INSAS-I/21/Report

Food and Agriculture Organization of the United Nations

GLOBAL SOIL PARTNERSHIP

Report of the First Meeting of the International Network of Salt-Affected Soils (INSAS)

14-15 April 2021, Online meeting

International Network of Salt-Affected Soils

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Rome, 2021

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1. Opening of the workshop

The first meeting of the International Network of Salt affected Soils (INSAS) was held virtually on 14-15 April, 2021. It was attended by 260 participants from 94 countries.

Mr Ronald Vargas, Secretary of the Global Soil Partnership (GSP), welcomed the participants to the virtual meeting and spoke about the initial set-up of INSAS.

Ms Ismahane Elouafi, FAO's Chief Scientist, stressed that all approaches taken by INSAS must be underpinned by science. She highlighted the importance of FAO in the process of developing and transmitting the best knowledge at a country level. She discussed the 3 branched approach - preventing soil salination, managing salt affected soils and rehabilitating affected soils. Ms Elouafi welcomed the establishment of INSAS governance, the development of a plan of action and the discussion of its implementation over the meeting's two days. She also stated that World Soil Day 2021 would focus on salt-affected soils.

2. Introduction to the FAO Global Soil Partnership tools and activity on salt-affected soils

The first session was devoted to the tools and activity of GSP in order to familiarise the participants with the existing structure of GSP and its style of work.

Ms Natalia Rodriguez introduced the history, construction and main activities of the GSP and introduced the 5 technical networks that support the GSP activities- ITPS, INSII, GLOSOLAN, INSAS and INBS.

She discussed the GSP's development of documents including the launch of the *Voluntary Guidelines for Sustainable Soil Management* in 2017 and *The International Code of Conduct for the Sustainable Use and Management of Fertilisers* in 2019. She also talked about the initiatives for monitoring soil carbon and the Soil Doctor programme, as well as the protocols providing the frameworks for sustainable soil management. She also discussed the raising of awareness through webstories, newsletters, competitions and World Soil Day.

Mr Christian Omuto presented an overview of the history of global soil salinity maps (GSSmaps).. He described the updating and consolidating of information along with the GSP's involvement in encouraging all countries' participation in the mapping, working on a country and regional level in providing solutions and tools to harmonise the process.

He discussed how more than 80 countries had submitted a map, with many others to follow, with a June launch of the maps[*].

He also discussed the development of the Global Status of Salt Affected Soils publication with a publish date towards the end of the year, during World Soil Day 2021.

Ms Carolina Olivera discussed how the Soil Doctors farmer training programme worked, through the collaboration and networking with governmental agencies, universities and institutions. She explained that the programme would be based on the initial selection,

[*] The updated date of the launch of the FAO Global Map of Salt-affected Soils is to be at the end of October, 2021, during the Global Symposium on Salt-affected Soils.

training and support of a promotor at a country level with the intention that they would work independently to reach farmers and create Soil Doctors. They, in their turn, could then train other farmers in their community, in a national, regional and finally local structure.

She informed the participants that the programme provided tools - posters about soil salinity, pH and heavy metal testing as well as soil kits.

Ms Zhanyl Bozeyeva, the National project manager of FAO-KZ added that the project, jointly with the GSP, were creating soil salinity maps for two pilot regions in Kazakhstan, one of the world's largest countries, and providing support for the government of Kazakhstan on sustainable soil management. While promoting the Soil Doctors programme in the country, they had produced GSP and FAO educational materials translated into Kazakh and Russian on soil management for distribution as well as a translated video for the project partners.

She said that the regional project had so far concentrated on Kyzylorda in promoting sustainable soil management practices, due it being one of the worst salt-affected regions, and in order to prevent further salination. They were also providing soil salinity measuring tools and creating soil kits and were in the beginnings of rolling out the Soil Doctors programme.

Ms Suvannang, the GLOSOLAN Chair, described the need for soil laboratories to harmonise and standardise the production of data and protocols in measuring soil salinity and pH over 650 laboratories networked in GLOSOLAN to make the information accessible across all countries and regions.

She described how the GLOSOLAN initiative on soil spectroscopy was to be linked with GLOSIS and the Global Spectral Calibration Library.

She concluded that for the soil salinity network, GLOSOLAN supported a centralised and harmonized approach around soil testing. She reiterated the importance of ensuring that all results had to be based on similar data quality and that members could help by spreading the word, registering for free with GLOSOLAN and provide samples to the database.

Ms Konyushkova informed participants about the Global Symposium on Salt-Affected Soils taking place on the 27th-29th October 2021* as well as it being originally a postponed initiative of the Republic of Uzbekistan in 2020. It would be co-organised by the GSP and the government of the Republic of Uzbekistan, WASAG, UNCCD, IUSS and the ICBA.

She discussed the three themes for the GSSAS symposium
1. Assessment, mapping and monitoring of salt-affected soils
2. Integrated soil-water-crop solutions in rehabilitation and sustainable management of salt-affected areas, together.
3. Agenda for action to prevent, rehabilitate, remediate salt-affected soils and scale up sustainable soil management practices.

In order to strike a balance between science and practical solutions to SAS, she suggested two approaches – Firstly, that science-focused abstracts and case study/practice abstracts should be presented. Secondly, she announced a competition, the prize being that the 5 winners would present a video tour of their case study and practice. She also asked for suggestions so that INSAS might more fully involve governments, farmers and other

* The updated date of the GSAS symposium is October 20-22, 2021.

associations by the time of the symposium.

Ms Isabelle Verbeke explained the plan for the celebrations of World Soil Day (WSD) on the 5th December every year, explained the function of the WSD and its mission to focus attention, advocate and raise awareness. She invited people to participate and to offer suggestions to further improve this year's campaign and event.

She also went on to explain what the GSP did in developing and coordinating campaigns, posters and toolkits, working with media and press and engaging with different partners.

She discussed WSD 2021, and its focus on salt-affected soils. She suggested that even though not all countries or target groups had salinity/sodicity problems, no one should be left out of the celebrations. There were other connected problems of water and irrigation faced by many countries meaning that the inclusion of these linked issues in the celebration could then allow all countries to be involved with WSD celebration.

3. Introduction to INSAS

Ms Maria Konyushkova described the collaborative quality of INSAS where the voice of each country was important, its establishment under the aegis of the GSP and the 10-year experience of GSP on promoting the sustainable management of soils at all levels, from individuals and farms to countries and governments. The goal of INSAS was to facilitate the sustainable management of salt-affected soils developing useful tools, harmonized methodologies and sharing good practices among farmers and countries.

More than 500 members, representing 120 countries, showed a decent global balance of nations, even at such an early stage in their development.

She encouraged participants to join and explained that members would serve as a representative of their organisation or group interested in working with SAS.

She also discussed the nominations and election of the Chair and Vice Chair and explained their duties. The list of INSAS members who had already responded to the open call for nomination on the position of Chair and Vice-chair was presented. She announced that the acceptance of nominations would close at midnight on April 14 and the voting for the Chair and two Vice-chairs would happen at the end of the meeting, on April 15.

4. Setting the scene – the main areas of work with salt-affected soils (first day)

The second session of the meeting was aimed at showing some general aspects of the main areas in which INSAS could work. These were:

The mapping and assessment of salt-affected soils.
The development of policies on sustainable management of salt-affected soils,
The development of the guidelines on growing plants and crops under saline and sodic conditions sustaining soil health.
An integrated soil and water management strategy in saline/sodic conditions.

Mapping and assessing salt affected soils, challenges and opportunities and experience for Latin American and Caribbean regions

Due to a lack of knowledge to the extent of SAS in many areas of Latin America, **Dr Mario Guevara** was pleased to announce a scheme to build professional capabilities and development for people interested in salinity. This would work alongside the GSP and FAO and give an opportunity to update national assessments with the right facilities, methodology and support available for mapping SAS, although some countries had yet to show interest in updating their mapping information.

He reported some countries having variable methods, or unreliable and insufficient sampling and spoke of the need to harmonise data. He also mentioned the further problem of some countries not considering salinity to be a problem. Other countries were producing very good soil maps and he praised and commented on his colleagues' work there.

He mentioned that the Caribbean region was lacking data sets beyond polygon maps as a baseline and spoke of the necessity of developing regional models.

He spoke of the difficulty of defining soil salinity thresholds and patterns with statistical accuracy.

He finished by stressing the importance of increasing the quality, quantity and access to soil salinity data sets, enabling countries to create soil salinity monitoring frameworks and support strategies in soil salination management.

