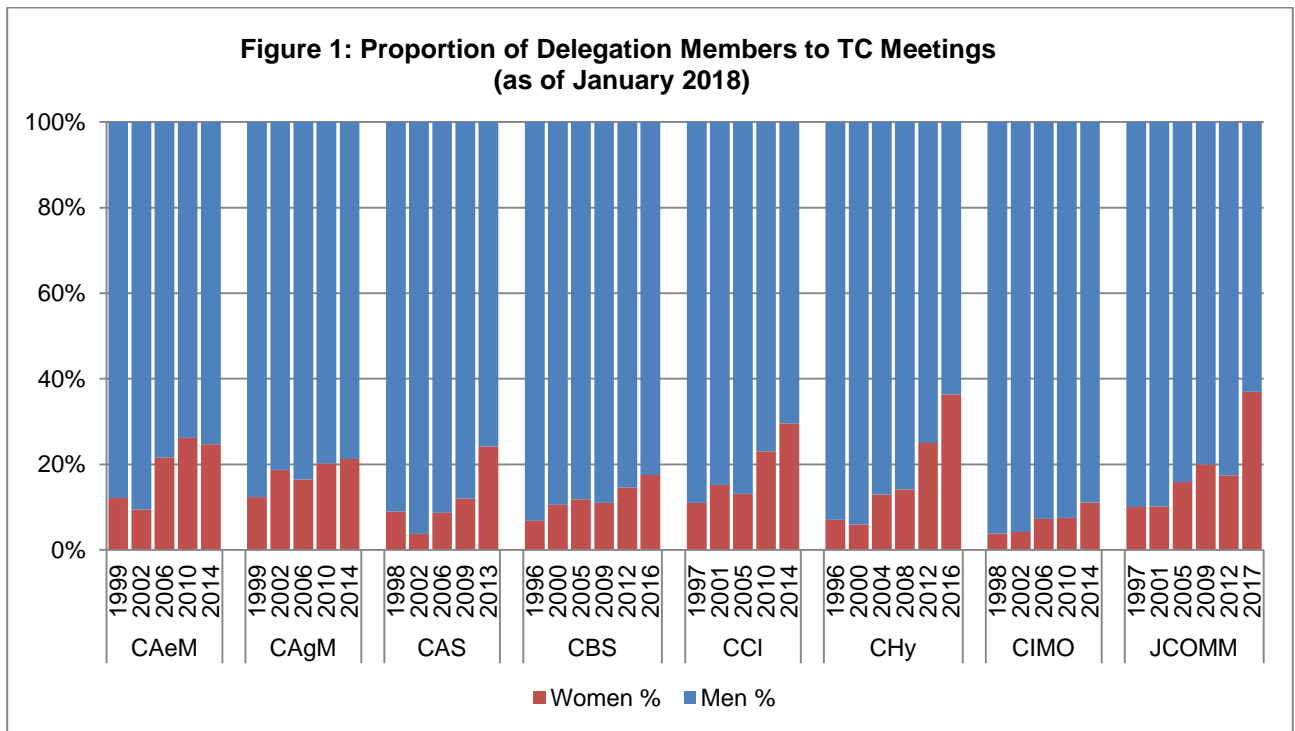
Delegates to CAgM Meetings

Table 1 presents the gender composition of delegates to the latest five CAgM sessions. Having started from a low baseline at 12%, female representation soared to 20% in 2010 and remained at the same level at the latest CAgM session in 2014.

CAgM Session	Women %	Men %
XII (1999)	12%	88%
XIII (2002)	19%	81%
XIV (2006)	16%	84%
XV (2010)	20%	80%
16 (2014)	21%	79%

Table 1: Proportion of female and male delegates at CAgM sessions

Figure 1 compares the representation of women and men in delegations to sessions of the eight WMO Technical Commissions. At 21%, the share of female delegates at CAgM-16 reflected the global average in the past financial period. The highest proportion of women was registered at the latest of sessions of JCOMM and CHy at 37% and 36%, respectively.



The increase in the share of female delegates to CAgM sessions was accompanied by an equivalent increase in the proportion of female principal delegates. The latter soared from 11% in 1999 to 17% in 2010, reaching 22% at the latest session in 2014 (see Figure 2). For comparison, the highest share of female principal delegates was registered at CHy-15 and JCOMM-5 at 34% and 33%, respectively.

CAGM Management Group

At 30%, female membership in the CAGM Management Group is above the TC average. Only CCI has more women on its Management Group (36%).

