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**PROGRESS MADE AND REVIEW OF THE STATUS OF IMPLEMENTATION OF
ARTICLE XI OF THE CHEMICAL WEAPONS CONVENTION**



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1. EXECUTIVE SUMMARY

- 1.1 This report has been produced for the 107th Session of the Executive Council (the Council) in response to a decision by the Conference of the States Parties (the Conference) at its Sixteenth Session (C-16/DEC.10, dated 1 December 2011) entitled “Components of an Agreed Framework for the Full Implementation of Article XI”, in which the Conference requested that the Technical Secretariat (the Secretariat) provide annual reports to the Council and the Conference on the progress of concrete measures undertaken in implementing the decision, and on the status of implementation of Article XI of the Chemical Weapons Convention (the Convention). The reporting period for this report is 26 August 2023 to 25 August 2024.
- 1.2 During the reporting period, the Secretariat continued to enhance and strengthen its portfolio of programmes and activities aimed at promoting the implementation of Article XI and addressing the four areas identified in decision C-16/DEC.10. The Secretariat sustained delivery of established programmes and launched new initiatives surrounding the three focus areas of integrated chemicals management, enhancement of laboratory capabilities, and chemical knowledge promotion and exchange.
- 1.3 All programmes and initiatives continued to be executed using a results-based approach, with a focus on cost-effectiveness and the needs and priorities of the States Parties. The resources utilised came from the regular budget, supplemented by voluntary contributions—both financial and in-kind—provided by various States Parties and entities for specific activities.
- 1.4 The Secretariat leveraged lessons learned during the COVID-19 pandemic to enhance the delivery of capacity-building training and events. By adopting a mix of online, hybrid, and in-person modalities, the Secretariat ensured maximum impact and effective implementation of its diverse range of programmes and activities.
- 1.5 The newly inaugurated OPCW Centre for Chemistry and Technology (ChemTech Centre) provides the Secretariat with a cutting-edge platform to offer enhanced capacity-building support and international cooperation opportunities for the benefit of States Parties. Equipped with state-of-the-art facilities, the Centre supports the delivery of specialised training, including under Article XI, that are aligned with its foundational vision and address the unique needs of States Parties.
- 1.6 During the reporting period, the Secretariat organised 31 capacity-building programmes (training activities, seminars, and workshops) with over 660 participants from 104 States Parties. The Secretariat supported 20 research projects, nine fellowships, and 10 conferences.
- 1.7 In the area of integrated chemicals management, during the reporting period the Secretariat initiated the twenty-fifth edition of the Associate Programme in face-to-face format, benefitting 32 participants from 32 States Parties. A special focus also continued to be placed on chemical safety and security management, with the organisation of 12 training courses and workshops benefitting over 205 participants from 69 States Parties.

- 1.8 In the area of the enhancement of laboratory capabilities, the Secretariat delivered 13 analytical skills development courses, proficiency testing training courses, and specialised laboratory training courses, benefitting 270 participants from 53 States Parties.
- 1.9 Under the chemical knowledge promotion group of programmes, various opportunities were provided to further enhance networking and the exchange of information and knowledge among scientific communities, academic institutions, chemical industry associations, and non-governmental organisations (NGOs), as well as regional and international institutions.
- 1.10 Among the highlights was the hybrid edition of the Education and Training Programme for Youth on Peaceful Uses of Chemistry aimed at enhancing the capacities of young people in the peaceful uses of chemistry towards the prevention of the diversion of chemicals for malicious use. The initiative, supported by the European Union, was attended by 24 participants from 12 Member States. The Secretariat also held the annual Symposium on Women in Chemistry in collaboration with the National Authority of Panama, in Panama City, Panama, from 22 to 23 May 2024. The Symposium, which aimed to foster gender equality and diversity in the field of chemistry, was organised in close cooperation with the United Nations Interregional Crime and Justice Research Institute (UNICRI) and the United Nations Institute for Disarmament Research (UNIDIR), and with a voluntary contribution from France. It was attended by 28 participants from 13 Member States.
- 1.11 The Secretariat sponsored 10 scientific conferences in nine States Parties under the Conference Support Programme, benefitting over 120 experts; it also funded 20 research projects in 11 States Parties under the Programme for Support of Research Projects, and provided nine fellowships for junior scientists under the Fellowship Programme.
- 1.12 To further enhance the effectiveness and impact of the international cooperation programmes provided by the Secretariat to States Parties under Article XI, a cost-effective and results-based approach was sustained. Special attention was given to the advancement of alumni networks of the programmes. In addition to the vibrant alumni network of the Associate Programme, the new alumni network that was launched in April 2022 for the Education and Training Programme for Youth on Peaceful Uses of Chemistry was further strengthened. Alumni networks have also been established for the Chemical Safety and Security Management Programme, the Integrated Chemicals Management Programme, and the Women in Chemistry initiative, which offer the Secretariat additional channels to communicate with former participants and support their initiatives, including education and outreach on the Convention and the peaceful uses of chemistry.
- 1.13 Furthermore, the Secretariat continued to place due emphasis on strengthening capacity-building needs assessments for the effective delivery of programmes. Within this context, during the reporting period, the Secretariat continued its efforts to conduct needs assessments in the area of integrated chemicals management. In 2023, the needs assessment exercise gathered input from 55 States Parties regarding their requirements in chemical safety and security management. This input has been analysed and integrated into the Secretariat's ongoing capacity-building activities in chemical safety and security management, including for influencing the selection of topics for the

upcoming indicative guidelines. In 2024, the Secretariat invited States Parties to voluntarily submit assessments of their specific needs in chemical safety and security management. Additionally, they have been asked to provide information on existing tools, guidelines, and best practices in chemical management within their respective countries.

- 1.14 The evaluation and impact assessment approach and techniques continued to be institutionalised during the reporting period. The assessment of all programmes was based on structured feedback from various stakeholders, including participants, relevant institutions, and National Authorities of States Parties. Assessments also took into account regular follow-up of participants' career paths and academic development vis-à-vis the impact of the respective programmes in which they participated. During the reporting period, the Secretariat carried out a comprehensive survey of the Laboratory Twinning and Assistance Programme (2019 to 2024).

2. INTRODUCTION

- 2.1 The Conference at its Sixteenth Session adopted a decision regarding the components of an agreed framework for the full implementation of Article XI of the Convention (C-16/DEC.10) and requested the Secretariat to report to the Conference at each regular session on the progress of concrete measures undertaken in implementing the decision, and on the status of implementation of Article XI. This report is submitted in accordance with the Conference request, with the reporting period being 26 August 2023 to 25 August 2024.
- 2.2 The components included in the agreed framework identified concrete measures in the following areas:
- (a) national capacity building for the research, development, storage, production, and safe use of chemicals for purposes not prohibited under the Convention;
 - (b) promoting networking and exchange among scientific communities, academic institutions, chemical industry associations, NGOs, and regional and international institutions;
 - (c) enhancing the effectiveness of the current international cooperation programmes of the OPCW; and
 - (d) measures by States Parties and the OPCW to facilitate States Parties' participation in the fullest possible exchange of chemicals, equipment, and scientific and technical information relating to the development and application of chemistry, in accordance with the provisions of the Convention.

3. ACTIVITIES UNDER CONFERENCE DECISION C-16/DEC.10 ON THE FULL IMPLEMENTATION OF ARTICLE XI OF THE CONVENTION

3.1 During the reporting period, the OPCW continued the implementation of Article XI of the Convention through various programmes and activities that were identified in decision C16/DEC.10. The needs and priorities of the States Parties were taken into consideration throughout the continued implementation of the programmes, with resources provided from the regular budget, as well as voluntary contributions, both financial and in-kind.

3.2 In accordance with the results-based approach that the Secretariat continued to apply during the reporting period, the effectiveness of these programmes was assessed according to whether skills and capabilities were enhanced in the three focal areas relating to the peaceful application of chemistry: integrated chemicals management, enhancement of laboratory capabilities, and chemical knowledge promotion and exchange.

3.3 The assessment of all programmes was based on feedback from the participants and from States Parties, as well as on observation of the evolution of the participants' career paths or academic development following their participation in the various programmes.

4. NATIONAL CAPACITY BUILDING FOR THE RESEARCH, DEVELOPMENT, STORAGE, PRODUCTION, AND SAFE USE OF CHEMICALS FOR PURPOSES NOT PROHIBITED UNDER THE CONVENTION

4.1 National capacity building for the research, development, storage, production, and safe use of chemicals for purposes not prohibited under the Convention has been supported through a number of programmes, including but not limited to the Associate Programme, the Laboratory Twinning and Assistance Programme, analytical skills development courses, training courses for the OPCW proficiency tests, and the Chemical Safety and Security Management Programme.

4.2 The portfolio of international cooperation programmes under Article XI features the following:

(a) Integrated chemicals management:

- (i) Associate Programme;
- (ii) Chemical Safety and Security Management Programme;
- (iii) Executive Programme;
- (iv) green and sustainable chemistry; and
- (v) development of tools and guidance on chemical safety and security management.

(b) Enhancing laboratory capabilities:

- (i) analytical chemistry and analytical skills development courses;
- (ii) enhancement of laboratory skills courses;
- (iii) proficiency testing training;
- (iv) customs laboratory training;
- (v) Laboratory Twinning and Assistance Programme; and
- (vi) Equipment Exchange Programme.

- (c) Chemical knowledge promotion and exchange:
 - (i) Fellowship Programme;
 - (ii) Programme for the Support of Research Projects;
 - (iii) Conference Support Programme;
 - (iv) Forum on Peaceful Uses of Chemistry;
 - (v) Education and Training Programme for Youth on Peaceful Uses of Chemistry;
 - (vi) Women in Chemistry initiative; and
 - (vii) policy and diplomacy for scientists.

5. INTEGRATED CHEMICALS MANAGEMENT

5.1 The integrated chemicals management concept is based on a holistic and comprehensive approach, considering multiple factors such as policy, practices, science, and engineering to address various facets of chemicals management from a health, safety, and security standpoint, towards the ultimate goal of ensuring the safe and secure management of chemicals throughout their life cycle.

Associate Programme

- 5.2 The Associate Programme aims to address the objectives set out in Article XI of the Convention in terms of capacity building and implementation of the Convention in areas relating to chemistry for peaceful purposes—in particular in developing countries and countries with economies in transition.
- 5.3 The programme facilitates capacity building in States Parties by imparting requisite skills to qualified chemists and chemical engineers and by exposing them to the modern chemical practices required to operate effectively and safely in a modern chemical industry environment. Moreover, it enhances the ability of States Parties to implement the industry-related provisions of the Convention and broadens the talent pool of those assuming the responsibility for implementation within the National Authorities and other relevant institutions. The programme also facilitates the trade in chemicals by disseminating the best practices in this field, and supports chemical safety and security in an industrial environment.
- 5.4 The Programme has emerged as the OPCW's flagship initiative for fostering international cooperation. It comprises three distinct segments: an induction – intermediate – final segment at the OPCW Headquarters; a university segment in the United Kingdom of Great Britain and Northern Ireland; and an industry segment in different locations. During the three-week intermittent segment, held at the University of Surrey in the United Kingdom, participants learn about the theory of mass balance and practice at the university's model plant. Subsequently, for the industry segment, participants are paired up and deployed to identified chemical industry sites hosted by participating States Parties for first-hand exposure to and training in various industrial operations. Upon the completion of the Programme, all participants present their research projects on topics related to the Convention, in addition to an industry assignment.

- 5.5 The twenty-fourth edition of the Associate Programme was conducted from 21 July 2023 to 22 September 2023, with 31 participants from the following 31 States Parties: Argentina, Armenia, Azerbaijan, Bangladesh, Botswana, Brazil, Cambodia, Chile, China, Colombia, Costa Rica, Djibouti, Ghana, Iraq, Jamaica, Jordan, Kenya, Lesotho, Malaysia, Mauritania, Morocco, Nigeria, Pakistan, the Philippines, South Africa, Sri Lanka, Suriname, Uganda, Viet Nam, Zambia, and Zimbabwe. The Programme helped raise awareness of participants of the Convention, its history, and its implementation by States Parties, with a particular focus on modern chemical industry operations. The programme also covered a wide range of topics, including chemical safety and security in industry, the audit of chemical plants, and emerging threats and trends.
- 5.6 The twenty-fifth edition of the Associate Programme began on 29 July 2024 in The Hague, the Netherlands, and is ongoing and due to conclude on 26 September 2024. The Programme is hosting a total of 32 participants from 32 States Parties: Angola, Argentina, Armenia, the Bahamas, Bangladesh, Bhutan, Botswana, Brazil, Burundi, China, Colombia, Côte d'Ivoire, Cuba, Ethiopia, Guatemala, India, Iran (Islamic Republic of), Jordan, Kenya, Malaysia, Maldives, Morocco, Nicaragua, Nigeria, Pakistan, the Philippines, Sierra Leone, Sri Lanka, the Sudan, Uganda, Zambia, and Zimbabwe. For the industry segment this year, the participants will be paired and deployed to 16 identified chemical industry sites hosted by 11 States Parties: Brazil, China, Germany, India, Italy, Malaysia, Poland, South Africa, Spain, Sri Lanka, and the United Kingdom of Great Britain and Northern Ireland.
- 5.7 To date, 25 editions of the Associate Programme have taken place, with the participating 608 professionals from 124 States Parties now being engaged in an active alumni network. Special attention has been given to the participation of female professionals, with over 180 women from 77 States Parties having enrolled in the Programme thus far. Feedback received from participants has indicated their great appreciation of the training, which has considerably upgraded their knowledge, technical skills, and experience in terms of chemistry and chemical and process engineering, with a focus on chemical safety and security management. Additionally, the training has increased participants' knowledge of the Convention and of the mission and role of the OPCW. Following the completion of the Programme, participants serve as resource persons to their National Authorities and often offer valuable support regarding the implementation of the Convention at the national and regional levels. It is noteworthy that over the years, a number of associates have later become Secretariat staff members. Furthermore, in 2024, the Secretariat was able to further strengthen its outreach efforts and enhance geographical representation in the Programme. As a result of such efforts, the twenty-fifth edition received participants from Angola and Guatemala for the first time.
- 5.8 The Alumni Association of the Associate Programme, established in 2012 as a group on the social media platform Facebook, has continued to provide a highly interactive forum among current and former participants to share views, scientific information, and experience in the field of chemistry. In addition, the Association has continued to serve as a reliable channel to receive feedback regarding the Associate Programme and to provide updates on the work of the OPCW. This exchange of information ensures continuous improvement of the Programme for a longer-term impact. The group also offers opportunities for professional networking, as participants can get together for joint projects and help each other with various professional issues.

- 5.9 To help reinvigorate and bolster these efforts, on 25 January 2024, the Secretariat organised an online event as part of the first engagement of the formalised Associate Programme Alumni Network. The online workshop aimed at addressing topics and providing information related to the Convention with Programme alumni, while also providing a platform for alumni to remain connected within the network. In this vein, the workshop covered two topics in chemical safety and security management: emerging threats and their implications for implementation of the Convention, and safety, security, and sustainability for chemical industry management. The event was attended by 36 participants from 28 Member States: Armenia, Bhutan, Botswana, Brazil, Cameroon, Chile, China, Colombia, Costa Rica, Cuba, the Gambia, Ghana, Hungary, India, Indonesia, Iraq, Jordan, Kenya, Lesotho, Malaysia, Morocco, Nepal, Nigeria, Pakistan, the Philippines, Poland, Sri Lanka, and Uganda.

6. CHEMICAL SAFETY AND SECURITY MANAGEMENT

- 6.1 The chemical safety and security management-related activities that took place during the review period were generously supported through voluntary contributions from Germany, Qatar, the Republic of Korea, and the European Union. Global, regional, and national events were conducted to meet the needs of participating countries. This has given impetus to the promotion of chemical safety and security in participating States Parties, especially in terms of sharing experiences and best practices.¹
- 6.2 During the reporting period, the Secretariat organised 12 capacity-building activities on chemical safety and security management, seven of which were either in-person or in hybrid format.
- 6.3 From 1 September to 6 October 2023, the Secretariat, in collaboration with the University of Wuppertal and with support from the Federal Government of Germany, organised an online “Wuppertal Course on Explosion Protection and Safety Management in the Chemical Process Industries”. The course employed the “train-the-trainer” approach and was intended for participants with backgrounds in chemistry, chemical engineering, or chemical industry who work at chemical or manufacturing industrial facilities or who, because of their involvement in the implementation of the Convention, are called upon to interact with the chemical industry at various levels, such as in relation to formulating, analysing, or implementing chemical safety policies in their home countries. The course accommodated 24 participants from the following 18 Member States: Bangladesh, Brazil, Burkina Faso, Cambodia, Chile, Colombia, Côte d’Ivoire, Cuba, India, Iraq, Kenya, Malaysia, Nigeria, Pakistan, Sri Lanka, Suriname, Uganda, and Zimbabwe.

¹ Launched in 2009, the Chemical Safety and Security Management Programme is an international cooperation programme designed initially to focus on the chemical industry and industry-related aspects of the implementation of the Convention, specifically on chemical safety and security at the plant level in the development, storage, production, handling, transportation, and distribution of chemicals.

