7th Evaluation Workshop within the SADCMET Proficiency Testing Scheme for Water Testing Laboratories

Windhoek, Namibia

1 – 4 November 2010

Report on the 7th Evaluation Workshop within the SADCMET Proficiency Testing Scheme for Water Testing Laboratories

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Prepared by Dr.-Ing. Michael Koch

Summary

The workshop covered the evaluation of the 7th SADCMET Water PT round and all aspects that could be derived from the results. The results showed a slight improvement compared to the 2009 round. Nevertheless there are still some laboratories that continue to fail in the PT, most probably due to the absence of adequate corrective actions, improper use of suitable analytical methods and also use of non-suitable methods.

During the workshop one important point was how to proceed with recommendations for suitable methods. This will be the task of SADCWaterLab working group established during the 2009 meeting in the Seychelles

Most of the participants are still very enthusiastic. So despite of the only slow improvement of the quality of the PT results it is recommended to continue the PT system. Nevertheless the system should move more to sustainability. The structure of local coordinators is very useful, but still has to be improved. The commitment of local coordinators differs very much. But to minimize logistical problems and to increase the number of participants the local coordinators play a crucial role. One of the main obstacles for further expansion of the system and for improvement of the quality of the labs the lack of awareness on the importance of PT or – even more basic – the importance on quality assurance in the chemical lab was identified. To overcome this the results of this workshop were communicated to all participating laboratories via a short report. To raise awareness amongst the policy makers in the laboratories a leaflet was be prepared explaining the importance of quality management in the laboratory and participation in PT schemes. In addition workshops on national level are indispensable. Since most of the local organizations were not able to do that a training for trainers was organized in August 2010. In this training course material for a basic course on quality assurance in the analytical laboratory was provided and the participants were trained to present this in a workshop.

To support the participants in performing the corrective actions, a short guideline on how to do that was sent out again to the participants.

The assessment procedure of the PT using limited standard deviations has again proven to be very effective, the statistical methods are in accordance with the internationally recommended procedures. After an intense discussion it was decided to lower the limits for standard deviations and also the include sample with lower concentrations to fit the needs of the WHO drinking water guideline.

The chemistry evaluation workshop was followed by a 1-day training on “Estimation of measurement uncertainty” and by the SADWATERLAB General Assembly where also the participants from microbiology workshop were present. For the microbiology workshop see separate report.

Introduction

The workshop reported here followed previous workshops held in

- Windhoek, Namibia (Feb 2004),
- Pretoria, South Africa (Dec 2004),
- Dar es Salaam, Tanzania (Nov 2005),
- Gaborone, Botswana (Nov 2006),
- Dar es Salaam (Dec 2007),
- Kampala, Uganda (Dec 2008) and
- Mahé, Seychelles (Nov. 2009).

The reports are available from http://www.sadcmet.org. As a result of these workshops the first and second proficiency tests for water testing laboratories were organised by Umgeni Water (Pietermaritzburg, South Africa), the following rounds after a training in Germany by Namwater (Windhoek, Namibia). The main aim of this workshop in Windhuk was the discussion of the evaluation of the seventh PT round on chemical parameters.

The improvement of cooperation between laboratories within the SADCWaterLab Association was also discussed during the workshop.

Participants

The chemistry workshop was attended by 26 participants from the following countries:

- Botswana 1
- Kenya 2
- Lesotho 1
- Malawi 1
- Mauritius 1
- Namibia 3
- Seychelles 9
- South Africa 1
- Swaziland 2
- Tanzania 1
- Uganda 1
- Zambia 2
- Zimbabwe 1

A complete list of participants with e-mail addresses is given in annex 1.

PT Workshop Programme

Monday, 1 November 2010:

Welcome, Opening, SADCWaterLab Working Groups reports, experience of the PT provider – part 1, reports of the local coordinators, WG discussions

Tuesday, 2 November 2010:

Experience of the PT provider – part 2, evaluation results, working group discussions on the way forward, SADCWaterLab Working Groups meetings

Wednesday, 3 November 2010:

Training on estimation of measurement uncertainty using validation and quality control data, PMC meeting

Thursday, 4 November 2010:

SADCWaterLab General Assembly
Lab Visit

Monday, 1 November 2010

Welcome and Opening

The participants were welcomed and the Workshop was officially opened by

Mr. Tommy Riva Numbala, PR manager Namwater
Mr. Donald Masuku, SADCMET Regional Coordinator
Ms. Kathrin Wunderlich, PTB
Ms. Kezia Mbwambo, SADCWaterLab chair
Dr. Vaino Shivute, CEO Namwater.

