

Southern African Development Community (SADC) Cooperation in Measurement Traceability Angola, Botswana, Democratic Republic of Congo, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia, Zimbabwe

REGIONAL COORDINATOR'S ANNUAL REPORT FOR THE PERIOD APRIL 2005 - MARCH 2006

1. METROLOGY SUPPORT FOR SMEs PROJECT

The metrology support for SME's project continued successfully, with to-date, ten pilot roll-out Workshops of the Measurement Practice Improvement Guide having been carried out in 10 different countries in East and southern Africa. Further roll-outs will be carried out between May and July 2006 in the remaining three SADC member countries as well two associate member organizations of SADCMET. The toolkit has now generated a lot of interest not only from across the whole African continent but from South America as well. Further work will entail completion of an impact assessment study to measure the level of measurement implementation in SMEs as well as benchmarking study so as to establish best practices across member countries. This would also provide an indication of the success of the collaboration project. SADCMET's TC 5 is also looking at other tools to assist SMEs from a measurements point of view. (details in TC 5 Chair's Report).

2. SADCMET WATER TESTING LABORATORIES PROFICIENCY SCHEME

The third Water PT Workshop was held in Dar es Salaam, Tanzania from 5-11 November 2005, following from the previous two held in Windhoek, Namibia in February 2004 and in Pretoria in November 2005 (reports are available from http://www.sadcmet.org). Following from this, two proficiency tests for water testing laboratories were organised by Umgeni Water (Pietermaritzburg, South Africa). The Pretoria workshop was to evaluate and assess the first PT and to find ways forward to a regular PT system and other supportive measures. The aim of the third workshop in Dar Es Salaam was the evaluation of the second PT and the establishment of a Water Laboratory Association to facilitate the mutual support between the water laboratories in the SADC region. The workshop was preceded by a training course on the estimation of measurement uncertainty, organised by the NML.

The workshop covered the evaluation of the second SADCMET water PT and all aspects that could be derived from the results. The results showed that there is a need for improvement in nearly all laboratories. It was shown how PT results could be used to find the weak points in the analysis and a link to the estimation of measurement uncertainty was given. The workshop recommended that the PT system for chemical analyses be continued and that it be extended to microbiology. The structure of local coordinators was strengthened to minimize logistical problems for the next round and to increase the number of

participants. The assessment procedure using limited standard deviations has proven to be very effective, the statistical methods used will be changed in the next round to be in accordance with the new ISO standard. As and Cd will be added to the list of parameters for the next PT round in June 2006. Training of the potential PT provider for microbiology can be arranged for and undertaken in Germany. The SADC ASSOCIATION OF WATER TESTING LABORATORIES (SADCWATERLAB) was established during the workshop. Chair, vice chair and a project management committee were elected. Main objective of the Association is to improve the quality of its members' laboratories through mutual help and harmonisation. An initiative to support the SADC laboratories with instrumentation was started and will be coordinated by SADCWATERLAB.

3. MEETING OF SADCMET WORKING GROUP CHAIRPERSONS

The first meeting of SADCMET Working Group Chairpersons was held in Pretoria, South Africa on 28 July 2005. Part of the meeting's agenda four technical presentations, which were meant to provide an overall background to CIPM/BIPM structures, activities and programmes, in order to ensure that all Chairs had a clear, uniform and standard understanding of these issues. The presentations focused on the following themes:

- ↓ Essential elements of the CIPM MRA.
- **CMCs** Review process.
- Organisation of Comparisons and role of the Consultative Committees in implementing the CIPM MRA.
- **4** The BIPM Key comparison Data-base.

