



25–29 July 2022
Vienna, Austria

Programme

International Symposium on
**Managing
Land and Water for
Climate-Smart Agriculture**



#Atoms4Climate



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Location of the Event:

International Atomic Energy Agency
Vienna International Centre (VIC)
Building M, BRB/M1
Wagramer Strasse 5
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Working Language: English

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TIMETABLE

MONDAY, 25 JULY 2022

Time	Session No.	Session Title/Break	Venue
09:30–10:30		Opening Session	Board Room B/M1
10:30–11:00		<i>Coffee/Tea Break</i>	
11:00–12:40	1	Plant Nutrition and Nutrient Cycling	
12:40–14:00		<i>Lunch Break</i>	
14:00–15:30	2	Soil Conservation and Land Management	
15:30–16:00		<i>Break</i>	
16:00–17:20	2	Continued: Soil Conservation and Land Management	
17:30–19:30		<i>Welcome Reception</i>	M-Building – Ground Floor

TUESDAY, 26 JULY 2022

Time	Session No.	Session Title/Break	Venue
09:00–10:30	3	Agricultural Water Management	Board Room B/M1
10:30–11:00		<i>Coffee/Tea Break</i>	
11:00–12:40	3	Continued: Agricultural Water Management	
12:40–14:00		<i>Lunch Break</i>	
14:00–15:00	Special	Global Soil Laboratory Network GLOSOLAN	
15:00–15:30		<i>Break</i>	
15:30–17:30	Special	AquaCrop – Development and Way Forward	

WEDNESDAY, 27 JULY 2022

Time	Session No.	Session Title/Break	Venue
09:00–10:30	4	Tracing Agricultural and Industrial Pollutants 4.1. Agricultural Pollutants	Board Room B/M1
10:30–11:00		<i>Coffee/Tea Break</i>	
11:00–12:00		Continued: Agricultural Pollutants	
12:00–12:40	4	Tracing Agricultural and Industrial Pollutants 4.2. Antimicrobial Resistance	
12:40–13:40		<i>Lunch Break</i>	
13:40–14:30		Continued: Antimicrobial Resistance	
14:30–15:30	4	Tracing Agricultural and Industrial Pollutants 4.3. Agricultural Plastics	

Time	Session No.	Session Title/Break	Venue
15:30–16:00		<i>Break</i>	
16:00–17:50	4	Tracing Agricultural and Industrial Pollutants 4.4. Nuclear Emergency and Remediation	

THURSDAY, 28 JULY 2022

Time	Session No.	Session Title/Break	Venue
09:00–10:30	5	Greenhouse Gas Emissions	Board Room B/M1
10:30–11:00		<i>Coffee/Tea Break</i>	
11:00–12:30	5	Continued: Greenhouse Gas Emissions	
12:30–13:00		<i>Lunch Break</i>	
13:00–17:30	Special	Poster All Sessions	

FRIDAY, 29 JULY 2022

Time	Session No.	Session Title/Break	Venue
09:00–10:30	6	Advances of Nuclear-Based Instrumental and Analytical Techniques	Board Room B/M1
10:30–11:00		<i>Coffee/Tea Break</i>	
11:00–12:30	7	Digital Technology, GIS, Machine Learning and Modelling	
12:30–13:00		Closing Ceremony	

MONDAY, 25 JULY 2022

09:30-10:30 OPENING SESSION

Board Room B/M1

Chairperson: Lee Heng, Joint FAO/IAEA Centre

Time	Name	Member State/ Organization	Title (as applicable: Opening Address; Welcome Address; Keynote Address or Title)
09:30-09:40	Rafael Mariano Grossi	Director General IAEA	Opening Remarks
	Qu Dongyu	Director General FAO	
09:40-09:50	Maria Helena Semedo	Deputy Director General FAO	Welcome
09:50-10:10	Rainer Horn	President Emeritus International Union of Soil Sciences (IUSS)	Keynotes: Soil science research approaches and future needs
10:10-10:30	Qingfeng Zhang	Chief of Rural Development and Food Security Thematic Group, Asian Development Bank	Rethinking food system transformation to meet the continuing demand for safe, nutritious, and affordable food
<hr/> <i>10:30-11:00 Coffee/Tea Break</i> <hr/>			

MONDAY, 25 JULY 2022

11:00-12:40 **SESSION 1:**
Plant Nutrition and Nutrient Cycling

Board Room B/M1

Chairperson: Gerd Dercon, Joint FAO/IAEA Centre

Time	Paper No.	Name	Member State/ Organization	Title
11:00-11:20	290	Roel Merckx	Belgium	Tracing and tracers for climate smart agriculture more than a research tool?
11:20-11:40	1	Xia Liang	Australia	Pursuing sustainable nitrogen management following the "5 Ps" principles: Production, People, Planet, Policy and Partnerships
11:40-11:50	263	Andrea Watzinger	Austria	Drought due to climate change reduced plant production and decelerated carbon and nitrogen cycling in an agroecosystem

Time	Paper No.	Name	Member State/ Organization	Title
15:00–15:10	51	Paolo Porto	Italy	Can ¹³⁷ Cs and ²¹⁰ Pbex tracers help to detect the impact of climate change on soil erosion? Example from a cultivated site in Southern Italy
15:10–15:20	169	Ratislav Skalsky	IIASA	Use of the ¹³⁷ Cs tracer-based soil erosion data as a benchmark for large-scale soil erosion rate estimates by process-based crop models
15:20–15:30	201	Jalal Bin Sharib (v)	Malaysia	A study of soil erosion and sedimentation in Sembrong catchment using ¹³⁷ Cs
<i>15:30–16:00 Break</i>				
16:00–16:10	59	Moncef Benmansour	Morocco	Use of nuclear techniques to assess the impact of agricultural practices and climate change on soil erosion and sedimentation in Morocco
16:10–16:20	311	Maral Khododadi (v)	Iran	Using plutonium atom ratios to quantify Chernobyl vs. global fallout contributions of ¹³⁷ Cs reference inventory in western Iran
16:20–16:30	38	Hugo Velasco	Argentina	Relative sedimentary contribution due to new agricultural practices in a hilly semi-arid region of Argentina
16:30–16:40	133	Enrique Munoz Arcos	United Kingdom	Application of fallout radionuclides to assess fine sediment residence time in river channel ecosystems
16:40–16:50	234	Emmanuel Chikwari	Zimbabwe	Use of ¹³⁷ Cs radioisotope in evaluating conservation agriculture practices on soil erosion control in semi-arid areas of Zimbabwe
16:50–17:00	57	Jose Luis Peralta Vital (v)	Cuba	Nuclear techniques supporting the strategy for strengthening the mitigation and the resilience capacity of land management in the national site
17:00–17:10	186	Naivo Rabesiranana	Madagascar	Assessing the impact of climate change on soil erosion in Madagascar upland agro-ecosystems using ¹³⁷ Cs resampling approach