M. Koch: Introduction

All participants shortly introduced themselves and Dr. Koch gave an overview on the workshop programme.

Reports from SADCWaterLab Working Groups

There were reports from what were done since the Seychelles Workshop in the two Working Groups.

Working Group I – Methods

Merylinda Conradie reported that the WG first concentrated on the determination of anions since there were the biggest difficulties. She received different methods from some of the WG members. The next steps will be to select suitable methods and than to look into the results of the participating laboratories to identify those who performed well.

Working Group II – Questionnaire

A questionnaire was produced during the workshop in 2009 and circulated among the participants to identify the needs of analytical laboratories in the region.
23 laboratories participated in the survey and gave the following answers:
How knowledgeable are you of PT?

low: 1 medium: 9 high: 13

Have you ever participated in any PT?

Yes: 20 No: 3

If Yes which ones

Water: 19
Food: 13
Environment: 2
Other: ECSA, Geochemical, BIPEA, IAEA

Are you still participating in PT?

Yes: 21 No: 2

If No, Explain Why:

Erratic chemical supplies

What benefits have you derived from participating in PT?

- PT enables us to uncover the errors that could not be found with other quality control measures, thereby improving on the accuracy
- Regular, external and independent check on data quality
- Opportunity to demonstrate laboratory quality and commitment to quality issue
- Motivation to improve and maintain performance
- Support for accreditation/certification to quality management standards
- Comparison of performance with that of peer group
- Traceability
- Networking
- Quality Assurance
- Assistance in the identification of measurement problems
- A particularly valuable method of quality control where suitable reference materials are not available
- Assistance in training staff and measure staff competence
- Assistance in the marketing of testing services
- Savings in time/costs by reducing the need for repeat measurements
- A guard against loss of reputation due to poor performance
- Increased competitiveness

Is PT helping to improve your system?

Yes: 20 No: 1

If No explain:

- no method validation procedure,
- In-house method not producing desired results!

What are your main testing fields of interest?

Water: 19
Food: 10
Environment: 5
Others (Specify): 3 Geochemical

What measures do you implement after receiving the PT evaluation report?

- Root cause analysis is carried out and corrective and preventative actions implemented
- Assess analytical procedures
- Equipment calibration
- Check stability of reagents
- Review meetings

Do you need any specific assistance regarding PT to improve your analytical performance ?

- Training (specify):
    - method validation

    - measurement uncertainty
    - Measurement traceability
    - Data/Statistical techniques & use of QC charts
    - Sulphate Analysis
- Data base for CRM: 19
- Data base for PT providers: 15

Do you have any quality management system? If yes, which one?

- ISO 9001: 5 in process, 1 certified
- ISO 17025: 11 in process, 3 accredited
- Others (specify): ISO 65

There was a discussion about the future tasks of the Working Group. As a result it was decided that the Working Group should coordinate national workshops as a follow-up of the training of trainers on Quality Assurance in Analytical Chemistry in Livingstone, Zambia, August 2010.
PTB will support national events. Sponsorship of the event in total is preferred These national workshops should also be used to promote the PT scheme and to raise awareness.
To facilitate organisation of national workshops the working group will prepare a database of potential trainers from the region. For that the working group chair will contact all participants of the training of trainers to identify trainers. In order to make use of people trained elsewhere (NMISA, SADCAS, …) the local coordinators should report about suitable persons to the working group chair.

M. Conradie: Experiences of the PT provider – part I

Merylinda Conradie reported about her experiences with this 7th PT round (annex 2, pages 1-4).
She listed the changes in participation from the member countries (table 1).

Table 1: Number of labs participating in the PT rounds

country	2004	2005	2006	2007	2008	2009	2010
Angola	1	1	1	0	1	0	0
Botswana	2	2	2	4	2	3	3
Burundi	0	0	0	0	0	0	1
Congo	0	0	0	0	0	0	4
Ethiopia	1	1	1	0	0	0	0
Kenya	2	2	4	3	3	7	9
Lesotho	1	1	0	1	1	1	1
Madagascar	0	0	2	2	3	3	2
Malawi	2	2	2	3	1	1	2
Mauritius	1	3	4	3	5	6	6
Mozambique	2	3	2	0	0	0	0
Namibia	2	2	3	3	3	3	3
Seychelles	1	2	2	1	1	1	1
Swaziland	1	1	0	1	2	3	0
South Africa	0	0	0	1	1	1	1
Tanzania	2	8	5	12	11	12	13
Uganda	1	3	6	5	5	5	4
Zambia	1	4	2	3	1	3	3
Zimbabwe	2	3	3	5	5	5	4
total number	22	44	39	46	45	54	57

Due to the attachment of the SADCMET letter on the agreement about PT samples no customs problems have been encountered.