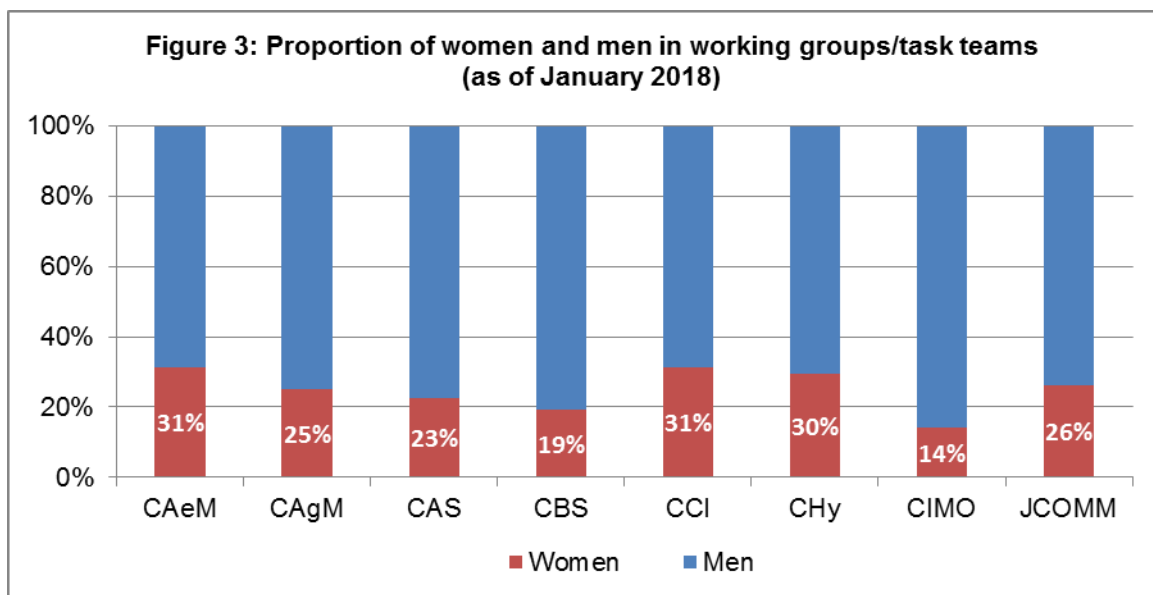
Women	Men	Total	Women %	Men %
3	7	10	30%	70%

Table 2: Proportion of women and men on CAGM Management Group

Working Groups and Expert Teams

Females represent a quarter of the membership of CCI expert teams and working groups, which is slightly above the average for TCs. As evident from Figure 3, women are best represented on the working groups and expert teams of Cag

M and CCI (31%), followed by the Open Panel of CHy Experts (OPACHEs) of which they comprise a third.



Progress Report and Global Survey on Gender Mainstreaming in WMO

More statistical information, including on the gender balance among NMHS staff, is available in the [Progress Report on Implementation of the WMO Policy on Gender Mainstreaming](#) (March 2015) and the [Results of the 2013 Global Survey on Gender Mainstreaming in WMO](#).

WMO Policy on Gender Equality

The Seventeenth World Meteorological Congress (Cg-17) adopted [Resolution 59 \(Cg-17\)](#) on Gender Equality and Empowerment of Women which requests WMO technical commissions and regional associations:

- (a) To develop action plans on implementation of the WMO Policy on Gender Equality within their areas of responsibility;
- (b) To continue compiling statistics on the participation of men and women in their work;
- (c) To take action on the outcomes and recommendations of the [Conference on the Gender Dimensions of Weather and Climate Services](#);
- (d) To report to the Executive Council and the World Meteorological Congress on progress.

Congress further urged Members to take the following actions, among others:

- (a) To nominate more female candidates to other WMO constituent bodies and their working structures as well as to training events and for WMO fellowships;
- (b) To nominate more female candidates to participate in the work of technical commissions as members of their management groups as well as members of relevant expert teams, working groups and programmes;
- (c) To increase the representation of women in their delegations to WMO constituent body meetings;
- (d) To respond to regular surveys on gender equality in WMO and in National Meteorological and Hydrological Services, and designate gender focal points.

As an annex to the Resolution, Congress adopted an updated [WMO Policy on Gender Equality](#) which outlines the following roles and responsibilities for technical commissions (paragraph 8.3):

“The technical commissions should be aware of and implement the WMO Gender Equality Policy within their area of responsibility. Efforts should be made to ensure that **a minimum of at least 30 percent of the members of their working structures is female** and that this percentage rises progressively within each financial period. The longer-term objective will be to reach parity between male and female members.”

Technical commissions are expected to report to the Executive Council on progress at least once during each financial cycle (paragraph 9.2).

EC-68 endorsed a [WMO Gender Action Plan](#) (Decision 77 (EC-68)) as well as agreed with the priority actions identified by the EC Advisory Panel of Experts on Gender Mainstreaming for 2016-2019 (marked in red). The document contains a range of actions intended for implementation by WMO constituent bodies, including technical commissions (see Column B of the WMO Gender Action Plan).