Time	Paper No.	Name	Member State/ Organization	Title
17:10-17:20	300	Samuel Tejada (v)	Mexico	Application of MUSLE, FRN and HEC-RAS to investigate the soil erosion and sediment transport of La Gavia River, México
17:20-17:30	166	Ochirbat Batkhisig (v)	Mongolia	Using Cesium-137 isotope methods for soil erosion study in Mongolia
17:30-19:30		Welcome Reception		M-Building – Ground Floor

TUESDAY, 26 JULY 2022

09:00–12:40 **SESSION 3:** **Board Room B/M1**
Agricultural Water Management

Chairperson: **Hami Said-Ahmed, Joint FAO/IAEA Centre**

Time	Paper No.	Name	Member State/ Organization	Title
09:00–09:20	118	Rafael Rosolem	United Kingdom	Improving field-scale root-zone soil moisture estimates worldwide with the establishment of a global Cosmic-ray soil moisture observing system
09:20–09:40	342	Trenton Franz	United States of America	Opportunities and challenges for the integration of hydro-geophysical sensors in precision agriculture
09:40–09:50	258	Gabriele Baroni	Italy	Integration of new non-invasive soil moisture observations for supporting water management and agricultural activities
09:50–10:00	49	Leticia Gaspar	Spain	Cosmic ray neutron sensor and fallout ¹³⁷ Cs to explore the connection of soil moisture with soil redistribution on an agroforestry hillslope
10:00-10:10	321	Xurong Mei (v)	China	Precisely detecting water status of wine grape with the combination of Cosmic Ray Neutron Sensor and UAV thermography in North China
10:10–10:20	58	Francisco Javier Gaxiola Ortiz (v)	Mexico	Use of a cosmic-ray neutron sensor to estimate soil moisture in a flood irrigated semi-arid farmland

Time	Paper No.	Name	Member State/ Organization	Title
10:20–10:30	227	John Patrick Stowell (v)	United Kingdom	Boron-based neutron sensing and COSMIC-SWAMP
<i>10:30–11:00 Break</i>				
11:00–11:10	274	Roland Rallos	Philippines	Partitioning evaporation and transpiration in rice paddies under different irrigation schemes through ¹⁸ O isotope-based method
11:10–11:20	207	Mathilde Vantghem	Belgium	Validating two banana drought stress proxies on-farm in the Kilimanjaro region, Tanzania
11:20–11:30	36	Ahmed Khalifa	Sudan	Effect of irrigation methods and mulching on growth, yield attributes and water productivity of tomato (<i>Lycopersicon esculentum</i> Mill.) under Kassala State conditions, Sudan
11:30–11:40	192	Kouman Koumanov	Bulgaria	Application efficiency and water extraction across the root zone of a microsprinkler irrigated almond tree
11:40–11:50	74	Kelvin Wafula Mukhebi	Kenya	In-situ water harvesting techniques and fertilizer improves water productivity, water use efficiency and yield of maize under semi-arid conditions
11:50–12:00	103	Ashebir Haile Tefera	Ethiopia	Low cost and water saving on-farm water management technique for improved water use efficiency and crop productivity at a smallholder farmer's field in Ethiopia
12:00-12:10	82	Naem Mazahrih	Jordan	Crop water requirement and crop coefficients of date palm trees in the Jordan Valley
12:10-12:20	145	Burcu Yazici	Turkey	WATERMED platform as an agricultural decision support system
12:20-12:30	256	Giacomo Manessi	Italy	W-PIE: a cosmic neutron spectrometer for smart water management
12:30-12:40	171	Didier Ramirez (V)	Costa Rica	Soil δ ² H and δ ¹⁸ O profiles aid in understanding water use efficiency in two varieties of common bean (<i>Phaseolus vulgaris</i> L) under irrigation and induced drought in Costa Rica

Time	Paper No.	Name	Member State/ Organization	Title
09:50-10:00	81	Duc Nhan Dang	Viet Nam	Sources apportionment for contaminants and tracking dissolved sulfate in the aquatic environment of Ha Noi city (Viet Nam) by the use of dual isotopic fingerprintings of sulfur ($^{34}\text{S-SO}_4$) and oxygen ($^{18}\text{O-SO}_4$)
10:00-10:10	159	David Saka	Ghana	Disentangling nitrate pollution sources and transport pathways in an agricultural ecosystem using hydrochemistry, stable isotopes and MixSIAR model: A case study in the Densu River Basin of Ghana
10:10-10:20	143	Radouan Saadi	Morocco	A multi-isotopic approach for water assessment and fingerprinting nitrate sources in groundwater of the Gharb plain
10:20-10:30	185	Vesna Zupanc	Slovenia	Determination of groundwater quality using stable isotopes
<i>10:30-11:00 Coffee/Tea Break</i>				
11:00-11:10	62	Hanqing Yu (v)	China	Novel source fingerprinting total nitrogen and phosphorus in sediment: A case study of an agricultural catchment in North China
11:10-11:20	270	Federica Tamburini (v)	Switzerland	Dissemination of technique and theory for using oxygen isotopes in phosphate as a tracer of sources in the environment
11:20-11:30	148	Anhettigama Chandrapala (v)	Sri Lanka	Assessment of $\delta^{18}\text{OP}$ in soil, water, stream sediments and other water quality parameters under different land uses in Central Highlands of Sri Lanka
11:30-11:40	214	David O'Connell	Ireland	Molecular level P speciation dynamics in the fluvial suspended sediments along an agricultural catchment stream
11:40-11:50	284	Hari Ram Upadhayay	United Kingdom	Environmental factors associated with isotopic ratios transformation in organic matter of stream sediment: uncertainties in sediment source apportionment

Time	Paper No.	Name	Member State/ Organization	Title
11:50-12:00	122	Claudio Bravo-Linares	Chile	Tracing agricultural-industrial sediments and associated pollutants to assess their threats to a hydropower basin in Central Chile