Local coordinators: Report

To facilitate the organisation of the PT rounds and to reduce shipment costs local coordinators (LC) for each country have been installed. During the workshop the local coordinators were requested to give a short report on their activities.

- **Botsuana (Teddy Ditsabatho)**
  - Promotion of the PT scheme was done in an ISO 17025 forum in Botsuana and in national PT scheme evaluation workshops
  - The feedback was always very enthusiastic, many labs showed interest, but finally only a few labs were participating.

- **Burundi (Djibril Ninkingiye)**
  - The Laboratoire d'Analyse des Eaux Africaines s.a. is a private laboratory and got information about the PT scheme from GTZ

- **Democratic Republic of Congo (Jean-Paul Munongo)**
  - 15 labs have been informed – 10 will participate next year

- **Kenya**
  - No report available

- **Lesotho (Mapaseka Makhaba)**
  - There is only one lab participating in Lesotho. Other labs were informed, but the PT programme does not fit to their needs

- **Malawi (Steve Afuleni)**
  - Not all “water boards” in Malawi participate, but 2 labs from the educational field.
  - Some labs miss equipment (AAS) or feel that the fees are too high
  - Participation can only be increased by capacity building

- **Mauritius (Shabbir Ghoorun)**
  - 6 labs were participating. Some more could participate, but do not yet want to.

- **Namibia (Merylinda Conradie)**
  - The 3 main water labs participate
  - The mines do not analyse themselves
  - Maybe the NSI (Namibian Standards Institution) will participate next year

- **Rwanda (Jeanne-Francoise Kabanyana)**
  - There are about 20 labs in Rwanda, but only RBS was participating
  - Other labs are not aware of the importance
  - There was a training about quality issues

- **Seychelles (Vivian Radegonde)**
  - Several albs were informed, but there was only low response
  - More participants in microbiology

- **Swaziland (Zanele Sgwane)**
  - No lab was participating due to restructuring of the lab
  - There are difficulties to convince the management

- **South Africa (Mare Linsky)**
  - There are 2 national PT providers in South Africa
  - Marketing of SADCMET PT scheme will be increased

- **Tanzania (Kezia Mbwambo)**
  - Participants pick the the samples from the local coordinator
  - The local coordinator used the brochure to advertise the scheme
  - It is a challenge to convince private labs and universities
  - Much more labs should participate
  - Next year special workshop especially for water labs
  - Use of certificates for water labs to motivate the labs to participate

- **Uganda (Joseph Iberet)**
  - Tried to approach other labs
  - Mostly they analyse only simple parameter

- **Zambia (Margaret Mazhamo)**
  - Very few labs
  - Most other labs contract these labs
  - Universities refuse to participate
  - One accredited lab preferred to participate in a UK PT scheme
  - National workshop planned to raise awareness

- **Zimbabwe**
  - The national association of labs was use to promote the scheme through workshops etc.

Michael Koch reminded, that promoting the EAC PT schemes is also a duty for the local coordinators.

Working group discussions

Three working groups were formed to discuss, how an ideal Local Coordinator would look like and how the management of a laboratory could be convinced.
The results of the discussion was:

An ideal local coordinator should

- perform a survey on water testing labs in his/her country and setup a database
- start communications with labs and make personal visits
- market the scheme and stress the importance of the scheme
- make regular follow-ups, if not – why not?
- know the mission and objectives of SADCWaterLab
- prepare a customer feedback questionnaire
- be able to communicate benefits of participating in PT
- conduct awareness to technical people and managers
- identify appropriate institution
- be a person nominated by his/her institution

- be a person with lots of contacts, experienced, convincing
- promote the PT scheme at a national level
- network with the PT provider assisting with administration
- ensure the distribution of samples
- liaise with PT provider (e.g. to ensure sending of results)
- disseminate information from the evaluation workshops to participating labs

How to convince the management?