Priority actions for constituent bodies include:

- (a) Make gender equality a permanent item on agendas and discuss at least once per financial period,
- (b) Promote the active role of female delegates in constituent body sessions,
- (c) Include a short gender analysis in Strategic Plan 2020-2023,

- (d) Maintain the Key Outcomes and KPIs related to gender mainstreaming in OP 2020-2023,
 - (e) Conduct at least two Women Leadership Workshops on the margin of constituent body meetings,
 - (f) Update the WMO Capacity Development Strategy and Implementation Plan with a view to incorporating relevant aspects of the WMO Gender Equality Policy,
 - (g) Update the WMO Capacity Development Strategy and Implementation Plan with a view to making them more gender-sensitive,
 - (h) Report to the EC and Cg on progress at least once per financial period.
-



OUTCOMES FROM THE WMO TECHNICAL CONFERENCE ON FUTURE CHALLENGES AND OPPORTUNITIES IN AGRICULTURAL METEOROLOGY

The WMO Technical Conference on Future Challenges and Opportunities in Agricultural Meteorology was held in Incheon, Republic of Korea from 15 to 16 April 2018. There were 138 participants. The Conference agreed to the following recommendations:

- 1) More collaboration between CCI and CAgM;
- 2) Need for face to face workshops and education of extension officers, highlighted by Nigeria;
- 3) Reports from CAgM Expert Teams need to be made more widely available. Try to capture the benefits of these reports with case reports;
- 4) Need to support extension services are declining in some countries;
- 5) Important to collaborate with the agricultural sector in all countries;
- 6) Need more than generic weather and climate data which can add value and inform users on what to do;
- 7) Need to develop joint services to address needs of all players across agricultural value chain using multiple sources of information. This is best achieved by partnerships and team efforts;
- 8) Increase public-private partnerships;
- 9) Need to reduce the carbon and water foot prints with more efficient irrigation and chemical use;
- 10) Need for an Integrated Drought model and to learn from other projects as many undertaking organizations are undertaking similar work;
- 11) Need to improve formal drought legislation to ensure action is taken when a drought is predicted;
- 12) Ensure sustainable agricultural practices due to climate change;
- 13) Need ways to measure sustainability (metrics);
- 14) Need more investment in research on sub to seasonal climate forecasts in regions with poor accuracy;
- 15) Need to increase the use of SMS for farmers and other users;
- 16) Need for agroclimatic study of main crops;

- 17) Need to prepare tactical and strategic methods;
- 18) Need to modernize agrometeorological equipment;
- 19) Need to make use of existing platforms and use open source code;
- 20) Need to work with policymakers to ensure that any tender contract that contains an element of weather/climate should pass through National Meteorological Service;
- 21) Observational data needs to be homogenized when being used in calculation of indices;
- 22) Develop specific Agricultural Meteorological indices;
- 23) Need studies to downscale parameters to local scale;
- 24) Need to integrate hi-resolution downscaled information for weather and agricultural activities;
- 25) Need for fisheries products;
- 26) Develop agrometeorological toolbox for crop and animal monitoring including for pest and disease occurrences;
- 27) Need more training in professional agrometeorology;
- 28) Need to apply research to operational agroclimatic services;
- 29) Enhance international support for Soil Moisture Demonstration Project;
- 30) Develop tools for EWS and forecasting fire;
- 31) Develop EWS tool for floods in agricultural situations;
- 32) Develop research in close contact with users and traditional/local knowledge;
- 33) Need to use of interpolation schemes for evaporation;
- 34) Need for Next Phase WAMIS to be developed and implemented;
- 35) Develop links to projects on soil moisture;
- 36) Need to link insurance products to crop models;
- 37) Need for cost-benefit assessments and examples;
- 38) Develop standard risk methodologies to insurance companies and banks;
- 39) Need to shift to impact based forecasting;
- 40) Use other predictors for climate forecasts adapted for weather system for the region;
- 41) Need best practices on pest and disease forecasting;
- 42) Improve relationship between agriculture, environment and human health;
- 43) Link crop models for different climate systems as the forecast of yield and soil moisture;

- 44) Develop standard risk methodologies for insurance companies using satellite data if there are no ground stations;
 - 45) Need to integrate systems for ground station and satellite data;
 - 46) Need instruments for the observation of soil moisture;
 - 47) Need for co-production and to ensure forecast information is presented in a format that is understandable to the end user;
 - 48) Communicate the positive effect of greenhouse warming to increase crop productivity without alleviating the damage of climate change to other sectors;
-



REVIEW OF DECISIONS AND RESOLUTIONS

The following list of decisions and resolutions of Executive Council and Congress provide the necessary background on relevant WMO activities to Commission members.

World Meteorological Congress

The Seventeenth World Meteorological Congress (Cg-17), reviewed the implementation of the Agricultural Meteorology Programme, and expressed its general satisfaction with the Programme and requested the Secretary-General to take necessary actions, to the extent possible within available budgetary resources, to support Members in their efforts to implement, at the national level, the priority activities of the AgMP as described in the WMO Strategic Plan 2016–2019, including support for their efforts in the following:

- (a) Improving service quality and service delivery;
- (b) Advancing scientific research and its application, as well as the development and implementation of technology to support sustained service outcomes on all scales and especially to address the challenges of managing climate risks and adapting to climate variability and change;
- (c) Strengthening capacity development through agricultural meteorological training at the regional, national and local levels;
- (d) Building and enhancing partnerships and cooperation through working in collaboration with other WMO technical commissions and Members, United Nations agencies and other relevant organizations, to create synergies and to support improved agricultural production and economic development.