- 6.4 The Secretariat, with the International Union of Pure and Applied Chemistry (IUPAC) as partner and co-sponsor, organised an online e-learning chemical safety training programme in Spanish for Member States in the Latin America and the Caribbean Group (GRULAC) from 25 September to 1 December 2023. The training course, delivered by the Chemical Industries Association of Uruguay, provided an update on the current standards, policies, and best practices in occupational safety, chemical hazard management, the handling, storage, and transport of chemicals, and waste management. Participants had access to a wealth of training materials available on a dedicated e-learning platform consisting of five modules covering safety, chemicals, security, emergencies, and management and culture. The course was attended by 15 participants specialised in the environment, health, safety, and security relating to the use of chemicals, representing the following 10 Member States: Argentina, Bolivia (Plurinational State of), Brazil, Chile, Colombia, Costa Rica, Ecuador, Nicaragua, Paraguay, and Peru.
- 6.5 The Secretariat organised an online seminar on chemical safety and security management for African Member States on 11 October 2023. The objectives of the seminar were to provide tools to assess, mitigate, and respond to the risks of chemical accidents, and prevent misuse of dual-use chemicals in the Africa region. During the seminar, the participants were briefed on dual use chemicals and their industrial applications, and how to improve safety and security at industry and ensure the legitimate use of chemicals during the entire chemicals supply chain. The seminar was attended by 23 participants from governmental institutions and National Authorities, representing 11 Member States: Algeria, Burkina Faso, Burundi, the Congo, Kenya, Morocco, Namibia, Nigeria, Uganda, the United Republic of Tanzania, and Zimbabwe.
- 6.6 From 17 to 19 October 2023 in Seoul, the Republic of Korea, the Secretariat organised the Seoul Workshop on the Peaceful Development and Use of Chemistry for Member States in the Asia Region. The workshop, funded by the Republic of Korea, aimed at promoting the peaceful uses of chemistry and enhancing capacities in chemical safety and security in Asia. Participants discussed topics related to dual-use chemicals, chemical management regulatory regimes, and customer and process safety management systems. The course was attended by 16 representatives from the following 15 Member States in the Asia region: Bangladesh, China, India, Indonesia, Iran (Islamic Republic of), Malaysia, Maldives, Myanmar, Pakistan, Philippines, Sri Lanka, Tajikistan, Thailand, the United Arab Emirates, and Viet Nam.
- 6.7 The Secretariat organised the Validation Workshop on Indicative Guidelines for the Safe and Secure Transport of Hazardous Chemicals by Road: Chemical Safety and Security Tools Development Programme on 13 November 2023. The workshop aimed to review the draft version of the guidelines with a wider range of experts appointed by the Member States. The draft version of the guidelines had been developed at two previous workshops under Chemical Safety and Security Tools Development Programme. The online review workshop was attended by 19 participants from 15 Member States: Brazil, China, Germany, Ghana, Hungary, India, Kenya, Malaysia, Mauritania, the Philippines, South Africa, Sri Lanka, Türkiye, the United Kingdom of Great Britain and Northern Ireland, and the United States of America.

- 6.8 The Secretariat organised a workshop on developing indicative guidelines on “Know Your Customer” from 27 February to 1 March 2024 in Colombo, Sri Lanka. The workshop was the third series within the framework of the Chemical Safety and Security Tools Development Programme, under which guidelines on chemical safety and security management for small and medium enterprises (SMEs) and the safe and secure transport of hazardous chemicals by road have been developed. The workshop aimed at enhancing the capacities of the Member States in chemical safety and security through the development of the “Know Your Customer” guidelines. During the workshop, a discussion was held among the participating experts, who exchanged views on the topic at hand. The workshop also featured breakout group sessions on developing an outline and the contents of the draft version of the guidelines. The workshop was attended by 17 participants from 11 Member States: Brazil, Canada, China, Germany, India, Kenya, Mexico, Nigeria, Sri Lanka, the United Kingdom of Great Britain and Northern Ireland, and the United States of America.
- 6.9 The Secretariat, in cooperation with the National Authority of Zambia for the implementation of the Convention, organised a regional seminar on the Convention and chemical safety and security management for Member States of the OPCW in the Africa region in Lusaka, Zambia, from 19 to 21 March 2024. The course, funded by the European Union, was aimed at building knowledge on advanced chemical safety and security in the region. The seminar promoted safety and security standards for chemical facilities and laboratories to minimise the risk of safety incidents. Participants reviewed the critical resources, tools, and training needed to raise chemical safety measures and secure industry facilities. The seminar was attended by 21 participants from governmental and private chemical laboratories, chemical industries, academia, and National Authorities, representing 14 States Parties: Burundi, Cameroon, Côte d’Ivoire, Djibouti, Ethiopia, Kenya, Liberia, Malawi, Mauritania, Namibia, Nigeria, Uganda, Zambia, and Zimbabwe.
- 6.10 The Secretariat, in cooperation with IUPAC and the Chemical Industries Association of Uruguay, organised the second edition in English of the e-learning safety training programme from 8 April to 7 June 2024. The course provided an update on the current standards, policies, and best practices in occupational safety and chemical hazard management, as well as the handling, storage, and transport of chemicals and waste management. The training was attended by 16 chemistry experts from 16 Member States: Botswana, Brazil, China, Colombia, Croatia, Iran (Islamic Republic of), Kenya, Lebanon, Malaysia, Morocco, Nicaragua, Nigeria, Pakistan, Romania, Togo, and Uganda.
- 6.11 The Secretariat, in cooperation with the National Authority of Costa Rica, organised a regional seminar on the Convention and chemical safety and security management for Member States of the OPCW in the GRULAC region in San José, Costa Rica, from 23 to 25 April 2024. The objectives of the seminar were to provide tools to assess, mitigate, and respond to the risks of chemical accidents, and prevent misuse of dual-use chemicals in the GRULAC region. During the seminar, the participants were briefed on different approaches to improve safety and security in industry and ensure the legitimate use of chemicals throughout the entire chemical supply chain. The seminar was attended by 27 participants from governmental and private chemical laboratories, the chemical industry, academia, and National Authorities, representing 12 Member States: Argentina, the Bahamas, Barbados, Brazil, Chile, Costa Rica, Cuba, Guatemala, Panama, Paraguay, Peru, and Suriname.

- 6.12 The Secretariat, in cooperation with the Sandia National Laboratory of the United States of America, organised a workshop on developing training materials for the Indicative Guidelines for the Safe and Secure Transport of Hazardous Chemicals by Road in Albuquerque, the United States of America, from 29 April to 2 May 2024. The objective of the workshop was to improve stakeholders' accessibility to the Indicative Guidelines. The workshop featured group sessions on developing training materials for the recently developed Indicative Guidelines. The workshop was attended by six experts from Germany, the United Kingdom of Great Britain and Northern Ireland, and the United States of America.
- 6.13 From 28 to 30 May 2024, the Secretariat hosted, jointly with the National Committee for the Prohibition of Weapons of Qatar, a seminar on the Convention and chemical safety and security management for Asian Member States in Doha, Qatar. The seminar, funded by Qatar, promoted the peaceful uses of chemistry and built the capacities of Asian Member States in chemical safety and security management. The seminar was attended by a total of 22 representatives from the following 17 Member States: Bangladesh, China, India, Indonesia, Jordan, Kazakhstan, Kuwait, Lebanon, Malaysia, Maldives, Myanmar, Oman, Pakistan, Saudi Arabia, Sri Lanka, the United Arab Emirates, and Viet Nam. Additionally, 28 local participants from Qatar also took part in the seminar.
- 6.14 The Secretariat announced the planned release of the Indicative Guidelines for the Safe and Secure Transport of Hazardous Chemicals by Road on the margins of the informal consultation on Article XI held on 21 June 2024. The newly developed Guidelines highlight the Secretariat's efforts to improve the capacities of States Parties in chemical safety and security management through the development of non-binding practical tools. The Indicative Guidelines provide an overview of and guidance on the key principles surrounding the safe and secure transport of hazardous chemicals by road for major stakeholders in transportation. Practical training materials are being developed on the Indicative Guidelines for wider outreach and benefit.

7. ENHANCING LABORATORY CAPABILITIES

- 7.1 The Secretariat continued to provide capacity-building activities for participants from developing countries and countries with economies in transition to assist their efforts in building or further enhancing their laboratory capacities. The activities included a range of general analytical chemistry courses (analytical skills development courses, analytical chemistry courses, enhancement of laboratory skills courses, and a basic analytical course for women chemists), the Laboratory Twinning and Assistance Programme, proficiency test training, specialised laboratory training (for customs laboratories), and the Equipment Exchange Programme. During the reporting period, over 235 participants from the following 55 Member States either benefited from or supported these activities: Algeria, Argentina, Armenia, Australia, Azerbaijan, Barbados, Botswana, Brazil, Burkina Faso, Burundi, Cameroon, Chile, China, Colombia, Costa Rica, Côte d'Ivoire, Croatia, Germany, Ghana, Greece, Guatemala, India, Iraq, Italy, Jamaica, Kenya, Malawi, Malaysia, Mauritania, Mauritius, Morocco, Myanmar, Namibia, Nicaragua, Nigeria, Oman, Pakistan, Panama, Paraguay, Peru, the Philippines, Poland, the Republic of Korea, Senegal, Slovakia, South Africa, Sri Lanka, Suriname, Türkiye, Uganda, the United Republic of Tanzania, Uruguay, and Zimbabwe.

- 7.2 The analytical chemistry courses and analytical skills development courses aim to assist qualified analytical chemists in acquiring further experience and practical skills in the analysis of chemicals related to the Convention and serve to:
- (a) enhance States Parties' national capacities in analytical chemistry for personnel from industry, academic institutions, and government related to the Convention, or in improving the quality and proficiency of laboratory work through sound management practices;
 - (b) facilitate the adoption of good practices in laboratories supporting national implementation of the Convention, trade, and economic development; and
 - (c) broaden the pool of human resources from which National Authorities and the Secretariat can draw in the future.
- 7.3 The courses for the enhancement of laboratory skills focus either on building skills in using specific techniques such as mass spectrometry (MS) and nuclear magnetic resonance (NMR) to analyse chemicals related to the Convention, or improving the quality and proficiency of laboratory work through sound management practices. These are two-week courses, each for a maximum of four participants who already have practical experience in liquid chromatography (LC), gas chromatography (GC), MS, NMR, or a combination of the techniques. Participants are introduced to the preparation of samples by means of demonstrations and practical exercises. The courses also address theoretical aspects of LC and GC, LC-MS, MS, and NMR, as well as those of quantitative MS, quality assurance, and instrument maintenance.

Laboratory Twinning and Assistance Programme

- 7.4 In addition to the established training programmes in the area of enhancing laboratory capabilities, the Secretariat has continued the Laboratory Twinning and Assistance Programme (merging the former Laboratory Twinning Initiative and Laboratory Assistance Programme), co-funded through a voluntary contribution from the European Union. The Programme is aimed at improving the technical competencies of laboratories in States Parties with economies that are either developing or in transition for participation in the OPCW proficiency tests. The Programme is based on the provision of mentorship and exchange of knowledge from more advanced laboratories, which preferably already hold OPCW designated laboratory status.
- 7.5 The Secretariat received a new expression of interest for participation in the Laboratory Twinning and Assistance Programme from the Chemical Analysis Laboratory of the Agency for Defense Development, the Republic of Korea. The Korean Laboratory offered assistance with the analysis of Convention-related environmental and biomedical samples. Significant progress has also been made in the preparation of two new twinning projects: one between the Department of Chemistry (Malaysia) and Chemical Agents Analysis Facility, Defence Science and Technology Group (Australia), and another between the National Laboratory of Scientific and Technical Police, (Morocco) and Lawrence Livermore National Security (the United States of America).

- 7.6 A twinning project between the Finnish Institute for Verification of the Chemical Weapons Convention (VERIFIN) (the assisting laboratory) and the Laboratory for Instrumental Analysis, Institute of Chemistry, Technology and Metallurgy, University of Belgrade, Serbia (the assisted laboratory) was successfully completed at the end of 2023. The Laboratory for Instrumental Analysis in Belgrade made significant progress in the analysis of Convention-related chemicals and took part in OPCW proficiency testing, with improved results.
- 7.7 Activities are ongoing within the twinning project between the Bundeswehr Research Institute for Protective Technologies and CBRN Protection in Germany (the assisting laboratory) and the National Institute of Criminalistics and Criminology of the National Gendarmerie (NICC/GN) in Algeria (the assisted laboratory). A key outcome in this project was the achievement by the Algerian laboratory of OPCW designation for the analysis of authentic environmental samples on 4 April 2024. The designation follows the successful performance of the NICC/GN in the last three consecutive OPCW proficiency tests and is based on its ISO-17025 accreditation.
- 7.8 Activities are also under way within the twinning project between the Netherlands Organisation for Applied Scientific Research (the assisting laboratory) and the Protechnik, a division of Armscor Ltd., South Africa (the assisted laboratory). The project was resumed in 2023 after an update of the memoranda of understanding and the project action plan.

Assessing and enhancing the capacity of analytical laboratories in Africa and GRULAC and proficiency testing training

- 7.9 The project on assessing and enhancing capacity of analytical laboratories from African and GRULAC Member States, initiated in 2019 and funded by a voluntary contribution from the Government of the United Kingdom of Great Britain and Northern Ireland, continued to advance during the reporting period. The previous four phases of the project, up to March 2023, resulted in the achievement of OPCW designation status by the laboratory of the Brazilian Army Technological Center in September 2021 and showed the considerable progress in the performance of other participating laboratories in OPCW proficiency testing. In the fifth phase, the project continued to support four laboratories seeking OPCW designation from Brazil, Chile, Kenya, and Nigeria.
- 7.10 In cooperation with two OPCW designated laboratories—VERIFIN in Finland and the Laboratorio de Verificación de Armas Químicas (LAVEMA) in Spain, assisting African and GRULAC laboratories, respectively—a series of activities has been organised between November 2023 and March 2024 to enhance the analytical capacities of participating laboratories and help them improve performance in OPCW proficiency tests. Three types of online and face-to-face activities included: interlaboratory exercises, face-to-face training and online workshops, and mentorship visits by assisting laboratory experts to assisted laboratories.

- 7.11 From November 2023 to February 2024, all assisted laboratories participated in the interlaboratory exercises organised by the assisting laboratories, which provided samples to be analysed by each assisted laboratory, evaluated the results obtained, and provided evaluation reports. The exercises were followed by online workshops to discuss results and issues encountered during the exercises.
- 7.12 All four assisted laboratories received mentorship visits from experts from the assisting laboratories aimed at adjusting procedures and improving the knowledge and skills of local personnel working on their own equipment. From 11 to 15 December 2023, LAVEMA experts visited the laboratory in Santiago, Chile, and from 19 to 23 February 2024, visits were made to the laboratory in Rio de Janeiro, Brazil. The VERIFIN experts visited the laboratory in Nairobi, Kenya from 5 to 8 February 2024, and the laboratory in Lagos, Nigeria, from 12 to 15 February 2024.
- 7.13 From 4 to 8 March 2024, proficiency test training was held at the OPCW ChemTech Centre in Nootdorp, the Netherlands. The training was delivered by the OPCW Laboratory and benefited six participants from the assisted laboratories in Kenya and Nigeria. In addition, four experts from the two assisted laboratories from Brazil and Chile attended dedicated face-to-face training in Madrid, Spain from 11 to 15 March 2024.
- 7.14 On 22 March 2024, the Secretariat organised an online closing workshop for the fifth phase of the project. The workshop summarised the project results, while identifying further needs and the way forward. The workshop was attended by 30 participants, representing four participating laboratories from Brazil, Chile, Kenya, and Nigeria, the assisting institutions in Finland and Spain, and the donor (the United Kingdom of Great Britain and Northern Ireland).

Projects on enhancing the capacities of analytical laboratories with voluntary funding from Germany and Spain

- 7.15 The project to build a network of Spanish-speaking laboratories for the analysis of Convention-related chemicals, funded by voluntary contributions from Spain, continued with the process of identifying participant laboratories and is now in the final phase. LAVEMA has partnered with the Secretariat in this five-year project to establish the network, conduct assessments, and provide capacity building to selected network participants.
- 7.16 In addition, activities under the project on enhancing the capacity of analytical laboratories from African Member States, funded by a voluntary contribution from Germany, included the participation of four chemists representing customs laboratories in Botswana, Ghana, Kenya, and Uganda in the analytical chemistry course for customs officials from 14 to 17 November 2023 at the OPCW ChemTech Centre and a technical evaluation visit to the laboratory of the Administration de la Defense Nationale Gendarmerie Royale, Institut de Criminalistique (ICGR) in Rabat, Morocco, from 16 to 17 April 2024. The Moroccan laboratory was visited to assess its capacity following its expression of interest to receive tailor-made support through a twinning project to be established under the programme. Development of the twinning project is currently ongoing.

Online annual proficiency testing trainings

- 7.17 From 25 September to 6 October 2023, the Secretariat conducted an online proficiency testing course from the OPCW ChemTech Centre. The course started with one week of self-study of training materials that were made available online. It was followed by online, live interactive sessions dedicated to discussions, as well as questions and answers. The training included lectures covering areas such as the chemical structure and properties of scheduled chemicals, the OPCW Central Analytical Database (OCAD), the Automated Mass Spectral Deconvolution and Identification System (AMDIS), the National Institute of Standards and Technology database (NIST), and proficiency testing types, strategy, and reporting. A total of 40 participants representing the following 22 Member States followed the course: Algeria, Australia, Azerbaijan, Brazil, Burundi, Cameroon, China, Germany, Greece, India, Iraq, Kenya, Morocco, Myanmar, Oman, Poland, Senegal, Slovakia, Suriname, Türkiye, Uganda, and Zimbabwe
- 7.18 From 3 to 14 June 2024, the Secretariat conducted an online proficiency testing course from the OPCW ChemTech Centre. The course began with one week of self-study of online training materials. It was followed by online, live interactive sessions. The training covered relevant areas such as the structure and properties of scheduled chemicals, OCAD, AMDIS, NIST, and proficiency testing types, strategy, and reporting. The event was attended by 48 participants from 19 Member States: Algeria, Botswana, Brazil, Burkina Faso, China, India, Iraq, Italy, Jamaica, Kenya, Malawi, Morocco, Nigeria, Pakistan, the Philippines, the Republic of Korea, Slovakia, Uganda, and the United Republic of Tanzania.

Analytical skills development training courses

- 7.19 During the reporting period, a total of 13 analytical chemistry courses, analytical skills development courses, and proficiency testing training courses were organised for the benefit of over 235 participants from 53 States Parties. These included courses for women chemists, experts from facilities supporting customs services, and professionals from laboratories interested in participating in OPCW proficiency testing, as well as analytical chemistry and analytical skills development courses for Member States of the OPCW worldwide. Additionally, two specialised laboratory skills enhancement training courses were held on laboratory quality management and LC-MS. These courses and events were organised in collaboration with VERIFIN in Finland, the Indian Institute of Chemical Technology in India, Protechnik Laboratories in South Africa, LAVEMA in Spain, and at the OPCW Laboratory and the ChemTech Centre.
- 7.20 From 4 to 15 September 2023, the Secretariat, in collaboration with the Indian Institute of Chemical Technology, organised an analytical skills training course for analytical chemists and laboratory specialists from Member States with economies that are developing or in transition, in Hyderabad, India. The two-week training provided chemistry professionals with the requisite theoretical knowledge and practical skills in techniques used to analyse chemicals subject to the Convention. In particular, participants received insight into techniques such as GC and GC-MS. The training also covered methods of sample preparation and derivatisation. The training was attended by 15 participants from 15 Member States: Algeria, Brazil, Burkina Faso, Costa Rica, India, Iraq, Mauritius, Morocco, Namibia, Paraguay, Sri Lanka, Suriname, Türkiye, Uganda, and the United Republic of Tanzania.