Following presentations by each individual Working group Chair in which they gave highlights of the activities and projects within their respective areas, a discussion session entailed which was meant to provide direction and ideas for comprehensive work programmes for each respective Working Group. Identified discussion points encompassed the following:

- Roles/responsibilities of working group chairs
- MRA requirements for NMIs.
- Metre Convention membership or Associate of the CGPM
- SADCMET regional CMCs data-base (Capabilities not yet recognized)
- CMCs reviews: SADCMET template/format
- CMC/BMC issue
- Technical peer reviews
- RAB & RMO/NAB & NMIs cooperation
- WG Chairs future meetings

4 SADCMET TECHNICAL COMMITTEE CHAIRPERSONS MEETING

The RC first gave a brief background to this meeting of SADCMET Technical Committee Chairpersons. It was pointed out that during the 8th SADCMET Meeting held in 2004 in Mauritius, the RC had proposed to that meeting that a *Coordinating Committee* comprising the Chairman, Regional Coordinator and the five chairpersons of the Technical Committees be established to assist the secretariat in coordinating and managing the expanding work programme. The meeting had then approved this proposal, which was adopted as a resolution.

Hence, the current meeting was indeed the first such meeting of the SADCMET *Coordinating Committee*. The RC indicated that the meeting had been called to make follow-ups on, in particular some of the SADCMET resolutions that had been passed at the 9th Meeting held in Maputo in May 2005, that required inputs from a small task group, which would then tender its recommendations to the next meeting of SADCMET in 2006. One such key resolution was as follows:

"SADCMET requests the SADCMET Secretariat to review the SADCMET Committee's by-laws and where necessary to align them with those of the other SQAM structures, including the establishment of the post of a Vice- Chairperson; the same to be presented at the next SADCMET Committee Meeting."

The Workshop Programme was then drafted with the key focus on discussions around the codes of procedure. General Comments emanating from the meeting were as follows:

- that the SADCMET letter-head should no longer reflect the name of Seychelles
- that the name of Madagascar should be now be incorporated. The RC pointed out that it will await confirmations and instructions on the issue from the SADC Secretariat. He further pointed out that he will bring it to the agenda of the meeting between the SADC Secretariat and the SADC-SQAM RCs to be held in Gaborone on 16 November 2005.
- That clarification be made to distinguish the difference between a code of procedure and a by-law
- That the meeting was simply going to make proposals on the review of the SADCMET codes and report to the full SADCMET Committee at its next meeting.

The TC Chairs provided summary reviews and updates of the activities within their respective areas since the May 2005 Maputo meeting:

The meeting proposed several amendments to the five SADCMET Codes of Procedure, for presentation to the full SADCMET meeting.

The meeting further discussed around activities to be carried out on World Metrology Day, with the following proposals:

- calibration of common medical related instruments (scales; blood pressure meters; thermometers)
- press release material
- poster campaign
- five minute movie focusing on the theme
- talk show on the day itself, focusing on the importance of calibration of medical equipment.

Finally, the Regional Coordinator informed the meeting that following resolutions from the Maputo meeting regarding relations with ARSO/NEPAD, he had prepared a concept document on the establishment of an Inter-Africa Metrology System. He further pointed out that concerns were also being raised by the BIPM regarding the inadequate metrology infrastructure across Africa, in particular the non-representation and non-existence of an Africa-wide metrology body. The RC was requested to circulate the document to all TC Chairs.

5. REGIONAL METROLOGY CONFERENCE 2005

Regional Metrology Conference 2005; "Metrology for Traceability in Measurements" and Mass Workshop: 19-23 September 2005, Kenya

The third Regional Metrology Conference (RMC) aimed at enhancing collaboration among metrology institutes in East Africa, and stimulating awareness in the region, recently took place in Nairobi, Kenya from 19-20 September 2005. SADCMET joined hands with the East African Subcommittee on Metrology and brought delegates of 15 of its members to the RMC.

In total, delegates from 19 African and two European countries attended the Conference. The CSIR NML was represented by Ireen Field, Louis Marais and Bennie van der Merwe. Dr Mukayi Musarurwa of the CSIR NML attended the conference in his capacity of SADCMET Regional Coordinator.

Apart from several generic topics, the Conference focused on electrical and mechanical metrology.

Dr Musarurwa delivered a paper on "The Emerging Metrology Infrastructure in SADC: A Model Roadmap towards an Inter-Africa Metrology System.