Congress took the following decisions of relevance to CAGM:

- (a) [Resolution 10 \(Cg-17\)](#) – Sendai Framework for Disaster Risk Reduction 2015-2030 and WMO participation at the International Network for Multi-Hazard Early Warning Systems, requesting technical commissions to assist with the development of science based methodologies and tools to support MHEWS and to develop appropriate training modules to enhance the capacity of NMHS in implementation of Sendai Framework;
- (b) [Resolution 23 \(Cg-17\)](#) – Pre-Operational Phase of the WMO Integrated Global Observing System, requesting technical commissions to develop technical guidelines and related guidance material incorporated in the Guide to WIGOS;
- (c) [Resolution 27 \(Cg-17\)](#) – Instruments and Methods of Observation Programme, requesting technical commissions to keep under continuous study and review the aspects of instruments and methods of observation related to their fields of specialization and to communicate their requirements to CIMO;
- (d) [Resolution 46 \(Cg-17\)](#) – Integrated Global Greenhouse Gas Information System (IG3IS), the president of the Commission for Atmospheric Sciences to work together with other technical commissions on implementation of IG3IS;

- (e) [Resolution 50 \(Cg-17\)](#) – Capacity Development Programme, requesting presidents of technical commissions to provide advice relating to the needs of Members in support of the capacity development of NMHSs;
- (f) [Resolution 51 \(Cg-17\)](#) – Education and Training Programme, requests the technical commissions to give high priority to the development and review of competence standards and requirements within the area of responsibility of each of the commissions, in conjunction with the ETRP, with the aim of ensuring that the service needs of Members continue to be linked with the technical standards, requirements and recommendations of the commissions through education and training; and invites the presidents of regional associations and technical commissions:
 - (i) To regularly review the education and training needs within their Regions or commissions including needs assessment and training requirements, peer-review monitoring and evaluation, with the aim of prioritizing regional and specialized training needs of Members;
 - (ii) To ensure that RTCs have a regional outlook, particularly in the selection and delivery of meteorological, climatological and hydrological courses;
 - (iii) To improve coordination of ongoing activities within and between Regions and within relevant subject areas;
 - (iv) To encourage and support dialogues between WMO-RTCs, the countries hosting WMO-RTCs and their respective regional associations as required, under the revised Executive Council criteria for the recognition and reconfirmation of WMO RTCs, with the objective to further develop those centres within the context of addressing the needs of Members in the WMO high-priority areas;
- (g) [Resolution 59 \(Cg-17\)](#) Gender equality and empowerment of women requesting technical commissions and the regional associations to take action on the outcomes and recommendations of the Conference on the Gender Dimensions of Weather and Climate Services;

The Congress also:

- (h) Requested CCI and CAGM and the Secretary-General to examine the establishment of a Joint CAGM/CCI Expert Team on Phenology which would also include the close collaboration with the International Society of BioMeteorology (ISB) ([Cg-17 paragraph 3.1.143](#));
- (i) Supported the CAGM recommendation to establish and coordinate a Soil Moisture Demonstration Project (SMDP) to develop these standards, guidelines and activities which would also contribute to the objectives of the WMO Integrated Global Observing System (WIGOS) and the Global Framework for Climate Services (GFCS) ([Cg-17 paragraph 3.1.144](#));
- (j) Urged Members to participate and disseminate WAMIS products to the global community ([Cg-17 paragraph 3.1.146](#));
- (k) Encouraged the Secretary-General to consider expanding the capability of the WAMIS DCPC in the handling of non-meteorological data as well as providing access to Members ([Cg-17 paragraph 3.1.147](#));
- (l) Requested to develop content and a format for the exchange of meteorological and environmental information on in-situ measurements and forecasts of allergenic reactive pollen ([Cg-17 paragraph 3.1.149](#));