- 7.21 From 11 to 22 September 2023, the Secretariat, together with VERIFIN, delivered two training courses in Helsinki for analytical chemists from countries with economies that are developing or in transition. The two parallel courses were aimed at enhancing laboratory management and advancing national chemical analysis capacities. In one course, participants improved their practical skills in the analysis of Convention-related chemicals using LC-MS. The other course focused on laboratory management practices related achieving accreditation under Standard ISO/IEC 17025:2017 of the International Organization for Standardization/International Electrotechnical Commission, a qualification that demonstrates competency in laboratory operations and the generation of valid and internationally recognised results. The two courses were co-funded by the Government of Finland and were attended by 10 participants from the following nine Member States: Brazil, Chile, Kenya, Nigeria, Pakistan, the Philippines, Uganda, the United Republic of Tanzania, and Uruguay.
- 7.22 From 11 to 22 September 2023, the Secretariat, in collaboration with LAVEMA of Spain, organised an analytical skills development course in Spanish for the GRULAC region in Madrid, Spain. The course enabled analytical chemists from the region to build and further improve their knowledge and skills on the theory and practice of the use of advanced analytical techniques, sample preparation, and interpretation of mass spectra of chemicals, as well as other aspects related to the maintenance of laboratory equipment, quality assurance systems in chemical analysis, and procedures for participation in OPCW proficiency testing. The event was attended by 15 participants from the following 10 Member States: Argentina, Brazil, Chile, Colombia, Guatemala, Nicaragua, Panama, Paraguay, Peru, and Uruguay.
- 7.23 From 14 to 17 November 2023, the Secretariat organised a course at the OPCW ChemTech Centre for analytical chemists from laboratories supporting customs services, co-funded by Germany and the People's Republic of China. The course, delivered by the OPCW Laboratory with a group of trainers provided by China as an in-kind service, assisted qualified analytical chemists from laboratories that support, or plan to support, customs services or offices in acquiring further experience and practical knowledge of the analysis of chemicals related to the Convention. The course was attended by 11 participants from the following 11 Member States: Botswana, Brazil, Croatia, Ghana, Guatemala, India, Kenya, Paraguay, Slovakia, Sri Lanka, and Uganda.
- 7.24 From 8 to 19 April 2024, the Secretariat conducted an online basic analytical chemistry course from the OPCW ChemTech Centre. The course started with one week of self-study of training materials that were made available online. It was followed by online, live interactive sessions dedicated to discussions, as well as questions and answers. The training included lectures on topics such as the general aspects of the OPCW and the Convention, the chemical structure and properties of scheduled chemicals, and the use of analytical techniques for the analysis of chemicals related to the Convention. Aspects of sample preparation and the applications of OCAD in compound identification were also covered. A total of 48 participants representing the following 20 Member States followed the course: Algeria, Australia, Barbados, Brazil, Cameroon, China, Colombia, Ghana, Iraq, Malawi, Malaysia, Morocco, Nicaragua, Pakistan, the Philippines, Senegal, South Africa, Uganda, Uruguay, and Zimbabwe.

- 7.25 From 3 to 14 June 2024, the Secretariat, in collaboration with LAVEMA of Spain, organised an analytical skills development course in Spanish for GRULAC in Madrid, Spain. The course enabled analytical chemists from the region to build and further improve their knowledge and skills on the theory and practice of the use of advanced analytical techniques, sample preparation, and interpretation of mass spectra of chemicals, as well as other aspects related to the maintenance of laboratory equipment, quality assurance systems in chemical analysis, and procedures for participation in OPCW proficiency testing. The event was attended by 12 participants from seven Member States: Brazil, Chile, Colombia, Costa Rica, Panama, Paraguay, and Uruguay.
- 7.26 From 3 to 14 June 2024, the Secretariat organised the thirteenth edition of the analytical chemistry course under the OPCW Programme to Strengthen Cooperation with Africa on the Convention. This two-week course, conducted in partnership with Protechnik Laboratories of South Africa, developed the analytical chemistry skills of the participants and showcased the cooperation that exists among African Member States. A total of 20 participants from the following 13 African Member States took part in the course: Algeria, Burkina Faso, Burundi, Côte d'Ivoire, Kenya, Malawi, Mauritania, Morocco, Namibia, Nigeria, South Africa, Uganda, and Zimbabwe.
- 7.27 From 9 to 11 July 2024, the Secretariat organised a basic analytical chemistry course for women at the OPCW ChemTech Centre. The training, delivered by the OPCW Laboratory, assisted qualified female analytical chemists from Member States with economies that are either developing or in transition in acquiring further knowledge and experience in the analysis of chemicals under the Convention regime. The training was attended by 10 female chemists representing the following 10 Member States: Argentina, Armenia, Chile, China, Iraq, Malaysia, Morocco, Uganda, Uruguay, and Zimbabwe.

Equipment Exchange Programme

- 7.28 The Equipment Exchange Programme aims to support the transfer of used, but still functional, equipment from institutions in one State Party to those in another. During the reporting period, the Secretariat facilitated one equipment transfer and the donation of three laboratory devices from Germany to the United Republic of Tanzania. This served as the second phase of this ongoing project. As this Programme is based primarily on donations of equipment by States Parties, the Secretariat continues to maintain contact with potential donors to encourage such donations.

8. CHEMICAL KNOWLEDGE PROMOTION AND EXCHANGE

- 8.1 The Secretariat continued to promote and advance networking and exchange among the scientific community, academic institutions, chemical industry associations, NGOs, and regional and international institutions through standing programmes, such as the Fellowship Programme, the Programme for Support of Research Projects, the Conference Support Programme, and a series of awareness-raising programmes entitled "Building a Knowledge Society". With a view to enhancing networking among scientists and their institutions, these programmes have provided a platform to a wide range of experts in the field of chemistry, from both developing and developed countries, to share their experience, knowledge, and insight.

Fellowship Programme

- 8.2 The Fellowship Programme assists scientists and engineers from States Parties with economies that are either developing or in transition in gaining experience by working in more advanced research laboratories and facilities in other States Parties for a limited period of time. A key objective of this Programme is to facilitate the exchange of scientific and technical information, while at the same time strengthening the institutions in the targeted countries through capacity building.
- 8.3 Nine fellowships were sponsored during the reporting period. Details of the fellowships can be found in Annex 2 hereto.
- 8.4 The new collaborative research projects under the OPCW Fellowship Programme, or the Joint Fellowships Programme, originally announced in the Secretariat's Note on "Anticipated New Programmes and Activities at the Centre for Chemistry and Technology" (S/2102/2022, dated 30 September 2022), was officially established with the publication of Note S/2267/2024 (dated 12 March 2024). The Note sets out the general procedures of the programme and provides a basis for further discussions between Member States and the Secretariat regarding potential donations and the definition of specific projects. The note also invites Member States to provide donations to render the programme fully operational and to engage with the Secretariat to define projects and their participants. These efforts are currently under way.

Programme for Support of Research Projects

- 8.5 Under the Programme for Support of Research Projects, support is extended to small-scale research projects in States Parties to promote the development of scientific and technical knowledge in chemistry for industrial, agricultural, research, medical, pharmaceutical, and other peaceful purposes relevant to the Convention. Funding for such projects may be provided either solely by the OPCW, or jointly with another organisation.
- 8.6 During the reporting period, the Secretariat continued to support 20 research projects undertaken by nationals of Argentina (2 projects), Brazil, Italy (2 projects), Kenya, Malaysia (6 projects), Poland, Serbia (3 projects), South Africa, Türkiye, and Uruguay, all of which were ongoing as at the cut-off date for this report. Details regarding the aforementioned projects are provided in Annex 3.

Conference Support Programme

- 8.7 The Convention encourages the fullest possible exchange of scientific and technical information relating to the development and application of chemistry for purposes not prohibited under the Convention. The Conference Support Programme provides financial support for conferences, workshops, and seminars on special topics relevant to the Convention—generally by sponsoring scientists, technical personnel, and resource persons from States Parties to attend such events and by subsidising the cost of publications. Sponsorship is channelled through scientific institutions and conference organisers in States Parties.

- 8.8 During the period under review, a total of 10 events were supported to facilitate the exchange of scientific and technical information in areas relating to the peaceful use of chemistry. A list of these conferences and the countries of sponsored participants is provided in Annex 1.

Building a Knowledge Society

Empowering youth to advance peaceful uses of chemistry

- 8.9 From 8 to 11 April 2024, the Secretariat organised the third edition of the Education Training Programme on the Peaceful Uses of Chemistry for Youth in Rio de Janeiro, Brazil, in close collaboration of the Brazilian National Authority and with financial support from the European Union. The training was organised in a hybrid format, with participants from GRULAC attending in person and global participants participating online. It aimed to raise awareness among youth, especially young academics and researchers in chemistry, chemical engineering, and other chemical-related scientific fields, on, inter alia, the Convention, the importance of chemical safety and security management, key concepts and historical events associated with the use, misuse, and abuse of dual-use chemicals, educational and ethical issues for chemists, The Hague Ethical Guidelines, and the benefits of the peaceful uses of chemistry.
- 8.10 A field visit to an industry-leading petro-chemical plant provided a practical demonstration of chemical risk and incident management measures, while a visit to a civil protection site introduced participants to response preparedness. The training was attended by 24 participants from 12 Member States: Brazil, Chile, Cuba, Guatemala, India, Nicaragua, Nigeria, Mexico, Panama, Paraguay, Uganda, and the United Republic of Tanzania.

Empowering women in chemistry

- 8.11 The OPCW's annual Symposium on Women in Chemistry attracts talented women from government, industry, and academia to illustrate the strength and depth of contributions women have made to the peaceful uses of chemistry.
- 8.12 From May 22 to 23, 2024, the Secretariat, in collaboration with the Panama National Authority, organised the annual Symposium on Women in Chemistry in Panama City, Panama. The event featured in-person attendance from participants in the GRULAC region and enabled global participation online. The Symposium was held in close association with UNICRI and UNIDIR, and highlighted the contributions made by women in the field of peaceful chemistry, in addition to raising awareness of education and capacity development opportunities for women in peaceful chemistry. The symposium included interactive discussions and thematic presentations on various topics, such as women's empowerment in scientific research, strategies to enhance women's participation in chemistry-related professions, and the importance of mentorship and networking. The Symposium also discussed the Compendium of Best Practices on the Engagement and Advancement of Women in Chemical Safety and Security, which was a result of research funded by the European Union, jointly conducted by the OPCW and UNICRI in 2022. The Compendium serves as a guide for policymakers and practitioners in the field of chemistry on gender inclusivity. The Symposium gathered 28 participants from governmental authorities, laboratories, and

academia, representing 13 States Parties: Argentina, Brazil, Colombia, Croatia, Ecuador, Germany, Iran (Islamic Republic of), Nicaragua, Nigeria, Panama, Paraguay, Uganda, and Zimbabwe.

Review and evaluation workshop on the components of an agreed framework for the full implementation of Article XI

- 8.13 The Secretariat continued the series of workshops on Article XI, which provided an opportunity to stakeholders to review and evaluate the activities run by the Secretariat and States Parties to promote peaceful uses of chemistry. On 20 November 2023, the Secretariat organised the eighth edition of the review and evaluation workshop, in a hybrid format, on the components of an agreed framework for the full implementation of Article XI at the OPCW Headquarters, in accordance with decision C-16/DEC.10. The workshop reviewed the progress and explored measures aimed at promoting and strengthening international cooperation initiatives towards the full and effective implementation of Article XI of the Convention. The Secretariat also briefed workshop participants on its capacity-building programmes, as well as new and upcoming programmes and activities. Over 40 representatives from 26 Member States, including officials from National Authorities and Permanent Representations, participated: Algeria, Bangladesh, Bolivia (Plurinational State of), Brazil, Burundi, China, Colombia, Cuba, Finland, France, Germany, Guatemala, India, Japan, the Lao People's Democratic Republic, Mongolia, Nigeria, Pakistan, Paraguay, Peru, Romania, the Russian Federation, Serbia, South Africa, Tunisia, and the United States of America.

Interaction with the chemical industry

- 8.14 The chemical industry has been recognised as a key stakeholder with regard to the full and effective implementation of the Convention. In accordance with the recommendations made in the report of the Third Special Session of the Conference of the States Parties to Review the Operation of the Chemical Weapons Convention (RC-3/3*, dated 19 April 2013) and in decision C-16/DEC.10, the Secretariat has continued to strengthen partnerships between the OPCW and chemical industry associations, in particular the International Council of Chemical Associations and the International Chemical Trade Association. Cooperation with the chemical industry includes the exchange of information within the framework of the Chemical Industry Coordination Group, as well as support from the chemical industry for activities related to chemical safety and security. More information on cooperation with chemical industry associations is available in the most recent annual Note by the Director-General on engaging the chemical industry associations (C-28/DG.15, dated 6 November 2023).

9. ENHANCING THE EFFECTIVENESS OF OPCW INTERNATIONAL COOPERATION PROGRAMMES

- 9.1 During the reporting period, the process of further formalising and strengthening the alumni networks of the programmes conducted by the Secretariat under Article XI continued to gain momentum. These networks help facilitate a professional channel of interaction among alumni of the various programmes to share experience and best practices related to programme objectives during the post-implementation phase.

- 9.2 Since its inauguration in May 2023, the OPCW ChemTech Centre has been instrumental in advancing some of the key Article XI capacity-building initiatives, including the proficiency and advanced proficiency test training and analytical chemistry courses, including for women. The success of these programmes highlights the Centre's adeptness in ensuring coordinated and effective programme delivery with optimal use of in-house expertise. Additionally, the ChemTech Centre's dedication to leveraging the Secretariat's expertise ensures that training is tailored to the assessed needs of States Parties and adheres to global quality standards.
- 9.3 During the reporting period, the Secretariat launched the ninth edition of the survey on needs assessment and best practices in chemical safety and security management, inviting States Parties to share their specific needs in the area and to provide information on their existing tools, guidance, and best practices in this field.
- 9.4 The Secretariat continued to support the facilitator for Article XI issues, Ms Fatima Hamdia Tanweer, First Secretary of the Permanent Representation of Pakistan to the OPCW. This support included organising informal consultations to provide States Parties with updates on the progress of the capacity-building programmes offered by the Secretariat to promote the peaceful uses of chemistry.
- 9.5 The Secretariat maintained its efforts to strengthen the evaluation systems and tools that allow for continual review and improvement of its programmes to further enhance the design, delivery, and effectiveness of the OPCW's international cooperation programmes and activities. Evaluation questionnaires address the content and continued relevance of the programmes, and feedback is taken into account when designing and updating the activities for the following year. Details of the evaluation of international cooperation programmes during the reporting period are provided in Annex 4 to this report.
- 9.6 The Associate Programme serves as the flagship programme of the OPCW and consists of five distinct components, each of which is evaluated by both participants and trainers, including within the university and industry segments, during which participants are also evaluated by lecturers, professors, and industry supervisors. All components of the programme are comprehensively and fully assessed as part of a 360-degree evaluation mechanism. Based on the feedback received, the programme curriculum and delivery are continually enhanced.
- 9.7 With regard to the Programme for Support of Research Projects, research proposals are assessed and evaluated by a review committee composed of a number of experts representing different Secretariat units, including two members of the Scientific Advisory Board. The criteria used to assess new project proposals and the final reports of completed projects include an examination of their scientific quality, level of achievement of the stated objectives, financial planning, performance, and—for proposals—managerial and logistic feasibility and relevance to the Convention.
- 9.8 For the Fellowship Programme, a continuous evaluation is undertaken by the Secretariat, both at the proposal stage and upon conclusion of the fellowship. In addition to the final scientific report on the fellowship, evaluation reports are also received from the fellowship supervisor at the host institution.

- 9.9 Regarding the Chemical Safety and Security Management Programme, feedback is routinely requested at the end of workshops or training events and then reviewed in order to explore any areas of improvement in the delivery of future activities.
- 9.10 Analytical skills development courses are evaluated through test exercises, including both theoretical and practical assignments, during and/or at the end of each course, and by means of a post-course evaluation meeting held with participants and trainers. Intermediate and final tests verify the knowledge participants have acquired, while questionnaires and post-course meetings collect feedback on the courses themselves and their perceived benefits for participants. An impact assessment of the analytical skills development courses held in the period from 2019 to 2022 was provided in the last report on the status of implementation of Article XI (EC-104/DG.14 C-28/DG.11, dated 13 September 2023).
- 9.11 This year, impact assessment review focused on the Laboratory Twinning and Assistance Programme. This programme has been operational since 2020, following the merger of two previous initiatives: the Laboratory Assistance Programme and the Laboratory Twinning Initiative. This combined programme maintains the fundamental principles and activities of its predecessors, while also expanding opportunities for participation and providing greater support to assisted laboratories.
- 9.12 The Laboratory Twinning and Assistance Programme is designed to improve the technical competence of laboratories in Member States with economies that are either developing or in transition, and that intend to improve their performance in the OPCW proficiency tests to achieve OPCW designated status, or to otherwise demonstrate excellence in the analysis of chemicals in relation to the Convention. In practice, the programme aims to enhance the capacity of assisted laboratories by providing targeted support and facilitating “twinning” with other, more advanced laboratories, acting as mentors (assisting laboratories), in different Member States that possess, or formerly possessed, OPCW designated status and wish to share their experience and offer support.
- 9.13 Since its launch by the Secretariat, the Laboratory Twinning and Assistance Programme has seen participation from laboratories in Algeria, Serbia, and South Africa, as assisted laboratories, with support from laboratories in Germany, Finland, and the Netherlands, respectively, as assisting laboratories. Additionally, discussions are ongoing with laboratories in Bangladesh, Malaysia, and Morocco, as assisted laboratories, and twinning and mentoring support from Finland, Australia, and the United States of America, respectively, as assisting laboratories.
- 9.14 To assess the impact of the Laboratory Twinning and Assistance Programme since 2020 to date, the Secretariat conducted a structured online survey using a well-developed questionnaire. This survey targeted all assisting and assisted laboratories involved in the Programme, as well as the National Authorities of the assisted laboratories. For deeper insight, the OPCW Laboratory was also approached for its independent feedback. The comprehensive participation of all involved stakeholders provided valuable insight into and enhanced understanding of the strengths of the programme, as well as areas for further attention.