WEDNESDAY, 27 JULY 2022

12:00–14:30 **SESSION 4:** **Board Room B/M1**
4.2. Antimicrobial Resistance

Chairperson: **Joseph Adu-Gyamfi, Joint FAO/IAEA Centre**

Time	Paper No.	Name	Member State/ Organization	Title
12:00–12:20	347	Junxia Song (v)	FAO	Addressing antimicrobial resistance (AMR) in agrifood systems through One Health approach
12:20–12:40	217	Martin Elsner	Germany	Isotopic techniques for assessing the persistence of antibiotics through the environment in agricultural catchments
<i>12:40–13:40 Lunch Break</i>				
13:40–14:00	266	Fang Wang (v)	China	Understanding and reducing transmission of antibiotic resistant genes from manure amended soil to plants in agricultural systems
14:00–14:10	150	Jim He	Australia	Transmission of antibiotic resistance genes in soil-plant systems
14:10-14:20	350	Thi Nga Vu	Viet Nam	Identification of Priority Antibiotics and its Persistence in Relation to Antimicrobial Resistance (AMR) in Agricultural Systems Using Isotopic and Related Techniques
14:20-14:30	90	Oleg Meniailo	Joint FAO/IAEA Centre	Nuclear Techniques to Fight Antimicrobial Resistance (AMR): Uncovering the Fate of Sulfamethoxazole in Agricultural Soils with Stable Isotopes

WEDNESDAY, 27 JULY 2022

14:30–15:30 **SESSION 4:**
4.3. Agricultural Plastics

Board Room B/M1

Chairperson: Oleg Menailo, Joint FAO/IAEA Centre

Time	Paper No.	Name	Member State/ Organization	Title
14:30-14:50	324	Giulia Garcasci	FAO	FAO work on agricultural plastics
14:50-15:10	348	Natalia Ivleva	Germany	On the potential of stable Isotope Raman Microspectroscopy for analysis of microbial degradation of microplastics in soils
15:10-15:20	293	Heng Gui (v)	China	Microplastics: An emerging threat and their fate in plant-soil systems
15:20-15:30	343	Evgenia Blagodatskaya	Germany	Decomposition of bio-based and biodegradable plastic and its consequences on soil organic carbon stock

15:30–16:00 *Break*

WEDNESDAY, 27 JULY 2022

16:00–17:50 **SESSION 4:**
4.4. Nuclear Emergency and Remediation

Board Room B/M1

Chairperson: Gerd Dercon, Joint FAO/IAEA Centre

Time	Paper No.	Name	Member State/ Organization	Title
16:00-16:20	224	Yuichi Onda (v)	Japan	Evaluation of the contamination of the leafy vegetables during early stage of nuclear emergencies
16:20-16:40	203	Tetsuya Eguchi	Japan	Indices derived from quantity/intensity relationship analysis to detect soils with difficulty to manage radiocaesium uptake risk by crops based on exchangeable potassium
16:40-16:50	239	Floris Abrams	Belgium	Minimizing the impact of radiological emergencies on agricultural production using a spatio-temporal clustering approach under a budget constraint.

Time	Paper No.	Name	Member State/ Organization	Title
09:40-10:00	156	Christoph Müller	Germany	Comprehensive experimental field set up to quantify in-situ N transformation pathways and effects of hot spots on N ₂ O and N ₂ emissions in an undisturbed grassland soil via stable isotope tracing
10:00-10:10	28	Mohammad Jahangir	Bangladesh	Estimation of Denitrification Product Ratio using ¹⁵ N Tracer Techniques and Mitigation of Greenhouse
10:10-10:20	316	Eduardo Aguilera	Spain	Co-design and pilot application of a carbon footprint calculation tool for agricultural systems
10:20-10:30	45	Quynh Vu Duong	Viet Nam	Climate-smart paddy rice cultivation practices developed and adopted for enhanced rice productivity through C sequestration and GHG mitigation in Vietnam
<i>10:30–11:00 Coffee/Tea Break</i>				
11:00-11:10	39	Abhishri Gupta	Joint FAO/IAEA Centre	The role of ¹⁵ N in developing climate smart agricultural practices
11:10-11:20	37	Segundo Urquiaga	Brazil	Arachis pintoi cv Belmonte: A stoloniferous forage legume for dairy productive and low GHG emission livestock production
11:20-11:30	6	Weixin Ding (v)	China	Combined application of biochar and urease plus nitrification inhibitors mitigated NH ₃ and N ₂ O emissions and N leaching in paddy fields
11:30-11:40	301	Patrick Namulisa	Austria	Greenhouse gas emissions from worm-compost-biochar combinations; a potential peat alternative?
11:40-11:50	92	Ana Pérez-Castillo	Costa Rica	Effect of urea-NBPT on the N losses as ammonia and nitrogen use efficiency in a rice crop under different tillage systems in the Central Pacific, Costa Rica
11:50-12:00	89	Oleg Meniailo	Joint FAO/IAEA Centre	Direct and reverse microbial priming for clarifying the role of ectomycorrhizae in the turnover of soil carbon under Arolla pine (<i>Pinus sibirica</i>)

Time	Paper No.	Name	Member State/ Organization	Title
12:00-12:10	313	Youssef Brouziyne	Morocco	Mitigation co-benefits of climate-smart agriculture in Morocco: Status, prospects, and avenues for isotope techniques
12:10-12:20	94	Khadim Dawar (v)	Pakistan	Effect of farmyard manure and urea fertilization with nitrogen inhibitors on greenhouse gas emissions, fertilizer use efficiency and soil fertility under semiarid climate
12:20-12:30	111	Juan Cruz Colazo	Argentina	Developing climate smart agricultural (CSA) practices for mitigation of greenhouse gases in the central semiarid region of Argentina
<i>12:30–13:00 Lunch Break</i>				
13:00-17:30				Poster All Sessions

FRIDAY, 29 JULY 2022

09:00–10:40 **SESSION 6:** **Board Room B/M1**
Advances of Nuclear-Based Instrumental
and Analytical Techniques

Chairperson: **Christoph Müller, Germany**

Time	Paper No.	Name	Member State/ Organization	Title
09:00-09:20	5	Christoph Müller	Germany	Advanced tool for analyzing ¹⁵ N tracing data
09:20-09:40	56	Enrico Yopez (v)	Mexico	Large spatial soil moisture and evapotranspiration measurements at a recently abandoned agricultural pasture
09:40-09:50	240	Aoife Canavan	Germany	Synthesis of 13C-stable isotope-labelled sulfamethoxazole for field experiments
09:50-10:00	253	Ruthger van Zwieten	Netherlands	Automation of sample delivery to Picarro isotope and gas concentration CRDS analyzers with the AS-210 gas autosampler
10:00-10:10	238	Jane Akoth Omenda	Kenya	Climatic controls on the precipitation stable isotopic composition and variability in the dry zones of central highlands of Kenya

