



AIDE-MEMOIRE No. 1 of 2011

Project Number TE/RAF/09/030 and YA/RAF/10/001

Institutional strengthening of the Intra-Africa Metrology System

Metrology in Chemistry Workshop:

Capacity building in chemical analysis for the Intra-Africa Metrology System

18-22 July 2011

Nairobi, Kenya

1. BACKGROUND

The challenge of Project Number TE/RAF/09/030 and YA/RAF/10/001 is to help to fill the gaps in metrology and measurement systems in Africa, especially in national metrology infrastructure, measurement standards, and lack of institutional competences and skills that are recognized internationally. The objective of this project is to provide African testing laboratories and exporting business units increased access to domestic and affordable calibration services from local NMIs that are reliable and internationally traceable.

The outcome of this project is to enhance the Intra-African Metrology System (AFRIMETS) to provide assistance to obtain international recognition of the metrology programmes of the African NMIs and LMOs.

Chemistry underpins trade and human and environmental health. To prove a laboratory's competency in chemical analysis, laboratories participate in proficiency testing schemes (PTs). In the 2010 AFRIMETS Metrology in Chemistry working group (TCQM) meeting a number of parameters were selected for PTs to develop analytical capacity and to build capability in Africa.

As current chair of TCQM, the NMISA proposed to host the first of the PTs identified: the determination of ethanol in aqueous solution (aqueous EtOH), as this is an important analysis for both industry and law enforcement. The accurate determination of ethanol content in aqueous medium is critical for effective regulation of blood alcohol levels (zero-tolerance, drunk driving, autopsies, etc.) and the classification and control of alcoholic beverages. In some African regions, alcohol adulteration with methanol poses health risks to the populations, especially in rural and remote areas. To prove their capabilities and obtain accreditation, analytical laboratories must participate in proficiency testing schemes or inter-laboratory comparisons.

The PT can also be easily followed up with an AFRIMETS key comparison which could underpin the Calibration and Measurement Capability (CMC) claims of members in the international key comparison data base (KCDB).

The NMISA is an accredited certified reference producer for aqueous ethanol solutions, and has been conducting an aqueous ethanol PT scheme for laboratories in South Africa since 2007. The NMISA has previously participated in CCQM key comparisons and have CMCs submitted to the KCDB for the determination of ethanol in aqueous solution.

The PT workshop is planned to coincide with the 2011 AFRIMETS TCQM meeting to optimise participation in the meeting, and to maximise the feedback to participants who could not participate in the PT, but who can benefit from the feedback and hands-on training.

2. OBJECTIVES

a) AFRIMETS TCQM meeting

The annual meeting of MiC representatives from all NMIs in Africa active in analytical chemistry is important for the development of a MiC infrastructure, as allows opportunity to prioritise activities that meet the needs of the member states. For 2011, the 'TCQM' part will be restricted to country reports and feedback to attendees on regional and international matters. The rest of the meeting will focus on technical workshops, most importantly, the feedback of the EtOH PT, which was concluded in June 2011.

b) Feedback of the Aqueous EtOH PT

Five (5) laboratories (with two sets of data from different methods from KEBS) participated in the AFRIMETS EtOH PT, and all laboratories submitted results. In all cases the participants can use the feedback to improve their performance in these analyses. Direct feedback, which includes discussions with all results and everybody's challenges, will ensure maximum return on corrective actions.

c) One day workshop for all PT participants

Analysis of the PT results highlighted a number of problems; one being the use of calibrant materials and CRMs. The workshop will address fundamental aspects of the analysis such that participants can use the principles taught in the training to underpin their other analysis as well.

The NMISA also plans to provide the participants with CRMs that they can use to calibrate their equipment to ensure that they implement all corrective actions required to address any measurement issues highlighted by their PT results.

d) One day meting seminar on Uncertainty of Measurement (UoM) for WG participants and KEBS MiC personnel

KEBS requested a workshop on UoM. The NMISA has extensive experience in this, and regularly presents a course in South Africa on behalf of the National Laboratory Association. The week long course will be condensed into a one day course, and it can be tailored to a hands-on experience with three seasoned NMISA metrologists present to assist all participants on how to calculate UoM.

e) Quality system review in preparation for AFRIMETS review and to submit CMCs.