- 9.15 The assisting laboratories rated the Laboratory Twinning and Assistance Programme very positively, acknowledging that it effectively facilitated the transfer of technical skills and knowledge, including analytical techniques, verification methods, and quality management system implementation. The combination of theoretical and practical approaches led to significant progress in capacity building for the assisted laboratories. Additionally, the assisting laboratories themselves also benefited from the professional exchange of new ideas and specialised procedures. The degree of progress at assisted laboratories, however, largely depended on the level of the laboratories' preparedness, the project start date, and the duration. Some of the challenges cited included varying expectations for specific training, economic constraints, lack of access to reference chemicals, and bureaucratic hurdles in finalising memoranda of understanding and other agreements. Overall, despite the challenges, the programme successfully enhanced proficiency test results for the assisted laboratories, culminating in one of the participating laboratories achieving OPCW accreditation in 2024.
- 9.16 The overall assessment Laboratory Twinning and Assistance Programme by assisted laboratories was also highly positive. There was a unanimous appreciation for the transfer of skills and knowledge, highlighting improvements in sample preparation, NMR spectra recording, and performing GC/MS and NMR analyses. Notable benefits cited included working with LC-MS/MS instruments for chemical synthesis, proficiency test reporting, and elucidating MS spectra. The assisted laboratories also noted that they gained practical experience in handling authentic samples with legal implications, analysing unknown samples, and understanding the quality management system required by designated laboratories. The potential benefits of joint scientific grant applications, OPCW fellowship grants, and staff exchanges were also noted.
- 9.17 In their feedback on the Laboratory Twinning and Assistance Programme, assisted laboratories also emphasised the value of comprehensive action plans based on a thorough assessment of capabilities and gaps, along with a particular focus on practical training under the guidance of the specialists from assisting laboratories. The key outcomes included improved proficiency test strategies, application of LC-MS/MS techniques in chemical analysis, and synthesising relevant chemicals for testing. They also found that achieving expertise in micro-synthesis and mastering analytical techniques like GC, LC, and NMR spectroscopy was crucial for attaining designated status for the analysis of chemical warfare agents. Participation in the programme was seen by some as having opened doors for newer opportunities, such as involvement in the OPCW Fellowship Programme and biotoxin analysis initiatives.
- 9.18 The assisted laboratories participating in the Laboratory Twinning and Assistance Programme also noted of some challenges that hindered smooth programme implementation, such as equipment malfunctions, infrastructural issues, and logistical difficulties during on-site training implementation. Limited access to exchange visits during the COVID-19 pandemic and access to a reduced number of experts from the assisting laboratories also hindered in-depth discussions and overall exposure. Loss of experienced personnel was also noted as a human resource challenge for a few, although effective succession planning helped ensure continuity. In the overall assessment by assisted laboratories, the programme yielded measurable improvements in the accreditation status of the institutions. They acknowledged tangible progress through the programme, with one laboratory successfully achieving OPCW accreditation status.

- 9.19 The National Authorities, in their overall assessment, also rated the Laboratory Twinning and Assistance Programme very positively, calling it very beneficial. National Authorities continue to play a key role in endorsing applications from laboratories for participation in the programme and providing administrative support, infrastructure, and enhancement of technical skills. Their services have included project endorsement, support with translation of memoranda of understanding, enabling initial contacts with programme stakeholders, monitoring, and allocating financial resources, as appropriate. National Authorities view the programme as important for improving the capacity of national laboratories and integrating them into the OPCW's network. In this regard, it is indeed rewarding to note that an Algerian laboratory participating in the programme successfully achieved OPCW designated status in 2024 with assistance from a German laboratory.
- 9.20 Despite the challenges faced regarding implementation of the Laboratory Twinning and Assistance Programme due to COVID-19 between 2020 and 2022, participating National Authorities have continued to exhibit a strong level of interest and confidence in the programme. Underscoring the programme's success in building national capacities and fostering international cooperation, National Authorities have called for devoting more attention to training opportunities at assisting laboratories, and greater facilitation and contact with experts in various specialties at assisting laboratories. They also recommend strengthened communication among all key stakeholders throughout the programme.
- 9.21 The OPCW Laboratory, for its part, continues to maintain very positive engagement with the Laboratory Twinning and Assistance Programme, and faced no specific challenges or concerns when working with assisted laboratories. During Convention chemical analysis competency testing (CCACT), one of the biggest challenges cited by the assisted laboratories was applying reporting rules to ensure that their analytical results for reported chemicals were accepted. To help overcome this challenge, the OPCW Laboratory plans to continue offering practical guidance on report writing, along with working instructions and sample reports, to assisted laboratories.
- 9.22 While the overall assessment of the Laboratory Twinning and Assistance Programme has been highly positive, the impact review has highlighted key takeaways and recommendations to further improve its coverage and delivery. The impact study highlights that the programme significantly enhanced the capabilities of assisted laboratories by equipping them with a broad range of skills such as sample preparation, NMR spectra recording, GC/MS and LC-MS/MS analyses, and chemical synthesis. Notable improvements include proficiency test reporting, handling legally significant authentic samples, and adopting quality management systems for both designated and non-designated labs. The proficiency test strategy, especially in LC-MS/MS application and chemical synthesis, was a major outcome. Additionally, skills were developed in chemical warfare agent analysis, micro-synthesis, and mastering various analytical techniques. Practical experience, data interpretation, and accreditation of methods like NMR were also achieved. Finally, as the latest achievement, the programme facilitated one of the assisted laboratories in attaining OPCW designation in 2024.

9.23 As for recommendations, assisted laboratories seek to place greater focus on on-site visits for experimental work—ideally spanning the entire five working days—to maximise productivity, and to move all theoretical lessons and activities online. Additionally, they reiterate placing an emphasis on active information and knowledge sharing between assisting and assisted laboratories. The impact study calls for assisting laboratories to continue to ensure the provision of qualified personnel to cover all aspects of chemical warfare agent analysis. For the Secretariat, the study recommends enhanced monitoring of the twinning projects to be able to swiftly address challenges as they emerge, rather than waiting until the project's conclusion. Furthermore, it is recommended that the Secretariat consider opportunities to further streamline the allowance transfer procedure, where feasible and practicable, in line with prevailing rules and regulations.

9.24 All these recommendations are being taken on board and will be incorporated to further strengthen and fine-tune the Laboratory Twinning and Assistance Programme.

10. MEASURES BY STATES PARTIES AND THE OPCW TO FACILITATE STATES PARTIES' PARTICIPATION IN THE FULLEST POSSIBLE EXCHANGE OF CHEMICALS, EQUIPMENT, AND SCIENTIFIC AND TECHNICAL INFORMATION RELATING TO THE DEVELOPMENT AND APPLICATION OF CHEMISTRY, IN ACCORDANCE WITH THE PROVISIONS OF THE CONVENTION

10.1 Throughout the reporting period, the Secretariat continued to actively support the facilitator for Article XI issues, including during the informal consultations between States Parties regarding the full implementation of this specific article of the Convention, which is aimed at the economic and technological development of the States Parties.

10.2 In order to enhance communication among all stakeholders, information about programmes, activities, and outcomes relating to the Convention, specifically Article XI, was shared through various platforms such as seminars and workshops, especially those organised by the Secretariat.

11. FINANCIAL ASPECTS

The activities covered during the reporting period were funded through the annual Programme and Budget of the OPCW. In addition, voluntary contributions were received from States Parties for specific events.

12. OVERSIGHT BY THE CONFERENCE OF THE STATES PARTIES AND THE EXECUTIVE COUNCIL

12.1 In accordance with decision C-16/DEC.10, the Secretariat reports to each annual session of the Conference on the progress made in implementing the decision and the status of implementation of Article XI, in order for the Conference to consider and take appropriate measures, if necessary, to further promote its full implementation.

12.2 During the 106th Session of the Council (9 to 12 July 2024), the Secretariat circulated a presentation to update the Council on the programme of activities related to the implementation of Article XI.

Annex 1

**CONFERENCES SUPPORTED
 UNDER THE CONFERENCE SUPPORT PROGRAMME
 26 AUGUST 2023 TO 25 AUGUST 2024**

No.	Conference Title	Location	Duration	State Party of Sponsored Participants	No. of Sponsored Participants
1.	Dioxin2023 – 43rd International Symposium on Halogenated Persistent Organic Pollutants	Maastricht, Netherlands	10 – 14 September 2023	Nigeria	1
2.	12th Argentinian Congress of Analytical Chemistry	San Juan, Argentina	12 – 15 September 2023	Mexico Spain	2
3.	26th Congress of the Society Chemists and Technologists of Macedonia	Ohrid, North Macedonia	20 – 23 September 2023	France (2) Germany Lithuania Serbia	5
4.	CSCM World Congress on CBRNe Science & Consequence Management (CSCM 2023)	Dubrovnik, Croatia	23 – 27 October 2023	India Iran (Islamic Republic of) Georgia	3
5.	International workshop on the analysis of chemical warfare agents to mark the 50th Anniversary of VERIFIN	Helsinki, Finland	14 – 16 November 2023	India Malaysia Uganda	3
6.	American Chemical Society (ACS) – Africa Regional Conference on Green and Sustainable Chemistry	Lagos, Nigeria	5 – 9 May 2024	Nigeria (publications)	1
7.	Powder diffraction: Advancing real materials in the information era	Erice (Trapani), Italy	1 – 7 June 2024	Argentina Ghana Iran (Islamic Republic of)	3
8.	ChemCon Asia 2024,	Bangkok, Thailand	3 – 7 June 2024	India Republic of Korea Viet Nam	3

No.	Conference Title	Location	Duration	State Party of Sponsored Participants	No. of Sponsored Participants
9.	The 27th IUPAC International Conference on Chemistry Education (IUPAC ICCE2024)	Pattaya, Thailand	15 – 19 July 2024	Cambodia Mexico Myanmar	3
10.	Virtual Conference on Chemistry and its Applications (VCCA-2024)	Mauritius	12 – 16 August 2024	70 from the Africa region 30 from other regions	100

Annex 2

PROJECTS CONDUCTED UNDER THE FELLOWSHIP PROGRAMME

No.	Title of Project	Location of Fellowship	Duration	State Party of Fellow
1.	Fellowship: “Identification of new antibiotic compounds against multi drug resistant bacteria from some endophytic fungi isolated from <i>Paullina pinnata</i> (Sapindaceae)”	Heinrich Heine University, Institut für Pharmazeutische Biologie und Biotechnologie, Germany	1 Mar – 31 Aug 2023	Cameroon
2.	Fellowship for NMR Specialist	VERIFIN, University of Helsinki, Finland	1 Jun – 31 Dec 2023	Serbia
3.	Fellowship: “LC-MS and antimicrobial activities guided isolation of secondary metabolites endophytic fungi harbored in <i>Pakia Biglobosa</i> (Fabaceae)”	Fundación MEDINA Parque Tecnológico de Ciencias de la Salud Granada, Spain	8 Jul – 31 Dec 2023	Cameroon
4.	Fellowship: “Validating the potential of nemertide alpha-1 toxin as a biopesticide for sustainable agriculture and environmental safety”	Department of Pharmaceutical Biosciences Uppsala University, Sweden	15 Jan – 14 Apr 2024	Sri Lanka
5.	Fellowship: “Development, validation and verification of modern technology and instrumental methods for toxic-free agriculture (non-toxic farming)”	Agrolab, Agrar und Umwelt GMBH, Sarstedt, Germany	15 Jan – 14 Apr 2024	Tanzania
6.	Fellowship: “Structural elucidation, Bioactivity and Toxicity of compounds from selected Ugandan Medicinal plants used in treating Bacterial skin infections”	Department of Chemistry University of Surrey, Guildford Surrey, United Kingdom of Great Britain and Northern Ireland	15 Jan – 14 Apr 2024	Uganda

No.	Title of Project	Location of Fellowship	Duration	State Party of Fellow
7.	Fellowship: “Approaches to create life science building blocks containing emerging fluorinated groups that are more environmentally friendly and avoid the PFAS problem”	UMR CNRS 7042-LIMA, Université de Strasbourg, ECPM, 25 rue Becquerel, 67087 Strasbourg, France	29 Jan – 28 Apr 2024	Argentina
8.	Fellowship: “Organoclay and organohydroxyapatite-carbon nanotubes nanocomposites as electrode modifiers for the electrochemical detection of some drugs in pharmaceuticals as well as in hospitals and slaughterhouses waste waters”	CNRS-Lorraine University, LCPME, Nancy, France	26 Feb – 25 Aug 2024	Cameroon
9.	Fellowship: “Biomedical applications of undoped and copper doped cobalt ferrite nanoparticles”	Università di Pavia Dipartimento di Fisica, Pavia, Italy	3 Apr – 30 Sept 2024	Cameroon

Annex 3

**RESEARCH PROJECTS FUNDED BY THE OPCW
 26 AUGUST 2023 TO 25 AUGUST 2024**

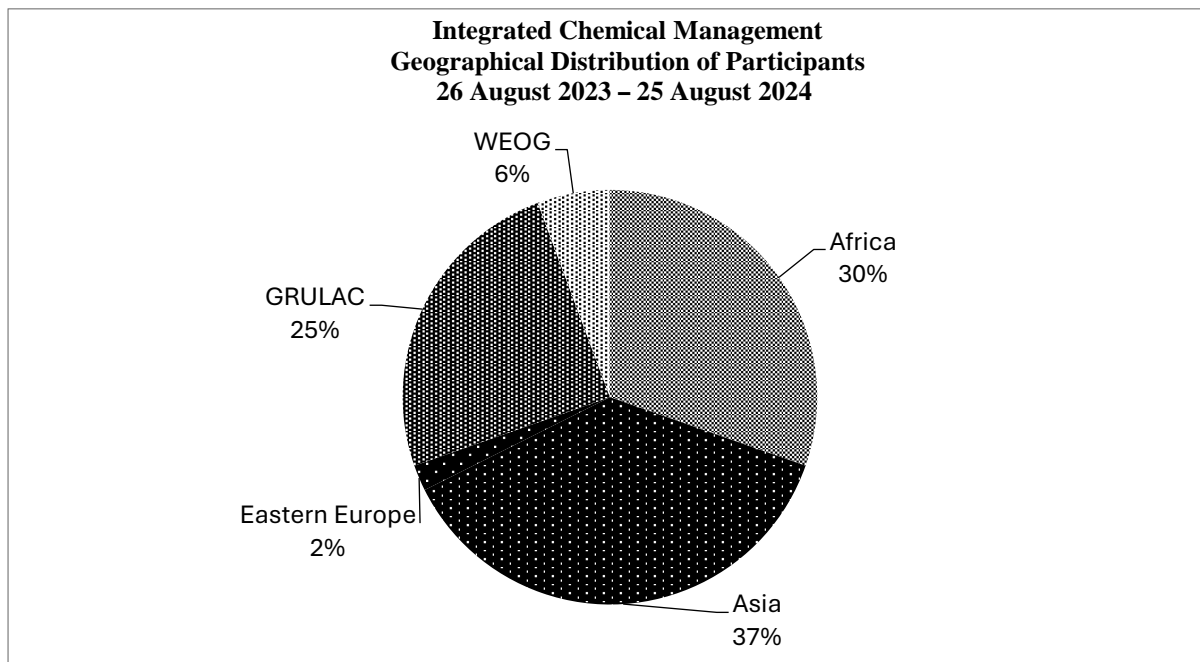
No.	Title	State Party of Researcher	Status
1.	Polyethylene mulching in agriculture: the interaction between plastic, soil, pesticides, and phthalic esters	Argentina	Ongoing
2.	Hybrid bio-nanomaterials: tools for the development of highly sensitive analytical methods applied to the determination of toxic elements in baby food	Argentina	Ongoing
3.	Development of polymer-based nanostructured sensors for detection of hydrogen sulphide (H ₂ S)	Brazil	Ongoing
4.	Chemistry beyond chlorine: dialkyl carbonates for biomass upgrading and synthesis of heterocycles	Italy	Ongoing
5.	Application of miniaturised sensors and sampler to remotely controlled mini aerial vehicles (payload less than 25 kg), a new pathway for the survey of critical areas	Italy	Ongoing
6.	Design and fabrication of chemo-sensor for food-borne mycotoxins as potential chemical warfare agents	Kenya	Ongoing
7.	Towards oxygen tolerant cross-coupling reactions in aqueous media for the developing world in the interest of safer molecular electronics: an attempt at reducing solvents and toxic chemicals dependency	Malaysia	Ongoing
8.	Mesoporous silica nanoparticles extracted from oil palm fronds for the development of magnetic solid phase extraction method for efficient separation of organochlorine pesticides in water samples	Malaysia	Ongoing
9.	Development and validation of electromembrane extraction with a new conductive polymer inclusion membrane sampling probe for simultaneous determination of cationic and anionic pesticides in environmental waters	Malaysia	Ongoing
10.	Investigation on the use of fabricated metals impregnated on pectin biopolymeric material as sustainable absorbents in solid phase extraction for pre-concentration of mycotoxins in cassava product samples	Malaysia	Ongoing
11.	Green synthesis of silver doped zinc oxide nanoparticles using aqueous leaves extract incorporated with activated carbon from oil palm kernel shell (Ag-ZnO-NPs/AC) and its mechanistic study towards photodegradation of organochlorine pesticide (OCPs) in water samples	Malaysia	Ongoing

No.	Title	State Party of Researcher	Status
12.	Adsorption and detection of model compounds analogous to chemical warfare agents by metal-organic framework CAU-1	Malaysia	Ongoing
13.	Risk analysis of natural toxic pyrrolizidine alkaloids in the food chain: Development, validation, and application of HPLC/MS ⁿ methods	North Macedonia	Ongoing
14.	Biomass valorization to enhance efficiency of toxic metals bioremediation from military and industry areas	Poland	Ongoing
15.	Diagnosis of schizophrenia and bipolar disorder by NMR-based metabolomics and lipidomics	Serbia	Ongoing
16.	Detection of herbs and dietary supplements fraud using metabolomics approach	Serbia	Ongoing
17.	Metabolomic fingerprints of schizophrenia and bipolar disorder	Serbia	Ongoing
18.	Monitoring the distribution of emerging micropollutants in food crops irrigated with reclaimed water	South Africa	Ongoing
19.	A novel approach to chlorine exposure: Raman spectroscopy Part II	Türkiye	Ongoing
20.	Turning industrial waste into value-added chemical products	Uruguay	Ongoing

