

# INSOP-INFA-II/23/Report



## Report of the International Network on Soil Pollution (INSOP) and the International Network on Fertilizer Analysis (INFA) joint meeting on cadmium SOP harmonization in fertilizers and soils

1 June 2023

Online meeting



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1 June 2023, Online meeting

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Rome, 2023

## Content

<b>1. Background</b> .....	<b>4</b>
<b>2. Collaboration areas and objective of the meeting</b> .....	<b>5</b>
<b>3. Opening of the meeting</b> .....	<b>5</b>
<b>4. Recap of the first INSOP-INFA meeting</b> .....	<b>5</b>
<b>5. The harmonization procedure: a step-by-step approach</b> .....	<b>7</b>
<b>6. Soil sampling logistics: GLOSOLAN experience</b> .....	<b>8</b>
<b>7. The harmonization of the SOP for Cd determination</b> .....	<b>9</b>
7.1. Matrix type.....	9
7.2. Extraction Methods .....	10
7.3. Analytical Methodologies .....	11
<b>8. Open discussion and agreements</b> .....	<b>12</b>
8.1. Matrix type discussion .....	12
8.2. Extraction methods discussion .....	13
8.3. Analytical methodologies discussion .....	13
<b>9. Conclusion</b> .....	<b>14</b>
<b>Annex I: Meeting Agenda</b> .....	<b>15</b>
<b>Annex II: Poll Report</b> .....	<b>16</b>
<b>Annex III: List of participants</b> .....	<b>17</b>

## 1. Background

In addition to fulfilling the vital function of providing 95 percent of the food we consume (FAO and ITPS, 2023); soils play diverse roles in providing ecosystem services essential for the continuity of life on the planet. The preservation of soil functions and fertility are essential to achieve food security and nutrition. However, this is a difficult goal to achieve given the scenario of the degradation of one-third of the soils and their loss of fertility. The appropriate use of fertilizers can support the recovery of soil fertility. However, the misuse and overuse of fertilizers and their low quality and safety lead to soil degradation, environmental pollution, and damage to animal and human health. One of the most significant global concerns regarding the quality and safety of fertilizers is the high cadmium (Cd) content that specific phosphorus-containing fertilizer sources may have. This is a well-founded concern considering Cd can create severe and difficult-to-reverse health problems for soils, crops, their products, animals, and people.

Given this scenario, the [International Network on Soil Pollution](#) (INSOP) and the [International Network on Fertilizer Analysis](#) (INFA), both technical networks of the [Global Soil Partnership \(GSP\)](#), are acting synergistically to improve the evaluation and monitoring of fertilizer quality to combat undesirable effects of some nutrient sources on environmental quality and human and animal health. As part of this inter-network collaboration, the first joint fertilizer quality assessment meeting was held on February 28, 2023. This first INSOP-INFA meeting was successful in highlighting the relevance of measuring and monitoring the quality of mineral fertilizers as a first step to reduce or avoid severe environmental contamination and health problems. Participants mainly focused on heavy metal content of some phosphate fertilizers. At this first meeting, soil and fertilizer testing laboratories from more than 100 countries met to take the first steps towards the harmonization of methodologies used worldwide for the determination of Cd content in soils and fertilizers. The participants agreed on the fertilizers to be included in the quality assessments, the analysis for measuring heavy metal load in fertilizers, and the future actions for the INSOP and INFA members towards the consolidation of a joint working group. Full information on the content and agreements reached at the first meeting can be found in the [report](#) of the meeting.

One of the main agreements of the first meeting was the organization of a workshop with the members of the [Global Soil Laboratory Network](#) (GLOSOLAN) to exchange knowledge and endorse the specific methodologies for the determination of total and available Cd content in soils and fertilizers, explain the GLOSOLAN process to harmonize methodologies, and define the governance of the joint working group. As a follow-up to this agreement, the second INSOP-INFA joint meeting on the harmonization of the standard operating procedure (SOP) for the assessment of Cd content in fertilizers and soils was held on 1st June 2023. This document reports the discussion and outcomes of the meeting.

## **2. Collaboration areas and objective of the meeting**

The INSOP and the INFA agreed to collaborate on the following tasks:

1. Harmonize laboratory methods or SOPs to analyse heavy metal content in mineral and organic fertilizers.
2. Raise awareness on the importance of environmental and health safety of mineral and organic fertilizers and recycled nutrient sources.
3. Develop a proposal for the permissible limits of Cd content in fertilizers and threshold values for Cd in agricultural soils at the regional and national levels.

Therefore, the objectives of the meeting were to:

- Reach an agreement on the harmonization process of the SOPs for Cd determinations in soils and fertilizers.
- Discuss and select the SOPs that will be harmonized for the extraction process (prior to Cd content determination).
- Discuss and agree on the SOPs and equipment used for the determination of the Cd content in soils and fertilizers.

## **3. Opening of the meeting**

The technical meeting on harmonizing SOPs for determining Cd content in soils and fertilizers, jointly organized between INSOP and INFA, was held virtually on 1<sup>st</sup> June 2023. The invitation to the meeting was sent to the INSOP, INFA and GLOSOLAN members. In total, 372 participants from 111 countries attended the workshop (see list of participants in Annex III). The meeting was moderated by INSOP and INFA coordinators, Mr Sergejus Ustinov and Ms Vinisa Saynes Santillan, respectively. Dr Wesley Feldmann, INFA Chair, welcomed the attendees.

## **4. Recap of the first INSOP-INFA meeting**

Mr Sergejus Ustinov presented the recap from the first INSOP-INFA meeting held on 28 February 2023. Mr Ustinov reminded participants of the GSP structure by explaining the current activities within the GSP and existing networks. Figure 1 shows the structure of the GSP. Mr Ustinov encouraged participants to visit the GSP website and join the networks of interest.

The moderator highlighted the importance of addressing heavy metal content in soils, mineral and organic fertilizers, focusing on Cd and uranium (U) as a priority for the INSOP-INFA to address. At the end of the presentation, participants were reminded about the wider scope

of the collaboration between the two networks. The activities listed below are preliminary actions that the INSOP-INFA members can work on together in a medium and long term:

- Harmonization of the SOPs for the analytical evaluation of heavy metal content in soils and phosphate fertilizers.
- Understanding the distribution of heavy metals in fertilizers globally.
- Developing and implementing the permissible limits of heavy metal content in fertilizers and threshold values in agricultural soils at the regional and national levels.
- Identifying and advocating for the involvement of research institutes and laboratories to support the analyses of heavy metals in fertilizers.
- Highlighting the fertilizer pollution to affected countries and proposing solutions, i.e. strengthening current legislations on fertilizer labeling.
- Capacity building to train farmers and technicians on sustainable fertilizer use to prevent misuse and overuse.
- Raising awareness on the importance of environmental and health safety of mineral and organic fertilizers and recycled nutrient sources.

