



# AIAM INTERNATIONAL ADVANCED SCHOOL IN AGRICULTURAL METEOROLOGY



FIRST EDITION

## AGRICULTURAL METEOROLOGY FOR A CLIMATE SMART AGRICULTURE



CO-ORGANIZED BY



WORLD  
METEOROLOGICAL  
ORGANIZATION

WITH THE SUPPORT OF



RESEARCH PROGRAM ON  
Climate Change,  
Agriculture and  
Food Security



Fondazione  
Clima e  
Sostenibilità



RETURURALE  
NAZIONALE  
20142020

CCRS | Center for Corporate Responsibility  
and Sustainability  
at the University of Zurich



UNIVERSITÀ  
DEGLI STUDI  
FIRENZE  
DAGRI  
ISTITUTO DI SCIENZE  
AGRICOLE, AMBIENTALI E FORESTALI



Since its foundation in 1997, AIAM has been involved in enhancing and promoting agrometeorological research through conferences, seminars, and training courses. It also acts as a link between the services and research activities. This connection has the result of promoting researches on relevant agrometeorological themes, which are internationally disseminated through the Italian Journal of Agrometeorology.

As part of its mission, AIAM is proud to launch the **First Edition of the International Advanced School in Agricultural Meteorology**, aiming to build up knowledge about the use of integrated tools and advanced technologies for a sustainable management of agroecosystems.

The **2021 edition, co-organized with WMO-RTC and FAO, is focused on the role of Agricultural Meteorology for a Climate Smart Agriculture (CSA)**, and wants to provide young researchers and professionals with high-level innovative knowledge and skills on the most advanced technologies for the agrometeorological analysis and monitoring applied to a sustainable agricultural development under climate change.

## Course Content

In order to facilitate participants to increase their knowledge on **how Agricultural Meteorology can contribute to a Climate Smart Agriculture**, the school will include **theoretical activity and practical sessions to allow the direct application of theoretical concepts**. The active participation of the trainees is necessary to facilitate the realization of an interdisciplinary partnership among technicians and scientists.

A large spectrum of topics will be covered by the course:

- **Climate Smart Agriculture concept and the 5 step-process to CSA implementation**
- **Eddy Covariance and flux measurement techniques in the agricultural ecosystem: briefing on theory, experimental design and implementation**
- **Climate information Services, Early Warning Systems and Early Action**
- **European Space Agency (ESA) facilities and tools: Copernicus, databases, instruments/tools**
- **Extreme events, risk reduction**
- **Index based insurance**
- **Climate Change, Agriculture, and Food Security**

**Trainers** are world-class experts from acknowledged **Universities, Research Institutions, International Agencies, as well as, Food and Agriculture Organization of United Nations - FAO, European Space Agency ESA.**

## Scientific coordinators for AIAM

Filiberto Altobelli, Anna Dalla Marta, Federica Rossi, Francesca Ventura

## Scientific committee

Filiberto Altobelli (CREA-PB), Anna Dalla Marta (University of Florence-DAGRI), Federica Rossi and Marina Baldi (CNR-IBE and WMO-RTC), Federica Matteoli (FAO)

## Organization committee

**AIAM**, National Research Council (**CNR**), Council for Agricultural Research and Economics (**CREA**), Food and Agriculture Organization (**FAO**), World Meteorological Organization - Regional Training Center (**WMO-RTC**), Rete Rurale Nazionale (**RRN**), Italian Ministry for Environment, Land and Sea Protection, European Space Agency (**ESA**), Foundation for Climate and Sustainability (**FCS**), Global Alliance for Climate-Smart Agriculture (**GACSA**), **Alliance-Bioversity – CIAT**. University of Florence (**DAGRI**), University of Zurich (**CCRS**).

## Course Format

**Two-week virtual classroom school, which includes lectures, group discussions, case studies and practical training sessions.** Students and teachers of the course will benefit from the Moodle platform through which educational material will be shared and assessment procedures conducted.

## Date and Time

From **Monday 08 March 2021 14:00** to **Friday 19 March 2021 18:00**

## Costs

A registration fee of 300€ will be charged to all participants, to be paid before the beginning of the School via Internet banking.  
Tuition fee includes course material

## Monday, 8

### Opening Session

Welcome  
Course introduction and overview

### Session 1 (4h) - Climate Smart Agriculture

The session will focus on the Climate Smart Agriculture - CSA approach and CSA pillars. Specifically, **the session will include challenges and opportunities for agriculture in the face of climate change**; CSA concept and 5 step-process to CSA implementation; practices and production systems for CSA; tools and Methods for Evidence-based Decision Making in CSA.