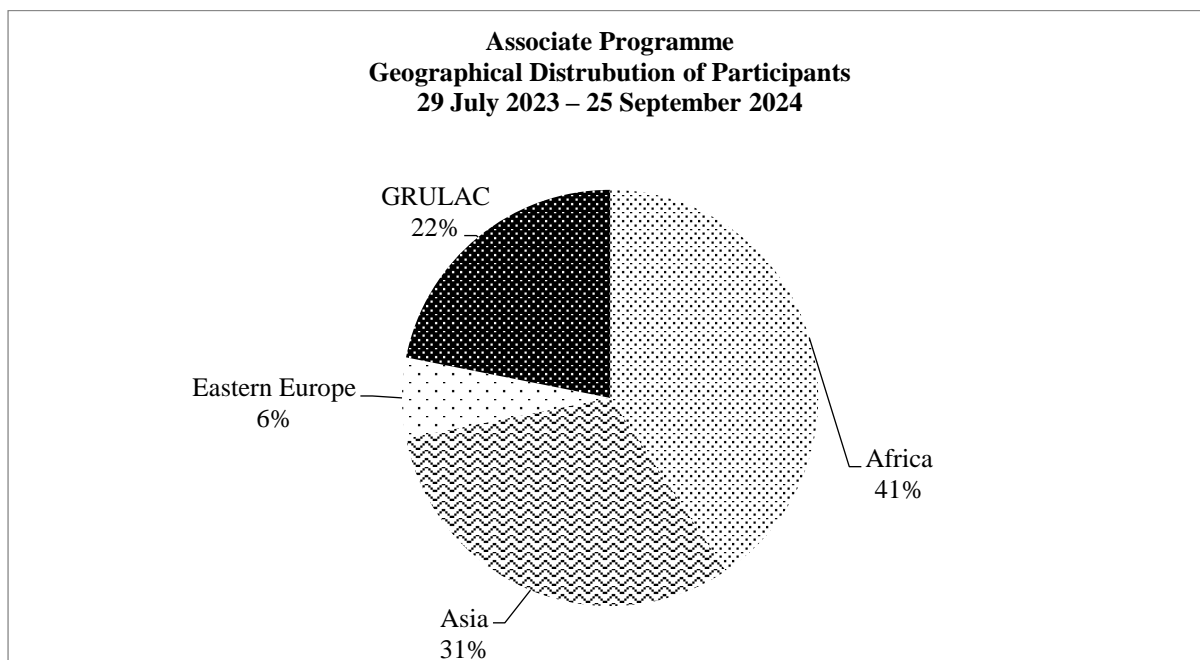
Annex 4

EVALUATION OF INTERNATIONAL COOPERATION PROGRAMMES

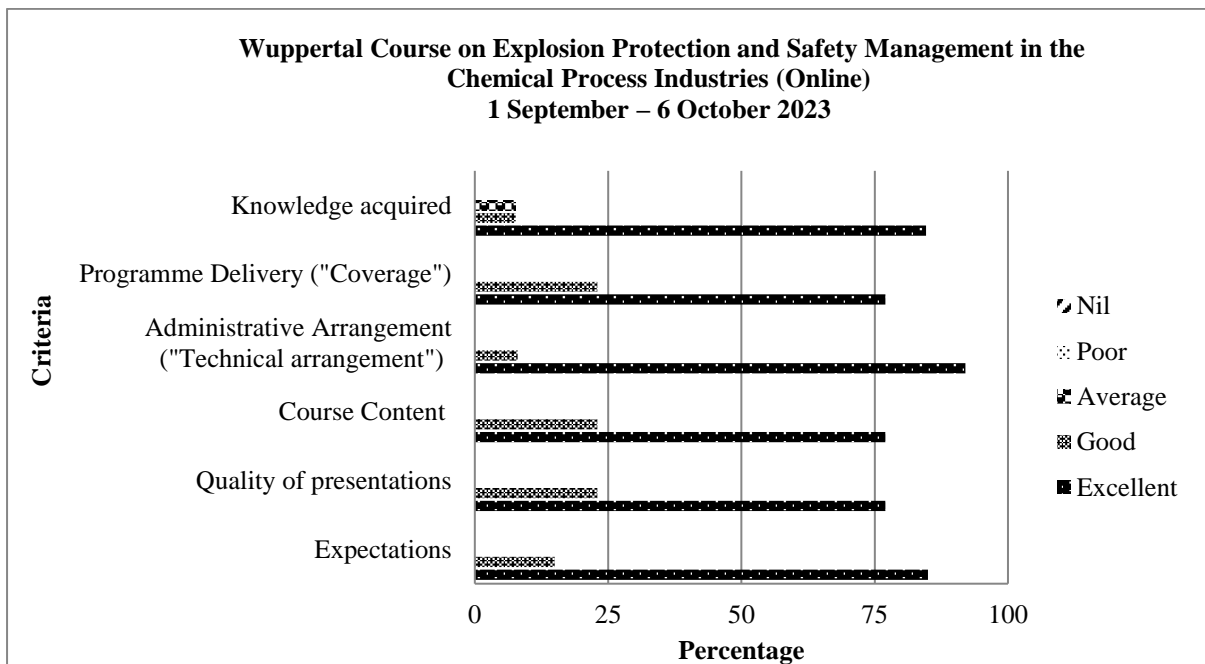
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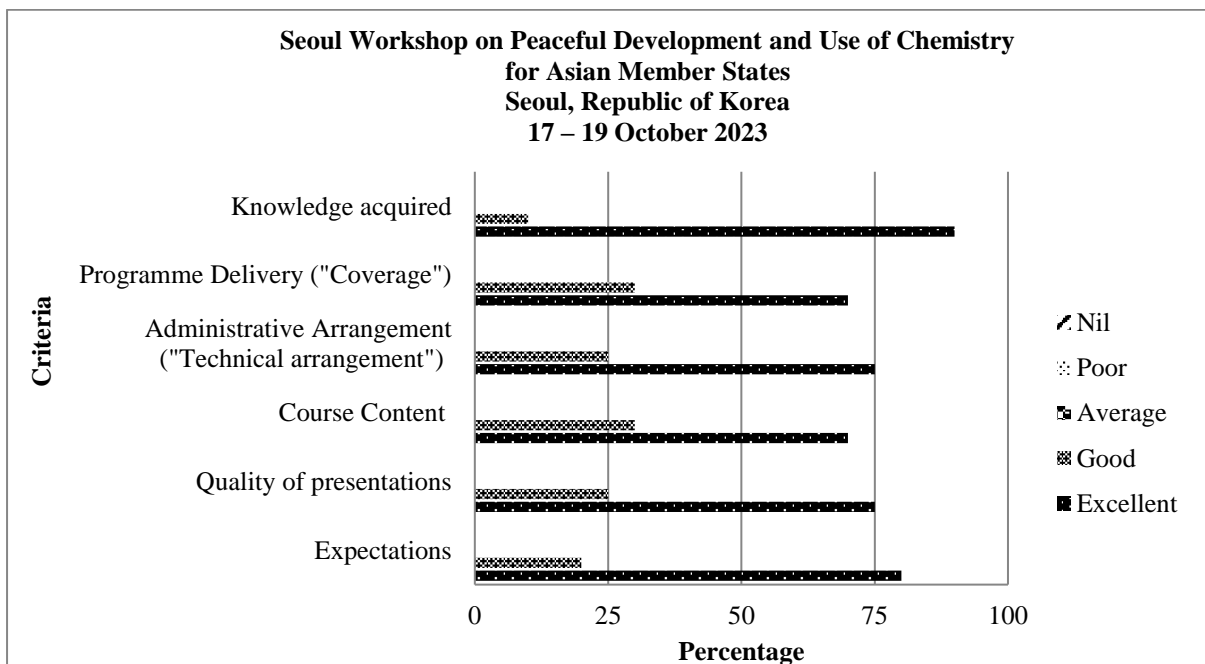
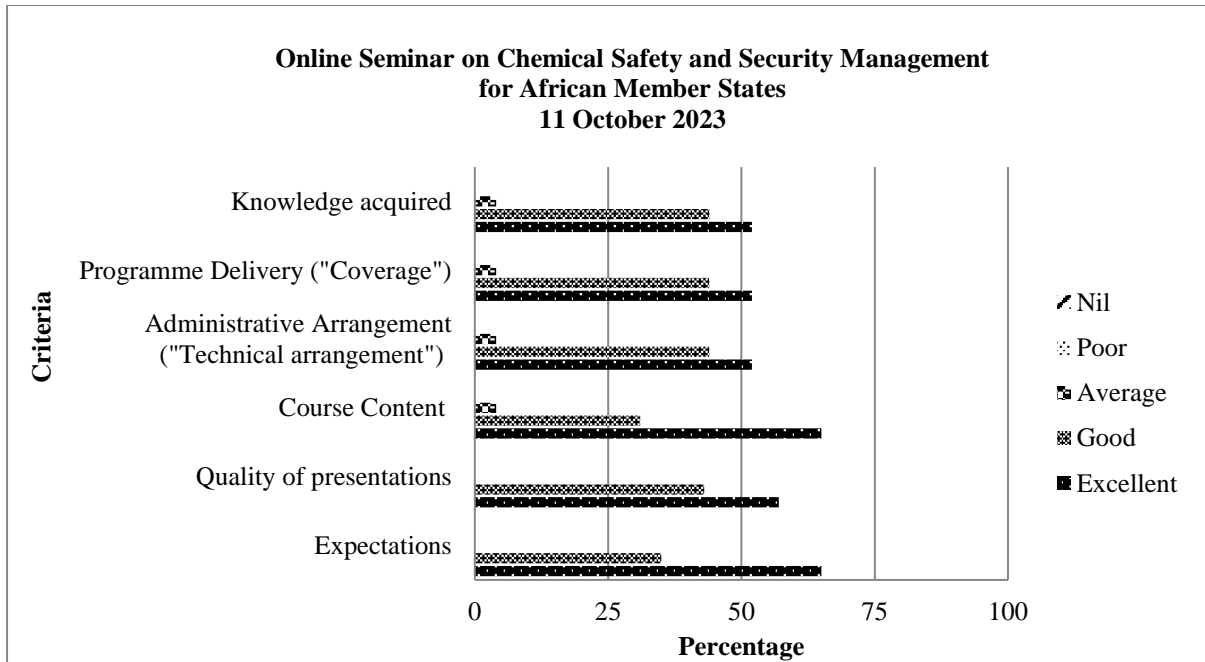


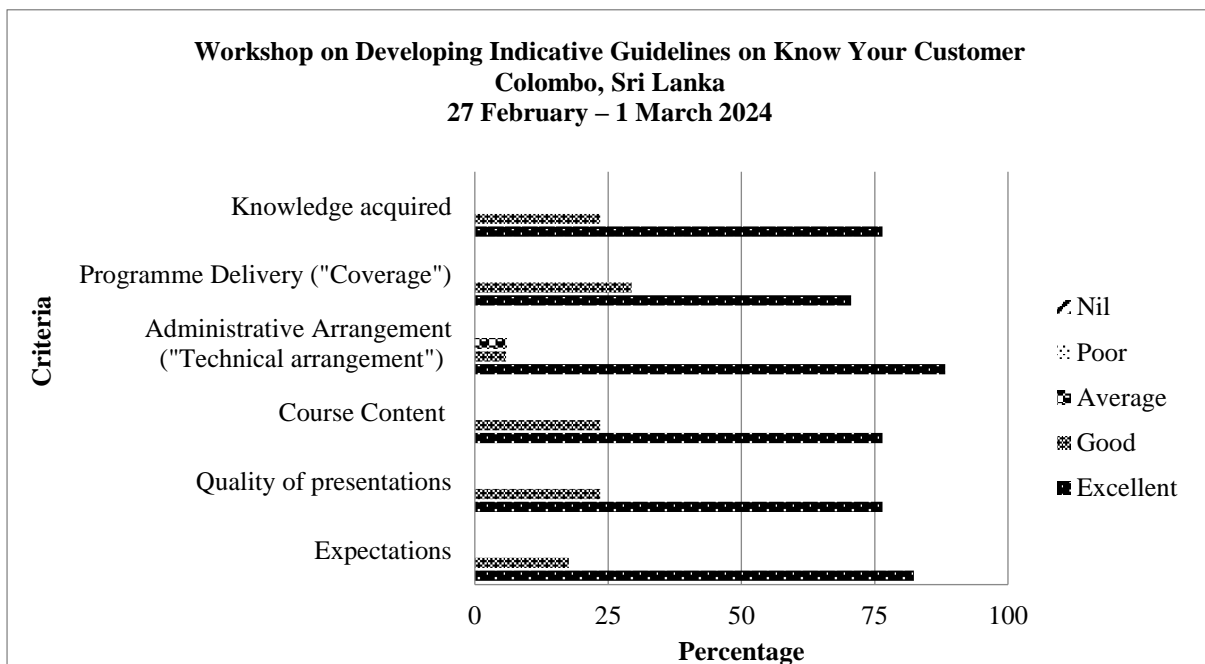
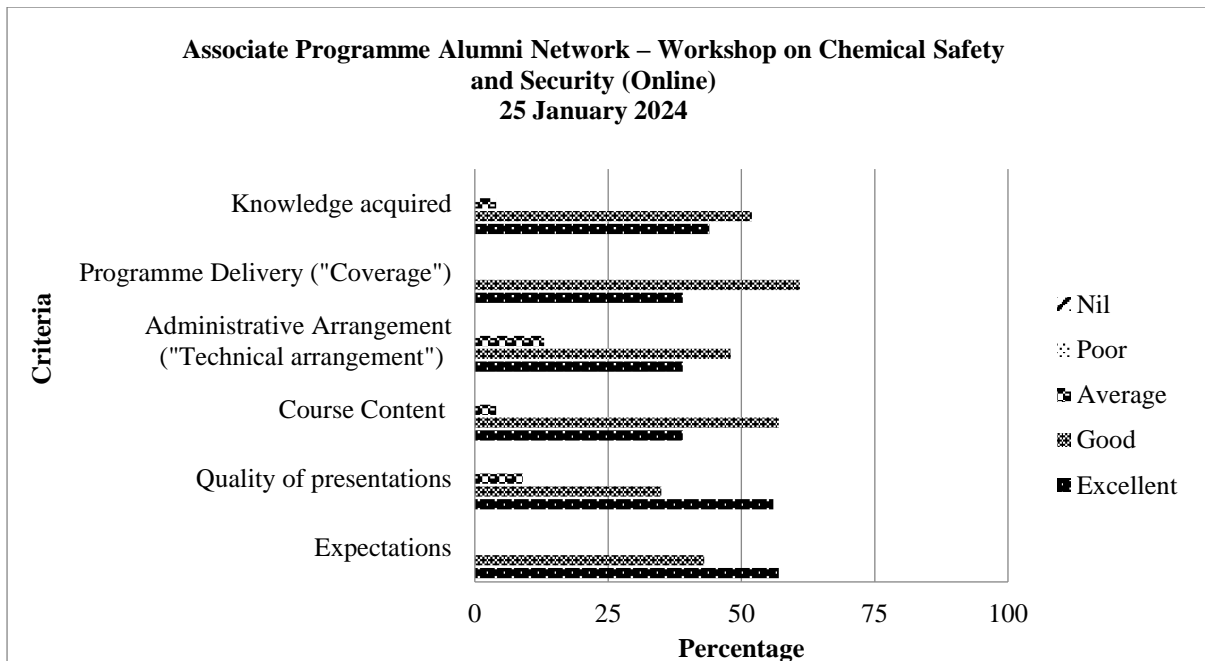
Associate Programme

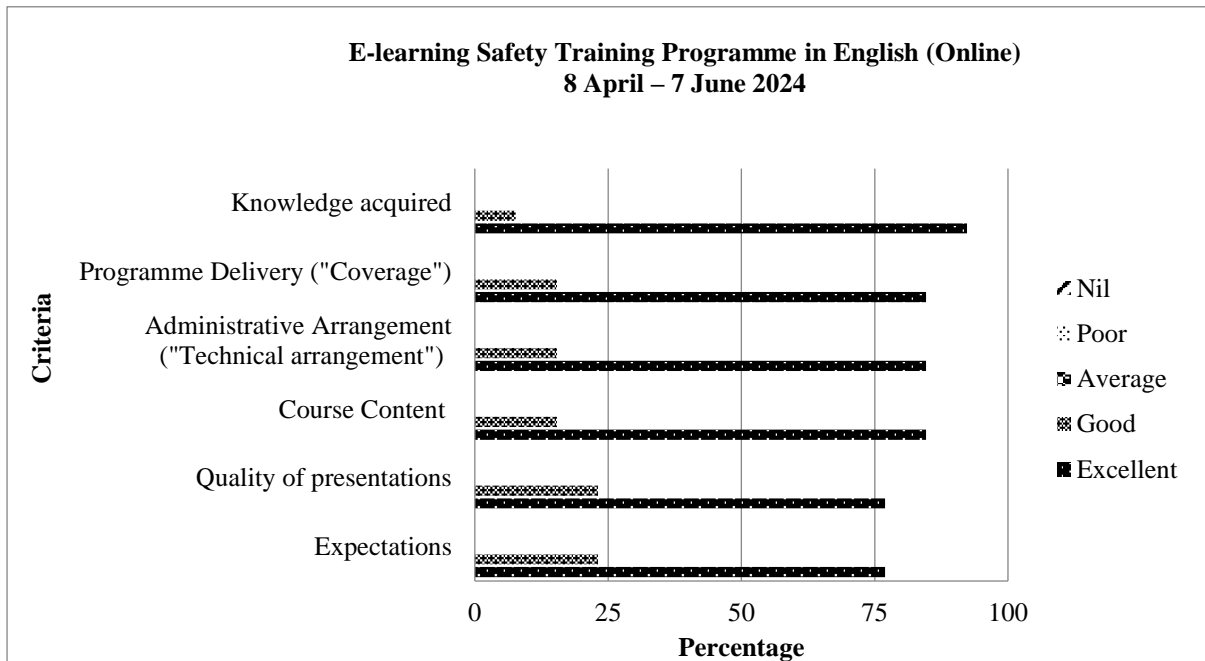
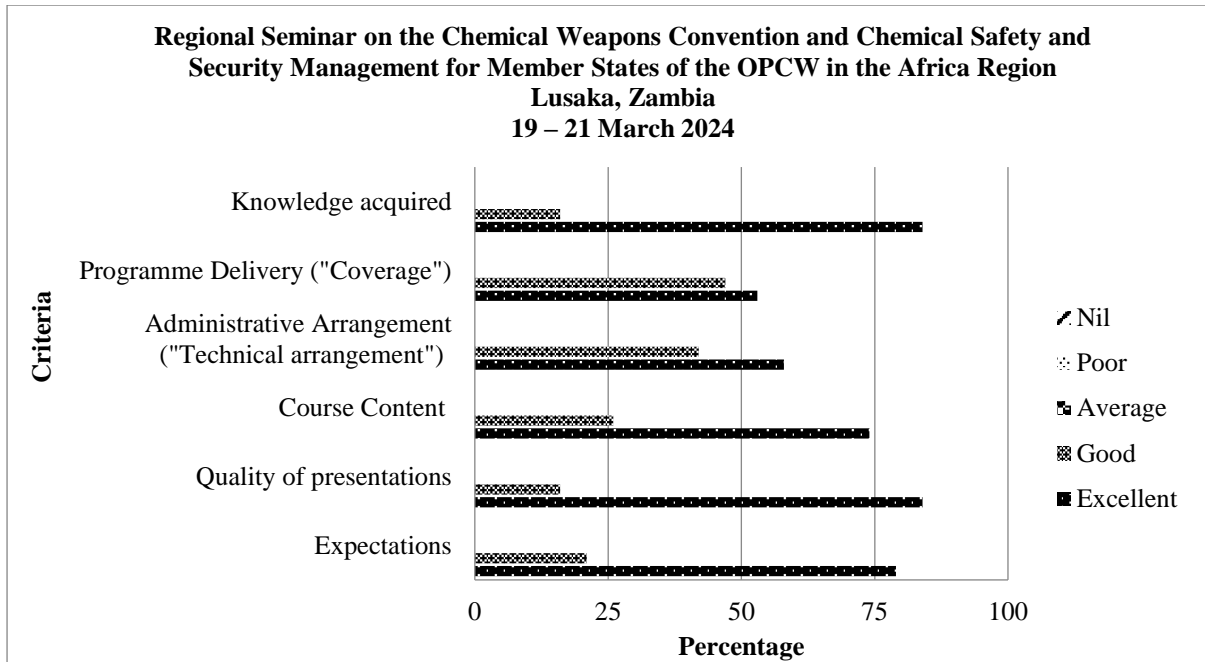