Time	Paper No.	Name	Member State/ Organization	Title
10:10-10:20	255	Javad Pirvali Beiranvand	Iran	A novel approach for estimation of crop yield losses arising from natural disasters by using neutron probe instruments
10:20-10:30	15	Mohamed Abdelkader (v)	Egypt	Chromium isotope fractionation during the Cr (VI) reduction by <i>Shewanella oneidensis</i> MR-1 in the presence of hematite and humic acid
<i>10:30–11:00 Coffee/Tea Break</i>				

FRIDAY, 29 JULY 2022

11:00–12:30 **SESSION 7:**
**Nuclear Techniques Digital Technology,
GIS, Machine Learning and Modelling** **Board Room B/M1**

Chairperson: **Gerd Dercon, Joint FAO/IAEA Centre**

Time	Paper No.	Name	Member State/ Organization	Title
11:00-11:20	183	Modou Mbaye	Senegal	Deep neural network for cosmic-ray neutron sensors calibration
11:20-11:40	196	Hami Said-Ahmed	Joint FAO/IAEA Centre	High-resolution soil moisture map using Cosmic-Ray Neutron Sensors data and Sentinel-1
11:40-12:00	318	Arnulf Schiller	Austria	Improved vegetation and topographic correction in air drone borne gamma ray spectrometry
12:00-12:10	107	Nina Kickingger	UNOOSA	The Space4Water Portal – A resource on space-based solutions for sustainable water management in agriculture
12:10-12:20	299	Satyajit Dwivedi	India	GIS-based mapping of digital agricultural potential in India for irrigation water management
12:20-12:30	341	Zdenko Machala	Slovakia	Non-thermal plasma and plasma-activated water technologies for smart agriculture

FRIDAY, 29 JULY 2022

12:30-13:00 **CLOSING SESSION** **Board Room B/M1**

Chairperson: **Lee Heng, Joint FAO/IAEA Centre**

Time	Name	Member State/ Organization	Title (as applicable: Opening Address; Welcome Address; Keynote Address or Title)
12:30–13:00	Najat Mokhtar	Deputy Director General - NA	Closing Remarks
	Hua Liu	Deputy Director General – TC	
	Ismahane Elouafi	Chief Scientist FAO	
	Qu Liang	Director Joint FAO/IAEA Centre	
	Qu Liang/Lee Heng	Joint FAO/IAEA Centre	Poster Award Ceremony

Annexure: Posters

SESSION 1: Plant Nutrition and Nutrient Cycling

Paper No.	Name	Member State/ Organization	Title
11	J. Shah (v)	Pakistan	Banana Residue Management through Composting and Mulching for Crop Fertilization and Production
16	C. Phy	Cambodia	Optimizing Rice Yield and Fertilizer Nitrogen Use Efficiency in Rice Production System through Application of ¹⁵ N Stable Isotopic Technique
17	N. A. Kouassi (v)	Côte d'Ivoire	Wetlands planted with oil palm as a response to land scarcity and rainfall shortage in southern Côte d'Ivoire
19	S. Pansiri	Thailand	Nutrient Management Using ¹⁵ N Labelled Fertilizer for Enhancing Rice Production
21	S. Phommalath	Lao PDR	The efficient use of nitrogen for soil improvement and good rice productivity in Lao PDR
35	A. Babiker	Sudan	Effect of different rate of urea on yield and yield components of onion applied by fertigation using ¹⁵ N techniques
41	E. Kosh-Komba	Central Africa Republic	Effect of the application of complete mineral fertilizer N.P.K and organic manure (cow dung) for the performance of the pure cultivation of Manihot esculenta Crantz in a forest area (municipality of Pissa) Central African Republic
47	N. Amenzou	Morocco	Nitrogen Use Efficiency in maize under organic mulch practice and nitrogen fertilizer doses
53	S. Rahman (v)	Malaysia	Nuclear and isotopic techniques in development of rice management package in Malaysia
91	M. Semiani	Algeria	Evaluation of nitrogen fertilizers use efficiency for potato (<i>Solanum tuberosum</i>) using the ¹⁵ N technique
106	R. Vecatasamy	Republic of Mauritius	Determining the yield and fertilizer use efficiency of open-field grown French bean and potato under gravity-fed drip fertigation system using ¹⁵ N Tracer
125	J. Villarreal (v)	Panama	Improving the efficiency of nitrogen fertilizer use by rice through application of fungi and bacteria that promote plant growth
130	S. Ramakhanna (v)	Lesotho	Mapping cropland soil organic carbon stock and potential for increased soil and crop productivity in Lesotho

Paper No.	Name	Member State/ Organization	Title
131	S. Mofolo (v)	Lesotho	Maximizing biological nitrogen fixation and nitrogen use efficiency by beans cultivars in maize-based cropping systems for enhanced crop and soil productivity in Lesotho using 15N isotopic dilution method
140	O. Abidine Traore	Burkina Faso	Cowpea (<i>Vigna unguiculata</i>) N ₂ fixation as affected by the diversity of farming practices in the centre-west area of Burkina Faso
141	O. Abidine Traore	Burkina Faso	Nitrogen and phosphorus uptake from isotope-labelled fertilizers by sorghum and soil microorganisms
149	S. de los Santos Villalobos (v)	Mexico	Improving wheat yield and nitrogen use efficiency by the inoculation of a native bacterial consortium in the Yaqui Valley, Mexico
151	F. Parra Cota (v)	Mexico	Simulation of grain yield in durum wheat under different doses of urea in the Yaqui Valley, México, by using the Aquacrop model
152	M. Vezzone	Brazil	Evaluation of Nitrogen use efficiency and nitrogen nutrition index in Marandu grass
155	S.K. Lam	Australia	Enhanced efficiency nitrogen fertilizers: Progress and prospects
178	T. Razafimbelo (v)	Madagascar	Tracing soil organic carbon dynamics in ecosystem degradation using 13C isotope
180	W. Wanek	Austria	Soil microbial nitrogen use efficiency is driven by climate- and bedrock-related factors constraining soil organic N availability at the continental scale
228	C. Samarawickrema (v)	Sri Lanka	Managing land and water for climate smart agriculture
229	B. Shoukat	Pakistan	Effects of different tillage methods, residue conservation and nitrification inhibitor on irrigated maize-maize rotation under subtropical conditions
230	W. Ishaque	Pakistan	Nitrogen use efficiency and 15N balance in flooded rice under semi-arid subtropical conditions
243	J. Vera Nune (v)	Mexico	Functional bacterial diversity in the absorption of 32P-liquid fertilizer by sugarcane plant (<i>Saccharum officinarum</i>)
244	T. Muraoka	Brazil	Nitrogen fertilizer (15N) associated with plant growth-promoting bacteria on agronomic performance and nutrition of corn in Brazilian Cerrado Oxisol