The soil salinity management of the United Arab Emirates

Dr Bayan Athamneh, Soil Quality Section Manager, UAE Environmental Agency Abu Dhabi stated how glad she was to be sharing the results of the soil salinity mapping and management project from the UAE and to be part of the global effort in combating soil salinisation.

She highlighted the many causes of soil salinisation and described their three year project, surveying around 4000 farms using multiple measurement parameters.

She explained that their project had provided detailed and differing thematic soil maps on three different scales and depths for agricultural areas of Abu Dhabi. This was in order to develop a soil salinity management plan, comprising of general recommendations and best practices in soil salinity management and improvement, recommendations for best managing soil salinity based on soil needs and defining the terms needed to properly understand soil, water and crop management in order to make plan accessible for a wider audience.

She then moved on to describe the next steps of developing and maintaining a long-term soil management and monitoring plan and the development of a soil protection policy. She also described the intention to conduct similar studies in other Emirates.

The Salt Doctors- improving crop yield under saline conditions

Dr Arjen De Vos explained that his group was a social enterprise from the Netherlands working on crop salt tolerance in their country as well as implementing those findings in many other countries. He also pointed out that that most soils globally are only slightly or moderately saline and needed only moderately salt-tolerant crops. He also discussed some

other properties of salt-affected soils such as low organic carbon and microbial content which also had to be considered and managed.

He discussed the updated data on the salt tolerance and productivity of conventional crops provided through their controlled field trials on over 50 crops in order to find varieties suitable for saline conditions. He discussed the development of protocols to estimate salt tolerance and suggested EC_{90}* as a robust alternative to EC_{50}**.

He discussed the trials producing increased yields using salt-tolerant potatoes in Egypt and Pakistan compared to local varieties.

He also related the market approaches in going from pilot schemes to implementation on a larger commercial scale, as well as the importance of both persuading plant breeders to produce salt-tolerant crop seeds and letting the farmers know there were other options available.

The Global Framework on Water Scarcity in Agriculture

Mr Jean Boroto, the coordinator of WASAG described its working group on saline agriculture, and the search for solutions to the challenges of soil salinity in order to provide resilience and food security.

He described the history, the partners and sectors making up WASAG, and how in order to deliver the commitments made, six working groups were set up, along with acknowledging the necessity of collaborating with the GSP in fulfillment of WASAG's commitments.

He discussed WASAG's list of commitments, in particular, #13, which proposed ways of living with salinity and how to have higher productivity in such conditions, and #14, producing solutions using adaptive farming techniques, sustainable farming systems, climate-smart agriculture and drought-tolerant crops.

5. Setting the scene – the main areas of work with salt-affected soils (second day)

The third session was focused on the example of an integrated approach to soil salinity management used at a regional scale as well as on several specific cases of soil salination such as the use of grey water and the impact of sea level rise.

Biosaline agriculture: lessons learned from agricultural R&D projects in salt-affected areas

Dr. Ahmed Elnaggar, a soil management expert from the International Centre of Biosaline Agriculture (ICBA) discussed the project's biosaline agriculture approach, using adaptation and mitigation techniques, salt-tolerant, climate-resilient and nutrient-rich crops along with the efficient use of irrigation and water to begin to restore salt-affected land back to health. He also mentioned the use of agri/aquaculture in this system, improving nutrient cycling and providing income for farmers.

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* EC_{90} is a threshold value of the electrical conductivity of saturated soil paste (dS m^{-1}) at which crop yield is reduced to 90 percent.

** EC_{50} is a threshold value of the electrical conductivity of saturated soil paste (dS m^{-1}) at which crop yield is reduced to 50 percent. The EC_{50} thresholds are given in *FAO Irrigation and Drainage Paper* No. 61 (2002), http://www.fao.org/3/ap103e/ap103e.pdf

He talked about the project's introduction of salt-tolerant grasses to abandoned land in the UAE for livestock, saving water and increasing biomass and discussed projects using the same rehabilitative approach in India, Pakistan and Ethiopia with very positive results to soil health, livestock and income.

In conclusion, Mr Elnaggaar explained that biosaline agriculture need only utilise poor quality water and badly degraded land while being able to generate resilience for marginal communities, offering income, food and fodder, while mitigating against climate change.

The integrated approach to soil salinity management in Central Asia and Turkey (CACILM-2 GEF project)

Mr Makhmud Shaumarov, the project coordinator for the Central Asian Countries Initiative for Sustainable Land Management (CACILM-2) and the Integrated Natural Resources Programme, discussed the addressing of drought and salinity issues through sustainable agriculture in Central Asian countries and the four components of the project, including scaling up their climate-smart agricultural practices and encouraging dialogue between multiple countries.

He talked about salinity issues in Central Asia and Turkey due to climate change, outdated drainage systems and unsustainable land management and the different regional approaches needed in dealing with these problems. These included dialogues on policy both regionally and nationally and the production of guidelines and reports. He also mentioned the promoting of different biosaline technologies in order to scale up the use of salt resistant crops, agroforestry and conservation agriculture.

On a national level, he discussed work in Kazakhstan and the production of soil maps, soil salinity testing, the Soil Doctors programme and the provision of drought and salt-tolerant crops, and training materials for local communities.

On the project in Tajikistan, he discussed the setting up of demonstration plots of salt-tolerant and drought-resistant crops, training and the production and distribution of training materials and manuals.

On their project in Uzbekistan, he discussed the importance of capacity building through the setting up of a seed base, the demonstration of salt-tolerant and drought resistant crops, as well as soil salinity management and conservation agriculture technology and techniques, producing salinity guidelines as well as the preparation of two district soil maps. He reiterated the importance of capacity building for farmers and decision makers together with scientists.

Effects of Grey Water Use on Salinity and Sodicity: Case Study from Belgium

Dr Wim Cornelis from Ghent University discussed the potentials and problems of using grey water in vegetable production and explained that Belgium was facing blue water shortages resulting in a search for alternative water resources such as grey water. This water posed a risk of salinity and sodicity, salt stress and soil structure degradation.

The overall aim of the case study was to examine the effect of grey water usage on soil structure, salinity and sodicity in the open field cultivation of cauliflower, potato and spinach. He reported the results of the trials over four seasons using differing crop, air and soil testing parameters and varied treatments and types of grey water.

He noted in conclusion that the SAR and ECe increased dramatically after irrigation with grey water, as well as observing a decline in soil structure. Crop yields were found to be less clear cut with both gains and losses found, depending on the treatments and crop/crop site tested.

The impact of sea level rise on soil salinization in Northern Europe and the potential of saline agriculture as an adaptation measure

Dr Kate Negacz from IVM Vrije University, Amsterdam presented the *Interreg North Sea Region project (Saline Farming, SalFar*) and the book- *Future of Sustainable Agriculture in Saline Environments*. She mentioned the four processes of soil salinisation in the North Sea Region; those of irrigation, aerosol, flood and seepage and discussed the effects of climate change on rising sea levels and coastal flooding events, especially in Northern Europe. The consequences varied according to soil type and type of land management in those regions.

She suggested that the solution was to be found in saline agriculture and reviewed the potentials of the method, including being able to use land previously denied to farming. Saline Agriculture also had great potential for fostering food security and sustainability, along with necessary climate change adaptation, circumventing trade offs with biodiversity, while providing income security through higher yields and the mitigation of economic and climate migrations.

She then discussed the action areas for INSAS shown from this research; that of multi-layer soil mapping, a manual on saline agriculture and best practices for farmers as well as indicators of soil salinity for soil health and food security and sustainability.

Modelling solute transport in SAS: case studies from Iran

Dr Meisam Rezaei from the Soil and Water Research Institute of Iran discussed the large amounts of agricultural land affected by salinity and sodicity and focused on the Sistan Plain of Iran with an extremely dry climate, including the agricultural practices, the limitations present and the reasons of salinity, including evaporation, flood and the dissolution of solute.

The study assessed the effect of differing irrigation systems on soil salinity/sodicity, comparing drip to furrow systems as well as evaluating leaching and solute transport of each system. The study used numerous parameters, measuring 312 soil profiles over one year for modelling.

He concluded that drip irrigation resulted in higher ECe and SAR compared to furrow irrigation. By applying the irrigation strategies from the study, it would result in a sustainable system, although due to the heterogeneity of the fields, a uniform drip irrigation system may not be an entirely efficient approach to take. Mr Rezaei then attempted to talk a little about the leaching and reclamation experiments but his internet connection failed at that point.