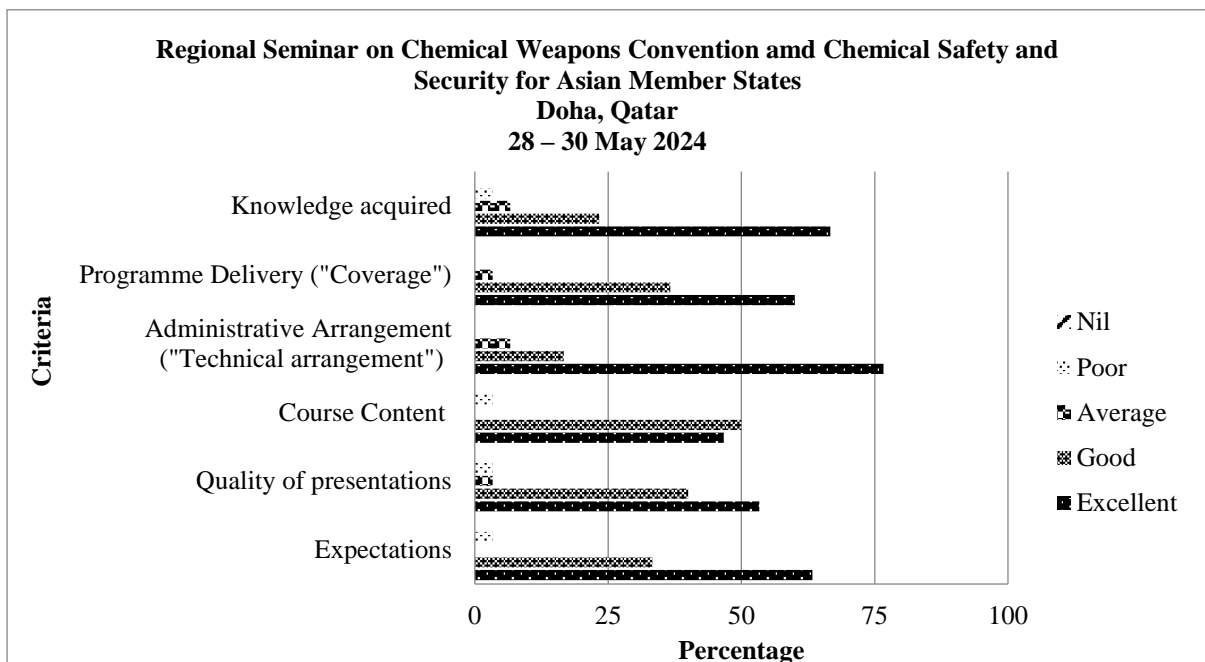
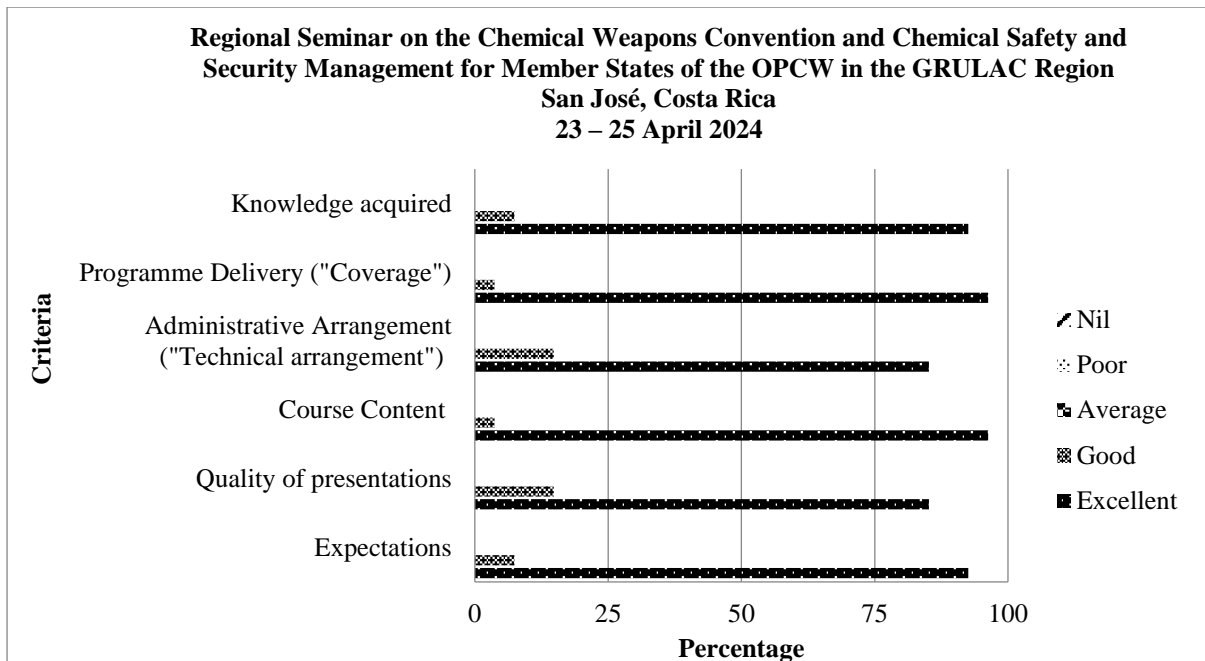
Chemical safety and security management



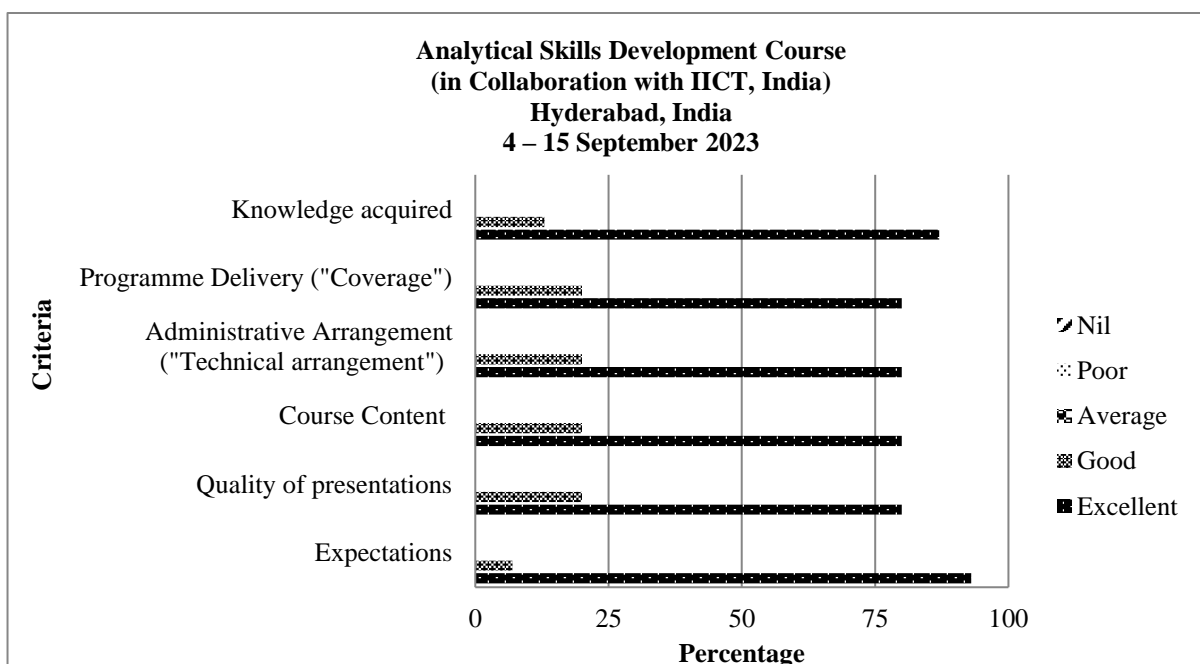
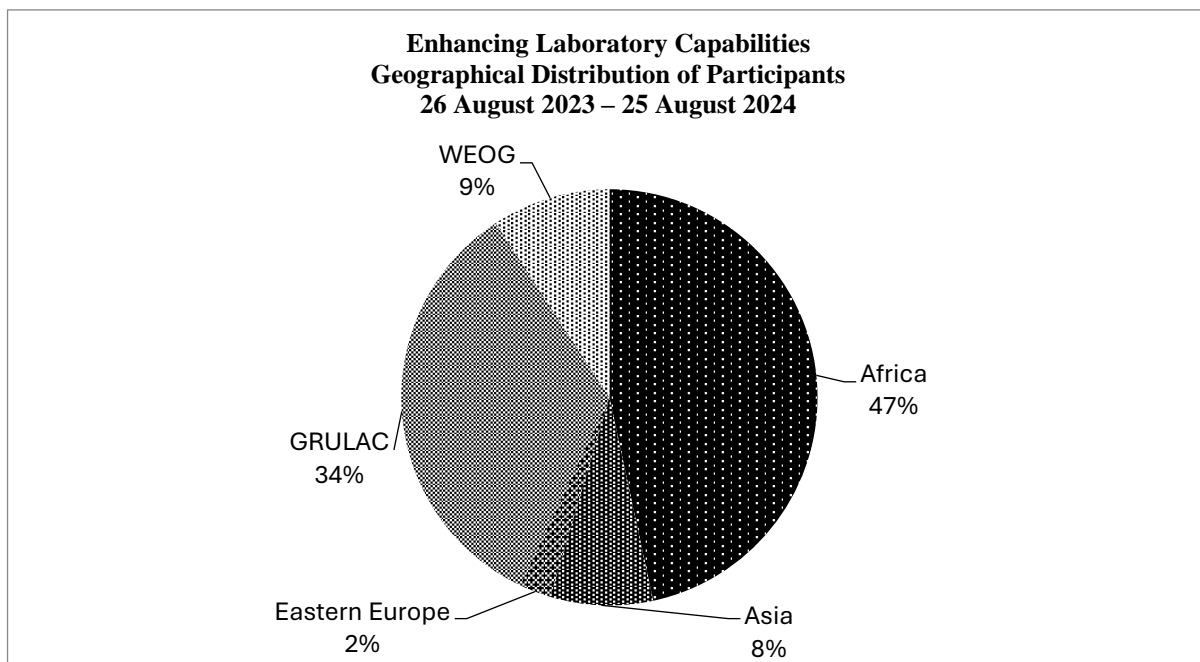


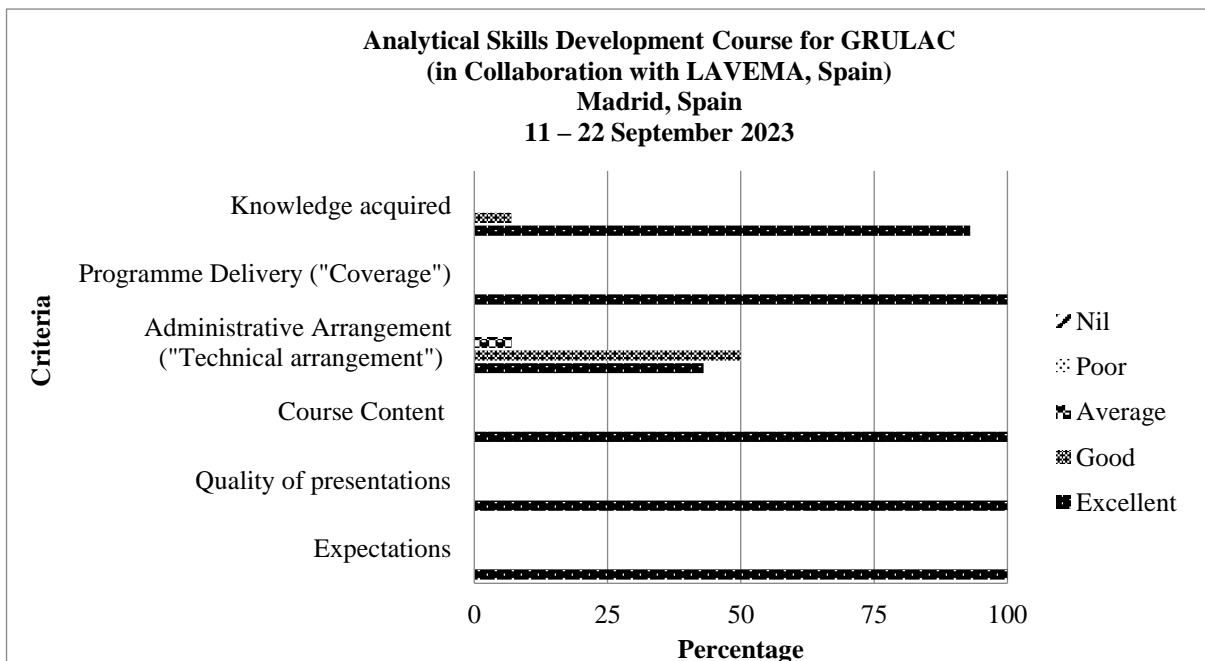
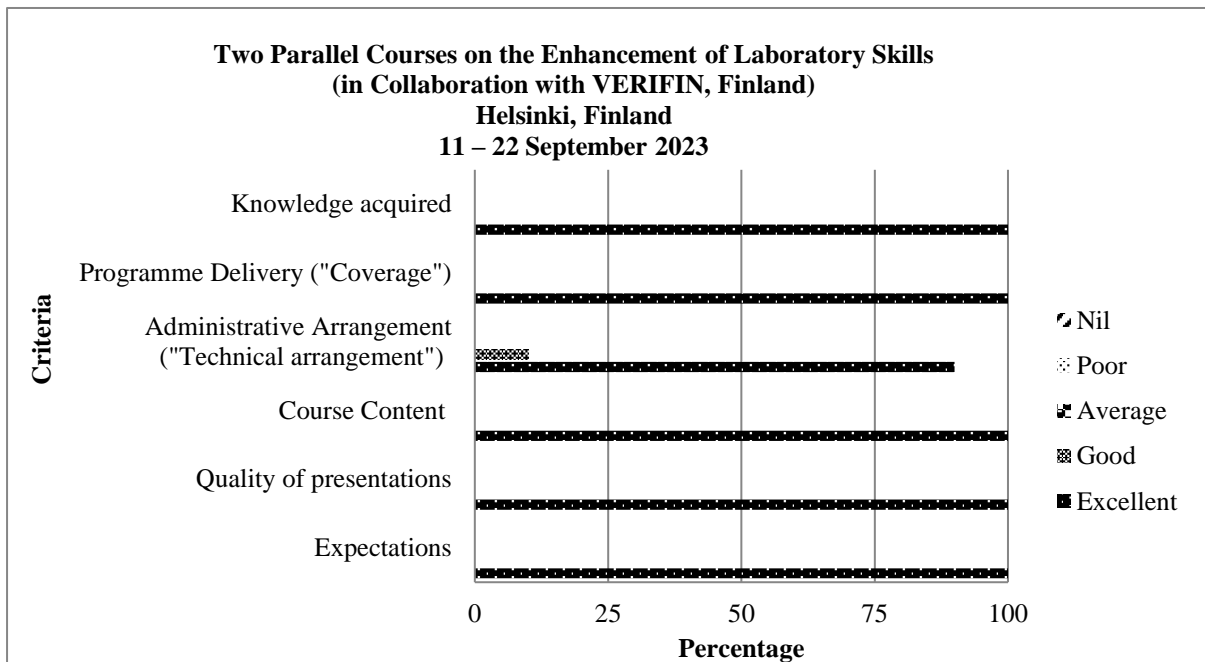