## The Global Soil Partnership global networks



Figure 1. The GSP networks

## **5. The harmonization procedure: a step-by-step approach**

Dr Wesley Feldmann, INFA Chair, delivered the presentation on the harmonization procedure. Dr Feldmann used the harmonization of the total nitrogen- Kjeldahl methodology as an example, which can be used as a foundation in harmonizing SOPs for Cd determination. The presentation was structured by explaining the six-step process (Figure 2):

### **1) Methods selected for harmonization**

- It is necessary to determine both the total and bioavailable Cd. The first step is to discuss and select the methods for harmonization.

### **2) Data sheet development to simplify the information collected**

- Adjust the data sheet (Excel sheet), previously developed by GLOSOLAN, to collect information on the methodologies regularly used by the member laboratories to determine Cd content in fertilizers and soils. The data sheet simplifies the harmonization process for data capture and comparison. Each step should be detailed and included in this data sheet.

### **3) Datasheets distributed and filled out by INFA members**

- Before the distribution, data sheets should be reviewed by the network and feedback should be included to improve the data sheets. Distribute the datasheet developed in step 2 among members and collect the data for the methodologies widely practised by different laboratories.

### **4) Datasheet harmonization into a centralized database**

- Collect the data sheets from the members and collate it into a single datasheet where all the information is compiled and evaluated by the laboratories involved in the process.

### **5) SOP draft development and review**

- The SOP template is created based on the data received from members in step 4. After creating the template (previously reviewed and endorsed by the networks), both internal and external reviews will be conducted. In the internal review, an expert is selected to review the SOP. This is followed by the external review, in which a committee of experts and volunteers is assembled to provide their comments and feedback. Thorough review is important to ensure the method is valid and robust.

### **6) SOP publication and adoption by laboratories**

- Publish a robust SOP which will act as a guideline for laboratories around the world in implementing the widely used, acceptable and harmonized methodology

Dr Feldmann concluded his presentation by highlighting the importance of harmonization of SOPs. This process provides a standardized and robust procedure to laboratories, improves fertilizer analysis at a global level and allows for building the capacity of laboratories in developing countries without access to other standardized protocols and procedures.

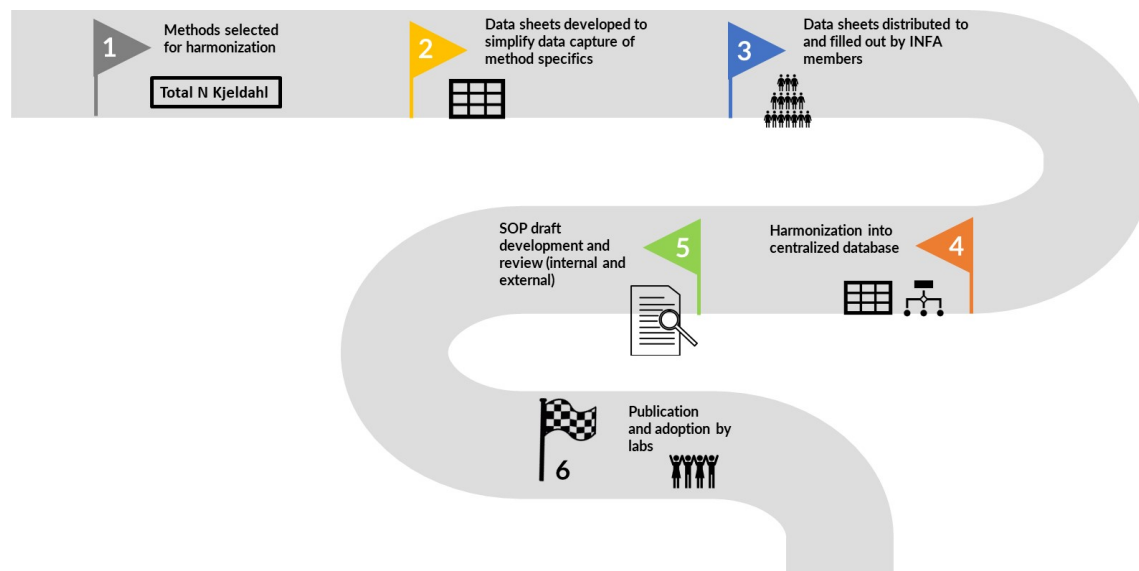


Figure 2. The general sequence of steps in the harmonization process of an SOP, in this case the determination of total N by the Kjeldahl method was taken as an example.

## 6. Soil sampling logistics: GLOSOLAN experience

During an open discussion, Mr Filippo Benedetti, GLOSOLAN coordinator, took the floor to share the experience on shipping soil samples from one country to another for inter-laboratory comparison tests. Because of the different legislations that exist, in 2020, GLOSOLAN developed an inter-laboratory comparison free-access tool, the Soil Import Legislation [database \(SIMPLE\)](#). SIMPLE compiles information on national legislation concerning soil samples import. The database is revised on a regular basis and represents a unique tool to support laboratories in exchanging soil material for scientific, commercial, or quality control purposes. SIMPLE provides comprehensive information on how samples should be prepared, sterilized, packed, labelled and shipped according to the receiving country's requirements. A list of supportive documents to be prepared and some external links to customs and other relevant authorities are also given. During discussion, Mr Benedetti suggested creating a tool to collect information regarding the national regulations for importing and exporting fertilizers to and from the country, similar to the SIMPLE tool that GLOSOLAN developed.



## 7. The harmonization of the SOP for Cd determination

During this item, Ms Vinisa Saynes Santillan presented the information collected from 69 laboratories in 49 countries. The data sheet highlighted the most used methods of extraction and equipment used for determining Cd levels in soils and fertilizers around the world (figure 3). Most of the data received came from Europe and Central Asia regions (28 percent), Asia (25 percent), and South America and the Caribbean (19 percent).

The presentation was divided into three topics, which were intended to clarify to the participants the differences according to the type of matrix, extraction methodology and the equipment used to determine Cd in fertilizers and soils is gained.