Ms Konyushkova then stepped in and suggested that when building methodology for soil maps, they had not considered soil modelling as part of their procedures and that it should be taken into account. It was also very important to find a balance around soil salinity between utility and sustainability and that INSAS should work towards developing new criteria and thresholds while thinking about soil health.

6. Interactive discussion of INSAS work plan

Ms Konyushkova then opened the interactive discussions on the thematic areas and concrete proposals of the work plan. These were to be:

SAS&Assessment: Mapping, assessing and monitoring of salt-affected soils

SAS&SSM: Sustainable management of salt-affected soils (practices, policy)

SAS&Crops: Halophyte agriculture and salt-tolerant crops

SAS&Water: Integrated soil and water management under saline/sodic conditions

She summarized the comments received during the meeting which showed that there was an overall agreement on the identified thematic areas and the proposed deliverables of the activity of INSAS, with few modifications. One of them was that SAS&Crops should include all plants (e.g. trees), hence the revised title for this thematic area had become SAS&Crops: Halophyte agriculture and salt-tolerant crops and plants.

Other comments focused on aspects other than the thematic areas and work plan. They reiterated the importance of dealing with the areas affected by salinity in their countries, such as the need for the mobilisation of financial resources, the updating of the existing criteria, guidelines and methodologies to adjust to modern knowledge and experience, the detalization of concrete activity, the involvement of more experts and the actions needed in salt-affected areas, for example, the reseeding of rangelands and raising the awareness of farmers around salinity (Annex VII). These comments are in line with the work plan of INSAS and will all incorporated into future activity and deliverables of INSAS.

The participants of the meeting were then invited to offer questions concerning the proposed workplan of INSAS.

Ali Sied firstly mentioned his knowledge of the area around Shewa-Robit, in Ethiopia, one of the regions in the ongoing soil salinity project mentioned by Ahmed Elnaggar from the International Centre of Biosaline Agriculture (ICBA). He explained that while a highly fertile area, soil salinity had resulted in some places being abandoned. He asked how might they adapt saline agriculture and salt-tolerant crops to that area, well known for mung bean production as a cash crop and wondered how best to collaborate in the selection and distribution of salt-tolerant mung bean varieties to alleviate soil salinity.

Ms Konyushkova then replied about the goal of INSAS being to build collaborations between partners and to develop manuals and guidelines to go forward in the sustainable management of SAS.

Ms Fozia Memon discussed her project in Pakistan working with farming families. She spoke of the speed of soil salination reported in the region. She noted the work being done on salt tolerant wheat and other food crops and stressed the importance of using salt-tolerant crops. She asked how she might best coordinate and engage the youth, women and men in the farming community.

Ms Konyushkova replied that the GSP worked on all levels, from government to farmers. She specifically mentioned the Soil Doctors programme as a way forwards along with developing materials to be used alongside the programme.

Mr Ebrima Jarra suggested a localised INSAS in Africa in order to integrate more fully with other countries and also asked how best to integrate from a community level upwards so that everyone could contribute. He also explained how many farmers in his area were using water from the tributaries close to the Atlantic, leading to saline water being taken from the rivers for irrigation, lacking the knowledge, techniques and information about salt-tolerant crops to cope with their SAS.

Ms Konyushkova answered and mentioned GLOSOLAN and the GSP who both worked initially on a global level, then regionally, then nationally. She suggested that first, similarly, INSAS needed to build a presence globally in order to facilitate change on a regional and local level.

She also suggested setting up a national soil partnership to combine the relevant sectors.

Mr Jarra began to reply to this, but unfortunately lost his internet connection.

Ms Pierrette Cazeau, President of the *Haiti Cholera Research Funding Foundation Inc* discussed how that beyond SAS and the reduction of nutrition available in crops for maintaining human health, there seemed to be a lack of information about chronic malnutrition in the work plan and the reality of people having to cook with and drink salinised water in under-developed countries in order to survive, leading to health issues.

Ms Konyushkova replied that soil salinity wasn't particularly affecting human health in this way, more the health of plants, and that the salt-tolerant crops were tasty and nutritious, although she also agreed that other salts, like boron did have adverse effects on human health and that this should be considered. However, the quality of water for drinking purposes is out of the scope of INSAS activity.

7. Voting for Chair and Vice-chairs and adoption of the work plan of INSAS

Ms Konyushkova then invited each candidate for the position of Chair of INSAS to speak, followed by each candidate for the two positions of Vice Chair.

After many inspiring and strong speeches from the candidates, an anonymous vote was taken and Mr Jorge Batlle-Sales was voted in as the Chair. He then proceeded to thank everyone and said that he felt very honoured, that he understood that it was a great responsibility and he would do his best. After another anonymous vote, Kate Negacz was voted in as Vice Chair, with a further Vice Chair to be decided later by an email vote due to an exact tie for second place.

Ms Negacz thanked all the members and said that she was looking forward to working together with Jorge and Maria.

The voting for the work plan then took place and was approved by the members of INSAS.

8. Closure of the meeting

Mr Batlle-Sales closed the meeting in his capacity as newly elected Chair by thanking all candidates who put their names forward for consideration and thanked all for their contributions to the network and to the farmers and stakeholders. He mentioned the next INSAS symposium, to be held virtually in October 2021. Looking forward, he asked that all should be innovative, exchanging and passing on scientific ideas for a better future for humanity.

He finished by congratulating the organisation for creating such a good meeting and wished good luck and good health to everyone and looked forward to a time when everyone could meet in person.

9. Posterior voting for the second vice-chair

The voting for the position of the second vice-chair took place online. 178 members of INSAS from 71 countries voted. Mr Meisam Rezaei was elected to the position by the majority of votes.

10. The formation of the working groups of INSAS

After the meeting, all members of INSAS were invited to join the WGs corresponding to their area of expertise and to contribute actively, on a voluntary basis, into the development of the documents of INSAS which are listed in the work plan. The interactive working meetings of WGs have been scheduled for the end of May and June.

Annex I: Agenda

Wednesday 14 April 2021	
13:30 – 13:40	**Opening** *Ismahane Elouafi, Chief Scientist, FAO*
FAO Global Soil Partnership tools and activity on salt-affected soils	
13:40 – 14:30	**Introduction to the GSP** *Natalia Rodriguez, GSP Secretariat* **Global soil salinity map and Global report on salt-affected soils** *Christian Omuto, GSP Secretariat* **Soil Doctors program and its materials on salt-affected soils** *Carolina Olivera Sanchez, GSP Secretariat & Zhanyl Bozayeva, FAO-KZ* **The Global Soil Laboratory Network (GLOSOLAN) Standard Operating Procedures (SOPs) for saline soil analysis** *Nopmanee Suvannang, GLOSOLAN Chair* **Global symposium on salt-affected soils (GSSAS2021)** *Maria Konyushkova, GSP Secretariat* **World Soil Day 2021** *Isabelle Verbeke, GSP Secretariat*
Introduction to INSAS	
14:30 – 14:50	**Introduction to INSAS** *Maria Konyushkova, GSP Secretariat* - Introduction to INSAS - INSAS webpage - Membership - Terms of Reference for Chair and Vice-Chair
Setting the scene - the main areas of work with salt-affected soils	
14:50 – 15:30	**Mapping and assessing salt affected soils: the challenges and opportunities as experienced for the Latin American and the Caribbean region** *Mario Guevara Santamaria, National Autonomous University of Mexico* **Salt-affected soils management: Soil salinity management plan of the United Arab Emirates** *Bayan Mahmoud Athamneh, UAE Environmental Agency Abu Dhabi* **Soil&Crops : The Salt Doctors - Improving crop yield under saline conditions** *Arjen de Vos, The Salt Doctors director*

	Soil&Water: The WASAG working group on Saline Agriculture - Partners at work for resilient agriculture and food security *Jean Boroto, coordinator of WASAG*