- (m) Requested the Secretary-General to continue the comparisons of rainfall measurements of simple plastic rain gauges distributed to farmers and pursue standardization of them, through collaborative efforts among the Commission for Instruments and Methods of Observation (CIMO), Commission for Hydrology (CHy), CCI and CAgM. (Cg-17 paragraph 3.1.152);
- (n) Requested the Secretary-General to make efforts to mobilize financial resources to support, to the extent possible, Roving Seminars in other countries as well as dialogue roundtables between farmers and providers of weather and climate information, and to liaise with other United Nations agencies such as the Food and Agriculture Organization of the United Nations (FAO) in organizing these Seminars and to continue promoting Roving Seminars as a useful tool to convey weather and climate information to final users (Cg-17 paragraph 3.1.153);
- (o) Requested the Secretary-General to facilitate efforts for mobilization of financial resources to support such Climate Field School programmes in other regions (Cg-17 paragraph 3.1.154);
- (p) Recommended that the Secretary-General continue to support similar projects as Training of Trainers on Weather and Climate Information and Products for Agricultural Extension Services in Ethiopia with the National Meteorological Agency of Ethiopia (NMAE) and the Caribbean Agrometeorological Initiative (CAMI) in the future and to ensure that there are sufficient human resources engaged with donor funds to adequately manage any future project (Cg-17 paragraph 3.1.155);
- (q) Requested Members to actively collaborate with the AgMP to develop and train future agricultural meteorologists in order to improve the provision of weather and climate information from their national Services to the agricultural community in their countries (Cg-17 paragraph 3.1.156);
- (r) Encouraged continued linkages with the Convention on Biological Diversity (CBD), the United Nations Convention to Combat Desertification (UNCCD), FAO, the World Food Programme (WFP), GEO and the Global Agricultural Monitoring (GEOGLAM) project, the COST Actions of the European Science Foundation, World Farmer's Organization (WFO), the Regional Training Centre for Agrometeorology and Operation Hydrology and their Applications (AGRHYMET) and the African Centre of Meteorological Application for Development (ACMAD) to assist with the work of the WMO Agricultural Meteorology Programme and other WMO activities such as GFCS, WIGOS, and WIS (Cg-17 paragraph 3.1.157);
- (s) Agreed that WMO join the Global Alliance for Climate Smart Agriculture (GACSA) with CAgM as its main representative (Cg-17 paragraph 3.1.158).

Resolution 43 (Cg-XVI) - Terms of Reference of the Commission for Agricultural Meteorology

The terms of reference of the Commission for Agricultural Meteorology shall be:

- (a) Support applications of meteorology to the management of agriculture, livestock, forestry, rangelands and fisheries sectors (herein after referred to as agricultural subsectors), taking into account developments in both the scientific and operational fields;
- (b) Assist the Member countries in developing and establishing their agrometeorological services (and, where necessary, encourage and assist National Meteorological and Hydrological Services in realigning/restructuring their services to provide effective

agrometeorological services) through transfer of knowledge, methodologies and techniques, and by providing advice, particularly on:

- (i) The most operational use of knowledge concerning weather and climate for sustainable agricultural management through conservation and better use of natural resources;
 - (ii) The use of weather and agrometeorological observations, forecasts and warnings for operational purposes;
 - (iii) The use of climate observations and predictions;
 - (iv) Adaptation to climate variability and change, in particular in developing countries;
 - (v) Combating unfavorable influences of weather and climate on agricultural subsectors, including weather-related pests and diseases;
 - (vi) The protection of agricultural produce in storage or in transit against damage or deterioration due to direct and indirect influences of weather and climate;
 - (vii) Effective means of communication and fostering coordination and collaboration activities between weather and climate service providers and users in subsectors;
- (c) Improve coordination and collaboration mechanisms through which users of weather and climate information in agricultural subsectors can liaise actively with weather and climate service providers and vice versa;
 - (d) Formulate data and information requirements for agricultural purposes;
 - (e) Foster the development and use of effective communication methods and channels for acquiring and disseminating agrometeorological information, advice and warnings to agricultural subsectors and obtaining feedback;
 - (f) Promote a better understanding of the interactions and impacts of weather and climate in regards to drought and desertification.

Executive Council

The Commission noted the following **Executive Council** decisions relevant to CAGM:

- (a) [Resolution 7 \(EC-69\)](#) – Collaboration with Implementation of the WMO Information System,
- (b) [Decision 9 \(EC-68\)](#) - Severe Weather Forecasting Demonstration Project,
- (c) [Decision 13 \(EC-68\)](#) - Assistance to humanitarian agencies,
- (d) [Decision 16 \(EC-68\)](#) - Country-focused results-based framework and mechanism for WMO contributions to the Global Framework for Climate Services,
- (e) [Decision 19 \(EC-68\)](#) - The Integrated Global Greenhouse Gas Information System concept paper,
- (f) [Decision 23 \(EC-68\)](#) - Development of a Climate Service Toolkit,
- (g) [Decision 28 \(EC-68\)](#) - Operational implementation of a Global Seasonal Climate Update,

- (h) [Decision 42 \(EC-68\)](#) - Implementation of the WMO Strategy for Service Delivery,
 - (i) [Decision 70 \(EC-68\)](#) - WMO contribution to the 2030 Agenda for Sustainable Development,
 - (j) [Decision 75 \(EC-68\)](#) - WMO-Group on Earth Observations key collaboration areas,
 - (k) [Decision 10 \(EC-69\)](#) - Climate Services Information System products to support United Nations system planning and WMO Members on seasonal to inter-annual timescales,
 - (l) [Decision 11 \(EC-69\)](#) - Implementation of the country-focused results-based framework and mechanism for WMO contributions to the Global Framework for Climate Services,
 - (m) [Decision 12 \(EC-69\)](#) - Response to priority needs for Global Framework for Climate Services implementation,
 - (n) [Decision 17 \(EC-69\)](#) - National implementation of the Climate Services Information System,
 - (o) [Decision 18 \(EC-69\)](#) - Sub-seasonal and seasonal forecasting systems,
 - (p) [Decision 39 \(EC-69\)](#) - Development of a general service delivery guide based on existing Guides developed by WMO programmes and technical commissions,
 - (q) [Decision 40 \(EC-69\)](#) - Concept paper for the development of common interfaces for service delivery,
 - (r) [Decision 51 \(EC-69\)](#) - The Integrated Global Greenhouse Gas Information System Implementation Plan,
 - (s) [Decision 68 \(EC-69\)](#) - WMO constituent body reform.
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WMO DRAFT STRATEGIC AND OPERATING PLANS