- explain the benefits of the PT
- mention about recognition – more customers, more money
- encourage international trade
- convince them legally (before issuing a certificate)
- organize workshops for top management
- telling the benefits
- contact them in one-to-one
- management needs to know how to use the results
- writing small reports (executive reports to management)
- feed-back from evaluation workshops explaining the benefits
- contact national accreditation focal points

Tuesday, 2 November 2010

M. Conradie: Experiences of the PT provider – part II

MC continued to report about their experiences (annex 2, pages 5 – 26)
She listed the parameters to be analysed in this PT round (table 2). No change was made compared to the last rounds.

Table 2: List of parameters in the 7th PT round

Sulphate	Manganese
Chloride	Aluminium
Fluoride	Lead
Nitrate	Copper
Phosphate	Zink
Calcium	Chromium
Magnesium	Nickel
Sodium	Arsenic
Potassium	Cadmium
Iron	Cobalt

She described the planning including the chemicals used for spiking, the necessary materials for sample preparation and packaging, choice of courier and necessary balances. Some problems were encountered with the courier Fedex, where some packages were mixed up and delivered to wrong countries

In detail she explained the preparation of the samples including

- Cleaning of bottles
- Weighing of chemicals
- Documentation of the weighings with printer attached to the balances

- Digestion of metals
- Preparation of stock solutions
- Documentation of weighings
- Labelling of bottles
- Preparation of final batches
- pH adjustment
- Ensuring homogeneity
- Sample dispensing
- Storage
- Preparation of documentation
- Packaging
- Information to courier
- Shipment

Evaluation and assessment was done in the proven way using the programme developed especially for the SADCMET PT scheme.
She described the principals of evaluation and assessment, including the establishment of the assigned value from formulation with its uncertainty.

She reported some details of the evaluation:
- The percentage success for all labs
- The number of acceptable and non-acceptable results

The provider faced some general problems:
- The provision of the PT with its heavy work load sometimes is difficult to realize besides the normal routine work
- Late confirmations caused additional problems
- Registration forms sometimes were not sent to the provider, so it was difficult to contact the participant
- Receipt of results by fax were unclear
- Results were faxed without a laboratory name
- Different names were used for e-mail or fax than on registration forms
- Return date for the results : 14th of September 2010 with an delay from some laboratories due to problems with equipment – caused a delay with evaluation report
- Only four out of 11 labs from the Congo submitted results

Merylinda Conradie summarized the challenges for participants for 2011
- Spend more time - a lot more time - going over your PT
- results
- Be sure PT samples are handled as normal samples
- Investigate problem or determine cause
- Documentation and implement corrective actions
- Precision & Accuracy
- Calibrations and trueness of calibrators
- Quality of chemicals
- Storage conditions for chemicals
- Choose appropriate methodology
- Evaluate before using a method

- Documenting methods in manuals
- Application of internal quality control
- Maximum participation in SADCWATER Lab PT in terms of parameters
- Comparison through exchange of samples in countries
- Equipment / method comparison
- Continuous education amongst each other

M. Conradie expressed her thanks to PTB for assistance and the financial support, to SADCMET regional coordinator and secretariat, to M. Koch, to the Namwater colleagues, the local coordinators and all participants.
The full presentation is included in annex 2.

M. Koch: Evaluation of the 7th SADCMET Water PT

M. Koch explained in detail the result of the evaluation of the PT round. As in the last round the assigned values were derived from the weighings made for the preparation of the samples. The standard deviations were calculated using Algorithm A from ISO 13528. These standard deviations were used for the calculation of z-scores, if they were below the limits for the standard deviations agreed upon during the previous workshops (table 3).

Table 3: Limits for standard deviations

Parameter	limit in %	Parameter	limit in %
Sulphate	10	Manganese	<1 mg/l: 20, >1 mg/l: 12
Chloride	10	Aluminium	30
Fluoride	12	Lead	25
Nitrate	15	Copper	20
Phosphate	10	Zinc	20
Calcium	10	Chrome	25
Magnesium	10	Nickel	25
Sodium	10	Cadmium	20
Potassium	10	Arsenic	20
Iron	<1 mg/l: 20, >1 mg/l: 12	Cobalt	20

In order not to affect the statistical calculations by gross outliers all values outside the range ref.-value/8 to ref.-value*8 were excluded prior to these calculations.
The detailed presentation is included in annex 3.

Special emphasis was put on the comparison of the results with those from last years' rounds. The data showed a slight improvement compared to last year's round. Looking to individual results of the laboratories it became clear that quite a few participants are continuously performing well, some are improving, some getting worse, but a substantial part of the participants are performing bad and do not change anything.