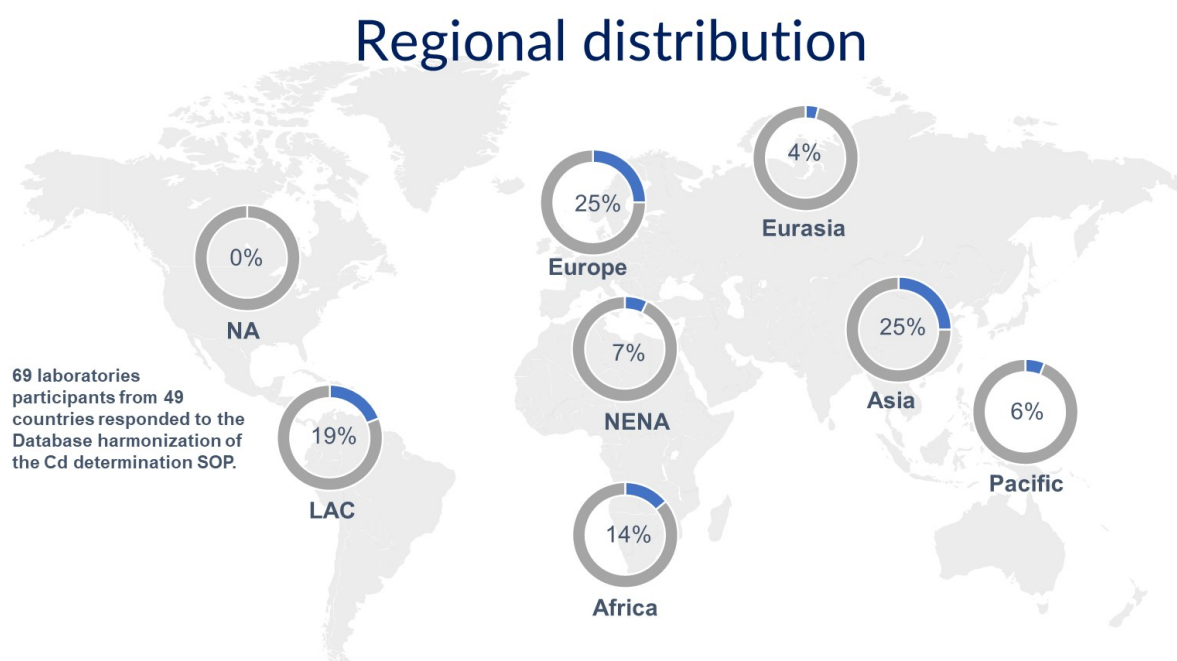


Figure 3. Regional distribution of the data provided by INSOP and INFA members for the determination of Cd in fertilizers.

### 7.1. Matrix type

Based on the data provided, 41 percent of participating laboratories test for the presence of Cd in both fertilizers and soils. Meanwhile, 36 percent of laboratories analyse only fertilizers and 23 percent of laboratories analyse only soils, as shown in figure 4.

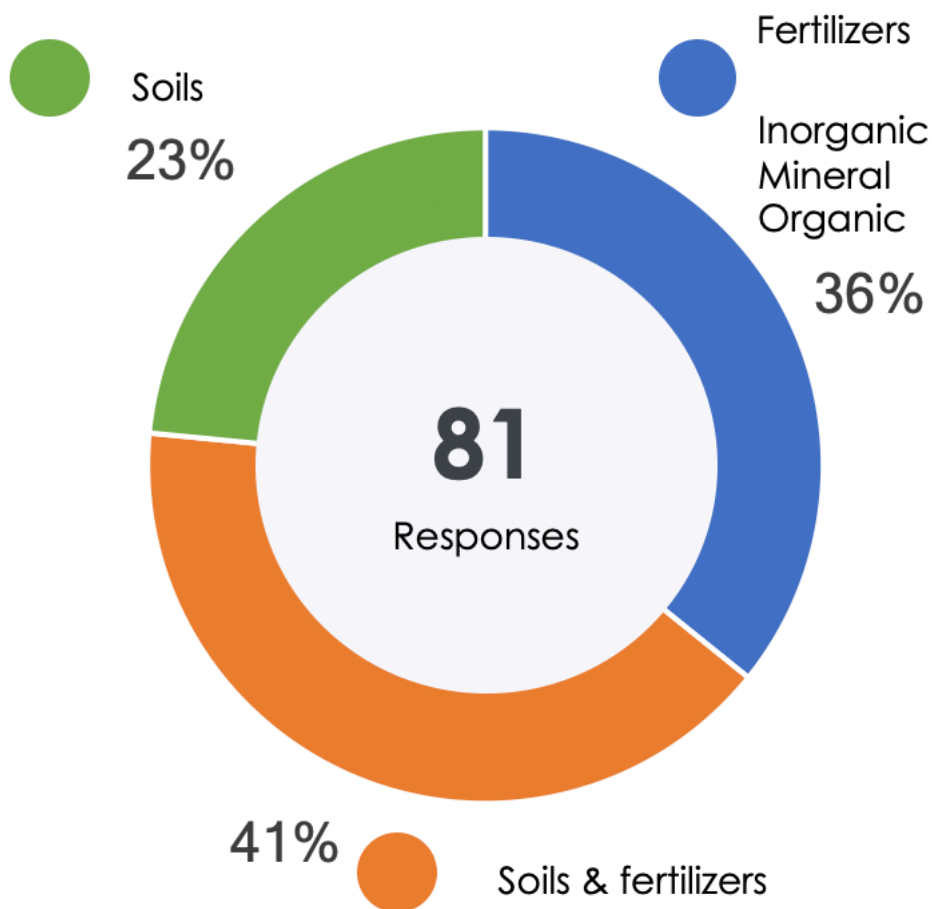


Figure 4. Laboratory data on the matrix type used in the determination of Cd in fertilizers and soils

## 7.2. Extraction Methods

Based on the data provided, 62 out of 81 respondents use a form of digestion such as microwave, titration, hot block extraction and others (figure 5). During the discussion, participants agreed to consider open digestion and microwave extraction methodologies in the SOP for Cd in fertilizers and soil.