Paper No.	Name	Member State/ Organization	Title
251	E. De La Cruz Torres (v)	Mexico	Improving fertilization practices in crops through the use of efficient genotypes in the use of macronutrients and plant growth promoting bacteria in Latino America and the Caribbean
262	A. Nduwumuremyi	Rwanda	Untapped potential of using nuclear techniques to improve cassava productivity and adoption of climate smart agriculture innovations
275	R. Rallos	Philippines	Fertilizer rate optimization and split application improve rice productivity and nitrogen use efficiency
282	J. Bayuelo Jimenez (v)	Mexico	The influence of land-use changes on phosphorus cycling in a volcanic ash-derived soil of Mexico
294	R. Hood-Nowotny; M. Heiling	Austria	Stable isotopes can help understanding processes of carbon turnover and storage in soils: Results of a ten-year long-term trial in Austria
298	U. Od Baatar (v)	Mongolia	Assessment of nutrient elements in the arable soils of Mongolia
303	P. Hounnandan (v)	Benin	Improving legumes productivity through rhizobial inoculation in cereal-livestock cropping systems in Benin
304	C. Zoundji (v)	Benin	Improvement of Bambara groundnut (<i>Vigna subterranea</i> L.) productivity in Benin by the use of efficient nitrogen fixing bacteria
315	A. Nario	Chile	Evaluation of Bacterial use efficiency as biofertilizers in maize using isotopic technique (15N)
320	M. Hangula (v)	Namibia	Compound Nitrogen, Phosphorus and Potassium Synthetic Fertilizers Improved Pearl Millet Grain Yield in Namibia
351	D. Nguyen (v)	Vietnam	Using 15N isotope techniques to assess nitrogen use efficiency of rice and maize on different soil types in Vietnam

SESSION 2: Soil Conservation and Land Management

Paper No.	Name	Member State/ Organization	Title
10	R. Yadav (v)	India	Earthworms as protagonists for soil health and crop production
12	Y.Tadesse	Ethiopia	Erosion: Conceptualization Based on Spatial Unit of Movement and Deposition

Paper No.	Name	Member State/ Organization	Title
20	N. A Kouassi (v)	Côte d'Ivoire	Using ¹³⁷ Cs to Assess Soil Conserving Efficiency of Pueraria Cover Crop on Oil Palm (<i>Elaeis guineensis</i>) Plantations In Côte D'ivoire
24	M.E Haque	Bangladesh	Study on Sediment Source in a Small Watershed in Bangladesh by Compound Specific Stable Isotope (CSSI) technique
27	T. Akplo (v)	Benin	Use of mulch-based technology as a climate-smart agricultural practice in Benin: A case study of the Zou Watershed
44	C. Kaizzi Kayuki	Uganda	Soil erosion and deposition rates assessment in Southwestern highland of Uganda using fallout radionuclides (caesium – ¹³⁷)
54	J. Peralta Vital (v)	Cuba	Adaptation and mitigation of the negative impacts of climate change and the sustainable management of land and water through the integrated use of nuclear techniques
55	J. Peralta Vital (v)	Cuba	Integrated application of nuclear techniques (FRN, CSSI, isotope hydrology) to assess the degradation of land and water resources of an important Cuban hydraulic facility.
68	A. Gloutney	Canada	Erosion assessment of cultivated Histosols using caesium-137 measurements
69	N. Oduor (v)	Kenya	Nutrient and organic carbon losses by erosion, and their economic and environmental implications in the drylands of Kenya
78	A. Biratu (v)	Ethiopia	Implications of land management practices on selected ecosystem services in the agricultural landscapes of Ethiopia
104	B. Jintaridth	Thailand	Assessing soil and water quality for agricultural management in the area of soil erosion by using nuclear techniques
109	F. Alladassi (v)	Benin	Quantification of water related soil erosion in southern Benin using radionuclides fallout and Universal Soil Loss (USLE) Models
128	A. Biratu (v)	Ethiopia	Ecosystem service valuation along landscape transformation in central Ethiopia
146	A. Gdiri (v)	Tunisia	Use of ¹³⁷ Cs technique to study the vegetation effect on soil erosion in El Kbir watershed (Zaghuan, Tunisia)
161	R. Hernandez (v)	Cuba	Quantification of soil erosion using the cesium- ¹³⁷ technique

Paper No.	Name	Member State/ Organization	Title
163	K. Tiwari	Nepal	Soil erosion and sedimentation control in the Phewa Lake of Nepal through integrated watershed management practices
197	M.R. Khan	Bangladesh	Assessment of depth distributed fallout radionuclide (FRN) and soil redistribution on a hill slope in Bangladesh
200	M. Kassab (v)	Egypt	Assessing soil erosion using the fallout radionuclides: Experimental investigations in two different agroecological zones in Egypt
212	C. Sproviero (v)	Argentina	Evaluating ecological service crops use in an Agronomic rotation within the Humid Pampa
219	M. Tarafder (v)	Bangladesh	Effectiveness of soil management practices to reduce soil erosion and improve soil health by fallout radionuclides
222	D. Dembele (v)	Mali	Characterization of soils and agricultural practices at high scale in the cotton-growing zone of Mali
225	M. Khododadi (v)	USA	Evaluating the impact of installing check-dams on the sediment sources using geochemical fingerprints in Zarivar Lake watershed, Iran
226	A. Azbouche (v)	Algeria	¹³⁷ Cs and ²¹⁰ Pbex redistribution in semi-arid land for soil erosion assessment
302	P. Houngnandan (v)	Benin	Use of radioisotopes for soil and water conservation for agriculture in Benin: achievements and perspectives