For all laboratories the average of the absolute values of all values was calculated for each year and shown in a diagram. Since the limit for acceptability of a value in the PT is a score in the range of $\pm$ 2, the value of 2 was taken to distinguish between well performing and bad performing labs.

Laboratories were grouped into 4 classes:

- Performing well in the previous round and well in the current round (constantly good)
- Performing bad in the previous round and bad in the current round (constantly bad)
- Performing bad in the previous round and well in the current round (improving)
- Performing well in the previous round and bad in the current round (getting worse)

In the presentation this is shown with horizontal arrows (above or below the 2.0-line) and with arrows going up (getting worse) or down (improving). The number indicates the number of the respective labs.

The example shown here for Sulphate shows 5 labs performing constantly well and 8 constantly bad, 10 were improving and 7 got worse.

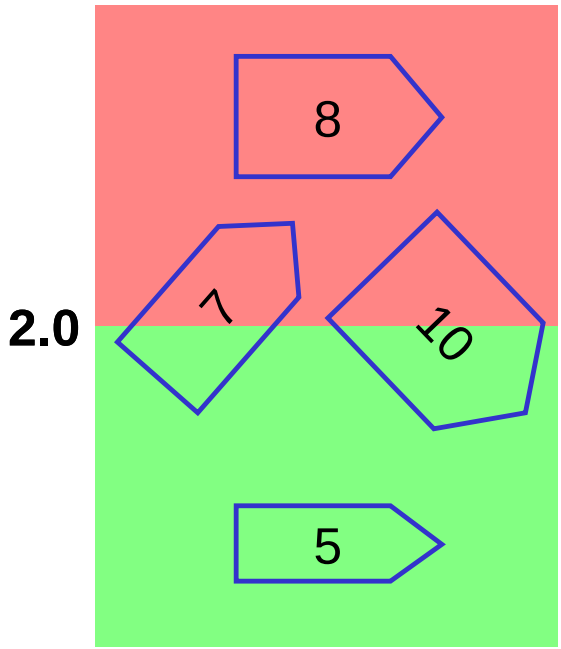


Fig.1

For the individual parameters the following conclusions could be derived from the data:

- Sulphate: There was a quite good agreement between means and ref.-values. The standard deviations are still too high. Too many labs still have unsatisfactory results, but some are quite good. A high portion of outliers was found for the turbidimetric and the gravimetrical method, obviously caused by mistakes in executing the methods
- Chloride: The means were found to be a bit too high compared to reference values. The standard deviations too high, no improvement could be found. More unsatisfactory results were found than ever before, only 2/3 of the labs have good results. Participants had problems with the endpoint detection in argentometric determination and obviously there were some problems with the spectrometric method
- Fluoride: Standard deviations are still very high, but not as extreme as in the last rounds. About 45% of the values are not satisfactory. As in the last years the colorimetric values were not reliable and obviously there were some problems with ion selective electrode.
- Nitrate: Some values obviously again were reported in wrong units (most probably 6 labs, at least 1 of them identical with 2009 and 2008). There is a high number of outliers and the standard deviations are still too high. Harmonization of methods is strongly needed!

- Phosphate: Again there are values in wrong units, otherwise results would be quite good. The standard deviations were slightly improving.
- Calcium: Mean values were close to the reference values, but the standard deviations were still too high. More than 30% of the results were not satisfactory. Obviously there were some mistakes in the application of the analytical methods.
- Magnesium: Mean values were around the reference values. The standard deviations were slightly better than last years, but still too high. Almost 40% of the values were not satisfactory. Titrimetric values showed not to be reliable.
- Sodium: Consensus means were close to the reference values. A slight improvement could be seen in the number of satisfactory results
- Potassium: The mean values were close to the reference values, the standard deviations better again. 1/3 of the results were not satisfactory. Obviously there were some problems with AAS
- Iron: The means were close to the reference values, the standard deviations much lower. So a good improvement could be seen.
- Manganese: The mean values were close to the reference values, the standard deviations are much better than last year, more values satisfactory.
- Aluminium: The number of values was very low. The mean values were close to the reference values, the standard deviation comparable to last year, but not really good.
- Lead: The mean values were around the reference values, the standard deviations were similar to last year, i.e. too high.
- Copper: The mean values were in quite good agreement with the reference values, the standard deviations better than in the previous year. The percentage of non-satisfactory results is steadily going down.
- Zinc: There was a perfect agreement between the mean values and the reference values. The standard deviations are better again, 20 % of the results were non-satisfactory
- Chromium: The mean values were exactly on the level of the reference values, the standard deviation again below limit. The percentage of non-satisfactory results went down again. The use of the colorimetric method is still unclear
- Nickel: The mean values were in good agreement with the reference values, the standard deviation lower again
- Arsenic: The number of values was very low. There was a good agreement between the reference values and the means. The standard deviation were like the years before.
- Cadmium: The mean values were slightly lower than the reference values, the standard deviations better again, but the percentage of non-satisfactory results was increasing.
- Cobalt: The means were close to the reference values. The standard deviation was found to be the best compared to last years.