WMO is in the process of reformulating its Strategic Plan for 2020-2023. A draft plan is currently available (see links below), which will be submitted to the seventieth session of the WMO Executive Council in June 2018, with the final plan to be submitted to the World Meteorological Congress the following year. In the meantime, the Secretary-General is undertaking to align the WMO Operating Plan for the 2018-2019 biennium with the emerging strategic objectives of the draft 2020-2023 Strategic Plan. Although both are subject to further refinement – by the Executive Council Working Group on Strategic and Operational Planning, as well as the Executive Council and Congress itself – significant work is reflected in the draft Strategic Plan already (see links at the end of this document).

In Decision 65 on Preparation of WMO Strategic Plan 2020-2023, EC-69:

- (1) Observed that further development of the draft Plan should be guided by: (a) an outcome based approach expressing clear benefits to Members; (b) an interactive approach to science and services to address service needs; (c) the sharing of knowledge as a critical factor in developing capacities; and (d) cooperation with all actors, including the private sector, to enhance the generation of services yielding socioeconomic benefits;
- (2) Requested regional associations and technical commissions to continue to contribute to the preparation of the Strategic Plan to ensure that the needs of Members, as well as science and technology development, are taken into consideration.

In this regard, CAgM and AgMP are expected to make their main contributions to Goals 1 and 4 but will also provide contributions to Goals 2, 3 and 5 (see below).

Goal 1 - Better serve societal needs: Delivering authoritative, accessible, user-oriented and fit-for-purpose information and services,

Goal 2 - Enhance Earth system observations and predictions: Strengthening the technical foundation for the future,

Goal 3 - Advance targeted research: Leveraging leadership in science to improve understanding of the Earth system for enhanced services,

Goal 4 - Close the capacity gap on weather, climate, hydrological and related environmental services: Enhancing service delivery capacity of developing countries to ensure availability of essential information and services needed by governments, economic sectors and citizens,

Goal 5 - Strategic realignment of WMO structure and programmes for effective policy- and decision-making and implementation.

[https://www.wmo.int/documents/SP2020-2023Scheme\(8Feb2018\).pptx](https://www.wmo.int/documents/SP2020-2023Scheme(8Feb2018).pptx)

[https://www.wmo.int/documents/DraftStrategicPlan2020-2023\(8Feb2018\)forWG-SOP_en.docx](https://www.wmo.int/documents/DraftStrategicPlan2020-2023(8Feb2018)forWG-SOP_en.docx)

[https://www.wmo.int/documents/DraftStrategicPlan2020-2023\(8Feb2018\)forWG-SOP_fr.docx](https://www.wmo.int/documents/DraftStrategicPlan2020-2023(8Feb2018)forWG-SOP_fr.docx)

[https://www.wmo.int/documents/DraftStrategicPlan2020-2023\(8Feb2018\)forWG-SOP_ru.docx](https://www.wmo.int/documents/DraftStrategicPlan2020-2023(8Feb2018)forWG-SOP_ru.docx)

[https://www.wmo.int/documents/DraftStrategicPlan2020-2023\(8Feb2018\)forWG-SOP_es.docx](https://www.wmo.int/documents/DraftStrategicPlan2020-2023(8Feb2018)forWG-SOP_es.docx)

[https://www.wmo.int/documents/DraftStrategicPlan2020-2023\(8Feb2018\)forWG-SOP_zh.docx](https://www.wmo.int/documents/DraftStrategicPlan2020-2023(8Feb2018)forWG-SOP_zh.docx)

[https://www.wmo.int/documents/DraftStrategicPlan2020-2023\(8Feb2018\)forWG-SOP_ar.docx](https://www.wmo.int/documents/DraftStrategicPlan2020-2023(8Feb2018)forWG-SOP_ar.docx)



RELATIONSHIP WITH OTHER WMO ACTIVITIES

Global Framework of Climate Services

The [Global Framework for Climate Services \(GFCS\)](#), which was established at the Extraordinary Session of the World Meteorological Congress in 2012, established the Intergovernmental Board on Climate Services (IBCS) and adopted the GFCS Implementation Plan. While the use of climate information and forecasts is growing rapidly, many developing countries still lack the resources and expertise they need for their citizens to benefit from climate services. The GFCS assists these countries to develop and use climate services. It also promotes international collaboration, the pooling of resources and expertise, and the sharing of best practices.