The paper covered:

- An overview of the SQAM infrastructure
- Pervasive nature of metrology
- · Global metrology set-up
- · Current metrology picture in Africa
- The SADC-SQAM structure
- · SADCMET in perspective
- · Roadmap towards an Inter-Africa metrology system.



Mr Louis Marais' presented a paper entitled "Realisation of time scales"

The paper covered:

- · Calendars
- · Clocks
- SI definition of a second
- Time scales
- Equipments used for time transfer
- Generation of time scales.

Marais' second paper, "Uncertainties in Time and Frequency", dealt with the standard methodology for calculating uncertainties, calculating the uncertainty of oscillator frequency and other time and frequency measurement uncertainties.

Bennie van der Merwe' paper "Mass measurements and their uncertainties" dealt with the topics:

Applying the ISO guide to the expression

- Steps of applying the ISO GUM
- Modelling the measurement
- Evaluating the standard uncertainty
- \cdot Type \cdot A and type B uncertainties
- · Determining combined standard uncertainty
- · Determining expanded uncertainty.

6. MEASUREMENT UNCERTAINTY TRAINING COURSE (MASS)

Following on directly from the Regional Metrology Conference, SADCMET organised a Mass Intercomparison Workshop and a training course on measurement uncertainty, which was attended by mass metrologists from 19 African countries, and held from 21-23 September 2005.

The first day of the workshop was spent on comparisons and the programme included presentations and discussions on key and supplementary comparisons, presented by Bennie van der Merwe and Ms Ireen Field of NML. Also discussed were the registration of RMO key, supplementary and bilateral comparisons, followed by the finalisation of the protocol for SADCMET M.M.S-1.

The last two days of the workshop were spent on the determination of uncertainty of measurement in the field of mass metrology. The programme included the practical demonstration and calculation of the total expanded uncertainty of measurement for the

calibration of weights (simple examples), weights (more complex examples, including air buoyancy correction) and weighing instruments.

Delegates also had the opportunity to visit the Mass Laboratory of the Kenya Bureau of Standards (KEBS) on the last day. The list of participants is attached below:

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1.	Tonui K. David	KEBS	Tonui@kebs.org
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3.	Kore Georges Gbougui	LANEMA/RCI	lanema@aviso.ci
4.	Ingram Kisamo	TBS	ijkisamo@yahoo.com
5.	Eston Macheche	MBS	estonmacheche@yahoo.co.uk
6.	Benno Gatzeneier	Sartorlus HG	Benno.Gatzenzemeier@sartorius.com
7.	Bennie Van Der Merwe	CSIR NML	bvdmerwe@csir.co.za
8.	Enos Chaazi	SIRDC-NMI	echaazi@sirdc.ac.zw
9.	Daniel Musonda Mutale	ZABS	zabs@zamnet.zm
10.	Alex M. Musili	KEBS	Musilia@kebs.org
11.	Alaaeldin A.E. Eltawil	NIS-Egypt	Eltaweel38@yahoo.com and Eltaweel@nisisci.eg
12.	Veersingh Facknat	MSB-(Mauritius)	vfacknat@msb.intnet.mu
13.	Chris O Muke	BOBS (Botswana)	o_muke@bobstandards.bw
14.	Brook Esseye	QSAE	brookesse@yahoo.com
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24.	Themba Simelane	MIN. OF ENTERPRISE & EMPLOYMENT	swazisQAM@swazi.net
25.	Ireen Field	CSIR-NML SOUTH AFRICA	ibfield@csir.co.za
26.	Peter G. Kahihia	KEBS	pkahihia@hotmail.com pkahihia@kebs.org

The SADCMET Chairperson and Regional Coordinator were invited by the BIPM to a Workshop on 7-8 March in Paris. The Workshop focused on the following issues:

- Assessors: selection and use for the accreditation process
- Scopes of accreditation- harmonise with CMC claims on BIPM database
- Process and sequence of events of the technical review processes
- Cost issues

The full report is available as an Annex to this report.