## Tuesday, 24

### Session 2 (4h) - Climate information Services

The session will be organized into two parts. A first session, which includes a series of lectures to be delivered **by experts of FAO, will cover various aspects of climate services value chain in the agricultural sector**. A second session will aim to provide practical experiences/tools how to translate climate knowledge into climate action on the ground. **More specifically, climate information services; delivery of climate information services to end-users; Early Warning Systems and Early Action, hands-on activities will be delivered.**

## Wednesday, 10

### Sessions 2-bis (4h) - Climate information Services

The session will be organized into two parts. A first session, which includes a series of lectures to be delivered **by experts of FAO, will cover various aspects of climate services value chain in the agricultural sector**. A second session will aim to provide practical experiences/tools how to translate climate knowledge into climate action on the ground. **More specifically, climate information services; delivery of climate information services to end-users; Early Warning Systems and Early Action, hands-on activities will be delivered.**

## Thursday, 11

### Session 3 (4h) - Copernicus, databases, instruments/tools

**European Space Agency's experts will illustrate New Capabilities in Earth Observation to support a sustainable Agriculture** with reduced environmental impact and increased climate resilience by responding to global, regional and local needs for: mapping and monitoring of crops; supporting and monitoring agricultural practices.

## Friday, 12

Pausa

## Monday, 15

### Session 4 (2h) – How agribusiness and agricultural meteorology can contribute to CSA

Digital agriculture can improve forecasting, diagnosis of pests and diseases, or bundle field and weather information to offer an integrated smart on-field strategy. The customized, real-time, finely tailored intelligent insights gathered can help growers tackle intra-field variability, make intelligent choices on what, when and where to plant, and what to apply. Agri-businesses can help farmers adopt digital agriculture practices through consolidation across the food value chain, new cooperative ways of investing, and modern finance and risk-sharing models.

### Session 5 (2h) – Principles of Climate and Risk Communication

The objective of this session is to present a general introduction on the complexity of climate change communication and the key principles for effective communication on climate change with a special focus on communicating climate change impacts on the agricultural sector. The session includes the presentation of the Training Operational Package for Climate Services – TOPaCS module on communication, and a practical assignment to be completed by the participants.

## Tuesday, 16

### Session 6 (4h) - Eddy covariance and flux measurement techniques in the agricultural ecosystem

The session will be divided in two parts. A first part including current state-of-the-art sensors for remote sensing, platforms and approaches for assessment of plant traits and productivity and stress detection. A second part that will focus on laboratory activity based on interactive visualization of an invisible fluorescence signal, hands-on environmental low-cost sensors for agriculture, practical test of WSN (Wireless Sensor Network) and UAV precision agriculture.

## Wednesday, 17

### Session 7 (2h) Climate Risk Profiling

They present key challenges posed by climate change and the impacts it might have on the agricultural sector. They then suggest specific interventions

that could address those challenges and outline financing opportunities for CSA. The session will provide students with an overview on how the profiles are structured, scientific models used to develop them and practical ways to adopt them in decision making processes.

### Session 8 (2h) – Climate Finance

Meeting the financing requirements for climate-smart agriculture is pivotal to address global food insecurity. The Climate Finance session aims at illustrating the main concepts related to financing mechanisms that aims to increase investments in agriculture sector, while delivering positive climate outcomes, such as increased resilience and reduced emissions intensity.

## Thursday, 18

### Session 9 (4h) - Extreme events, risk reduction, Early Warning Systems

The session will include an introduction to drought and its impacts on agroecosystems, a description of an open and interoperable climate service to support user needs for reducing the gap between the drought development and the emergency management. Attention will be pointed out on what type of information should be produced and how, dealing with concepts of Data Cube, Open Science and FAIR principles. A practical session will explain how to use the different drought Climate Service tools and integrate its products with other information.

## Friday, 19

### Session 9-bis (2h) - Extreme events, risk reduction, Early Warning Systems

Continuing the practical session started on the day before, participants will be invited to continue the exercise which consists in using an open source GIS (Qgis), pre-installed by each participant on their own computer, to make basic processing of the images, obtain indexes, cross them with other information by returning a layout for print or online publication.

A good internet connection will therefore be required to access the Copernicus and MODIS servers on the fly in order to download the necessary data.

### Session 10 (1.30h) - Climate Information Services for Agricultural Advisory and its application

The presenter will showcase deployment of different example of climate services for informed agricultural decision making from Latin America, Africa and South East.

## Closing of the school