Resolution 62 (Cg-17) on the Relationship and Interaction Between the Intergovernmental Board on Climate Services and WMO Constituent Bodies states that:

- (1) Technical commissions shall invite the IBCS designated representative to their sessions to inform the commissions on progress and requirements and needs of the Board as appropriate; the Board shall delegate the responsibility to a member of its Management Committee or to the Chairperson or Vice-Chairperson/Co-Vice-Chairpersons as appropriate; the Chairperson of IBCS shall invite the presidents of technical commissions, as deemed appropriate, to attend IBCS as well as Management Committee sessions;
- (2) Relevant technical commissions and WMO Programmes should identify a GFCS liaison; these individuals can report through the technical commission Management Groups on ways to better align technical commission operating plans with GFCS activities and, conversely, inform the Board of relevant technical commission activities that support the Framework;
- (3) WMO should reach out to the technical commissions, or equivalent, of GFCS partner organizations, as needed, for input into IBCS Partner Advisory Committee activities; the Secretary-General should also submit relevant activities as GFCS contributions via the existing processes established for other partners.

In addition, Cg-17 approved Resolution 64 on the Development of a Results-Based Framework for WMO Support to the Implementation of the Global Framework for Climate Services, which requests the technical commissions, regional associations and WMO programmes, including co-sponsored programmes, to:

- (1) Contribute to the development of the results framework,
- (2) Report back on the outputs generated and results achieved in the context of the framework as part of their ongoing reporting processes.

Decision 16 (EC-68) provides the results-based framework and a mechanism for WMO contributions to the GFCS. The mechanism is implemented through regular meetings of the presidents of regional associations and presidents of technical commissions, with representation from WMO and co-sponsored programmes, chaired by the WMO President.

Severe Weather Forecast Demonstration Project (SWFDP)

The project currently involves and benefits over 75 developing countries including LDCs and SIDS in eight sub-regions, with contributions from various global and regional centres and support from donors/partners. The project has improved the lead-time and reliability for alerts and warnings about high-impact events such as heavy precipitation, strong winds and high waves. It has been strengthening engagement of NMHSs with users including media, disaster management and civil protection agencies and local communities, for improved disaster risk reduction (DRR) and related decision making. The project is benefiting various socio-economic sectors as well, including agriculture, livestock and fisheries. SWFDP is making contributions to the WMO Strategic Priorities for 2016-2019, especially in areas of DRR, GFCS [with special focus on agriculture and food security through climate change adaptation, by building climate resilience] and Capacity Development.

The SWFDP is primarily built on the [Global Data Processing and Forecasting System \(GDPFS\)](#) programme, in collaboration with [Public Weather Services \(PWS\)](#) programme, and the [Agricultural Meteorology \(AgM\)](#) programme of WMO.

Decision 9 (EC-68) on the Severe Weather Forecasting Demonstration Project encourages all relevant technical commissions and programmes:

- (1) To be engaged in the steering of the SWFDP and in the development and implementation of SWFDP regional subprojects, facilitating synergy, wherever possible, between their activities and the SWFDP;
- (2) To establish synergies between the SWFDP and the multi-hazard impact-based forecast and risk-based warning services so as to maximize the benefits of disaster prevention activities.

Global Data-Processing and Forecasting System

The main purpose of the [Global Data-processing and Forecasting System \(GDPFS\)](#) is to prepare and make available to WMO Members, in the most cost-effective way, meteorological analyses and forecast products. The design, functions, organizational structure and operations of the GDPFS shall be in accordance with Members' needs and their ability to contribute to and benefit from the system. It is organized as a three-level system of World Meteorological Centres (WMCs), Regional Specialized Meteorological Centres (RSMCs), Regional Climate Centers (RCCs), and National Meteorological Centres (NMCs), which carry out GDPFS functions at the global, regional and national levels, respectively. The GDPFS shall also support other WMO Programmes and relevant programmes of other international organizations in accordance with policy decisions of the Organization. At Cg-17, [Resolution 11, on Towards a Future Enhanced Integrated and Seamless Data-Processing and Forecasting System](#) was approved which requests the technical commissions to include this activity in their work programmes, as appropriate, depending on the guidance from the Executive Council, in order to fully accommodate the Resolution's cross-programme nature.