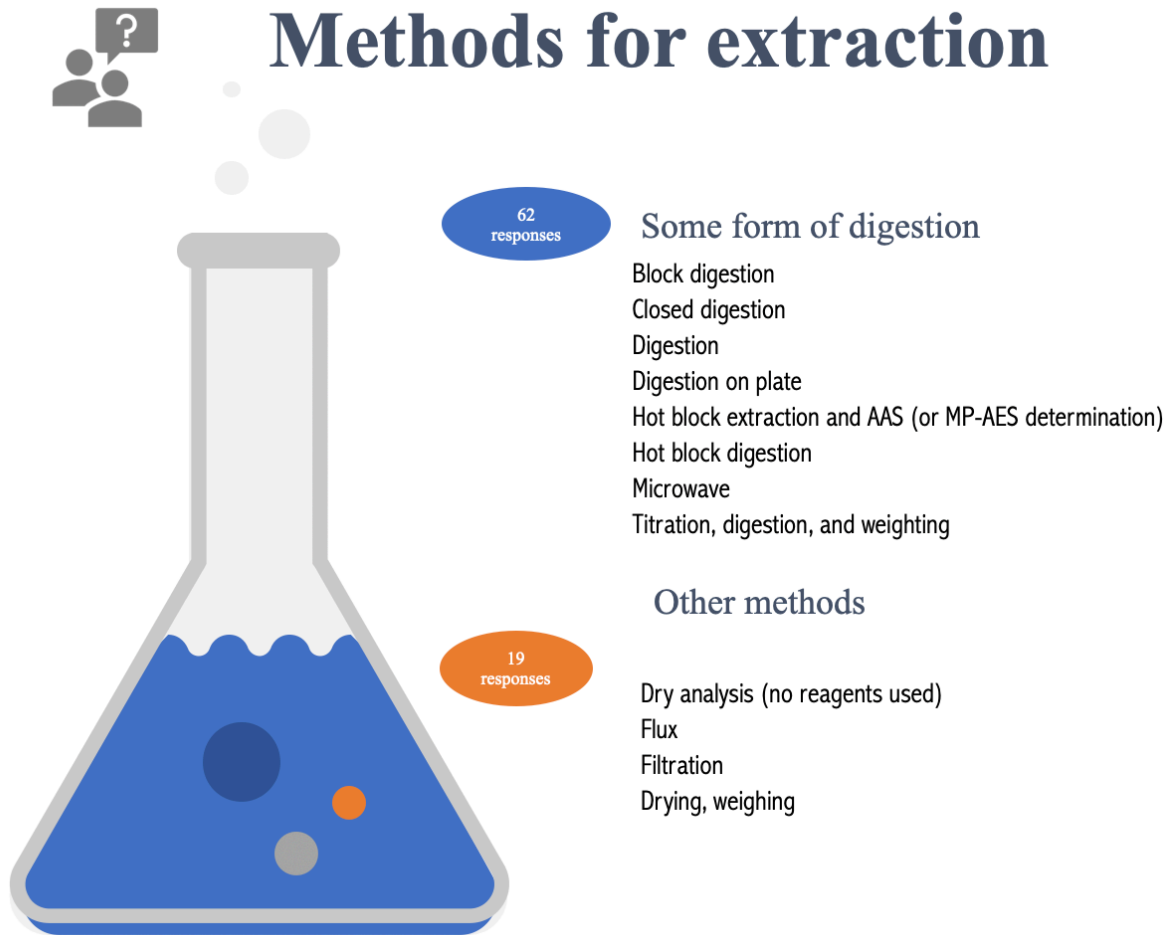


Figure 5. Laboratory data on the most common methods of extractions used in the determination of Cd in fertilizers and soils.

### 7.3. Analytical Methodologies

Based on the data provided, 44 percent of laboratories use inductively coupled plasma (ICP) spectroscopy to determine Cd content in fertilizers and soils, 35 percent of laboratories use atomic absorption spectroscopy (AAS), while 21 percent of laboratories use other available methodologies such as flame atomic absorption spectroscopy (FAAS), graphite atomic absorption spectroscopy (GAAS), microwave plasma atomic emission spectroscopy (MP-AES) and portable X-Ray fluorescent spectroscopy (XRF) (figure 6).

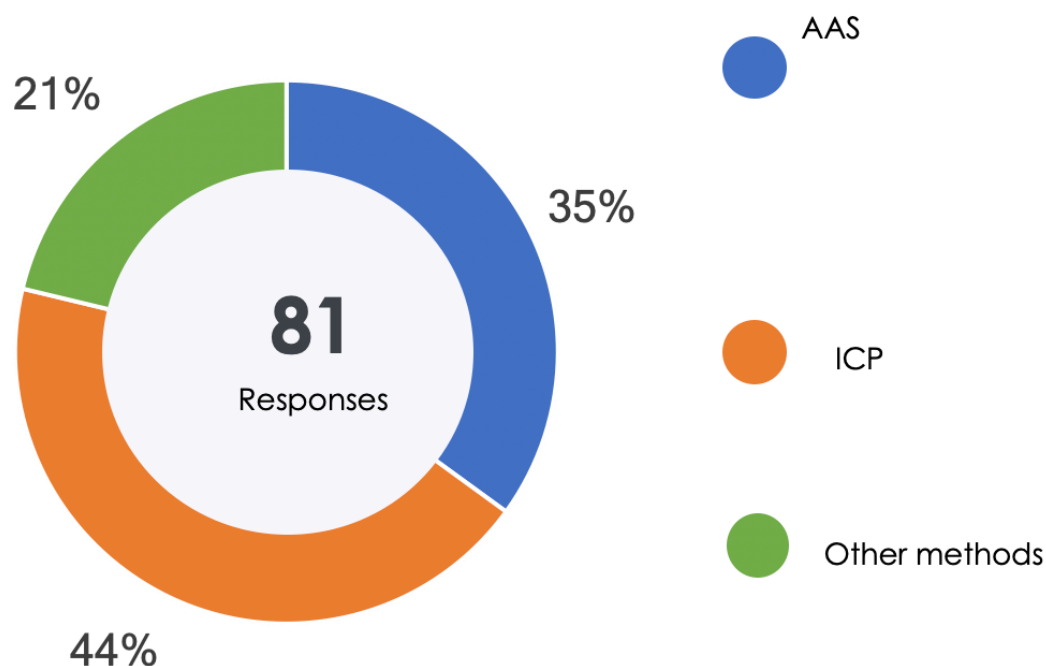


Figure 6. Methods used by the laboratories in determining Cd in fertilizers and soils.

## 8. Open discussion and agreements

Mr Sergejus Ustinov opened the discussion by asking participants the following three questions:

- What matrix type should be considered when harmonizing the SOP for determining Cd in fertilizers and soil?
- What extraction method should be considered when harmonizing the SOP for determining Cd in fertilizers and soil?
- What analytical equipment should be proposed for determining Cd in fertilizers and soil?

### 8.1. Matrix type discussion

Participants opened the discussion by saying that there is no difference in methodology depending on the matrix to be used, that is, whether it is a fertilizer or a soil sample. It is important though how the samples are prepared for the analyses and which acid is used during the preparation. Therefore, there is a suggestion to collect more data from the

laboratories on sample preparation and acids used. There is a suggestion to use the same SOP for both matrices: fertilizers and soils.

## 8.2. Extraction methods discussion

Participating laboratories widely use three methods of extraction. These are microwave digestion, open digestion, and dry analysis. The microwave extraction methodology leads to the total digestion of the sample. Therefore, it is recommended to use microwave digestion when possible. However, because this extraction method involves higher costs, it is not affordable to use microwave digestion in many laboratories, especially in developing countries. It is recommended to have a SOP with two options: open digestion extraction and microwave extraction. This will allow laboratories to choose the extraction method based on equipment availability.

During the discussion on which extraction methods should be included in the SOP, a vote was held. According to figure 6, 68 percent of participants voted to include two extraction methods, open digestion and microwave, in the SOP for determining Cd in fertilizers and soils.