This will assist KEBS to ensure that they practice their chemistry in a truly metrological way and that they are successful in the AFRIMETS review of their quality system. KEBS can only submit CMCs once their quality system has been approved by AFRIMETS. Though they are accredited to ISO/IEC 17025, it is more as a testing laboratory, and in metrology there are other challenges (such as traceability to higher order CRMs) that needs to be addressed. The proposed NMISA team can also assist and guide towards ISO 17043 accreditation to become a PT service provider. KEBS already hosts one of the EAMET PTs, and such accreditation will enhance their profile and role within EAMET, and the greater Africa, significantly. This forms part of the larger AFRIMETS roadmap and quality review under the AFRIMETS Quality WG.

f) Hands-on training to KEBS to prepare for AFRIMETS.QM.K27

KEBS participated in a CCQM pilot comparison for ethanol, but their results showed some bias. Initial results of the PT showed that though they can do the analysis, they need help with their calculations. Training in this is critical to help them to eventually participate successfully in any international comparison on RMO or CCQM level. Submitting CMCs is a critical key performance indicator for KEBS, and with the upcoming AFRIMETS.QM.27, they can realise this and have a CMC to submit to CCQM for review in April 2011.

g) Roadmap for future Africa PTs and comparisons

One of the major challenges for emerging economies/ developing countries in participating in international comparisons is that they often need to underpin some basic parameters, which have been covered by CCQM already, with not much opportunity for participation in a comparison that will be run for them to underpin their capabilities in some simpler matrices, since the CCQM WGs have started a more strategic cycle approach to comparisons. This effectively means that if they did not participate in the first of a series of comparisons, they will only be able to do so in 5 years' time again, unless there is an RMO comparison. Needs for capabilities in pesticides and both mycotoxins and heavy metals in foods have been identified as critical for Africa and in both cases a roadmap of PT and then comparisons from simple matrices to complex analysis that includes extraction capabilities, have been proposed at AFRIMETS TCQM. A PT for food is planned as an outflow of the IAEA's "Consumer Safety and Trade Development through Competent Nuclear Testing and Metrology Laboratories (AFRA)-RAF0027-009 Regional (AFRA) Training Course for Analysis of Heavy Metals and Established PT Scheme for Food and a workshop will be hosted at the NMISA during the week of 21-25 November 2011.

3. PLACE, DATE AND LOCATION

The Metrology in Chemistry workshop will form part of the AFRIMETS 2011 Working Group meetings and General Assembly, which will take place in Nairobi, Kenya, from 18 to 22 July 2011. Preferential accommodation rates have been arranged at the Red Court Hotel.

4. AGENDA AND PROGRAMME

The provisional agenda is outlined below. The technical part of the workshop which includes all participants will be from Monday, 18 July, to Wednesday afternoon, 20 July. The three NMISA presenters will stay for two more days (21-22 July 2011) to conduct a review of the KEBS quality systems in terms of metrology.

Meeting Agenda

(Everybody attends Monday - Wednesday).

(Each country needs to prepare a presentation for Monday morning to introduce their activities to the group).

Monday 18 July 2011		Presenter
Morning	Opening Country reports Regional PT feedback SADCMET EAMET CCQM feedback	Sara Prins All Mare Linsky Kezia Mbwambo/Felista Nyakoe Jayne de Vos
Afternoon	Feedback of PT results and discussion	Jayne de Vos Maria Fernandes-Whaley
Tuesday 19 July 2011		
Morning	Workshop and laboratory training EtOH analysis	Jayne de Vos Maria Fernandes-Whaley
Afternoon	Workshop and laboratory training EtOH analysis	Jayne de Vos Maria Fernandes-Whaley
Wednesday 20 July 2011		
Morning	Uncertainty of Measurement workshop	Mare Linsky Maria Fernandes Whaley
Afternoon	Uncertainty of Measurement workshop	Mare Linsky Maria Fernandes Whaley
Thursday 21 July 2011		
Morning	Review of KEBS quality systems Additional EtOH training for AFRIMETS.QM.K27	Mare Linsky Maria Fernandes Whaley
Afternoon	Review of KEBS quality systems	Mare Linsky Maria Fernandes Whaley
Friday 22 July 2011		
Morning	Review of KEBS quality systems	Mare Linsky Maria Fernandes Whaley
Afternoon	Closing meeting	Henry Rotich