Integrated Global Greenhouse Gas (GHG) Information System (IG3IS)

In June 2015, the seventeenth World Meteorological Congress requested a plan for an [Integrated Global Greenhouse Gas \(GHG\) Information System \(IG3IS\)](#). In December 2015, the UNFCCC Parties forged the Paris Agreement, the implementation of which is based on Nationally Determined Contributions (NDCs). The NDCs include measures to reduce GHG atmospheric concentrations. A framework capable of accepting and promoting a range of advanced GHG emission quantification capabilities could improve the quality of, and confidence in, GHG emission inventories. The IG3IS will be such an information source and framework that will join atmospheric GHG composition and flux measurements and other observations (the "top-down") with spatially and temporally explicit socioeconomic emission inventory data

(the "bottom-up"). The combination of these data sources will better inform emission reduction policies and measures. Mid-term IG3IS objectives, requested by Cg-17, include the application of these methods and standards to methane emissions from the agricultural sector. Long term IG3IS objectives include developing the capacity to provide complete attribution of emissions to sectors, including agriculture and livestock. Resolution 46 (Cg-17) on the Integrated Global Greenhouse Gas Information System (IG3IS), requests the president of Commission for Atmospheric Sciences to work together with other technical commissions on IG3IS implementation.

Global Seasonal Climate Update

WMO has been issuing consensus-based El Niño/La Niña Updates on a quasi-regular basis for more than a decade, providing useful information on these events, which are of significant importance to affected regions. There has been a widely expressed need to expand on these products, to provide more comprehensive information on seasonal climate anomalies. Accordingly, the concept for a [Global Seasonal Climate Update \(GSCU\)](#) has been elaborated, for further development under the guidance of the Commission for Climatology (CCI) and the Commission for Basic Systems (CBS), endorsed by the World Meteorological Congress in May 2011. The GSCU, with a vision to be issued on a regular basis by WMO, is expected to summarize the current status (monitoring) and the expected future behaviour (prediction) of major general circulation features and large-scale oceanic anomalies around the globe and to discuss briefly its likely impacts on continental-scale temperature and precipitation patterns. GSCUs are expected to be used primarily by Regional Climate Centres (RCCs), Regional Climate Outlook Forums (RCOFs) and NMHSs in order to elaborate regional and national climate updates, and also by global user communities as well as the general public. At EC-69, [Decision 10 on Climate Services Information System Products to Support United Nations System Planning and WMO Members on Seasonal to Inter-Annual Timescales](#) was approved which requested the Commission for Climatology (CCI) and the Commission for Basic Systems (CBS) to lead the development and provision of relevant climate-related products and services, with inputs from other technical commissions. The GSCU has since been in operation on a pilot basis. Based on Decision 44 (EC-69) on Enhancing National and Regional Drought-Monitoring Systems, CAGM is the lead technical commission on coordinating drought monitoring and early warning systems. It is proposed that a CAGM contribution on current droughts be a component of the GSCU based on national and regional drought monitoring and forecasting systems.

MHEWS / Global Multi-Hazard Alert System (GMAS)

Early warnings for weather, water and climate hazards have been demonstrated over the past decade to be very effective in reducing loss of life and property. These warnings, which come from the National Meteorological and Hydrological Services (NMHSs) of each country, provide the foundation on which early action to take precautions against hazards by the responsible authorities and public can be realized. However, as these hazards affect an increasingly exposed and vulnerable population at the national, regional and global levels, there is a need for warning information from all countries to be made more easily available and understandable for decision makers in the humanitarian agencies, economic sectors, and the general public, including travellers who may be unfamiliar with local early warning information sources. It is proposed that a WMO Global Multi-Hazard Alert System (GMAS) be developed that would provide target users with authoritative hydrometeorological hazard warnings and related information. The vision of GMAS is "To be recognized globally by decision makers as a resource of authoritative warnings and information related to high-impact weather, water, ocean and climate events." Decision 3 (EC-69) on the WMO Global Multi-Hazard Alert System (GMAS) urged Members, regional associations, technical commissions and technical programmes to participate and contribute to the development of WMO GMAS. CAGM would contribute to GMAS by incorporating national drought alerts and warnings as well as alerts and

warnings on dust storms, frosts, coldwaves, heatwave and floods impacting agriculture into regional MHEWS and global alert systems.

HydroSOS

The fifteenth Session of the Commission for Hydrology (CHy), through Resolution 8 (CHy-15), decided to initiate the [WMO Global Hydrological Status and Outlook System \(HydroSOS\)](#), which is intended to provide an operational WMO system capable of assessing the current hydrological status and its likely near-future outlook (sub-seasonal to seasonal time frames) for all areas of the globe. The System will be delivered by National Meteorological and Hydrological Services (NMHSs), offering simple, accessible hydrological information to users such as government bodies, basin managers, funding institutions, aid agencies, UN bodies, and the general public. HydroSOS will be developed in phases, with the first one being a pilot phase (2017-2020). This initiative is aligned with WMO priorities regarding Disaster Risk Reduction, the Global Framework for Climate Services (GFCS), the WMO Integrated Global Observing System (WIGOS), and Capacity Development. HydroSOS is seen as an important tool to help NMHSs deliver their services. In addition, the system, underpinned by hydrological data sharing, meteorological forecasts and climate prediction information with advances from the global research community, will support the 2030 Agenda for Sustainable Development and, in particular, the broader global community in the area of water management. One component of HydroSOS is on drought monitoring and forecasting, which will be a contribution of CAGM, in coordination with other technical commissions.