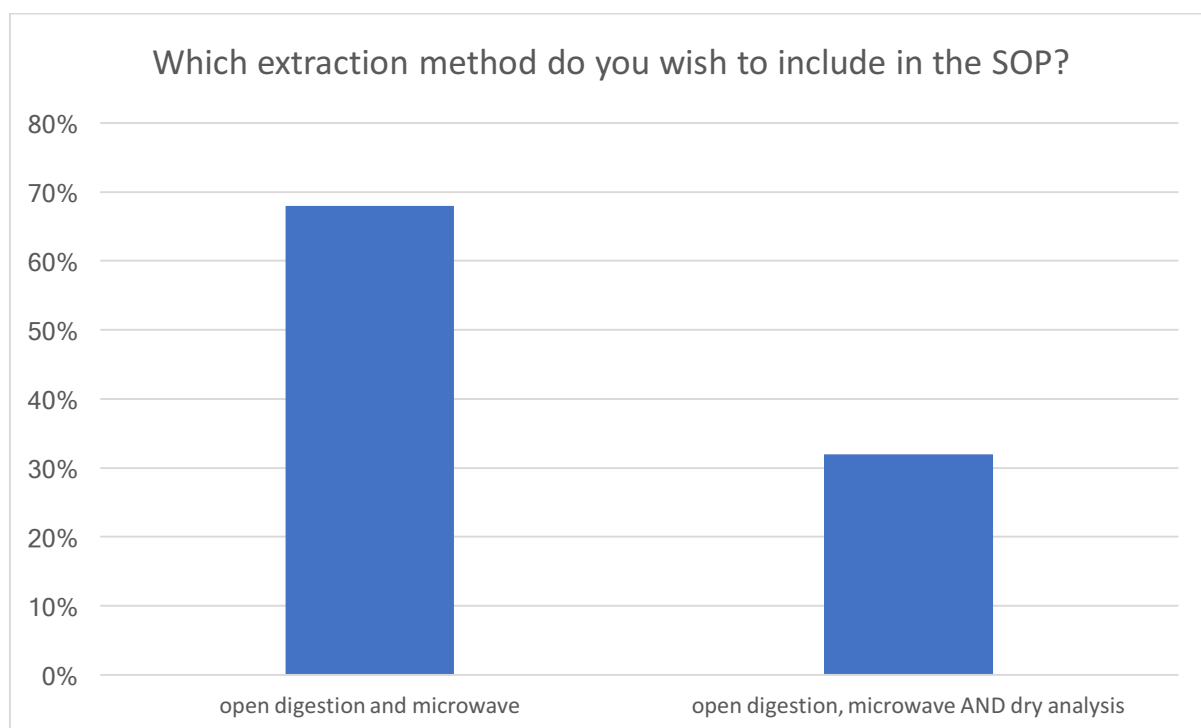


Figure 2. Voting results on the extraction method to be used in the determination of Cd in fertilizers and soils.

## 8.3. Analytical methodologies discussion

The discussion began by emphasizing the importance of using the ICP or AAS equipment due to their high detection levels. On the other hand, XRF can be used but only as a screening tool. Participants agreed that both ICP and AAS equipment are valuable and therefore to be

included in the SOP. To address the capabilities of as many laboratories as possible, including both types of equipment in the SOP is necessary.

## **9. Conclusion**

Ms Vinisa Saynes Santillan and Mr Sergejus Ustinov closed the meeting and thanked the participants for their attendance. To summarize the discussion, Mr Ustinov stated that the INSOP-INFA and GLOSOLAN members had agreed on the following activities and actions to be taken:

- Agreed to develop and harmonize the SOP on Cd determination in mineral fertilizers and soils. The following mineral fertilizers will be considered during the harmonization process: multi-nutrient fertilizers (NPK), triple superphosphate (TSP) and rock phosphate fertilizers.
- Agreed to consider both matrices during the development of the SOP: fertilizers and soils
- Agreed to develop the SOP with two widely used extraction methods: open and microwave digestion.
- Agreed to develop the SOP with two equipment: ICP and AAS.
- Agreed to create a team of internal experts and volunteers to help develop the SOP for determining Cd levels in fertilizers and soils.

## **Annex I: Meeting Agenda**

**13:00-13:10** | OPENING REMARKS

*Dr Dey Hou, INSOP Vice-Chair*

*Dr Wesley Feldmann, INFA Chair*

**13:10-13:20** | Recap of the first INSOP-INFA meeting and endorsement of the agenda

*Mr Sergejus Ustinov, FAO GSP*

**13:20-13:35** | The harmonization process step by step

*Dr Wesley Feldmann, INFA Chair*

Q&A session

**13:45-14:15** | Available harmonization methodologies of Cd

Open discussion

*Ms Vinisa Saynes Santillan, FAO GSP*

**14:15-14:30** | Governance of the INSOP-INFA joint working group

*Mr Sergejus Ustinov, FAO GSP*

**14:30-14:45** | Next steps and timeline

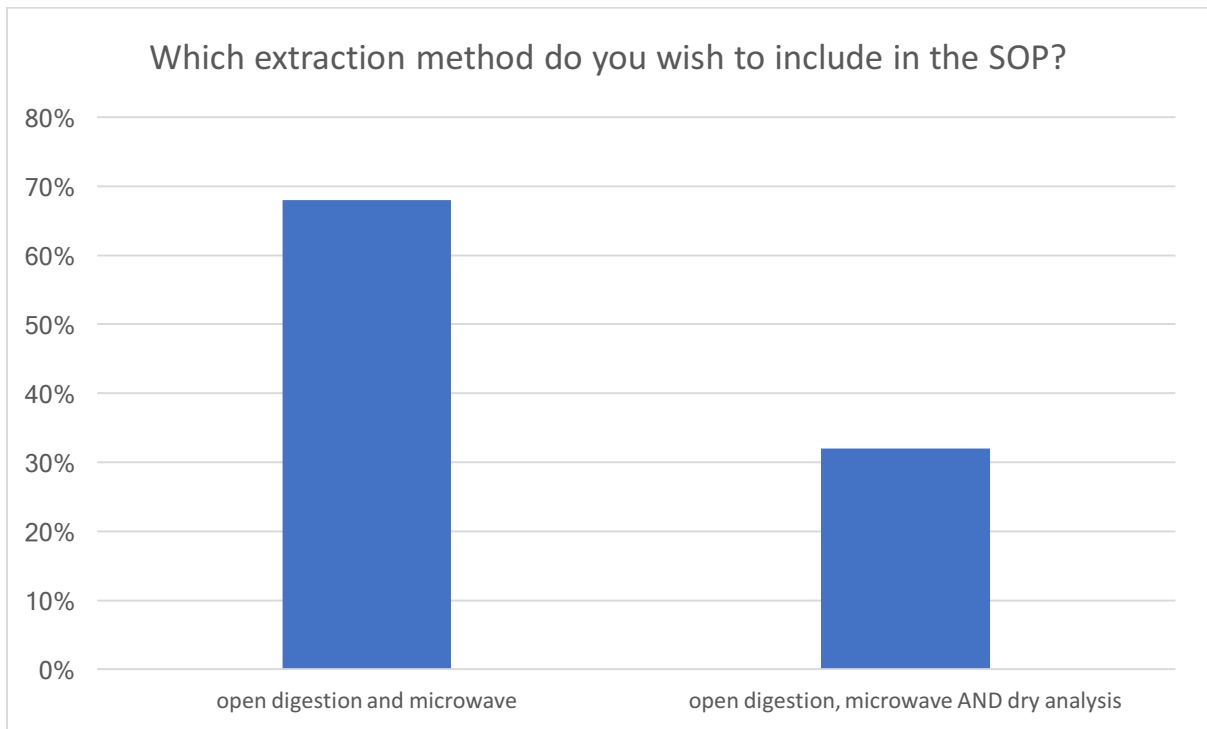
*Ms Vinisa Saynes Santillan, FAO GSP*

**14:45-15:00** | Q&A session and closure of the meeting

*Moderated by: Mr Sergejus Ustinov and Ms Vinisa Saynes Santillan, FAO GSP*

## Annex II: Poll Report

Poll results





### Annex III: List of participants

First Name	Last Name	I am member of	Country
Mohammad Rafi	Salihzada	GLOSOLAN	AFGHANISTAN
Tatev	Jhangiryan	N/A	Armenia
Vachagan	Davtyan	INFA	Armenia
Gayane	Gasparyan	INSOP	ARMENIA
Brad	Scott	N/A	Australia
Deli	Chen	GLOSOLAN	Australia
Armin	Bajraktarevic	INFA	Austria
Sara	Ma	N/A	Bahrain
Md. Lutfar	Rahman	GLOSOLAN	Bangladesh
Dr. Zainal	Abedin	INFA	Bangladesh
Mazharul	Islam	INSOP	Bangladesh
Shofiqul	Islam	INSOP	Bangladesh
Dr. Zainal	Abedin	INFA	Bangladesh
Fabian	Janssens	N/A	Belgium
Clémence	Mariage	GLOSOLAN	Belgium
Edgar Daniel	Matallana Pinilla	N/A	Bogotá D.C. Colombia
Cristina	Ovando	N/A	Bolivia
Carlos	Saavedra	GLOSOLAN	Bolivia
Alejandro	Coca Salazar	GLOSOLAN	Bolivia
Tihomir	Predic	GLOSOLAN	Bosnia and Herzegovina
Pako	Dick	N/A	Botswana
Flavia	Consolini	INFA	Brasil