5. LANGUAGE / DOCUMENTATION

The working language of the meeting will be English. All course material will be available to candidates electronically, and working documents for the training will be supplied in hardcopy. Interpretation services will be provided (English/French) for 3 days of workshop.

6. PARTICIPATION

Five countries participated in the PT scheme and all submitted results. Tanzania and Zimbabwe are not currently active in EtOH analysis, but participate annually in the EAMET and SADCMET PTs, thus they would benefit from the workshop. Egypt has signed up to participate in AFRIMETS.QM.K27, a key comparison registered at the BIPM for the determination of ethanol in aqueous solution, which will run from July – September 2011.

The NMISA will supply three technical presenters, of whom one is the PT organiser, and all of whom are experienced in the preparation of certified reference materials and calculation of uncertainty in measurement. The NMISA experts also cover the fields of both organic and inorganic chemical analysis, to ensure most of KEBS' quality systems

can be reviewed by experts who have participated in numerous CCQM comparisons. Find below initial list of participants. Others may confirm at later stage.

	Country	Participant	UNIDO to sponsor				Motivation
			Air ticket	Venue Costs	Day 1-3	Day 4-5	
1	Uganda	Aziz Mukota	Yes	Yes	X		EtOH PT participant
2	Tunisia	Intissar Liman	Yes	Yes	X		EtOH PT participant
3	Rwanda	Wicief Kagisha	Yes	Yes	X		EtOH PT participant
4	Malawi	Steve Afuleni	Yes	Yes	X		EtOH PT participant
5	Tanzania	Kezia Mbwambo	Yes	Yes	X		Other PT participant/ EAMET PT organiser
6	Zimbabwe	Mathew Ranganai	Yes	Yes	X	X	Other PT participant
7	Egypt	Ibrahim Tahoun	Yes	Yes	X		AFRIMETS.QM.K27 participant
8	South Africa	Jayne de Vos	Yes	Yes	X	X	EtOH PT organiser
9		Maria Fernandes-Whaley	Yes	Yes	X	X	EtOH PT organiser
10		Mare Linsky	Yes	Yes	X	X	Uncertainty of Measurement SADC WaterPT
11		<i>*Sara Prins</i>	<i>No</i>	Yes			<i>Chair: AFRIMETS TCQM</i>
12	Kenya	Felista Nyakoe	No	Yes			EtOH PT participant
13		Martin Masibo	No	Yes			EtOH PT participant
14		Geoffrey Maruua	No	Yes			EtOH PT participant
15		Luvonga Caleb	No	Yes			EtOH PT participant
16		<i>*Henry Rotich</i>	No	Yes			<i>Head: MiC at KEBS</i>

7. EXPECTATIONS

The PT workshop will allow the participants to understand:

- How they performed in the PT
- What mistakes they made in their analysis
- How they can address this (corrective actions) when back in their laboratories
- The hands-on sessions will show them best practice and allow them to test some skills with experts who can correct any mistakes immediately.

The Uncertainty of Measurement workshop will:

- Give participants an understanding of what affects their measurements
- Show them how to identify all the parameters that can influence an analysis and ways in which to quantify it
- Prepare the two laboratories (KEBS and NIS) for the upcoming AFRIMETS.QM.K27 comparison, where they will be expected to report detailed uncertainty budgets for their analysis.