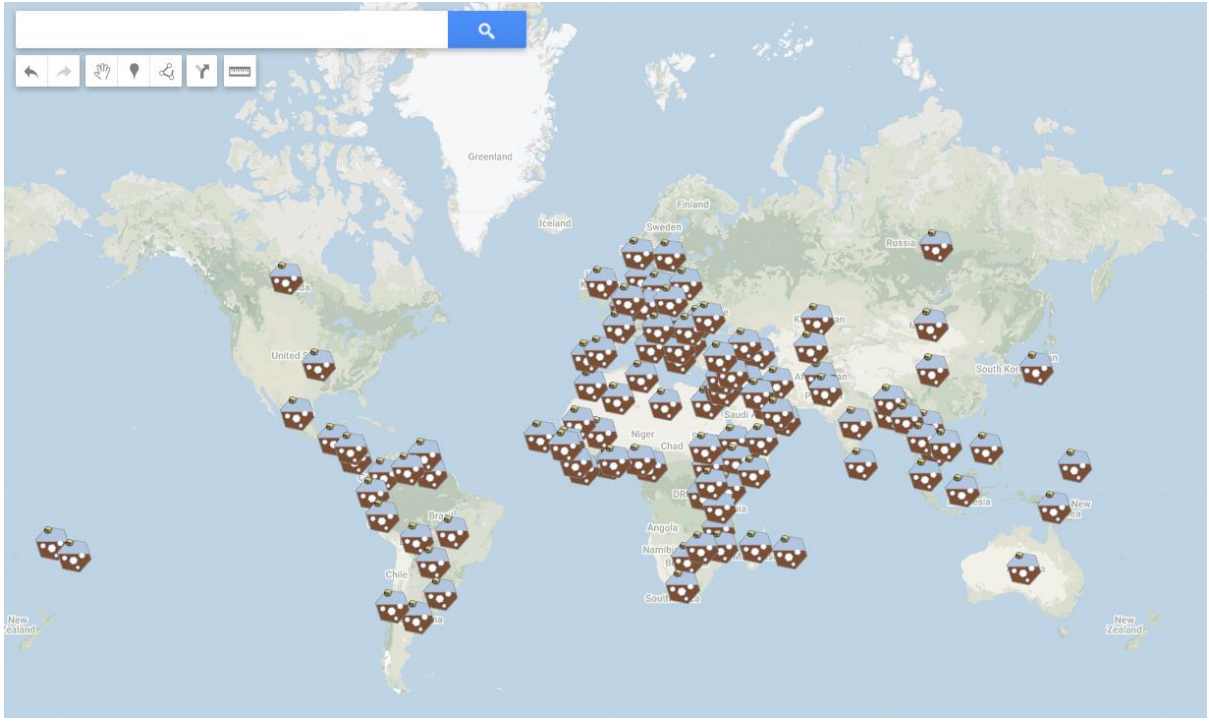
Moderator: Mr. Ronald Vargas, GSP Secretariat

Thursday 15 April 2021	
Setting the scene - the main areas of work with salt-affected soils (cont'd)	
13:30 – 14:20	**Biosaline agriculture: lessons learned from agricultural R&D projects in salt-affected areas** *Ahmed H. Elnaggar, International Center for Biosaline Agriculture* **The integrated approach to soil salinity management in Central Asia and Turkey (CACILM-2 GEF project)** *Makhmud Shaumarov, regional project coordinator, FAO-KZ* **Effects of grey water use on salinity and sodicity: case study from Belgium** *Wim Cornelis, Gent University - UNESCO Chair on Eremology* **Modelling solute transport in salt-affected soils: case studies from Iran** *Meisam Rezaei, Soil and Water Research Institute of Iran* **The impact of sea level rise on soil salinization in Northern Europe and the potential of saline agriculture as an adaptation measure** *Katarzyna Negacz, IVM Vrije Universiteit Amsterdam*
INSAS work plan and governance	
14:20 – 15:30	- Work plan of INSAS including thematic areas - Interactive discussion - Election of Chair and Vice-chair - Voting and adoption of the work plan of INSAS
15:30	**Closure of the meeting**

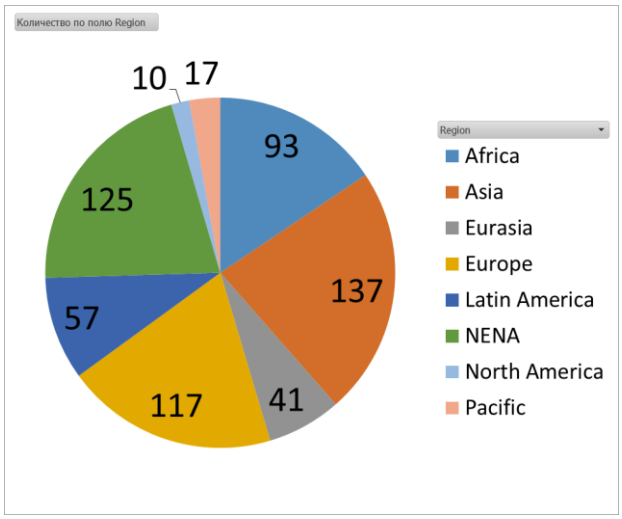
Moderator: Maria Konyushkova, GSP Secretariat

Annex II: Statistics of INSAS

The number of members of INSAS as of the end of April 2021 is ~600 members from 121 countries. The INSAS is represented by all regions of the world.



The geographic coverage of INSAS



The regional representation of INSAS (by UN regions)

Annex III: Terms of reference of INSAS

Any partner[1] of the FAO Global Soil Partnership can become a member of INSAS. National institutions, academia, NGOs, civil society, farmer associations, and other stakeholders interested to participate in the joint action to achieve the sustainable and productive management of salt-affected soils are welcome to join this network.

To join the network, the registration form available on the website of INSAS must be filled in (http://www.fao.org/global-soil-partnership/insas).

The governance over the activity of INSAS is performed by its Chair, Vice-Chair and representatives of ITPS.

The **Chairperson** is responsible for:

i. Supporting and ensuring the timely implementation of the INSAS work plan;
ii. Reporting on INSAS activities at the annual INSAS meeting;
iii. Representing INSAS at any other GSP meetings or international events;
iv. Reporting (jointly with the GSP Secretariat and ITPS Chair) to the GSP Plenary Assembly about the INSAS progress;
v. Supporting the INSAS Coordinator in capacity-building and financial-resources mobilization activities;
vi. Ensuring that the activities of the working groups are implemented according to the principles of INSAS, including transparency, inclusivity, and respect; and
vii. Coordinating cooperation with projects and initiatives that contribute to the aims of the INSAS, including research, service, and capacity development.

The term for the Chairperson is two years after election, extendable via INSAS decision to a second term. The appointment of the Chair of the INSAS takes place during the annual meeting of INSAS.

The Chair is, whenever possible, supported by a **vice-Chair** in all its activities and tasks.

At least one member of the Intergovernmental Technical Panel on Soils (ITPS) should be part of the INSAS. The duties of the representatives of ITPS to INSAS are:

i. Supporting the development and implementation of the INSAS work plan;
ii. Representing ITPS at the annual INSAS meetings;
iii. Reporting to ITPS about the INSAS activity.

The documents produced by INSAS that may have political implications or need a consensus between countries shall go through the procedure of approval by ITPS before publication.

The INSAS governance (Chair, Vice-Chair, ITPS representatives) should ensure to the best of their ability that the INSAS as a whole and its working groups have an appropriate geographical balance and representation of members.
All INSAS members receive regular updates on the work of the network.

[1] **To become a partner of the Global Soil Partnership, please register through the form at: http://www.fao.org/global-soil-partnership/partners/en/**

Annex IV: The governance of INSAS for the term 2021 - 2022 (elected Chair, Vice-chairs, ITPS representatives)

CHAIR

Prof. Dr. Jorge Batlle-Sales, University of Valencia, Spain

VICE-CHAIR

Dr. Katarzyna Negacz, Vrije Universiteit Amsterdam, the Netherlands

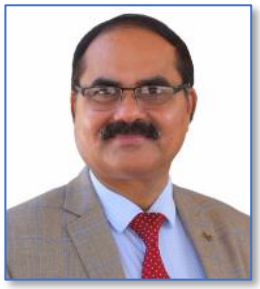
VICE-CHAIR

Dr. Meisam Rezaei, Soil and Water Research Institute, Iran

ITPS representative to INSAS

Prof. Dr. Mohammad Jamal Khan, University of Agriculture, Pakistan

ITPS representative to INSAS



Dr. Ashok K. Patra, ICAR – Indian Agricultural Research Institute, India

The work of INSAS is also supported by the members of the ITPS Salinity working group: Rosa Poch (Spain), Megan Balks (New Zealand), Kutaiba Hassan (Iraq), Rafla Attia (Tunisia).