SESSION 3: Agricultural Water Management

Paper No.	Name	Member State/ Organization	Title
4	M. Oke (v)	Nigeria	The livelihood diversification strategies, landscaping of a typical fish farm in Gwagwalada Abuja Nigeria
9	Y. Amirhosseini	Iran	Investigation of water resources used in agriculture using isotopic data (Case study: Basin in Arak)
25	A. Sunday Fasina	Nigeria	Nuclear Techniques to the Rescue: Practicing Agriculture by Internal Displaced Farmers in Nigeria in the Face of Climatic and Political Hardship

Paper No.	Name	Member State/ Organization	Title
26	A. Sunday Fasina	Nigeria	Influence of Drip Irrigation Frequency, N-Fertilization and Mulching on Yield, Nitrogen and Water Use Efficiencies of Cucumber in Nigeria
30	M. Sall	Senegal	Promotion of climate smart irrigation technologies in the small-scale farming systems of the Senegal river are
64	F. Muraga (v)	Kenya	Assessment of the pollution impacts to the riparian small-scale irrigators along river Nairobi, Kenya
71	P. Mboyerwa (v)	Tanzania	Irrigation water management regimes, nitrogen fertilization and their interactive effects on water use, water productivity and rice yield in eastern Tanzania
73	R. Chouari	Tunisia	Combining gamma irradiation and bioaugmentation enhances treated waste water's quality for its reuse in agricultural irrigation
83	A. Wahbi	Austria	Coping with COVID-19: Virtual training on installation, setup, calibration and validation and use of cosmic ray neutron sensor (CRNS) for soil moisture assessment
87	M. Itam (v)	Japan	Improving water use efficiency in bread wheat under heat, drought, and combined heat and drought stresses
100	A. Haile Tefera	Ethiopia	AquaCrop model evaluation for irrigated potato (<i>Solanum tuberosum</i> L.) under various water levels at Debre Birhan, Amhara regional state, Ethiopia
101	A. Haile Tefera	Ethiopia	Applications of improved water management technologies in Tef production of Ethiopia
102	A. Haile Tefera	Ethiopia	On-farm validation and pre-extension demonstration of improved water management practices in Ethiopia.
105	C. Mukungurutse	Zimbabwe	Effect of water application rates on fertilizer nitrogen use efficiency, yield and water productivity of drip irrigated cabbages (<i>Brassica oleracea</i>)
115	F. Eddine Belkhiri (v)	Algeria	Calibration of FAO AquaCrop model for Durum wheat (<i>Triticum durum</i>) under Mediterranean conditions
120	B. Ait Hssaine (v)	Morocco	The impact of sharpened land surface temperature on evapotranspiration estimated using three thermal-based energy balance models

Paper No.	Name	Member State/ Organization	Title
124	R. Mirkhani	Iran	Maximizing the planting date of wheat with AquaCrop model and isotopic mass balance method for adaptation to climate change
127	S. Masic (v)	Serbia	Radiation influence on the reduction of dissolved organic matter (DOM) present in water
134	A. A. Phiri (v)	Zambia	Optimizing Agricultural Water Management for Improved Water Use Efficiency (WUE)
135	L. Bouchaou	Morocco	Review of isotopic techniques contribution for sustainable water resources management: Insights from agricultural area of Souss-Massa (Morocco)
138	G. Skrzypek	Australia	Irrigation water quality assessed using hydrochemical and stable isotope analyses, Rio Cobre, Jamaica
158	V. Zupanc	Slovenia	Influence of irrigation on capsicum plants using the isotope ^{15}N
160	R. Sibello Hernandez (v)	Cuba	Parameterization of the AquaCrop model in the tomato crop (<i>Solanum lycopersicum</i> L), in the productive company Cultivos Varios Juraguá, Cienfuegos, Cuba
181	N. Ismayilzade	Azerbaijan	Strengthening best agricultural practices related to soil, nutrients and water in cotton production (GAP)
184	M. Mwape	Zambia	Understanding the interaction between maize water use efficiency and nutrient uptake in irrigated cropping systems, a basis for predicting and improving Zambia's productivity in a changing climate
191	N. Ramachandra Bhat (v)	Kuwait	Climate-smart nutrient and irrigation management for sustainable date palm production in arid environments
193	H.Said-Ahmed	Joint FAO/IAEA	Field scale soil moisture monitoring with Gamma Rays Sensor
194	M. Mbaye	Senegal	A near-real-time web GIS tool for climate smart water management by combining Cosmic-Ray Neutron Sensor data and remote sensing data (Sentinel 1 & 2 and MODIS)
195	G. Kornov	Bulgaria	Refining drip irrigation in a primocane-fruiting raspberry plantation
213	A. Nario	Chile	Determination of water use efficiency in maize (<i>Zea mays</i>) using isotopic techniques $\delta^2\text{H}$ (Deuterium, D) and $\delta^{18}\text{O}$ (Oxygen 18) under different irrigation levels
215	S. Hin	Cambodia	Effect of water irrigation regimes and nitrogen rates on rice yield and N fertilizer efficiency

Paper No.	Name	Member State/ Organization	Title
218	R. Subedi	Nepal	Identification of recharge area of mountain springs using environmental isotopes and geospatial tool
220	J. Van Laere	Belgium	A dual stable isotope (C-13 and O-18) approach to assess drought tolerance of two contrasting varieties of cassava with different potassium availabilities
221	R. Singh Thapa	Nepal	Identifying potential recharge area of mountain springs through hydrogeological mapping and isotope analysis for effective springshed management against climate change impacts
235	A. Misi Manyanga; E. Chikwari	Zimbabwe	Effect of water application rates and plant population on white bulbous onion water and nitrogen use efficiency under drip irrigation on a clay soil
237	L. Mhaka; E. Chikwari	Zimbabwe	Evaluating different mulching materials for moisture retention, and nitrogen use efficiency and yield of drip irrigated white cabbage (<i>Brassica oleracea</i>)
257	T. Kelly	UK	AquaCrop-OSPy: Bridging the gap between research and practice in crop-water modeling
281	S. N. Akai Nettey	Ghana	Growth, yield attributes and water use efficiency of drip-irrigated cucumber (<i>Cucumis sativus</i> L.) under greenhouse conditions
285	C. Chinchilla-Soto (v)	Costa Rica	Improving water management for common beans (<i>Phaseolus vulgaris</i> L.) in Costa Rica using FAO model AquaCrop
306	A. Canet-Mari	Austria	Tracing the attenuation of $\delta^{18}\text{O}$ and $\delta^{2}\text{H}$ in the unsaturated zone for different soil textures and biogeographic regions
327	F. Gbaguidi (v)	Benin	Determination of rates of applied fertilizer (nitrogen) and irrigation water by drip irrigation using nuclear techniques (^{15}N) for vegetable (tomato) production
332	V. A. Berriel (v)	Uruguay	Benefits of using legumes as a summer cover crop for rotation with malting barley
333	Y. Cartagena (v)	Ecuador	Evaluation of the efficient use of water in the cultivation of corn (<i>Zea mays</i>) variety INIAP 101, with different levels of fertilization
345	A. Hegazi	Egypt	Natural Radioactivity Levels in Some Vegetable Crops Under Greenhouse Cultivation
346	T. Thierry Lékadou	Cote d'Ivoire	Impact of Climate Variability on Water Resources: The Case of Marc DELORME-CNRA Station, Southeast of Cote d'Ivoire