7. 15th JCRB Meeting, September 2005

The 15th JCRB meeting was held from 28-29 September 2005, at the BIPM, in Paris, France. Key discussion areas focused on the following issues:

- Status of the KCDB (over 18 000 entries)
- Updates from RMOs on QS reviews and lists of CMCs to be deleted from Appendix C
- Status of CMC reviews (pending CMC reviews in the JCRB website
- Report by the working group on the redefinition of the term CMC
- Guidelines for the use of the CIPM MRA logo
- Criteria for the selection of peer reviewers for NMIs
- Recommendations to CCs for establishing relationships between CMC and Key comparisons

- Formation of a task group to harmonize RMO criteria for review of CMCs in the absence of supporting key comparisons

- CIPM/ILAC joint statement

8. Measurements Uncertainty Training Course (Chemistry)



Following from requests raised by the participating labs in the SADCMET water PT scheme with regards to request for training in measurement uncertainty, SADCMET organized a 5 day training course in the estimation of measurement uncertainty for chemical measurements for the participants.

The training course was presented by Angelique Botha from the CSIR NML in South Africa

over the five days from 5-9 November 2005. The course was attended by 39 participants from water laboratories from most of the countries in the SADCMET region who participated in the proficiency testing scheme, as well as attendees from additional institutes in Tanzania. During the first three days the course focussed on training in the basic principles for the evaluation of measurement uncertainty according to the ISO Guide to the Expression of Measurement Uncertainty (ISO GUM).

During the fourth day the participants were taught how to use data already available in their laboratories to evaluate the measurement uncertainty of a method. The course was concluded with a written examination on the fifth day and a presentation from Dr Michael Koch, a consultant in water testing appointed by the PTB to assist with the proficiency testing scheme. The presentation explained the use of the Nordtest Handbook for the rugged evaluation of measurement uncertainty in a laboratory through the use of amongst others, the results from a proficiency testing scheme.

The participants will only have completed the training course successfully once they have handed in an assignment to evaluate a method in their own laboratories to identify the uncertainty components through the use of a cause and effect diagram (fishbone diagram). Most of the participants have submitted their assignments by the pre-agreed deadline of 10 January 2006. The assignments are still being evaluated and the certificates of completion will be issued by SADCMET at the end of April 2006. All the participants have passed the written examination with one scoring 100%.



9. SADCMET BIO-MEASUREMENTS SYMPOSIUM

African and international experts in biological and biochemical measurement science met in Pretoria on 10 November 2005 when the CSIR-NML hosted the SADCMET symposium on Bio-Measurement.

The symposium was aimed at the African metrology community, and commercial or public organisations that use bio-measurements in food and clinical analysis. The focus was on bio-measurements with an emphasis on food and health care issues.

Various delegates from a number of African countries' National Metrology Institutes met at the CSIR International Convention Centre in Pretoria to share research results, strategy, and

experience in the areas of genetically modified organisms (GMOs), medical diagnostics, and the detection of pathogenic micro-organisms in food. The African countries represented included Botswana, Kenya, South Africa, Tanzania and Zimbabwe. The symposium delegates included the metrologists from the Biological Analysis Working Group (BAWG) of the BIPM Consultative Committee on Amount of Substance (CCQM), which had just completed its 8th meeting, also hosted by the CSIR-NML, and the majority of the presentations were by these international experts. They included delegates from the Netherlands, UK, USA, Japan, New Zealand, France, Belgium and Australia. The full programme of the symposium is appended to this document.

Presentations on the role in international metrology of the BIPM Consultative Committee on Amount of Substance (CCQM) and of the BAWG emphasised the importance of bio-metrology to international trade. Other presentations covered the international standardisation of biological materials, which is critical to the control of diseases such as AIDS and malaria, Genetically Modified Organisms (GMOs) in crops that have to be monitored to enforce labelling regulations and maintain trade relations, the protection of human health through detection of microbial pathogens and the traceability and equivalence of measurements in clinical laboratories. An overview of current trends in the accreditation of microbiology laboratories in the Southern African Development Community (SADC) and the East African Community (EAC) was presented. Delegates discussed the options for Africa to stay abreast of the international developments in bio-measurements and to participate in discussions on these new measurement technologies.