Only 6 participants analysed all parameters. The percentage of participation per laboratory is shown in fig. 2.

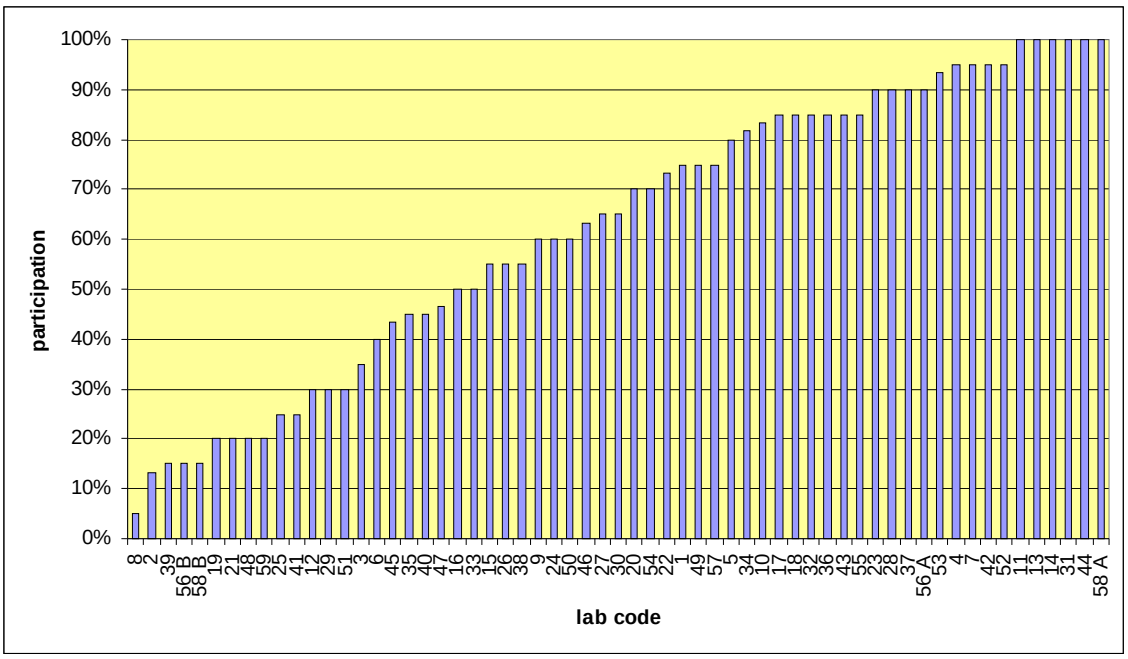


Figure 2: Percentage of participation for each participant

29 participants managed to analyse more than 80% of their values within the tolerance. Fig. 3 shows the proportion of successfully analysed parameters for each participant.