SESSION 4: Tracing Agricultural and Industrial Pollutants

Paper No.	Name	Member State/ Organization	Title
3	M. Oke (v)	Nigeria	Land use conflict between farmers and herdsmen – implication for agricultural and rural development in Nigeria
43	H. Hu	Australia	The global distribution and environmental drivers of the soil antibiotic resistome
88	I. Vujcic	Serbia	Microbiological decontamination of the coastal soil using of gamma irradiation
95	F. Tasneem Ahmed	Bangladesh	Agricultural water quality evaluation and environmental risk surveillance of trace pollutants in groundwater and soil in an industrialized region of Jessore, Bangladesh
99	M. Noor Hidayat (v)	Malaysia	Source analysis of sulphate and carbon stable isotopes ratio in soil to determine source of pollution in Sungai Besar, west coast of Malaysia
113	A. Watzinger	Austria	Riparian strips as climate change mitigation strategy - ^{18}O - PO_4 technique to study the P cycling in streams subject to excess nutrient inputs
119	O. Meniallo	Joint FAO/IAEA	Microplastics in agricultural soils: a new field for stable isotopes application
126	J. Alexander Villalaz Perez (v)	Panama	Soil properties, heavy metal content and dynamics of cadmium in Creole cocoa genotype grown organically in Bocas Del Toro Region of Panama
136	G. Skrzypek	Australia	FRAME - a new tool for isotope mixing and fractionation Monte Carlo models for pollution studies
139	G. Skrzypek	Australia	Stable isotope multitracer approach to disentangling the pollution budget of Inle Lake, Myanmar
147	C. Nonterah (v)	Ghana	Application of water quality index for irrigation and sustainable water resources management
157	E. Courage (v)	Ghana	Sources and impacts of anthropogenic contaminants on surface water quality in the Volta Estuary: Any concerns?
164	A.G. Chandrapala (v)	Sri Lanka	Are $\delta^{18}\text{O}$ ‰ values in water and other water quality parameters solute concentration dependent? A case study of seasonal variation of stream water quality parameters in central highlands of Sri Lanka

Paper No.	Name	Member State/ Organization	Title
179	H.L. Nguyen	Vietnam	Assessment of nitrogen nutrient sources in aquatic environment of Tuyen Lam sub-catchment based on its stable isotopes ratio ($\delta^{15}\text{N-NO}_3$) combined with geochemical parameters
210	V. Zupanc	Slovenia	Characterization of hydraulic properties in the upper vadose zone for alluvial aquifers with Hydrus
248	T.B. Anh Nguyen	Australia	Livestock manure and the antibiotic tylosin significantly altered soil protist functional groups
254	L. Bouchaou	Morocco	Groundwater management challenges in southern Morocco: Insights from stable isotopes
261	N. Zakaria (v)	Ghana	The use of stable isotopes and an isotope mixing model to quantify nitrate sources in groundwater from the lower Anayari catchment, Ghana
265	F. Wang (v)	China	Migration and potential ecological risks of microplastics in soil-water-plants system
268	C. Bezuidenhout	South Africa	Antibiotic residue and antibiotic resistance gene patterns in wastewater effluent and rivers – Implications for downstream agriculture use
269	A. Harbottle	United Nations	Reconstruction of heavy metals and hydrocarbons contamination history in lacustrine systems from Balta Mica a Brailei natural protected area, Romania
271	J. Regitano	Brazil	Land-use and microbial diversity depletion on enzyme activities and impacts on glyphosate mineralization in tropical soils
272	J. Regitano	Brazil	Land use and bacterial diversity effects on atrazine biodegradation
277	S. Jebri (v)	Tunisia	Antibiotic resistance patterns of relevant antibiotic resistance genes in bacterial and viral fractions of reclaimed wastewater used in agriculture
319	J. Halder	Austria	Agriculture versus wastewater: tracing nitrate and water sources in the Danube River Basin with stable isotopes and compounds of emerging concern
344	E. Blagodatskaya	Germany	Microbial biodegradation of a bio-based and biodegradable plastic in field soil environments under ambient and future climatic conditions
349	K. Müller	Germany	Applicability of Stable Isotope Raman Microspectroscopy for the Analysis of Biodegradation of Microplastics

SESSION 5: Greenhouse Gas Emissions

Paper No.	Name	Member State/ Organization	Title
7	J. He	Australia	Relative contributions of ammonia oxidizers to soil nitrification
66	A. Sanz Cobena	Spain	Reliable and cost-effective on-site ammonia emission measuring techniques based on inverse dispersion modeling
72	P. Mboyerwa (v)	Tanzania	Mitigation scenario for reducing greenhouse gas emission from irrigated paddy rice field in eastern Tanzania
153	M. Vezzone	Brazil	The use of Aquacrop for evaluating strategies to mitigate climate change effects on pasture systems
165	G. Dicen (v)	Philippines	Vulnerability of soil organic matter to microbial decomposition as a consequence of burning
273	M. Deppe	Germany	Long-term climate feedback of elevated atmospheric CO ₂ concentrations on GHG emissions in a grassland ecosystem
296	A. Wawra	Austria	MaxRoot-C optimizing roots for sustainable crop production in Europe—pure cultures and cover crops
297	J. Chin-Pampillo (v)	Costa Rica	Addition of biochar and other charred materials to the soil do not alter bromacil and diuron efficiency and improves soil habitat conditions for fauna in a tropical agroecosystem
307	H. Deroo	Belgium	Stable isotopes to understand paddy soil biogeochemical processes under water-saving irrigation
312	A. Larrandart (v)	Argentina	Azospirillum spp. as a tool to reduce the nitrous oxide emissions from a corn crop