10. Practical training course (Lesotho)

Following the Mass Training Workshop held in Nairobi Kenya in September 2005, SADCMET, through the NML mass lab made an offer for Lesotho to perform the mass measurements for the ongoing SADCMET intercomparisons at their laboratory since Lesotho does not have any labs at present.

In the week of 5 to 10 December 2005 Ms P Leboela of Lesotho came to the National Metrology Laboratory of South Africa – Mass laboratory for some hands on training and to participate in the SADCMET inter-comparison of a 1 kg weight.

The training was in two parts; first three days for hands on practical training in intercomparison measurements and calculation of uncertainties and the last two days for the actual measurements

The training consisted of theory "Weighing the Right Way" a Mettler Toledo book was used for background information on the requirements in a metrology laboratory.

The rest of the day was spent on demonstrations of mass comparison by substitution and practical work in the laboratory.

The next day a demonstration of the tests of performance of a balance, encompassing linearity, eccentricity, repeatability and sensitivity were done, paying particular attention to the theory in the book.

More hands on practice was done, this time incorporating buoyancy corrections.

By the third day we moved to the more accurate balance where the inter-comparison would be done and practiced with the same weights of the previous days as a validation of the technique and paid particular attention to uncertainties and the protocol requirements.

The Inter-comparison was performed on a Mettler Toledo balance of 2 kg with a resolution of 0,0001g against a standard 1 kg mass of stainless steel belonging to the NML Mass laboratory.

On the last day the calculations were made and the protocol completed.

The preliminary results look most promising.

11. Mass Laboratories Accreditation Project

SADCMET, with the active support and assistance from PTB, is running a project to enable member laboratories to achieve accreditation of their mass labs. A task team has been formed to assist with evaluation and review of member labs' quality manuals and mass procedures as a first step towards this process. It is expected that by the end of 2007, a total of 9 mass labs from the region will have been accredited to ISO 17025.

The participating countries (on basis of those who submitted their documents by the deadline) are:

Botswana DRC Egypt Ethiopia Kenya Mozambique Tanzania Zambia Zimbabwe

A questionnaire was sent to all representatives with the following questions:

11.1 What is the proposed scope of accreditation for the mass lab?

11.2 How many technical staff in the mass lab and what are their qualifications, experience, training?

11.3 What standards and equipment are used by the lab?

11.4 What is the chain of traceability for the lab (i.e. where are the mass lab's top standards calibrated?)

11.5 Have any inter-comparisons / bilaterals taken place with the lab? If so, with which other NMI's and supply final report?

11.6 Is there a person employed in the organization that is trained in quality auditing (to ISO 17025)? Give contact details.

11.7 Is there a mass staff member trained in technical auditing (to ISO 17025)? Give contact details.

Responses to the questionnaires are being consolidated for the rest of the review process.

The planned review and improvement process is proposed, as follows:

- 11.8 A check list will be formulated, based on the technical requirements of ISO 17025.
- 11.9 Each country's procedures and responses to the questionnaire will be evaluated for compliance to technical requirements of ISO 17025, using the checklist.
- 11.10 The task team members are allocated specific NMI's to assist with their evaluations. The NMI's will henceforth, be dealing directly with the team member allocated to them.

NMI's	Task Team Members
Ethiopia	Ireen Field
Egypt	Ireen Field
Zimbabwe	Ireen Field
Kenya	Benny van der Merwe
Zambia	Benny van der Merwe
Mozambique	Benny van der Merwe
Botswana	Ronel Steyn
Tanzania	Ronel Steyn
DRC	PTB

The allocations are as follows:

More information may be required from the NMI to adequately complete the checklist for that particular NMI by their task member.

Full co-operation is thus required, as it will ensure timely completion of the review and gap analysis.