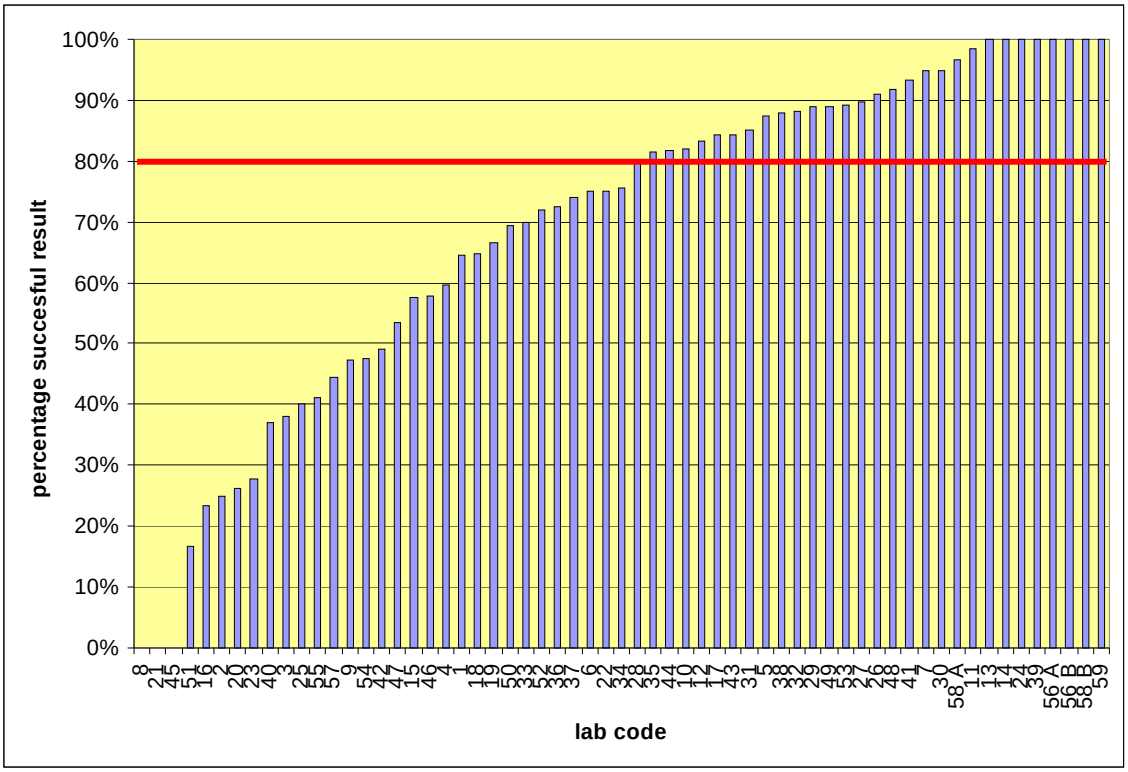


Figure 3: Percentage of successfully analysed values for each participant

Table 4 shows the percentage of labs that succeeded to have more than 80% of the values within tolerance limits over the last years.

It clearly can be seen that the percentage in 2010 is much higher than in the previous year, which was the worst of all.

Table 4: Percentage of labs that succeeded to have more than 80% of the values within tolerance limits

year	percentage of labs
2005	23,9 %
2006	25,6 %
2007	37,0 %
2008	35,6 %
2009	23,5 %
2010	45,8 %

The definition of fitness-for-purpose criteria (in the form of limits for the standard deviation) resulted in a higher proportion of values outside the tolerance limits. The stronger the requirements are, the more values will be outside.
Experience from Germany shows that normally up to 20% of non-successfully analysed values can be expected for each parameter.

Fig. 4 shows for each parameter the percentage of values outside the tolerance limits. The figure shows that – on the basis of the current fitness-for-purpose-criteria - improvement is still necessary for most of the parameters. Compared to 2009 a slight improvement was recognised.