Annex V: INSAS work plan for 2021-2022

as approved by its members at the 1st meeting (April 15, 2021, Zoom)

Thematic areas (working groups):

- **SAS&Assessment**: Mapping, assessing and monitoring of salt-affected soils
- **SAS&SSM**: Sustainable management of salt-affected soils (practices, policy)
- **SAS&Crops**: Halophyte agriculture and salt-tolerant crops and plants
- **SAS&Water**: Integrated soil and water management under saline/sodic conditions

#	Activity	Working group
1	Standard Operating Procedures for salinity / sodicity / alkalinity measurements	SAS&Assessment (jointly with GLOSOLAN)
2	Harmonization of the criteria on the assessment of salt-affected soils	SAS&Assessment (jointly with GLOSOLAN)
3	Review and refinement of methodology for mapping salt-affected soils	SAS&Assessment (jointly with INSII)
4	Development of indicators and methodology for monitoring salt-affected soils	SAS&Assessment, SAS&Water (jointly with INSII)
5	Development of indicators of soil salinity for soil health, food security and desertification/aridization	SAS&Assessment
6	Inventory on sustainable management practices for saline and sodic soils	SAS&SSM
7	Development of the manual on sustainable management of salt-affected soils*	SAS&SSM
8	Support the Global Soil Doctors program and complement the soil kit with salinity meters/field methods	SAS&SSM
9	Develop an inventory of halophytic plants suitable for saline agriculture and salt-tolerant crops, update the FAO Irrigation and Drainage Paper 61 (2002)	SAS&Crops
10	Development of the manual on saline agriculture*	SAS&Crops
11	Development of water quality criteria for sustainable management of soils to avoid its salinization and sodification	SAS&Water
12	Guidelines for using brackish water	SAS&Water
13	Development of the manual on sustainable water management in saline/sodic environments*	SAS&Water

*It can be one comprehensive manual in the end that covers sustainable agricultural practices, water and soil management, and crop selection under saline/sodic conditions.

Annex VI: List of participants

The 1st meeting of INSAS was attended by 260 participants from 94 countries including 190 members of INSAS and 72 non-INSAS participants from GSP/FAO, ITPS/FAO, other entities of FAO and other organizations.

Region	Country	Name	Institution	Member of INSAS
NENA	Algeria	Tarek Assami	Scientific and Technical Research Center on Arid Regions (CRSTRA)	Yes
Latin America	Argentina	Rainhart Luciano	UNLpam	Yes
Eurasia	Armenia	Samvel Sahakyan	Center for Agricultural Services of SNCO of the Ministry of Economy of the Republic of Armenia	Yes
Pacific	Australia	Thomas Baumgartl	Federation University Australia	Yes
Pacific	Australia	Dr Vinod Phogat	South Australian Research and Development Institute	Yes
Pacific	Australia	Bethanie Haase		
Eurasia	Azerbaijan	Amin ISMAYILOV	The Institute of Soil Science and Agrochemistry of Azerba ijan National Academy of Sciences	Yes
NENA	Bahrain	Ebrahim Jaffar Ahmed	Plant wealth Directroate	Yes
Asia	Bangladesh	Abdullah Al Mahmud	IFDC	Yes
Asia	Bangladesh	A. F. M. Manzurul Hoque	Soil Resource Development Institute (SRDI)	Yes
Asia	Bangladesh	Dr. Md. Taiabur Rahman	Soil Resource Development Institute (SRDI)	Yes
Asia	Bangladesh	MST. ARIFUNNAHAR	Soil Resource Development Institute, Ministry of Agriculture.	Yes
Europe	Belgium	Lin Wang	Gent University	Yes
Europe	Belgium	Sarah Garre	Flanders Institute for Agriculture, Fisheries and Food (ILVO)	Yes
Europe	Belgium	Tim De Cuypere	Inagro vzw	Yes
Europe	Belgium	Wim Cornelis	Ghent University	Yes
Latin America	Bolivia	Demis Andrade Foronda	Universidad Mayor de San Simon	Yes

Africa	Botswana	Topoyame Isaac Makoi	Botswana University of Agriculture and Natural Resources	Yes
Latin America	Brasil	Francelita Coelho Castro	Universidade Federal do Ceará	Yes
Latin America	Brazil	Antonio Marcos dos Santos	University of Pernambuco	Yes
Latin America	Brazil	João Santiago Reis	Rio Grande do Norte Federal University (UFRN)	Yes
Asia	Cambodia	Chhin Phy		
Asia	Cambodia	Khat Piseth	Departement of Agricultural Land Resource Management of GDA, MAFF	Yes
Africa	Cameroon	Georges Kogge Kome	Department of Soil Science, Faculty of Agronomy and Agricultural Sciences (FASA), University of Dschang	Yes
Latin America	Chile	Francisco Alfaro-Lopez	Consultor Independiente	Yes
Asia	China	Jianfeng ZHANG	Institute of subtropical forestry, Chinese Academy of Forestry	Yes
Latin America	Colombia	Juan Carlos Loaiza Usuga	Universidad Nacional de Colombia	Yes
Latin America	Colombia	LADY MARCELA RODRÍGUEZ JIMÉNEZ	INSTITUTO GEOGRÁFICO AGUSTÍN CODAZZI	Yes
Latin America	Colombia	Olga Lucia Ospina	Ministerio de Ambiente y Desarrollo Sostenible	Yes
Latin America	Colombia	Reinado Sanchez	Instituto de Hidrología, Meteorología y Estudios Ambientales (IDEAM)	Yes
Latin America	Costa Rica	Albán Rosales Ibarra	INTA	Yes
Latin America	Costa Rica	Elizabeth Moreno Bujan	Tessenderlo Kerley International	Yes
Europe	Czech Republic	Dauren Rakhmanov	Palacký University Olomouc	Yes
Europe	Czech Republic	Kamilla Alibekova	Palacký University	Yes
Africa	Djibouti	MOHAMED EGUEH EGUEH WALIEH	CERD	Yes

Africa	Djibouti	Nasser Mohamed Nasser	Laboratoire de pédologie - CERD/ISV	Yes
Latin America	Ecuador	Wilmer Jimenez Merino	Ministerio de Agricultura y Ganadería de Ecuador	Yes
NENA	Egypt	Dr. Moustafa M. M. A. Ghandour	Desert Research center	Yes
NENA	Egypt	Sameh Abd-Elmabod	National Research Centre	Yes
Africa	Eritrea	Samuel Berekt Ghebremariam	National Agricultural Research Institute	Yes
Africa	Ethiopia	Ali Seid Mohammed	Wollo University	Yes
Africa	Ethiopia	Hillette Hailu	Wollo University	Yes
Europe	European Union	Luca Montanarella	European Commission	Yes
Pacific	Fiji	Amit Raj Singh	Sugar Research Institute of Fiji	Yes
Europe	Germany	Erik Grüneberg	Thuenen Institute of Forest Ecosystems	Yes
Europe	Germany	Noelia Garcia-Franco	Technische Universität München Lehrstuhl für Bodenkunde	Yes
NENA	Global (UAE based)	Ahmed El Naggar	ICBA	Yes
Europe	Greece	Detsikas Spyridon	ELGO DEMETER	Yes
Europe	Greece	Dimitris Triantakonstantis	Institute of Soil and Water Resources (Hellenic Agricultural Organization DEMETER)	Yes
Europe	Hungary	Arzu Rivera	University of Debrecen	Yes
Europe	Hungary	Zsófia BAKACSI	Institute for Soil Sciences, Centre for Agricultural Research (ATK TAKI)	Yes
Europe	Hungary	Ghada SAHBENI	Eötvös Loránd University	Yes
Asia	India	Akhila M		Yes
Asia	India	Kishan Kumar	BHU Varanasi	Yes
Asia	India	Pradip Dey	ICAR-Indian Institute of Soil Science	Yes
Asia	India	PREETI SINGH	ICAR-IARI, Hazaribag, Jharkhand	Yes
Asia	India	Shiveshwar Pratap Singh	Dr. Rajendra Prasad Central Agricultural University, India	Yes
Asia	India	Vedant	AKRSPI	Yes
Asia	India	Vishaw Vikas	M&M	Yes