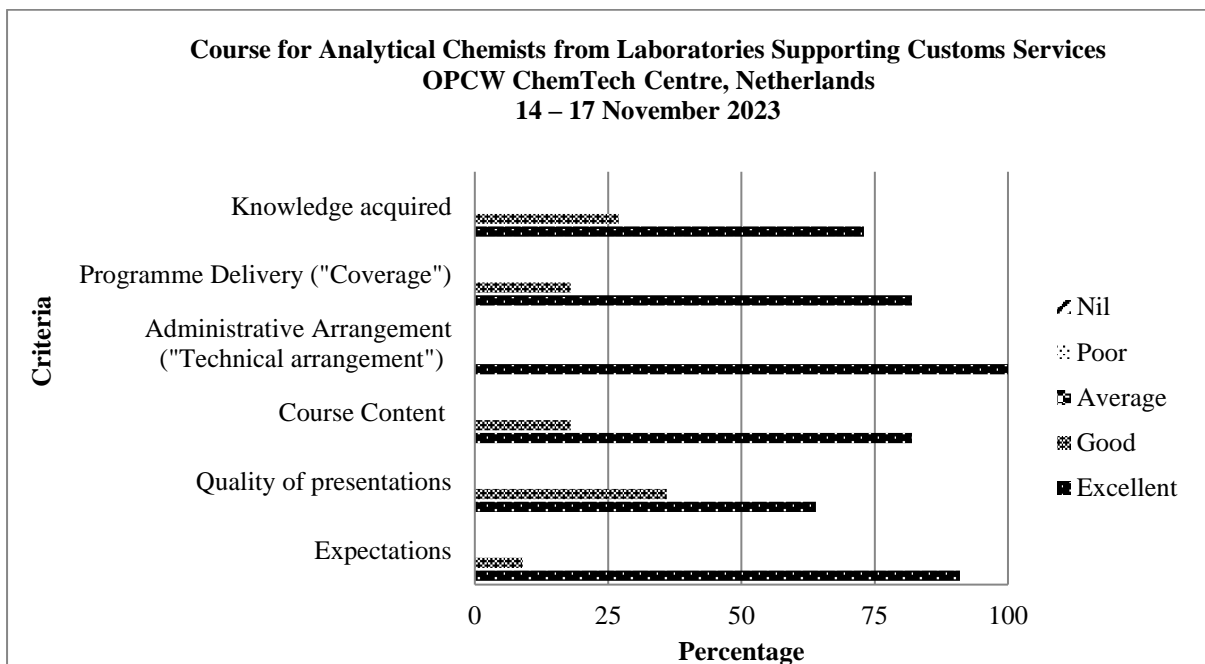
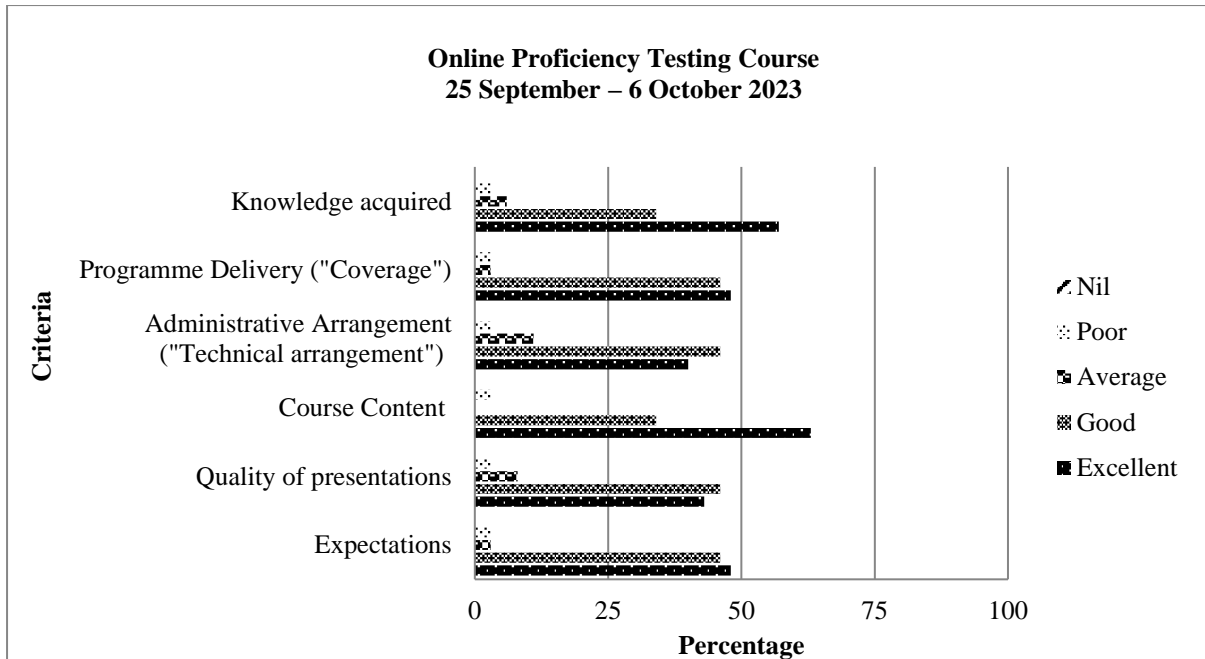


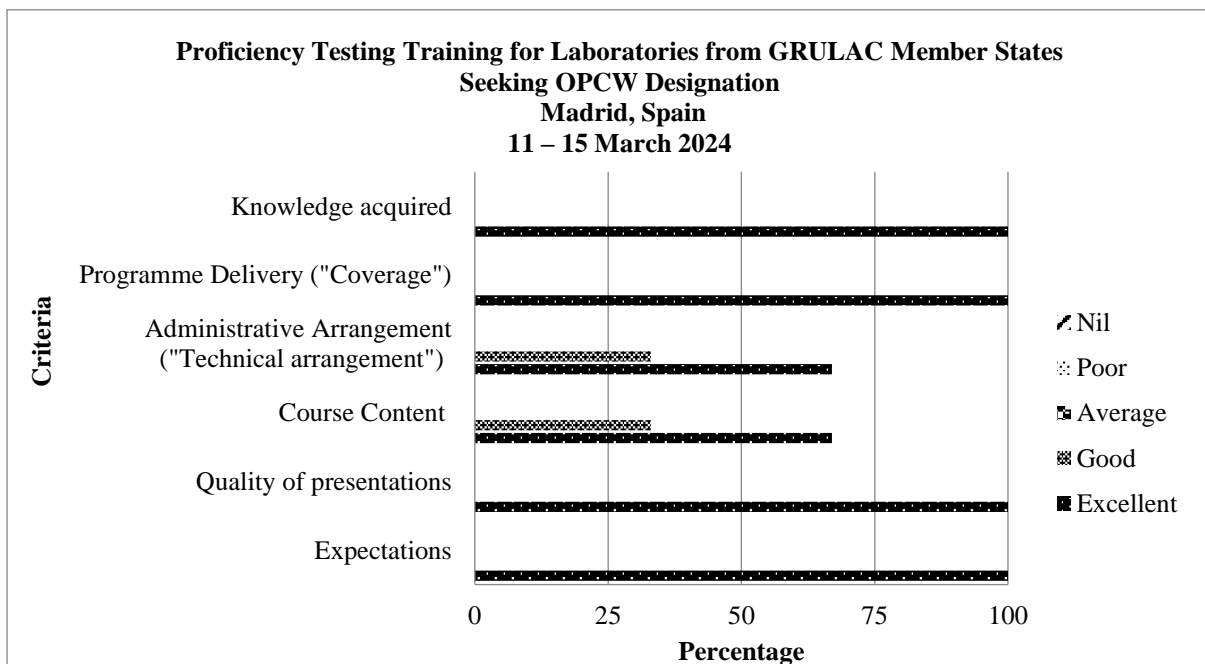
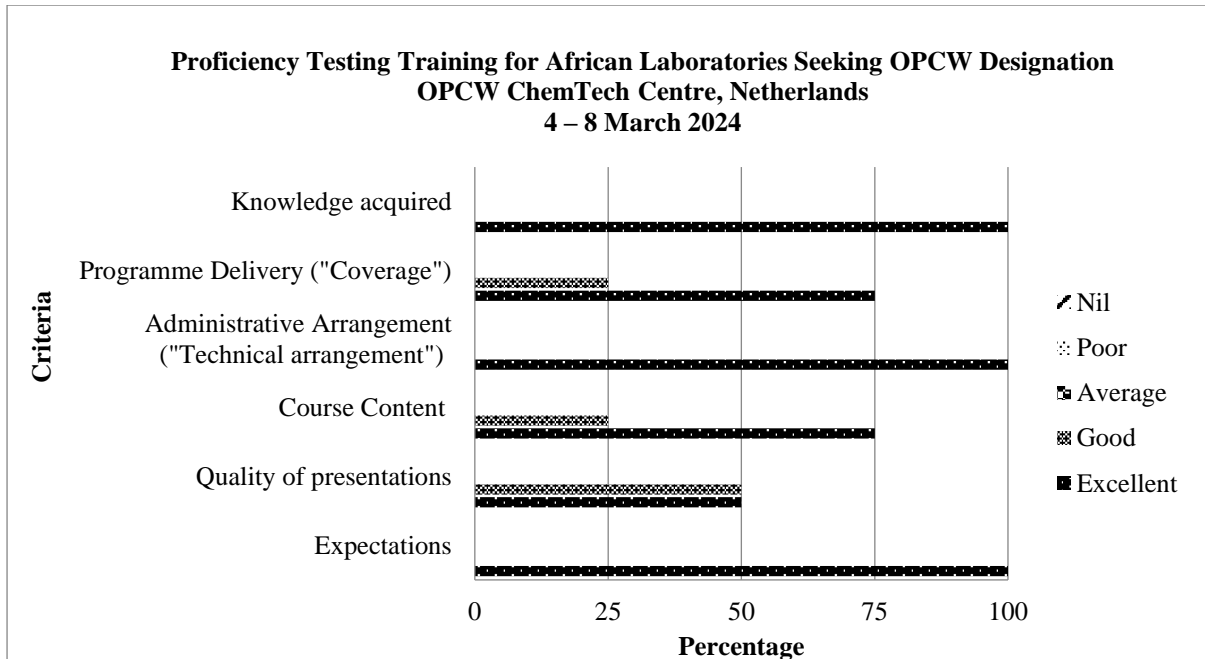


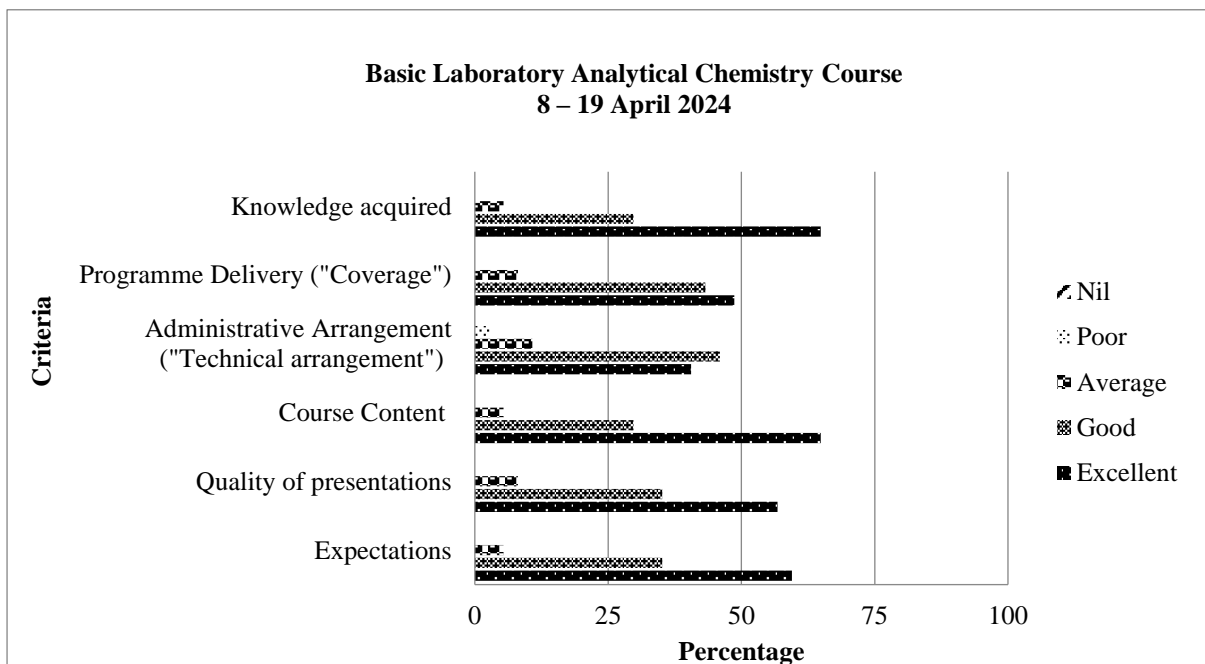
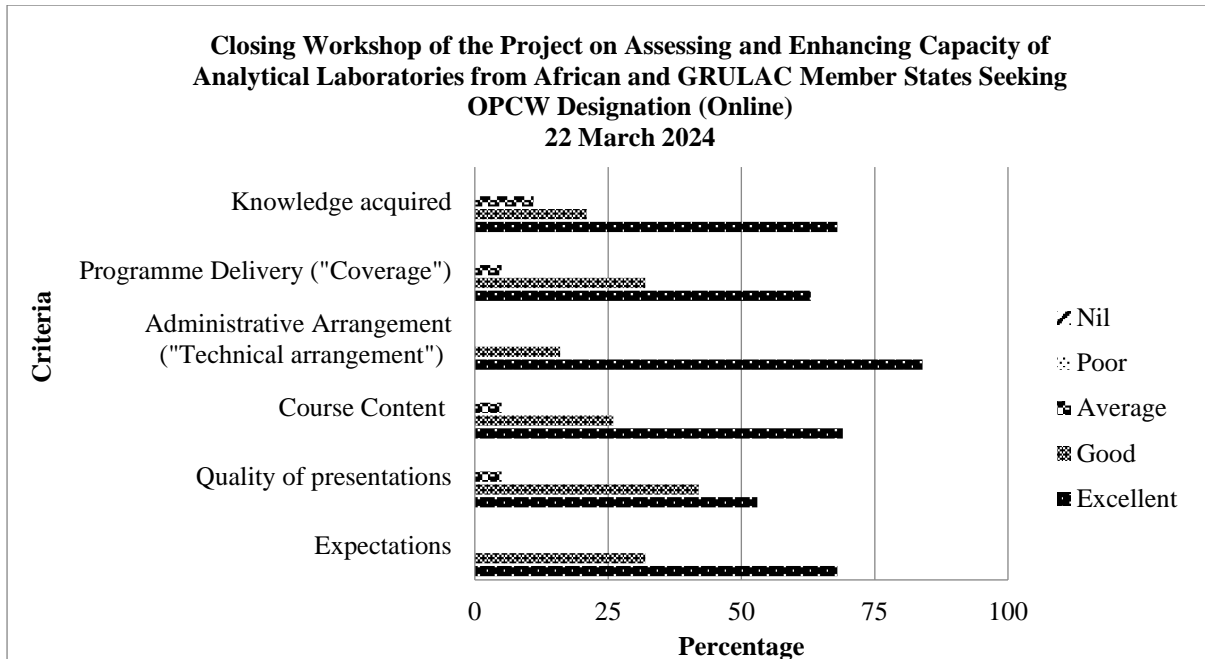
2. ENHANCING LABORATORY CAPABILITIES

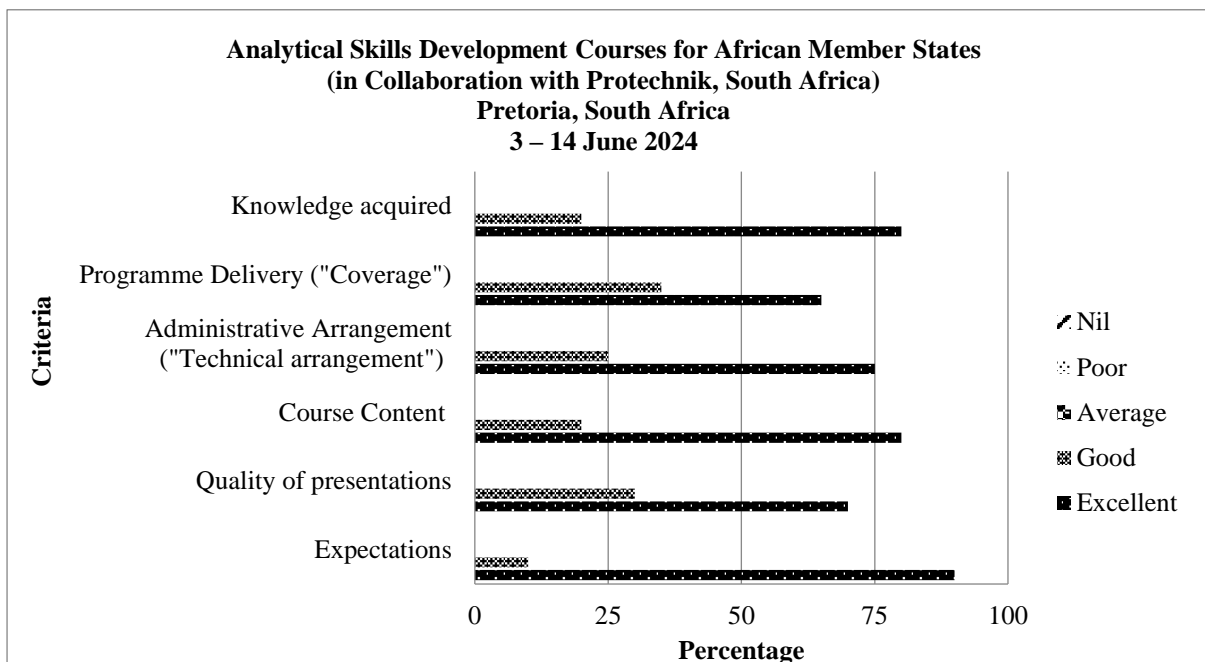
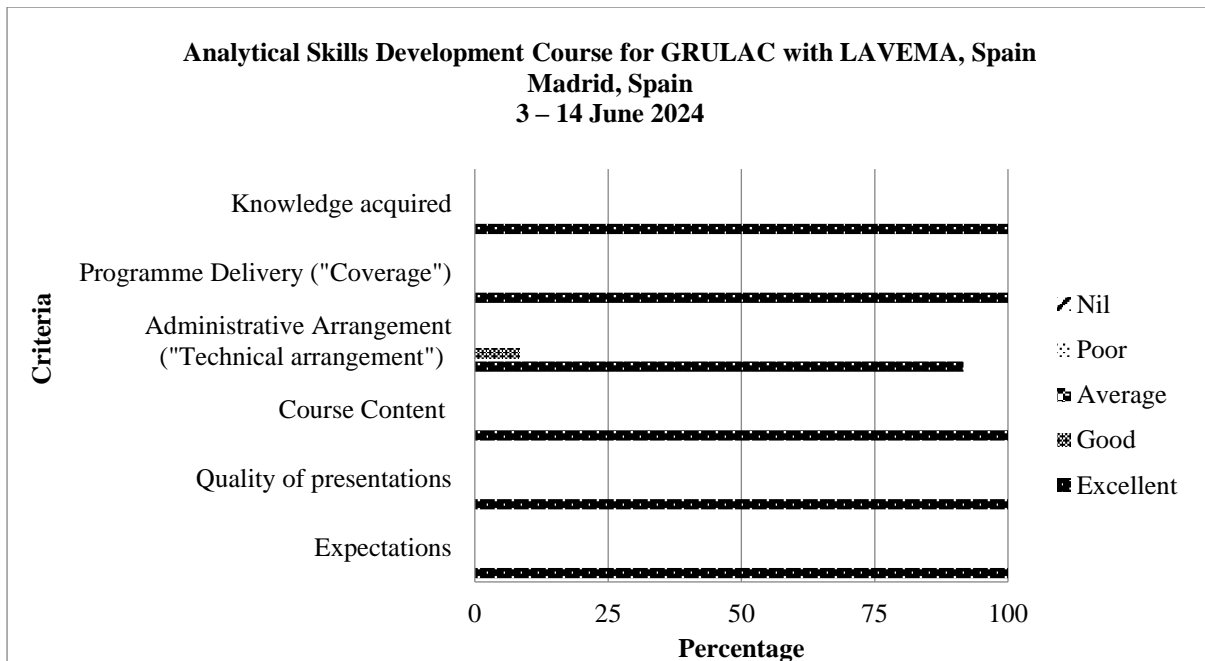