Rozilda	Oliveira	GLOSOLAN	Brasil
Eliezer	Augusto Baeta de Oliveira	INFA	Brasil
Deise	Nogueira	GLOSOLAN	Brazil
Claudia	Teixeira Siqueira	INFA	Brazil
Nilson	Guimaraes	N/A	Brazil
Vladimir	Ilinkin	GLOSOLAN	Bulgaria
Alassane	KOUSSOUBE	N/A	Burkina Faso
Mamadou	NIMI	N/A	Burkina Faso
Sambo	Pheap	INFA	Cambodia
Ratha	Muon	GLOSOLAN	Cambodia
Sun	Sarak	GLOSOLAN	Cambodia
MFOPOU MEWOOU	YVETTE CLARISSE	GLOSOLAN	Cameron
ENANG	ROGER KOGGE	INSOP	Cameroon
MICHELE LAURE	PEKAM	INSOP	Cameroon
AMINATOU	AMRAOU	N/A	Cameroon
Rose	Ndango	GLOSOLAN	Cameroon
Samuel	Tetsopgang	INSOP	Cameroon
Lauriane Archange	TCHINDA NINLA	INSOP	Cameroon
Ali	Khalvati	N/A	Canada
Ivonne	Aránguiz	N/A	Chile
Ingrid	Castro	GLOSOLAN	Chile
Chile Marlene	Mejías Jeldres	GLOSOLAN	Cchile
yaqi	liu	N/A	China
Kai	Kang	INSOP	CHINA
会利	刘	GLOSOLAN	CHINA
Janice	Li	N/A	China

Xunfeng	Chen	INSOP	China
Zhiqiang	Cao	INSOP	China
xiaoming	wan	N/A	China
Deyi	Hou	INSOP	China
Hong	Wang	INFA	China
Yunfan	Li	N/A	China
Gerardo	Ojeda	INFA	Colombia
Laura	Casas	GLOSOLAN	Colombia
ROSALINA	GONZALEZ	INSOP	Colombia
Alonso	Bustos	INSOP	colombia
Carlos Alberto	Robles Sangregorio	INSOP	Colombia
Orlando	Idarraga	N/A	Colombia
Laura	Uribe	INFA	Colombia
Melissa	Lis-Gutiérrez	GLOSOLAN	Colombia
Veda	Obando	INFA	Costa Rica
Jean-Martial	Johnson	GLOSOLAN	Côte d'Ivoire
Marija	Romic	GLOSOLAN	Croatia
Nada	Maurović	GLOSOLAN	Croatia
Ivana	Zegnal	GLOSOLAN	Croatia
Šárka	Poláková	INSOP	Czech Republic
Jiří	Čuhel	GLOSOLAN	Czechia
Maria Cristina	Suarez	GLOSOLAN	Dominican Republic
Elie	NSIMBA NGEMBO	INSOP	DR Congo
Katty	Pastas	GLOSOLAN	Ecuador
karina	Peña	N/A	ECUADOR
Manuel	Carrillo	N/A	Ecuador
Steven	Gomez	N/A	Ecuador

Ahmed	Afigi	INSOP	Egypt
Grecia Lídice	Henríquez de Chávez	INFA	EL SALVADOR
Rafael	Jaco	GLOSOLAN	El Salvador
Samuel	Bereket	GLOSOLAN	Eritrea
Tõnu	Tõnutare	GLOSOLAN	Estonia
Senzo	Ntshakala	INFA	Eswatini
Getinet	Assabu	N/A	Ethiopia
Zeyede	Aregahegn	GLOSOLAN	Ethiopia
Enyew	Adgo	GLOSOLAN	Ethiopia
Abdulmalik	Mohammed	INSOP	Ethiopia
Jobira	Defera	INSOP	Ethiopia
Mohamed	Eida	INFA	FAO
Carolina	Olivera	N/A	FAO
Cecile	Gomez	GLOSOLAN	France
Neil-Yohan	MUSADJI	INSOP	Gabon
Rolf Gael	Mabicka Obame	INFA	Gabon
Ebrima	Jarra	GLOSOLAN	Gambia
Giorgi	Ghambashidze	INFA	Georgia
Kakha	NADIRADZE	INFA	Georgia
Maia	Sebiskveradze	GLOSOLAN	Georgia
Konstantine	Bziava	INSOP	Georgia
Hussam	Hag Husein	INSOP	Germany
Benjamin	Afful	INSOP	Ghana
Awudu	Abubakari	GLOSOLAN	GHANA
Adams	Sadick	GLOSOLAN	Ghana
Eleni	Karasali	INSOP	Greece
Vasileios	Tzanakakis	INSOP	Greece

Margarita	Hurtarte	INFA	Guatemala
Moussa Tady	Diallo	GLOSOLAN	Guinea
Moussa Tady	Diallo	GLOSOLAN	Guinée
Eunice	Aguilera	GLOSOLAN	Honduras
Pushpajeet	Choudhari	INFA	India
ENVIRO	TECHNOLOGIES	INFA	INDIA
G K	Dinesh	INSOP	India
Palanisamy	Vasudhevan	INSOP	India
ASIT	MANDAL	N/A	India
Dr Govind	Kumar	N/A	India
Tapan	Adhya	INSOP	INDIA
Ankitkumar	Chauhan	INSOP	INDIA
Vassanda Coumar	Mounissamy	INSOP	India
Suresh Kumar	Panchbhai	INSOP	India
VIVEK	M S	INSOP	India
Pradip	Dey	INFA	India
Rucha	Kulkarni	N/A	India
Ragini	Kumari	N/A	India
Dr.Partha Pratim	Chakravorty	INSOP	India
Dr. Vinod	Gaur	GLOSOLAN	India
Arjun	Singh	INSOP	India
Priyanka	Sarangi	INSOP	India
Jegan	Sekar	GLOSOLAN	India
Bharani	Alagirisamy	INSOP	India
Puspendu	Shit	INSOP	India
Jacob	Jose	INSOP	India
Pravesh	Kumar	INSOP	India