NENA	Iran	Karim Ghorbani	Deputy of Water & Soil, Ministry of Agriculture-Jahad, I.R. of IRAN	Yes
NENA	Iran	Meisam Rezaei	soil and water research institute	Yes
NENA	Iran	Mehdi Khayyat	University of Birjand	Yes
NENA	Iran	Saeed Karbin	FAO	Yes
NENA	Iraq	Hassan Kutaiba	ITPS	Yes
Europe	Israel	Elazar Volk	Ministry of Agriculture	Yes
Europe	Israel	Isaac Kramer	Hebrew University	Yes
Europe	Israel	Yair Mau	The Hebrew University of Jerusalem	
Europe	Italy	Carolina Olivera	FAO	Yes
Europe	Italy	EDOARDO ANTONIO COSTANTINO COSTANTINI	International Union of Soil Sciences	Yes
Europe	Italy	Filiberto Altobelli	Crea	Yes
Europe	Italy	Francesca Ragazzi	ARPAV – Environmental Protection Agency of Veneto Region – Soil Unit	Yes
Europe	Italy	Franco Vos	unemployed	Yes
Europe	Italy	Giuseppe Lo Papa	University of Palermo	Yes
Europe	Italy	Ialina Vinci	ARPAV Environmental Protection Agency of Veneto Region	Yes
Europe	Italy	Lorenzo Sassi	Regione Liguria	Yes
Asia	Japan	Hidetoshi Taira	chiba university	Yes
Asia	Japan	Kazuyuki Inubushi	Chiba University	Yes
Eurasia	Japan/Uzbekistan	Kristina Toderich		
NENA	Jordan	Mahmoud Hasan Alfraihat	MoA	Yes
Eurasia	Kazakhstan	Azamat Yershibulov	Institute of Soil Science	Yes
Eurasia	Kazakhstan	Bozayeva	FAO	Yes
Eurasia	Kazakhstan	Ibrayeva Mariya	U.U.Uspanov Kazakh Research Institute of Soil Science and Agrochemistry	Yes
Eurasia	Kazakhstan	Madina Kassenova	FAO	Yes
Eurasia	Kazakhstan	Maira Kussainova	Kazakh National Agrarian Research University	Yes
Eurasia	Kazakhstan	Makhmud Shaumarov	UN FAO	Yes

Eurasia	Kazakhstan	Узбаев Марат Булатович	Комитет по управлению земельными ресурсами Министерства сельского хозяйства Республики Казахстан	Yes
Eurasia	Kazakhstan	Dariga Zhanaburshinova		
Eurasia	Kazakhstan	Meirzhan Essanbekov	Republican state enterprise, «South Kazakhstan Hydrological and Amelioration Expedition»	Yes
NENA	Kuwait	Shabbir A Shahid	Kuwait Institute for Scientific Research	Yes
NENA	lebanon	fatmeh beydoun	MOA	Yes
NENA	Lebanon	Talal Darwish	National Council For Scientific Research	Yes
Africa	Lesotho	Selebalo Ramakhanna	Department of Agricultural Research	Yes
Africa	Liberia	Prince David Hiama	Central Agriculture Research Institute	Yes
Asia	Malaysia	ROSLAN BIN ISMAIL	Universiti Putra Malaysia	Yes
Latin America	Mexico	Blanca Prado	Instituto de Geología. UNAM	Yes
Latin America	Mexico	Miguel Ortiz Olguín	Universidad Autónoma Chapingo	Yes
Latin America	Mexico	Mario Guevara		
Asia	Mongolia	Enkhtuya Bazarradnaa	Institute of Plant and Agricultural Sciences, Mongolian University of Life Sciences	Yes
NENA	Morocco	ABDELMONIM ELKANIT	OCP	Yes
NENA	Morocco	Fassil Kebede	Mohammed VI Polytechnic University	Yes
NENA	Morocco	Haitam Moulay	UM6P	Yes
NENA	Morocco	Fatiha Hourri	Ministry of agriculture	Yes
NENA	Morocco	Krishna Devkota	UM6P, ASARI, Laayoune, Morocco	Yes
NENA	Morocco	Lamfeddal Kouisni	UM6P	Yes
NENA	Morocco	Marieme Seif-Ennasr	IAV Hassan II	Yes
NENA	Morocco	meryem maatougui	UM6P	Yes
NENA	Morocco	Rachid MOUSSADEK	INRA/ICARDA	Yes

NENA	Morocco	Abdelmjid	National Institute of Agricultural Research (INRA)	Yes
NENA	Morocco	Abdelaziz Hirich		
NENA	Morocco	Abdelaziz Nilahyane		
NENA	Morocco	Adnane Beniaich		
NENA	Morocco	Ahmed Laamrani		
NENA	Morocco	Aziza Tangi		
NENA	Morocco	Cherki GHOULAM	Cadi Ayyad University	Yes
NENA	Morocco	Yao Kohou Donatien GUEABLE		
NENA	Morocco	FatimaEzzahra JABBOU		
NENA	Morocco	HICHAM ELBELRHITI	Institut Agronomique et Vétérinaire Hassan II	Yes
NENA	Morocco	Khalil EL MEJAHED		
NENA	Morocco	Outbakat Mbarka		
NENA	Morocco	Nawal TAAIME		
Africa	Mozambiqu e	Ricardo M. Maria	Institute of Agricultural Research of Mozambique	Yes
Europe	Netherlands	Judit Snethlage	Wageningen Environmental Research	Yes
Europe	Netherlands	Katarzyna Negacz	Wadden Academy/IVM-VU	Yes
Europe	Netherlands	Sjoerd Van Der Zee	Wageningen University and Research	Yes
Europe	Netherlands	Arjen de Vos	The Salt Doctors	Yes
Europe	Netherlands	Peter Prins	Land Water Food Consult	Yes
Africa	Nigeria	Mr Oluwatosin Oderinde		Yes
Africa	Nigeria	Prof Victor Chude	Nigeria Institute of Soil Science	Yes
Europe	North Macedonia	Dushko Mukaetov	Institute of Agriculture - University "Ss Cyril and Methodius"	Yes
Europe	Norway	Anne Asselin de Williencourt	Norwegian University of Life Sciences	Yes
Europe	Norway	Hesam Mousavi	Inland Norway University of Applied Sciences	Yes
Europe	Norway	Ole Kristian Sivertsen	Desert Control	Yes
NENA	Oman	Saud Al Farsi	FAO Oman	Yes
Asia	Pakistan	Muhammad Ansar Farooq	Fauji Fertilizer Company Limited	Yes
Asia	Pakistan	Muhammad Sabir		Yes
Asia	Pakistan	Fahad Raza	Sindh Agriculture University Tandojam	Yes

Asia	Pakistan	Fozia Memon	SOFT/USPICAS MUET Jamshoro	Yes
Asia	Pakistan	Hafeez ur Rehman	Department of Agronomy, University of Agriculture, Faisalabad	Yes
Asia	Pakistan	Iqra Ghafoor	MNS UNIVERSITY OF AGRICULTURE MULTAN PAKISTAN	Yes
Asia	Pakistan	Asghar Khan	GDC Totakan	Yes
Asia	Pakistan	Mohsin javeed	BZU	Yes
Asia	Pakistan	Noman Ahmad	University of Agriculture Faisalabad	Yes
Asia	Pakistan	Muhammad Saleem Chang	Sindh Agriculture University Subcampus Umerkot Pakistan	Yes
Asia	Pakistan	Munir Zia		Yes
Asia	Pakistan	Narbat	N/a	Yes
Asia	Pakistan	Waqar Ahmad		
Asia	Pakistan	Rehman Ali	University of agriculture faisalabad	Yes
Asia	Papua New Guinea	Mark Tinah	National Agricultural Research Institute	Yes
Latin America	Paraguay	Arnulfo Encina Rojas		Yes
Latin America	Peru	Silvia Aguero Aguilar	INSTITUTO DE BIOLOGIA DEL SUELO	Yes
Asia	Philippines	Sarah Joey Salgado	Bureau of Soils and Water Management	Yes
Asia	Philippines	Emma Tayad	Department of Agriculture	Yes
Asia	Philippines	Elly Paul Tomas, RCh	Regional Soils Laboratory, Department of Agriculture RFO12, Philippines	Yes
Europe	Poland	Joanna Świdwa-Urbańska	AGH UST	Yes
Europe	Portugal	Antonio Manuel Machado Perdigão	SPCS	Yes
Europe	Portugal	Carlos Guerrero		Yes
Europe	Portugal	Tiago Ramos	Instituto Superior Técnico	Yes
Europe	Republic of North Macedonia	Hristina Poposka	Institute of Agriculture, Skopje	Yes
Europe	Republic of North Macedonia	Mile Markoski	Faculty of Agricultural Sciences and Food - Skopje Institute of	Yes