- 11.11 The task team will establish gaps, with what needs to be done to address gaps identified. This will be reported to PTB and the relevant NMI's.
- 11.12 Gaps identified by the task team must be logged by the relevant NMI's as corrective actions, and records maintained of improvements implemented on these corrective actions by the relevant NMI's.
- 11.13. The task team will make recommendations according to the gaps identified. The implementation of the recommendations made, will be the responsibility of the relevant NMI.
- 11.14 The task team will assist in guiding the NMI through the implementation of their systems by holding constant reviews of the process.
- 11.15 Ownership of improvements must belong to the relevant NMI, to improve quality ownership within the NMI and empower the NMI to continue to run an effective quality system, achieve accreditation and maintain accreditation thereafter.
- 11.16 The task team will focus on formal training requirements and wherever possible recommend appropriate training by appropriate training vendors.
- 11.17 All participating NMI's will be informed of the processes being followed and of progress with the review and improvement process.
- 11.18 The review is at present only a paper exercise, i.e. no on-site visits were made and thus the task members rely solely on the information supplied by the NMI's.
- 11.19 Invitation of a particular NMI representative to the NML facilities for quality training or on-site visits to an NMI may be conducted where the task team member deems necessary.

12. BIPM/ILAC and RMOs/RABs Workshop

The between the BIPM and ILAC, including representatives from the Regional Metrology Organisations (RMOs) and the Regional Accreditation Bodies (RABs) was held from 7-8 March 2006, at the BIPM in Paris, France. This is now an annual forum between these bodies and discussions focused on the following:

- NMi support for the ILAC arrangement
- Confidence in the degree of confidence equivalence obtained through the CIPM MRA
- CMCs vs BMCs
- Timing of accreditation and CIPM MRA reviews
- Releasing the names of laboratory assessors
- Payment of laboratory assessors
- Assessors' training
- Guidance for assessors who provide advice to labs
- Competition between NMIs and accredited labs for calibration services
- Separation of accreditation activities from NMIs

13. RC ATTENDS 14TH ARSO GENERAL ASSEMBLY

At the invitation of the ARSO secretariat, the RC attended the 14th ARSO General Assembly which was held in Cairo, Egypt. The General Assembly was preceded by an international Workshop on "Challenging the challenges of Standardisation in Africa", at which the RC gave a presentation on: "*The Emerging Metrology Support Programme for Small and Medium Enterprises (SMEs): A Model for Africa*". The full presentation is available as an annex to this report.

The RC made an announcement in the ARSO GA concerning the forthcoming AFRIMETS Launch Workshop to be held in March 2006 in South Africa, to which the ARSO President was cordially invited.

14. AFRIMETS

The AFRIMETS workshop launch, attended by some 40 delegates from across Africa with resource persons from the BIPM, EUROMET, SIM and APMP, was hosted by SADCMET together with NEPAD in Midrand, South Africa from 23-24 March 2006.

A copy of the declaration agreed to by the participants is illustrated below:

Declaration of the Workshop to launch the InterAfrica Metrology System

24th March, 2006 Midrand, South Africa

- 1) Mindful of the challenges that face our continent and the vision and direction created by NEPAD and the Africa Union;
- Committed to the positive contribution of Metrology to building Africa's Productive Capacity, through the NEPAD Sustainable Industrial Development Strategy and its Market Access Initiative;
- Recognising the synergies and the potential of joint efforts and collaboration with the other pillars of the Quality Infrastructure in Africa (Accreditation and Standardization);
- 4) Aware of the increasing need to raise the profile of Metrology in Africa and to raise the profile of Africa's metrology Internationally; and

5) Recognizing the need to optimize limited resources in the Metrology systems;

We hereby resolve to:

Create the InterAfrica Metrology System (AFRIMets), as the umbrella body for Metrology Cooperation in Africa, encompassing legal, scientific and industrial metrology.

The AFRIMets will be an open non-exclusive partnership to stimulate collaboration in the area of Measurement standards and Measurement in Africa.

This resolution empowers NEPAD, in cooperation with SADCMET, to establish a task force to take all the necessary actions to give effect to this declaration.

Agreed on by the workshop participants (annex A).