Geetha	P.N.	INSOP	India
Dr. Shatrohan	Lal	INSOP	India
Oslan	Jumadi	N/A	Indonesia
Laili	Purnamasari	GLOSOLAN	Indonesia
Lenita	Herawaty	INFA	Indonesia
Dessy Dwi	Septian	N/A	Indonesia
Linca	Anggria	N/A	Indonesia
Ambar Fitri	Rochyati	GLOSOLAN	Indonesia
Ahmad	Mahdavi	INSOP	Iran
Karim	Shahbazi	GLOSOLAN	Iran
Seyed	Cheraghi	GLOSOLAN	Iran
Dr. Abdul Sattar J.	Zaben	N/A	Iraq
Sergejus	Ustinov	INSOP	Ireland
Yunfan	Li	N/A	Ireland
Chiara	Cassinari	GLOSOLAN	Italy
PEGAH	KHARAZIAN	N/A	Italy
Maria	Martin	N/A	Italy
Saham	Mirzaei	INSOP	Italy
Carlo	Jacomini	INSOP	Italy
ChiehYi	Cheng	N/A	Italy
Salifou	GOUBE MAIROUA	GLOSOLAN	Ivory Coast
Kellie-Ann	Clue	INFA	Jamaica
Osama	Abu-Libda	INSOP	Jordan
Nabeel	BaniHani	GLOSOLAN	Jordan
Leigh	Winowiecki	GLOSOLAN	Kenya
Isaboke	Job	GLOSOLAN	Kenya
Elvis	Weullow	GLOSOLAN	KENYA

Godfrey	Owuor	GLOSOLAN	Kenya
Stephen	Ahenda	INFA	Kenya
Odipo	Osano	GLOSOLAN	KENYUA
Bedanga	Bordoloi	INSOP	Kuwait
Santi	Kongmany	GLOSOLAN	Laos
Lauris	Leitans	GLOSOLAN	Latvia
Aldis	Butlers	GLOSOLAN	Latvia
Edgars	Muižnieks	GLOSOLAN	Latvia
Souhail	Awad	INFA	Lebanon
Valerie	Azzi	GLOSOLAN	Lebanon
Mira	Mrad	GLOSOLAN	Lebanon
Talal	Darwish	INSOP	Lebanon
Yara	Khairallah	GLOSOLAN	Lebanon
Malefetsane	KHESUOE	GLOSOLAN	Lesotho
Henry Tamba	Nyuma	INSOP	Liberia
JALAL	ELGADI	GLOSOLAN	LIBYA
Karolina	Barcauskaite	INSOP	Lithuania
Lionel	Leydet	GLOSOLAN	Luxembourg
Bella	Anis	INSOP	Malaysia
Chuck Chuan	Ng	INSOP	Malaysia
Shafar Jefri	Mokhatar	INSOP	Malaysia
Vinisa	Saynes Santillán	INFA	Mexico
Juliana	Padilla-Cuevas	INFA	Mexico
Rogelio	Carrillo González	N/A	Mexico
David	Maldonado Romero	GLOSOLAN	Mexico
ROSA	MARTINEZ	INFA	Mexico
MARIELA	DEYTA	GLOSOLAN	MEXICO

Kathia	Peralta	N/A	Mexico
Claudia	Moreno	GLOSOLAN	MEXICO
Martin	Solís	INSOP	México
Joan	Salas Leiva	INSOP	México
José Manuel	Cena Velázquez	INFA	México
MONICA	AVILES	INFA	MÉXICO
Armando	Guerrero-Peña	GLOSOLAN	México
Ganbat	Battsetseg	GLOSOLAN	mongolia
Khalid	Benzhir	GLOSOLAN	morocco
Laila	Tajeddine	GLOSOLAN	Morocco
ABDELMONIM	ELKANIT	INSOP	MOROCCO
Youness	RAKHILA	GLOSOLAN	Morocco
Abdelillah	LEMERHYERATTE	GLOSOLAN	Morocco
Leonardus	Vergutz	N/A	Morocco
Sanae M'hidli	Ouihmane	N/A	Morocco
Houssine	Benjelloun	N/A	Morocco
Arlindo	Manhica	GLOSOLAN	Mozambique
Momade Mamudo	Ibraimo	GLOSOLAN	Mozambique
Aung Kyaw	Thu	GLOSOLAN	Myanmar
Cho Mar	Htwe	INFA	Myanmar
Filippo	Benedetti	GLOSOLAN	NA
Ella	Shiningaymwe	GLOSOLAN	Namibia
Sunil	Pandey	N/A	Nepal
Ashmita	Kafle	INSOP	Nepal
Sunil	Manandhar	INSOP	Nepal
Pedro	Muñoz	GLOSOLAN	Nicaragua
MAIDAGI	Maman	GLOSOLAN	Niger



Bouba	Hassane	GLOSOLAN	Niger
Saidou	ADDAM KIARI	GLOSOLAN	Niger
Dr. Moustapha Maman	Mounirou	GLOSOLAN	Niger
Bassirou	Hassane	INSOP	Niger
Suleiman	Garba	GLOSOLAN	Nigeria
Joseph	Uponi	GLOSOLAN	Nigeria
ABDULLAHI	SANI SALIHI	N/A	Nigeria
Dr. OKORE	Ikokwu Kalu	INSOP	Nigeria
Miebaka Emmanuel	Ikiriko	INSOP	Nigeria
Dr Emmanuel	Njadvara	INSOP	Nigeria
Yvonne Adaobi	Onmonya	INSOP	Nigeria
Surajo M.	Usaini Rimi	INSOP	Nigeria
Mary	Idowu	INFA	Nigeria
Tope	Akinola	GLOSOLAN	Nigeria
Suleiman	Usman	INSOP	Nigeria
Lauritta	Ndufeiya-Kumasi	INSOP	Nigeria
Hamood	Al-Hashmi	GLOSOLAN	Oman
Asghar	Khan	INSOP	Pakistan
Muhammad Talha	Baig	N/A	Pakistan
Zulfiqar	Saqib	GLOSOLAN	Pakistan
Muhammad Saleem	Chang	INSOP	Pakistan
Amanullah	Khan	INSOP	Pakistan
Nahawand	Souqia	GLOSOLAN	Palestine
Helana	Derbashi	N/A	Palestine
June	Mark	INFA	Papua New Guinea
JULIO CESAR	CASTRO LAZO	INFA	PERU

Bertha Cecilia	Garcia Cienfuegos	INSOP	Perú
Marhleni	Cerda	N/A	Perú
Julio	Zavaleta	N/A	Perú
Carla Nicole	Torre De la cruz	INSOP	Perú
Juan Miguel	Guerrero	INFA	Perú
Marieta	Cervantes	INSOP	Perú
Giuliana Shelly	Lizana Flores	GLOSOLAN	Perú
Emma	Tayad	GLOSOLAN	Philippined
Paul Kristian	Berjuega	INFA	Philippines
Carleen	Calimpon	GLOSOLAN	Philippines
Sherlyn	Tipayno	INSOP	Philippines
Marife	Rebalde	GLOSOLAN	Philippines
Adrienne	Zabate	GLOSOLAN	Philippines
Joshua Mikhel	Reyes	INFA	Philippines
Madonna	Go Lim Tai	GLOSOLAN	Philippines
Maria Carmela	Capule	GLOSOLAN	Philippines
Gerame	Gaces	GLOSOLAN	Philippines
Justine	Estabillo	GLOSOLAN	Philippines
Mel Chrisel	Sales	GLOSOLAN	Philippines
VERONICA	MIGO	GLOSOLAN	Philippines
Olivia Klarina	Paraoan	INFA	Philippines
Jovino	de Dios	GLOSOLAN	Philippines
WILFREDO	DE MESA JR	GLOSOLAN	Philippines
Alexandra	Ribeiro	N/A	Portugal
Raquel	Mano	GLOSOLAN	Portugal
Filipe	Pedra	N/A	Portugal
Rita	Silva	N/A	Portugal