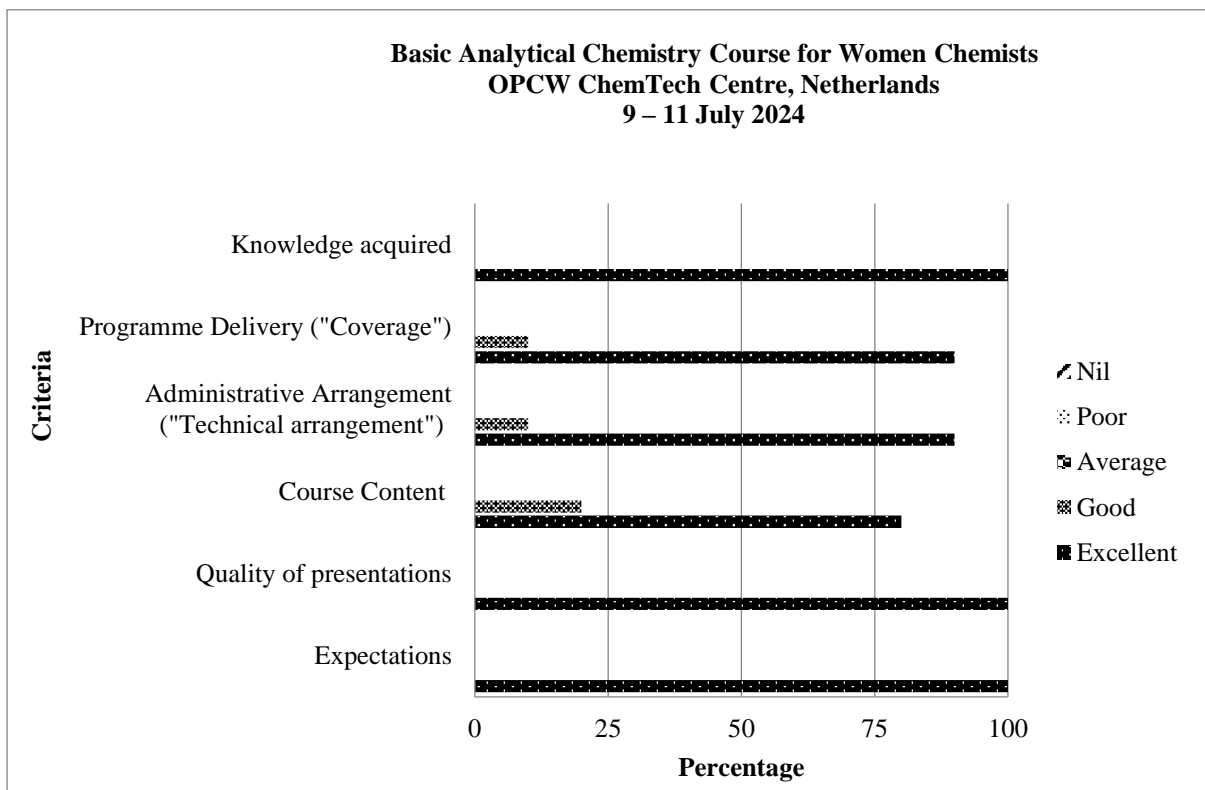
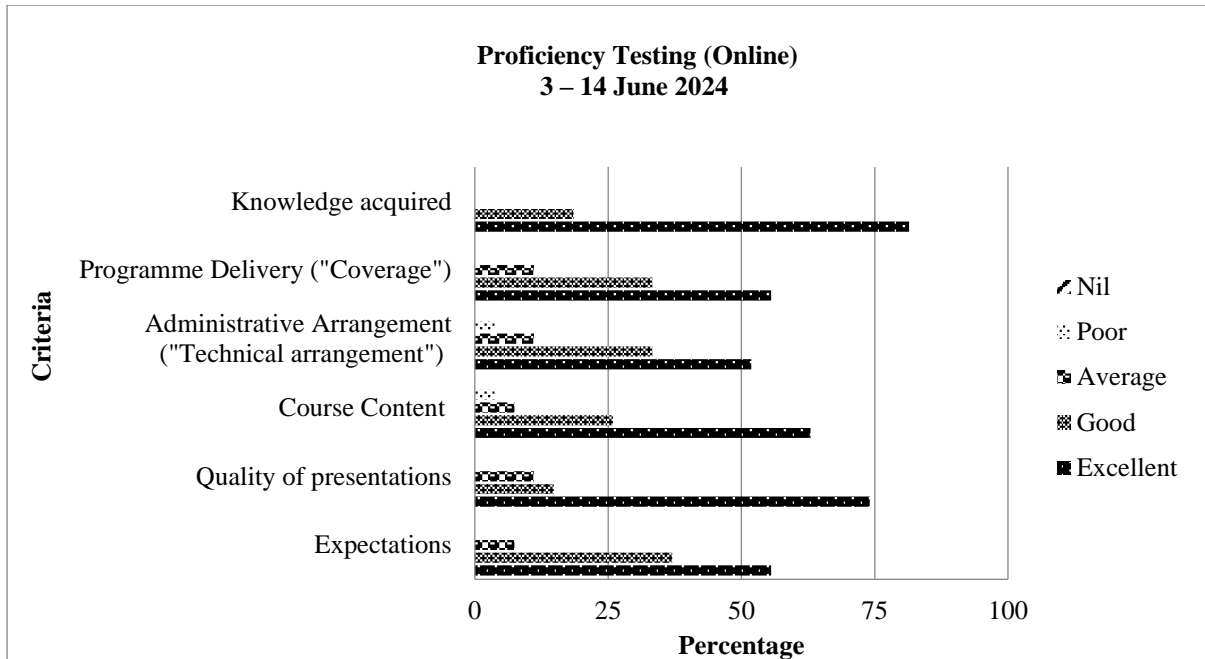




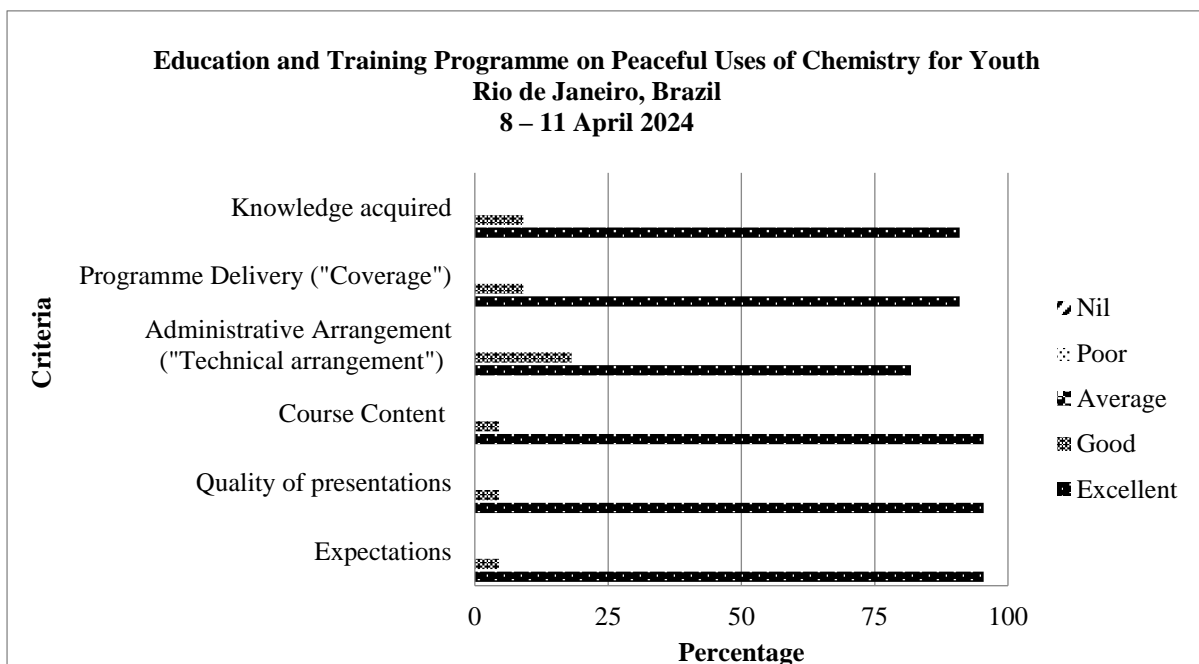
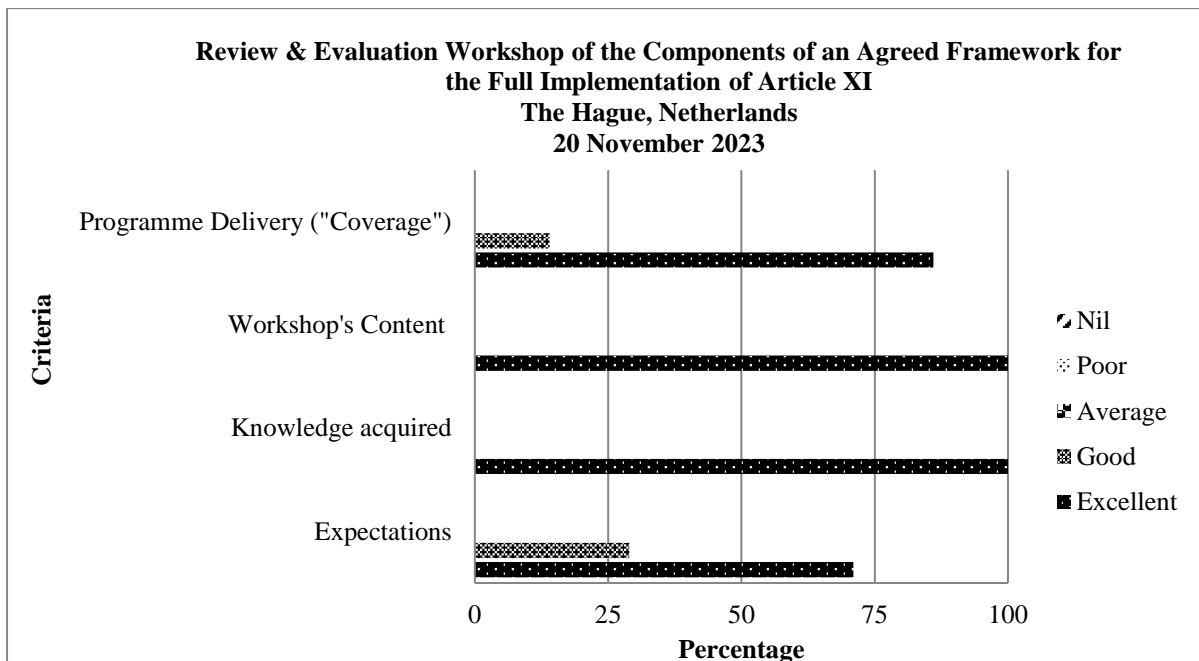


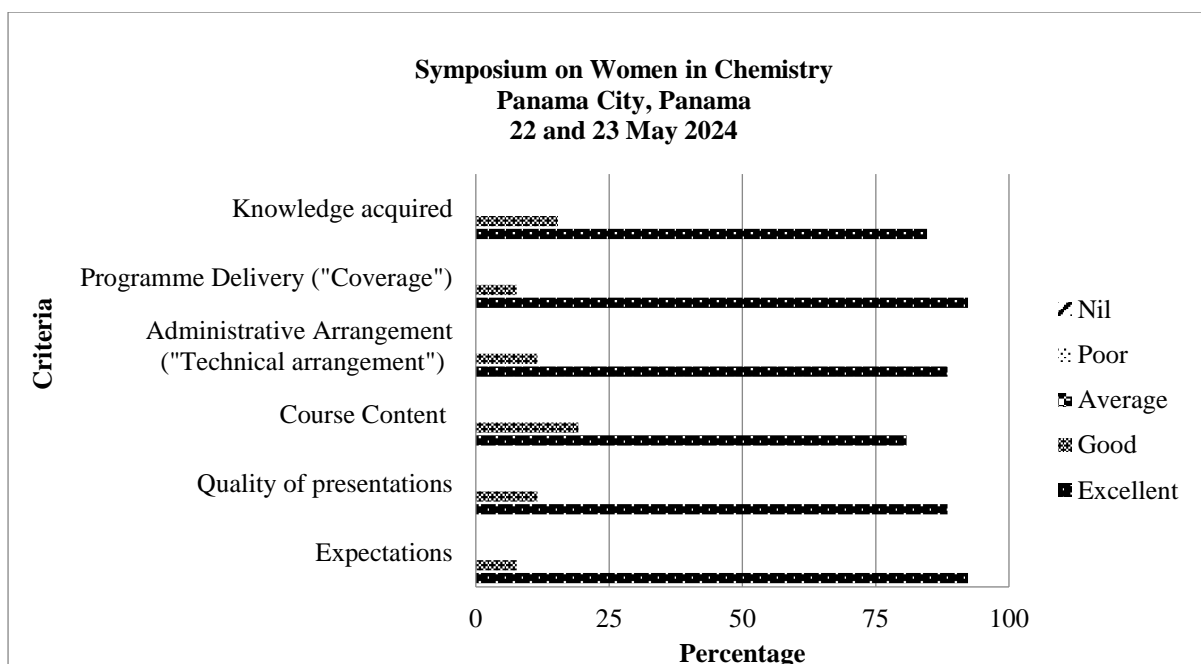




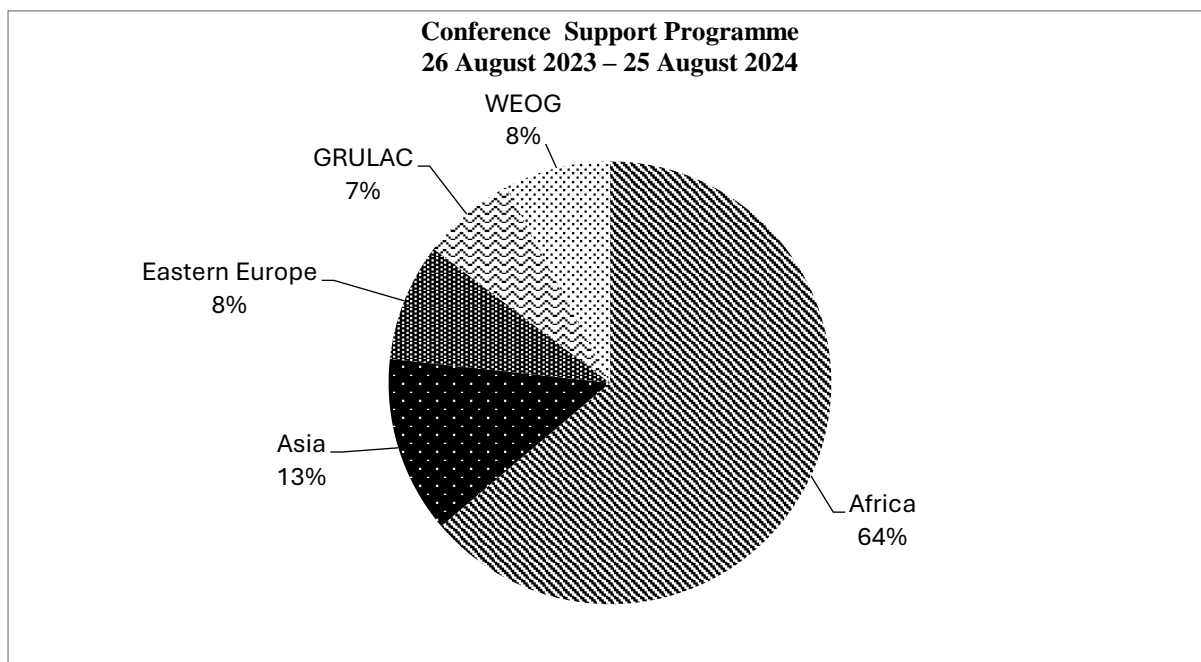


3. CHEMICAL KNOWLEDGE PROMOTION AND EXCHANGE

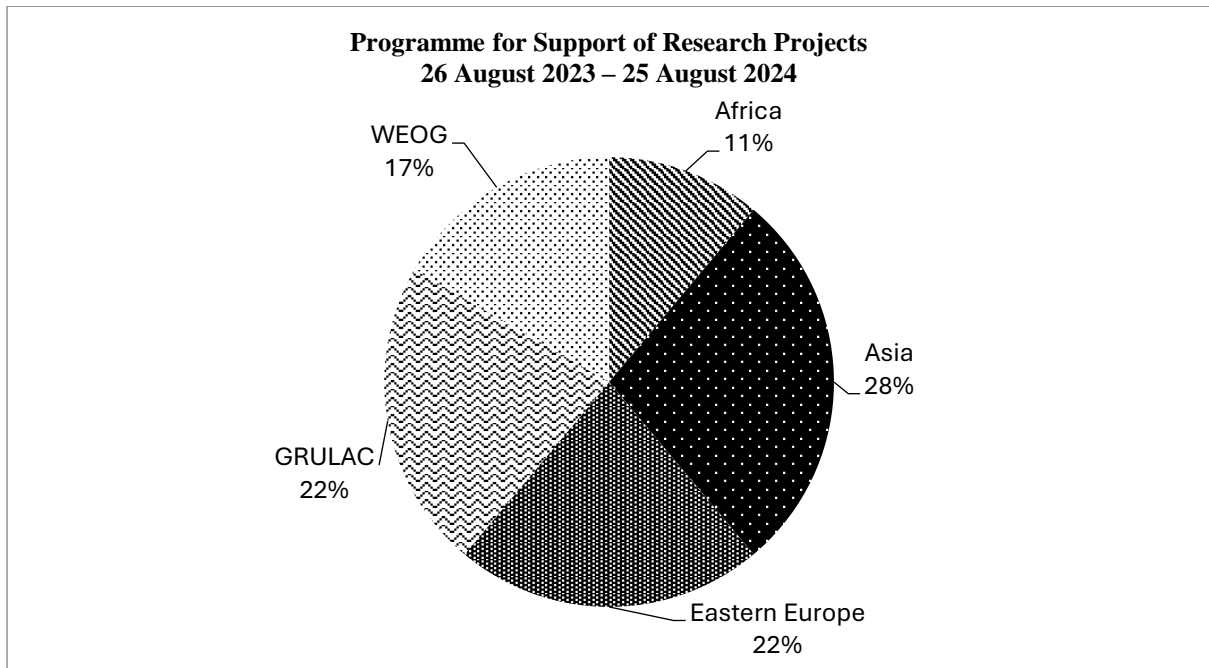




Conference Support Programme



Programme for Support of Research Projects



Fellowship Programme