SESSION 6: Advances of Nuclear-Based Instrumental and Analytical Techniques

Paper No.	Name	Member State/ Organization	Title
23	A. Gdiri (v)	Tunisia	Quantifying soil erosion using ¹³⁷ Cs on cultivated land in the Sbailia watershed-Zagouane, Tunisia
67	M. Mihajlo	Bosnia and Herzegovina	Innovative agricultural water management in Bosnia and Herzegovina, SMARTWATER project

Paper No.	Name	Member State/ Organization	Title
132	R. M. dos Anjos (v)	Brazil	Nuclear, isotopic and related techniques available at the LARA of the Fluminense Federal University, Brazil
142	A. Zaouak (v)	Tunisia	Gamma irradiation synthesis of Ag/PVA nanocomposites and their catalytic removal of toxic nitro-aromatic compounds
205	C. Grail	France	Transformation of pesticides in agricultural soil and groundwater: insights from pesticides and compound-specific isotope analysis (CSIA) in the Berambadi catchment (South India)
206	N. Rhoujjati	Morocco	Assessing the snowmelt contribution to water resources in agricultural areas using stable isotope in the High and Middle Atlas Mountains of Morocco
249	T. Contreras (v)	Honduras	Stable Isotopes ^{18}O and ^2H as a tool to understand El Cajon reservoir behavior
259	M. Hofmann	Netherlands	Real-time, online monitoring of ammonia and GHG emissions from soils with Cavity Ring-Down Spectroscopy
286	E. Ramirez (v)	Bolivia	Use of Cosmic ray neutron sensors for the study of high-altitude wetlands in a context of climate change: Case of the Bolivian Andes (4500 m.a.s.l.)
292	T. Franz	United States	Feasibility assessment on use of proximal geophysical sensors to support precision management

SESSION 7: Digital Technology, GIS, Machine Learning and Modelling

Paper No.	Name	Member State/ Organization	Title
50	L. Conceição (v)	Brazil	Assessment of the dependence and control of ET in temporal and spatial variability of soil moisture at a woodland savanna site in southern Brazil
85	Y. Tadesse (v)	Ethiopia	Spacing theorems and procedure for manual level bench terraces
116	I. Ibrahim (v)	Qatar	FarmTech: Regulating the use of big data in the commercial agricultural sector
173	H. Jegat	Venezuela	Integrated land and water management in the Yacambu-Quíbor Project, Venezuela
242	M. Djordjevic	Serbia	Use of nuclear techniques and GIS for soil erosion state interpretation in the forest areas of the Crveni potok catchment

Paper No.	Name	Member State/ Organization	Title
308	R. Jafía	Chile	Evaluating the water resource in the region of Magallanes, Chile, based on a combination of Cosmic Rays Neutron Sensor (CRNS) and climate and glaciological models

JOINT FAO/IAEA PUBLICATIONS RELATED TO THE SUBJECT OF THE EVENT

- Wahbi, A., Heng, L., Dercon, G. (2018) Cosmic Ray Neutron Sensing: Estimation of Agricultural Crop Biomass Water Equivalent, Springer Open, Cham. 33 pp.
- Zaman, M., Shahid, S.A. Heng, L. (2018) Guideline for Salinity Assessment, Mitigation and Adaptation Using Nuclear and Related Techniques, Springer Open. 131 pp.
- Mabit, L., Blake, W. (Eds). (2019) Assessing Recent Soil Erosion Rates through the Use of ⁷Be, Springer Open, Cham. 69 pp.
- Adu-Gyamfi, J., Heng, L., Eklund, G., De Souza, M. (2019) Antimicrobial movement from agricultural areas to the environment: The missing link. A role for nuclear techniques. FAO Land and Water Discussion Paper 13 Rome. 33 pp. FAO
- IAEA (2019) Guidelines for Sediment Tracing Using the Compound Specific Carbon Stable Isotope Technique, IAEA-TECDOC-1881. 66 pp.
- Lee Zhi Yi, A. and Dercon, G. (Eds). (2019) Data management and visualisation in response to large-scale nuclear emergencies affecting food and agriculture, FAO Technical Guidelines. Vienna, FAO/IAEA. 39pp.
- Zaman, M., Heng, L., Müller, C. (2021) Measuring Emission of Agricultural Greenhouse Gases and Developing Mitigation Options using Nuclear and Related Techniques. Springer Open, Cham. 336 pp.
- Adu-Gyamfi, J. , Pfahler, V. (2022) Oxygen Isotopes of Inorganic Phosphate in Environmental Samples. Springer Open, Cham. 330 pp.
- Dercon, G., Lee Zhi Yi, A., Fesenko, S., Heng, L. (2022) Sampling of Agricultural Soils and Plants for Radioactivity Analysis, <http://www.fao.org/3/cb9304en/cb9304en.pdf>

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Symposium on International Safeguards: Reflecting on the Past and Anticipating the Future, 31 October-4 November, Vienna, Austria

Fifth International Conference on Nuclear Power Plant Life Management (PLIM), 28 November – 2 December, Vienna, Austria

International Conference on Integrated Medical Imaging in Cardiovascular Diseases (IMIC-2022), 13-16 December, Vienna, Austria

2023

International Conference on Effective Nuclear and Radiation Regulatory Systems, 20-23 February, Abu Dhabi, United Arab Emirates

International Symposium on Trends in Radiopharmaceuticals (ISTR-2023), 17-21 April, Vienna, Austria

International Symposium on Uranium Raw Material for the Nuclear Fuel Cycle: Innovation for Sustaining Future Resources and Production (URAM-2023), 8-12 May, Vienna, Austria

International Conference on Nuclear Decommissioning: Addressing the Past and Ensuring the Future, 15-19 May, Vienna, Austria

International Conference on Computer Security in the Nuclear World: Security for Safety, 19-23 June, Vienna, Austria

International Symposium on Isotope Hydrology, 3 – 7 July 2023, Vienna, Austria

Second International Conference on Climate Change and the Role of Nuclear Power, 9-13 October, Vienna, Austria

29th IAEA Fusion Energy Conference, 16-21 October, London, United Kingdom

International Conference on Waste and Environmental Safety: Integrated Approach to Strengthening Sustainable Development, 6-10 November, Vienna, Austria

International Conference on Research Reactors: Achievements, Experience and the Way to a Sustainable Future, 27-30 November, Dead Sea, Jordan

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