			Environment Department of Soil Sciences	
Eurasia	Russian Federation	Denis Frolov	Lomonosov Moscow State University, Geographical faculty	Yes
Eurasia	Russian Federation	Dmitry Golovanov	Lomonosov Moscow State Univrsity, Faculty of Geography	Yes
Eurasia	Russian Federation	Natalya Shabanova	Institute of Forest Science Russian Academy of Science (IFS RAS) and RUDN university	Yes
Eurasia	RussianFederation	Khitrov Nikolay Borisovich	Dokuchaev Soil Science Institute	Yes
Africa	Rwanda	Olive Tuyishime		Yes
Africa	Senegal	Jean Henri Bienvenue Sène	University Cheikh Anta Diop, Dakar	Yes
Africa	Senegal	Macoumba Loum	Institut National de Pédologie	Yes
Africa	Sierra Leone	Abdul Rahman Kamara (Dr.)	Ministry of Agriculture and Forestry (MAF)	Yes
Africa	South Africa	Ramakgwale Mampholo	Ministry of Agriculture, Land Reform and Rural Development	Yes
Africa	South Africa	Lambi Mohlala	Limpopo Department of Agriculture	Yes
Africa	South Africa	Mashapa Elvis Malobane	Agricultural Research Council-Soil, Climate and Water	Yes
Africa	South Africa	Nicholas Mamadi	Nooitgedacht soil testing laboratory Mpumalanga Dept of Agriculture	Yes
Africa	South Africa	Lethabo Cyril Sadiki	Mpumalanga Department of Agriculture	Yes
Europe	Spain	Adriana Florentino González	UMH	Yes
Europe	Spain	ILDEFONS PLA-SENTIS	UNIVERSITAT DE LLEIDA	Yes
Europe	Spain	Jorge Batlle-Sales	Universitat de València	Yes
Europe	Spain	Karl Vanderlinden	IFAPA	Yes
Europe	Spain	Sara Cisneros	Private company	Yes
Europe	Spain	Rosa Maria Poch Claret	Universitat de Lleida	Yes
Europe	Spain	Gonzalo Martinez	University of Cordoba	Yes
Asia	Sri Lanka	Konara Mudiyanselage Abhaya Kendaragama	No. 155/1, Sirikulam Watte, Mallawapitiya, Kurunegala, Sri Lanka	Yes

NENA	Sudan	MALIK MOHAMMED	CCS Haryana Agricultural University, INDIA	Yes
NENA	Sudan	Abdelmagid Ali Elmobarak Elhag	Retired	Yes
Europe	Sweden	Masud Parvage	Division of Geohydrology	Yes
NENA	Syria	Ahmad Majar	GCSAR	Yes
NENA	Syria	Dr.Riham Fouzi Zahalan	General Commission for Scientific Agricultural Research GCSAR.Administration of Natural Resource Research	Yes
NENA	Syria	Hassan Dergam	ACSAD	Yes
Africa	Tanzania	MOH'D MMANGA OMAR	Tanzania Agricultural Research Institute (TARI)	Yes
Africa	Tanzania	Primitiva Andrea Mboyerwa	Sokoine University o Agriculture	Yes
Africa	TANZANIA	SIBAWAY BAKARI MWANGO	TANZANIA AGRICULTURAL RESEARCH INSTITUTE (TARI)	Yes
Asia	Thailand	Pirach Pongwichian	Land Development Department, Ministry of Agriculture and Cooeratives	Yes
Asia	Thailand	Yuji Niino	FAO	Yes
Asia	Thailand	Nopmanee Suvannang GLOSOLAN Chair		
Africa	The Gambia	Ebrima Jarra	Soil Solution Gambia	Yes
Africa	Togo	Kyky Komla Ganyo	ITRA/DL (Togo)	Yes
Latin America	Trinidad and Tobago	Gabrielle de Souza	Ministry of Agriculture, Land and Fisheries	Yes
NENA	Tunisia	Asma CHEBAANE	CBBC	Yes
NENA	Tunisia	Attia Rafla	Ministry of Agriculture	Yes
NENA	Tunisia	Mohamed Hachicha	Institut National de Recherche en Génie Rural, Eaux et Forêts (INRGREF)	Yes
NENA	Tunisia	Khaled Ibrahimi	Agronomic Institute of Chott-Mariem, The University of Sousse	Yes
NENA	Tunisia	chehidi hatem	centre technique de l agriculture biologique	Yes
NENA	Tunisie	karem SAAD	FAO	Yes
Europe	Turkey	Fuat Kaya	Isparta University of Applied Sciences, Departmant of Soil	Yes

			Science and Plant Nutrition	
Europe	Turkey	HAKKI EMRAH ERDOĞAN	FAO	Yes
Europe	Turkey	Sevinc Madenoglu	Ministry of Agriculture and Forestry General Directorate of Agricultural Research and Policies	Yes
NENA	United Arab Emirates	RK Singh	ICBA	
Africa	Uganda	Moses Isabirye	Busitema University	Yes
Africa	Uganda	Hadijah Yahyah	Kampala International University	Yes
	United Kingdom	Andy Murray		
Eurasia	Ukraine	Arkadiy Levin	National Scientific Center "Institute for Soil Science and Agrochemistry Research"	Yes
Eurasia	Ukraine	Olena Drozd	O.M.Beketov National University of Urban Economy / National Scientific Centre "Institut for Soil Science and Agrochemistry Research named after O.N. Sokolovsky"	Yes
Eurasia	Ukraine	Maryna Zakharova	National Scientific Center «Institute for Soil Science and Agrochemistry Research named after O.N. Sokolovsky»	Yes
Eurasia	Ukraine	Ludmila Vorotyntseva	Institute for Soil Science and Agrochemistry Research named after O.N. Sokolovsky	Yes
Eurasia	Ukraine	Anna Yarosh		
Eurasia	Ukraine	Yurii Zalavskyi	Institute for Soil Science and Agrochemistry Research named after O.N. Sokolovsky	Yes
NENA	United Arab Emirates	Fatma Rekik	ICBA	Yes
Europe	United Kingdom	Fabiola Torrico	Self employee	Yes

North America	United States of America	Pierrette J Cazeau	Haiti Cholera Research Funding Foundation Inc USA	Yes
Eurasia	Uzbekistan	Gafurova Laziza	National University of Uzbekistan	Yes
Eurasia	Uzbekistan	Mamutov Nizamatdin	Karakalpak State University	Yes
Eurasia	Uzbekistan	Kholdorov Shovkat	Soil composition, repository and quality center	Yes
Africa	Zimbabwe	Runyararo Munondo	Southern Alliance For Indigenous Resources (SAFIRE)	Yes
	FAO	Aizhan Karabayeva		
	FAO	Akmaral Sman		
	FAO	Daniyar Kenzhegulov		
	FAO	Ismahane Elouafi		
	FAO	Matraim Jusupov		
	FAO	Olga Grebennikova		
	FAO	Rahmanberdi Hanekov		
	WASAG/FAO	Rosaida Dolce		
	WASAG/FAO	Ruhiza Boroto		
	ITPS/FAO	Mohammad Jamal Khan		
	ITPS/FAO	Matshwene E Moshia III-South Africa		
	ITPS/FAO	ASHOK PATRA		
	ITPS/FAO	Rosa Poch		
	GSP/FAO	Christian Omuto		
	GSP/FAO	Filippo Benedetti		
	GSP/FAO	Giulia Stanco		
	GSP/FAO	Isabel Luotto		
	GSP/FAO	Isabelle Verbeke		
	GSP/FAO	Julia Mousquer		
	GSP/FAO	Julie Itey		
	GSP/FAO	Maria Konyushkova		
	GSP/FAO	Matteo Sala		
	GSP/FAO	Natalia Rodríguez		
	GSP/FAO	Ronald Vargas		
	GSP/FAO	Rosa Cuevas		
	GSP/FAO	YI PENG		
	GSP/FAO	Yusuf Yigini		
	GSP/FAO	Yuxin Tong		

	N/A	Mohammed Ruhul Islam		
	N/A	Sudarshan Dutta		
	N/A	Dautalinov Ruslan		
	N/A	Tarcilia		
	N/A	AbdulQader Al-Gylani		
	N/A	Amarendranath Biswas		
	N/A	Carleen Calimpon		
	N/A	Darwin Sanchez		
	N/A	Elogne		
	N/A	Godson Urassa		
	N/A	Massamba DIOP		

Annex VII: The comments of the members of INSAS on the work plan sent through e-mail and chat

Megan Balks (ITPS): clear guidelines for the working groups are needed to avoid overlap and duplication of effort between the groups

Jamal Khan (ITPS):
Proposals for SAS&Water:

- Water Quality characterization, classification and its impact
- Guideline for using brackish water
- Specific toxic ion and its management

Evans Mutuma (Kenya)
I have a lot of interest in the management of salt affected soils.
The salt affected soils take a huge percentage of land in the northern region of Kenya. The northern part of Kenya provides 70% of all the beef consumed in the all major cities in Kenya and some exported to other countries in the Middle East. Land degradation and loss of vegetation cover is a phenomena that welcomes one when you visit some of these areas. Salt affected soils cannot support enough forage/grass for the livestock and competition for the limited pasture areas more often than not fuel serious community conflicts.
There is an urgent need to reseed the rangelands by introducing grass and vegetation cultivars that are palatable and nutritious to livestocks and at the same time, those that can tolerate salinity, temperature and moisture stress.
In my view, this is a perfect forum, where I will be able to interact with experts with previous experiences in the management of salt affected soils to enhance agricultural and livestock productivity in marginal lands.
I look forward to fruitful deliberations starting 14th-15th April 2021.