The KEBS quality system review will

- Assist the laboratory to grasp the requirements of a quality system for metrology applications (which are more intense than what is required for a testing laboratory)
- Assess the level of KEBS' metrology in chemistry readiness for AFRIMETS approval, which is required for the eventual submission of CMCs to the BIPM KCDB.

8. EVALUATION AND FOLLOW-UP

Participants will be required to complete an evaluation questionnaire after the PT workshop on how to implement the proposed corrective actions in their laboratories.

Participants will be required to complete a basic test at the end of the Uncertainty of Measurement to qualify for a certificate.

The KEBS laboratory review will be summarised in a report with suggested corrective actions (if any) for them to prepare for their official AFRIMETS review.

A full report on all the activities will be submitted to the UNIDO Project Manager within ten (10) working days of the training. Recommendations as to further events and follow-up of the impact of the training and further requirements that need to be addressed are expected to result from the evaluation.

9. ADMINISTRATIVE AND FINANCIAL ARRANGEMENTS

Financial and administrative arrangements for the participant will be in accordance with established UNIDO rules and regulations.

Workshop materials and interpretation

The PT feedback will include laboratory time at KEBS, where potential problems identified in the PT result evaluation will be addressed, and best practices such as dilution of samples, will be shown to the participants, giving them the opportunity to practice under supervision to address errors. This will require some consumable materials to be supplied by KEBS.

UNIDO will provide interpretation services (English/French) for 3 days of workshop.

UNIDO will also provide the venue to conduct the three day workshop at the Red Court Hotel.

Air tickets

For the confirmed participants invited (see point 6) a round trip air ticket between home country and the Jomo Kenyatta International Airport, Nairobi, Kenya for the most direct and economic route shall be provided through the UNIDO head office in Vienna, Austria. The Participant should await formal travel authorization from the Project Manager and should, under no circumstances, purchase their own tickets. Any additional cost incurred resulting from deviations from the authorized route shall be covered by the participant.

The Participants and presenters arriving from outside Kenya will be transported to and from the Jomo Kenyatta International Airport by way of shuttle arranged by UNIDO.

Arrival/ Departure

The selected workshop participants from outside Kenya are expected to arrive in Nairobi on Sunday, 17 July 2011 and depart only after 17h00 on Wednesday 20 July (or 21st if no evening flight available).

The three NMISA presenters and Dr. Mathew Ranganai (Zimbabwe) are expected to arrive in Nairobi on Sunday, 17 July 2011 and depart in the afternoon/ evening of Friday 22 July (or 23rd if no evening flight available).

UNIDO will not be financially responsible for earlier arrivals or late departures. Participants should confirm their travel itineraries before their departure and provide the Project Co-ordinator in Pretoria, South Africa, with all details of their scheduled arrival date and time in Nairobi, indicating flight numbers.

Daily subsistence allowance

Preferential rates have been negotiated by KEBS for the participants of the workshop. Participants will receive partial DSA of 220 USD (to cover accommodation, meals and incidentals) after registration/check in at the hotel (Red Court Hotel). (This is only valid for participants sponsored by UNIDO). Participants not sponsored by UNIDO will be responsible for all their own expenses.

Hotel Reservation

UNIDO will make reservation for the sponsored participants directly to the Red Court Hotel. Participants will be responsible to pay the Hotel for their accommodation and incurred expenses.

10. NEITHER HOST COUNTRY NOR UNIDO WILL ASSUME RESPONSIBILITY FOR THE FOLLOWING EXPENSES:

- Any expense in the home country incidental to participants' travel, including expenditures for passports, visas, and medical examinations, and travel to and from the airport;
- Travel or any other costs incurred by aides or dependants accompanying participants;

- Any additional costs incurred as a result of failure to make flight reservations for the homeward journey before departure from the home country;
- Costs incurred by participants with respect to insurance;
- Costs incurred by participants because of travel by a route other than the most direct;
- Compensation in the event of death, disability or illness of participants;
- Purchase of personal belongings, or compensation for any loss or damage caused by climatic or other conditions.

11. CONTACTS

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