IAEA
International Atomic Energy Agency
Atoms for Peace and Development

Regional Training Course on Cosmic Ray Neutron Sensor for Soil Moisture Assessment

Hosted by

The Government of Romania

through the

Research Station for Viticulture and Oenology Murfatlar

Constanta, Romania

02 -13 October 2023

Ref. No.: TN-RER5028-2304328

Information Sheet

Purpose

The purpose of the event is to train the participants on the use of Cosmic Ray Neutron Sensor (CRNS) for measuring the soil moisture and the CRNS data for agricultural applications.

Working Language(s)

The working language(s) of the event will be English.

Deadline for Nominations

Nominations received after 16 August 2023 will not be considered.

Project Background

The unbalanced rainfall distribution has negative effects on vegetation and soil. It causes a drought stress during the dry seasons and excess moisture during the wet periods (rainy seasons and snow melt periods). Neither dry nor waterlogged soils can support appropriate agricultural exploitation of land and the soil moisture management is a major threat of food production. Another on-site and off-site environmental consequences are surface runoff, soil erosion, sediment transport, floods, pollution of water sources and siltation in water reservoirs.

To improve the soil moisture management the more comprehensive soil moisture monitoring is needed. The soil moisture data should be more long lasting and associated with larger territorial extend of the studied area to express the spatial variability of soil moisture. This can be achieved with the aid of new nuclear techniques.

Nuclear and isotopic techniques such as the cosmic ray neutron sensor (CRNS) are useful and effective tools to assess landscape soil water status for irrigation scheduling, and in calibrating and validating remote sensing data for possible drought and flood forecasting. Gamma ray spectrometer (GRS) for monitoring soil water and soil properties mapping at field scale. These maps can be directly applicable for farmers conducting precision farming such as the use of fertilisers, planting distance, irrigation, soil improvement and tillage. The GRS sensor is also useful to pinpoint locations within fields that need treatment when agricultural soils are converted from nutrient-poor soil. Such information when combined with conventional approaches and modern technologies such as UAVs, GIS, Remote Sensing can provide an additional advantage in generating science-based natural resource management recommendations for sustainable agriculture production systems while protecting the environment.

Scope and Nature

This training course would comprise of three study modules:

A) The training on theoretical background and physical principles of CRNS technology

B) CRNS data exploitation for developing agricultural added value products and their use for agriculture soil water management.

C) The basic training on installation and calibration of CRNS, running soil moisture monitoring programmes, basic data processing and interpretation.

The efforts will focus on addressing the increasing occurrence of extreme weather events such as water scarcity and flooding affecting agriculture, through the use of advanced nuclear techniques such as cosmic ray neutron sensing for improving landscape water management, irrigation scheduling and forecasting the onset of drought and flood.

Participation

The event is open to up to 24 participants with qualification/experience corresponding to the requirements described under “Participants’ Qualifications and Experience” from the Member States participating in the TC Project RER5028.

Participants' Qualifications and Experience

The nominated participants should represent authorities and organisations in charge of agricultural or environmental research and they should have education in earth sciences, agricultural sciences or life sciences related to agriculture.

Application Procedure

Candidates wishing to apply for this event should follow the steps below:

1. Access the InTouch+ home page (https://intouchplus.iaea.org) using the candidate's existing Nucleus username and password. If the candidate is not a registered Nucleus user, she/he must create a Nucleus account (https://websso.iaea.org/IM/UserRegistrationPage.aspx) before proceeding with the event application process below.

2. On the InTouch + platform, the candidate must:
    a. Finalize or update her/his personal details, provide sufficient information to establish the required qualifications regarding education, language skills and work experience ('Profile' tab) and upload relevant supporting documents;
    b. Download and complete the Designation of Beneficiary and Emergency Contact Form, and upload to InTouch+ ('Profile' tab under the personal section) specifying the document name. If already provided, kindly discard this step; and
    c. Search for the relevant technical cooperation event (EVT2304328) under the 'My Eligible Events' tab, answer the mandatory questions and lastly submit the application to the required authority.

NOTE: Completed applications need to be approved by the relevant national authority, i.e. the National Liaison Office, and submitted to the IAEA through the established official channels by the provided designation deadline.

For additional support on how to apply for an event, please refer to the InTouch+ Help page. Any issues or queries related to InTouch+ can be addressed to InTouchPlus.Contact-Point@iaea.org.

Should online application submission not be possible, candidates may download the nomination form for the training course from the IAEA website.

NOTE: A medical certificate signed by a registered medical practitioner dated not more than four months prior to starting date of the event must be submitted by candidates when applying for a) events with a duration exceeding one month, and/or b) all candidates over the age of 65 regardless of the event duration.

Administrative and Financial Arrangements

Nominating authorities will be informed in due course of the names of the candidates who have been selected, and will at that time be informed of the procedure to be followed with regard to administrative and financial matters.

Selected participants will receive an allowance from the IAEA sufficient to cover their costs of lodging, daily subsistence and miscellaneous expenses. They will also receive either a round-trip air ticket based on the most direct and economical route between the airport nearest their residence and the airport nearest the duty station through the IAEA's travel agency AX Travel Management, or a travel allowance, or they will be reimbursed travel by car/bus/train in accordance with IAEA rules for non-staff travel.

Disclaimer of Liability

The organizers of the event do not accept liability for the payment of any cost or compensation that may arise from damage to or loss of personal property, or from illness, injury, disability or death of a participant while he/she is travelling to and from or attending the course, and it is clearly understood that each Government, in approving his/her participation, undertakes responsibility for such coverage. Governments would be well advised to take out insurance against these risks.

Note for female participants

Any woman engaged by the IAEA for work or training should notify the IAEA on becoming aware that she is pregnant.

The Board of Governors of the IAEA approved new International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources. The Standards deal specifically with the occupational exposure conditions of female workers by requiring, inter alia, that a female worker should, on becoming aware that she is pregnant, notify her employer in order that her working conditions may be modified, if necessary. This notification shall not be considered a reason to exclude her from work; however, her working conditions, with respect to occupational exposure shall be adapted with a view to ensuring that her embryo or foetus be afforded the same broad level of protection as required for members of the public.

IAEA Contacts

Programme Management Officer (responsible for substantive matters):

Ms Meng Li
Division for Europe
Department of Technical Cooperation
International Atomic Energy Agency
Vienna International Centre
PO Box 100
1400 VIENNA
AUSTRIA
Tel.: +43 1 2600 26442
Fax: +43 1 26007
Email: Me.Li@iaea.org

Administrative Contact (responsible for administrative matters):

Ms Dragana Rainer
Division for Europe
Department of Technical Cooperation
International Atomic Energy Agency
Vienna International Centre
PO Box 100
1400 VIENNA
AUSTRIA
Tel.: +43 1 2600 25987
Fax: +43 1 26007
Email: D.RAINER@iaea.org