Dr Shabbir A Shahid, PhD (Kuwait)
Research Scientist
Desert Agriculture and Ecosystems Program
Environment & Life Sciences Research Center
Kuwait Institute for Scientific Research

1) I have the experience that many scientists don't make distinction between water salinity i) dominated by Na & Cl and ii) Ca and Cl or SO4. The type i is more toxic than type ii, so the concept of Sodium Adsorption Ratio (SAR) and Residual Sodium Carbonates (RSC) must be considered, while making recommendation for some crop varieties suitable for different water salinities (Na & Ca dominance). This variability may not show impact in sandy soils but in fine texture soils.
2) The second point is about the sodicity problem, which is more difficult, expensive and time consuming to manage than soil salinity (can be managed through leaching, bed shapes, selection of salt-tolerant crops etc). In Pakistan and many other countries salinity-sodicity is the main issue not in sandy but in dense-soils (high silt & clay). I suggest we should also focus on sodicity assessment and monitoring too. One of my observations working in over 15 countries in MENA & SSA, that soil scientists

are using a factor of 0.86 to convert gypsum requirement from meq/100g to tons per acre 6 inches and 1.72 for 12 inches. These factors are reported in USDA Handbook 60 published in 1954 (~66 years ago) based on some US soils. Not all soils in the globe have same weight-bulk density (6 inches or 12 inches depth), therefore using these factors, the labs either overestimate or underestimate gypsum requirement and gave recommendations to farmers, which are not real values on his field. I tested the US factor on the UAE soils and found factor different to the one in Handbook 60. It is therefore my request to highlight this issue to INSAS members to determine GR conversion factors on local soils (soil families or soil series basis) or while collecting soil samples at the same time take sampled in cores for bulk density, in their countries.

3) Another main point which may need consideration at the national level to introduce mobile laboratories to provide extension services especially in soil/water salinity at farm level and provide on-site recommendations, reasons being farmers are not either awar about the salinity effects on crops or just dint have access to laboratories, the lab usualyy takes long time to provide analyses, which mayor may not help farmers.

I have highlighted these issues in the book published jointly with IAEA (see attachment for information) and distribution as you wish.

Jianfeng Zhang (China)

For THE TENTATIVE WORK PLAN OF INSAS, on saline agriculture, I think besides of agricultural production, other points should be paid attention, such as (1) landscape construction. In some coastal countries, with population growth, urbanization develops rapidly, more and more coastal saline lands had to be developed. In this case, performing landscape construction is crucial. (2) ecological function. Coping with climate change is a global issue, the key is to control and reduce carbon emission. As we know there are two ways to realize carbon neutrality, one is to decrease emission, and another is to increase sequestration. As regard to carbon fixing, forests play an important role. In order to plant much more trees on the earth, reclamation of saline lands is necessary.

Meisam Rezaei (Iran)

First of all, I would thank you and your FAO colleagues for arranging to have such a nice, positive and efficient meeting. I know that lots of effort and time has been dedicated to this event. After the meeting I talked and discussed with some members of INSAS. As we all agreed with four thematic areas so I would suggest four vice-chairs based on their expertise and specialty (in my point of view it does not matter who will take the positions, because I find all of the applicants are eligible and have potential to be active in each thematic area). In that way, we will have a core of INSAS consisting of 5 experts on all topics.

Another suggestion is that similar to GLOSOLAN, we may divide the globe in 5-7 regions where there may have similar problems with salt-affected soils. For each region we will have a representative person or team to handle and manage the proposals (package of proposals from characterizations to application and solving the problems).

In this context, we will ask each country to have a person and or team as representative and responsible for the action- in their own country or their country of their institute-. So, we will have an organized network. Moreover, the core of INSAS may call for research proposals. So, once the proposals of each country have been received, the core and the representative of regions can make all them together and try to define a package of proposal (for each region) that contains multidisciplinary (i.e., include all four the thematic areas of INSAS) and participatory approaches (i.e., involve stockholders and farmers). It should be mentioned that the package may be adopted a little bit based on each study case situation (can be standardized later). I think, if we will have a package of proposals then we already solve lots of uncertainty of measures and data, data harmonization and the standardize outputs and outcome and etc.

I would suggest to share my comments to Jorge and Kate and also FAO colleagues to get their feedback. We can share our experiences and make INSAS more structured, efficient and effective.

I see some scientists from developing and low-income countries suffer from financial support (as discussed with them). I would suggest getting some budgets to carry out the packages. If we can try to support their institution based on INSAS proposal packages (even a small amount of money), then we will be more successful and reach the goals of INSAS in a shorter time.

On behalf of prof.Sviatoslav Baliuk,
Arkadiy Levin
Deputy GSP Focal Point of Ukraine

NSC ISSAR is ready to participate in all activities of INSAS Workpla excluding Activity 9.
To participate in it, we expect to attract experts from other Ukrainian organizations with experience in halophytic plants suitable for saline agriculture and salt-tolerant crops.
Unfortunately, the proposed tentative plan does not directly reflect the support of targeted scientific research on saline soils, provided for in GSP pillar 3.
Therefore, we propose to do the next steps in the near future:
i) Looking forward, we would like to propose INSAS to support and globalize the EaSP's successful practice of periodically holding competitions for research projects for saline soils.
We propose to add the appropriate separate activity in the INSAS Workplan.
It is clear that this will require additional sponsor's contributions, but realy this is one of the main tasks of INSAS. Apparently, this can be real, given the vital interest of a number of Middle East countries and main UN Conventions in solving the problems of sustainable usage of Salt-Affected Soils.
It would be very appropriate to link the announcement of the first such competition with the
Global Symposium on Salt-Affected Soils.
ii) To support the activities of all other INSAS working groups, it seems expedient to create a special INSAS working group for targeted scientific research on Salt-Affected Soils or, rather, a kind of Steering scientific council of INSAS experts for the global coordination of research

on saline soils - an analogue of ITPS. The world's leading experts on saline soils could be included in it on a competitive basis.

Fozia Memon (Pakistan)

- Overall meeting notes aim to develop strong international forum for INSAS
- INSAS is a great platform for soil scientist, specially salinity tolls measuring experts
- INSAS can not only work on the described SDGs described by many partners directly or indirectly
- SDGs also perform through various tracks to identify the solution
- It will be better to understand for real practitioners for long term sustainability
- Promote soil health through basic soil analysis and amendments is key role to reflect ground really
- INSAS will enhance capability of small holders to middle one by involving stakeholders
- Initial analysis will help to produce maps
- Introduce more model like Farmer Integrated Learning Model(FILM)
- All participants preventative work not only help to understand the salinity but also introduce and give way forward to develop proposal to work on integrated measurements

Way forward

- Outline of all FFS activities
- First stakeholders meeting at local level
- Use media and animated movies regarding salt-affected soil for visual observation
- Introduce salt tolerant and high yielding verities
- Enhance concept of value chainaddition/ marketing

Future highlights

- Inform all members the way forward
- Identify more adaptive options for community
- Introduce those interventions there by real practitioners get benefited
- Intuitions must be identified at the INSAS platform
- Others activities set according to timeline

Samvel Sahakyan (Armenia)

1. Implement the technology of local reclamation of saline and alkaline soils, when only the nutrient volume of the plant is reclaimed. This allows you to reduce the cost of soil reclamation from at 8 to 10 times.
2. For local reclamation of alkaline soils, use the technology of the non-contact method of electro-reclamation, when highly mineralized ground, surface, and sea waters, as well as neutral salts of sodium chlorides and sulfates, are used as a ameliorant. Mini solar stations can be used for feeding of the installation.

Judit Snethlage (Netherlands), through chat: **Question**: Is the assessment group also looking into climate change impacts and future possible salinization? **Answer**: As the first step, the harmonized methodology for mapping salt-affected soils should be elaborated and adopted by INSAS members and ITPS/GSP PA. As soon as the approach to assess the present spread and magnitude of soil salinity/sodicity is adopted, the next step will be to work on the temporal predictions and salinization scenarios.