Ana Eduardo	Lima Rodrigues	N/A	Portugal
Carolina	Machado	N/A	Portugal
Hristina	Poposka	INFA	Republic of North Macedonia
Nicoleta	Vrinceanu	GLOSOLAN	Romania
Cioroianu	Traian Mihai	INFA	Romania
Iustina	Boaja	INSOP	Romania
Denis	Frolov	INSOP	Russia
Denis	Frolov	INSOP	Russia
Elena	Shamrikova	GLOSOLAN	Russian Federation
Phillip	Reti	GLOSOLAN	Samoa
Alassane	Traore	GLOSOLAN	Senegal
Mamadou	FAYE	GLOSOLAN	Sénégal
Anna	Ndiaye	GLOSOLAN	Sénégal
stanko	Milić	GLOSOLAN	Serbia
Vesna	Dragicevic	INSOP	Serbia
Maja	Manojlović	GLOSOLAN	Serbia
Mateja	Gosar	N/A	Slovenia
Marvin	Baekisapa	GLOSOLAN	Solomon Islands
Merald	Ajo	GLOSOLAN	Solomon Islands
Ramakgwale	Mampholo	INFA	South Africa
Wesley	Feldmann	INFA	South Africa
Edna	Laubscher	GLOSOLAN	South Africa
Naven	Naicker	INFA	South Africa
SEGWATIBE	MAKOBE	N/A	SOUTH AFRICA
JOSE MATIAS	PEÑAS CASTEJON	INSOP	SPAIN
Amparo	Cortés	GLOSOLAN	Spain

Joan	Centelles	N/A	Spain
MARIA ANGELICA	GARCIA ALVARO	GLOSOLAN	SPAIN
Juanjo	Ramon	N/A	Spain
Wajira	Balasooriya	INSOP	Sri Lanka
Renuka	Silva	GLOSOLAN	Sri Lanka
Nuha	Khamis	GLOSOLAN	Sudan
Xiaolin	Wang	INSOP	Sweden
Solaf	Hallwm	GLOSOLAN	Syria
Alaa	Khallouf	INFA	Syria
Nada	Ghebeh	INFA	Syria
Kobusinge	Aloys	GLOSOLAN	Tanzania
Nelson	Mbawala	INSOP	Tanzania
Jacob	Lisuma	INSOP	Tanzania
Catherine	Senkoro	INFA	Tanzania
Merick	Rugengah	N/A	Tanzania
Khalfan	Mtua	N/A	Tanzania
Nopmanee	Suvannang	GLOSOLAN	Thailand
Chaiyasit	Wattanawangjongsuk	N/A	Thailand
Onanong	Chomsiri	N/A	Thailand
JUTHARAT	YIMCHALUAY	GLOSOLAN	THAILAND
Aleena	Rattanapairote	GLOSOLAN	Thailand
Thanyaporn	Panawong	GLOSOLAN	Thailand
Lankondjoa	Kolani	INFA	Togo
Anani	OGOOU	INSOP	Togo
Alimatou Sadia	ILIASSOU	INFA	Togo
Dosseh K.Atah	ANOUMOU	N/A	TOGO
Tony	Mensah	N/A	Ttogo

Gbénonchi	MAWUSSI	GLOSOLAN	Togo in Africa
Gabrielle	de Souza	INSOP	Trinidad and Tobago
Gaius	Eudoxie	INSOP	Trinidad and Tobago
Dhouha	Zidi	INSOP	Tunisia
Wafa	Boumaila	GLOSOLAN	Tunisia
Dalel	MELKI	GLOSOLAN	Tunisia
Rafla	Attia	GLOSOLAN	Tunisia
Salih	Demirkaya	GLOSOLAN	Turkey
Vecihe	Incirkuş	GLOSOLAN	turkey
ONUR	BAYIZ	GLOSOLAN	Turkey
Huriye	Bayram	INFA	Türkiye
Atilla	Polat	INFA	Türkiye
AYŞEN	AKAY	N/A	TÜRKİYE
Noura Salem Amer	Ameri	INFA	UAE
Noura	Alkaabi	N/A	UAE
Roudha	AlGhaithi	N/A	UAE
Charity	Akao	INFA	UGANDA
Beatrice	Sadina	GLOSOLAN	Uganda
Ashim	Batya	INSOP	Uganda
Tanya	Kolesnikova	GLOSOLAN	Ukraine
Tetiana	Volokh	GLOSOLAN	Ukraine
Dmytro	SEMENOV	INSOP	Ukraine
Yuriy	Dmytruk	N/A	Ukraine
SIMON	MAFABI	INFA	United Arab Emirates
Reji	Krishnan.G	N/A	United Arab Emirates
shamma	Aldhaheri	N/A	united arab emirates
SANDEEP	PULA KKUNNUMMAL	N/A	UNITED ARAB EMIRATES

Habiba	Al Yafei	GLOSOLAN	united arab emirates
Neil	Coyne	INSOP	United Kingdom
Fei	Jin	INSOP	United Kingdom
Adewale	Sedara	INSOP	United States
Penelope	Nagel	N/A	United States
Hugh	Rodrigues	N/A	United States
Laura	Lombardo	INFA	Uruguay
Dra.Ethel Luján	Mediza Madera	INFA	Uruguay
job	fugice	INFA	USA
Peng	Li	INSOP	USA
Taqi	Raza	GLOSOLAN	USA
James	Fuller	N/A	USA
Job	Fugice	INFA	Usa
Sindor	Pardaev	GLOSOLAN	Uzbekistan
Maiella	Rangel-Istillarte	GLOSOLAN	Venezuela
Nuriangel	Casanova Hernández	GLOSOLAN	Venezuela
NGHI	TONG QUOC	GLOSOLAN	Việt Nam
Hung	Nguyen Duc	GLOSOLAN	Vietnam
Mohammed Hezam	Al-Mashreki	GLOSOLAN	Yemen
Tатев	Джангирян	N/A	Yerevan
Tonderai	Chihota	INFA	zimbabwe
Washington	Mutatu	GLOSOLAN	Zimbabwe
Thembinkosi	Mbedzi	GLOSOLAN	Zimbabwe
Takesure	Tendayi	GLOSOLAN	Zzimbabwe
Samuel	Kodani	N/A	Zimbabwe
JORAM	TAPFUMA	GLOSOLAN	ZIMBABWE
Luther	Muteeri	INSOP	Zimbabwe

Kenias	Simbi	N/A	Zimbabwe
Hui	Jia	INSOP	中国