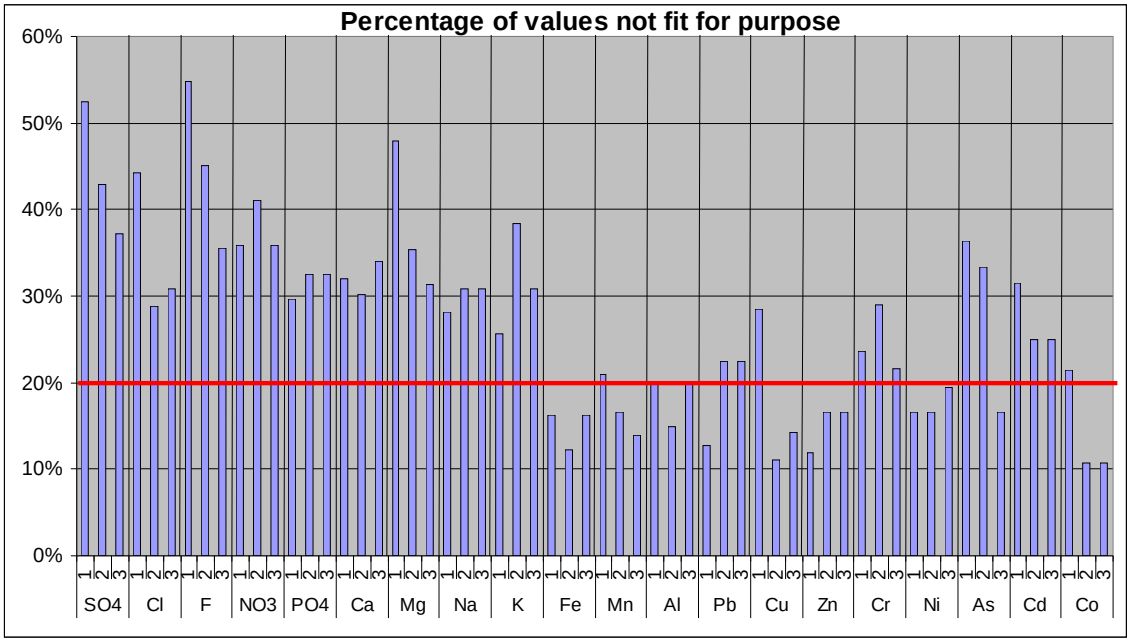


Figure 4: Percentage of values outside the tolerance limits for all samples

Michael Koch came to the following conclusions:

- Again the PT Provider did a very good job
- The evaluation and assessment procedure is fit for the purpose
- The SADCMET Water PT is a good possibility for the participants to compare with peers and with stated fitness-for-purpose criteria
- Overall the results of this PT round show an improvement for many labs, but the results of some laboratories continuously are not satisfactory or getting worse

- More emphasis should be put on corrective actions after unsatisfactory participation
- Some participating labs seem to be resistant against advice; in an accreditation procedure they will wake up
- There should be a discussion
    - How to proceed with recommendation of suitable methods?
    - How to help laboratories to proper apply these methods?
    - How to convince the "resistant" labs that participating in PTs without corrective actions is waste of money and resources?
- The gaps that prevent labs from proper application of the methods should be identified

All: Discussion

The discussion concentrated on the limits for standard deviation, concentrations and parameters.
To intensify this discussion the workshop participants split into 3 groups for further discussion

All: Working group discussion

The following questions were discussed:

1. Should we change the concentrations levels to meet the WHO requirements?
2. Should we change the standard deviation limits?
3. Should we change the parameters?
4. What are the reasons that networking didn't work within SADCWaterLab?

The working groups came to the following conclusions:

1. Should we change the concentrations levels to meet the WHO requirements?
   There was a clear tendency amongst the participants that it is necessary to lower the concentrations, because this is the level that has to be controlled for drinking water. On the other side it is to be expected that the rate if success will be lowered in the PT, because of increased difficulty of analysis. Finally it was decided to use prepare samples with concentrations around the WHO values at least for the lowest concentration level in the next PT

2. Should we change the standard deviation limits?
   After long discussions it was decided that 10% shall be used as standard deviation limit for all parameters, except for more challenging heavy metal samples, where 20 % shall be used, and for Aluminium, where 25% shall be used throughout. It was clear in the discussion that this will result in a higher percentage of non-satisfactory results, especially in combination with lower concentrations.

3. Should we change the parameters?
   Since the effort to prepare the samples is already very high, there is no room for more parameters. So if other parameters are to added, it has to be ensured that the effort for the sample preparation is not increased. It was decided that the PT provider should check, if the anion samples could be used to determine total dissolved solids in addition.

4. What are the reasons that networking didn't work within SADCWaterLab?
   The working group came up with the following answers:
    - reluctance – website and contact addresses are available

- human nature
- communication problems (internet connections etc.)
- we don't have a database with testing capabilities
- proposal to put scope of accreditation for each lab and the range of tests together with the methods
- laboratories do not do corrective actions, so they don't care

SADCWaterLab Working group sessions

The two working groups met to proceed in their work.

Working group "methods"

The working group decided to concentrate on the determination of anions first, because here the problems are evident.
Sulfate: Shabbir Ghoorun and Jean-Paul Munongo will look after the turbidimetric and gravimetric methods.
Chloride: Jeanne-Francoise Kabanyana and Shabbir Ghoorun will tale care of the argentometric method; Merylinda Conradie will identify participating labs that performed well with this method.
Fluoride: Merylinda Conradie to identify participating labs that performed well with photometric method; Silke Kriess will take care of the ISE method.
Nitrate: Merylinda Conradie to identify participating labs that performed well with photometric methods.
Phosphate: Silke Kriess to identify problems.

Working group "gaps"

The WG will help and coordinate national workshops. A database on trainers will be created and will be available mid of January 2011.
In order to achieve that:

- Teddy Dithsabatho will contact all participants of the training of trainers in Livingstone (Zambia) to ask them, what topics they would be ready to teach.
- Donald Masuku to contact SADCAS in order to also include SADCAS trainers in the database
- All other members and local coordinators to notify Teddy Dithsabatho of other suitable trainers (trained elsewhere) in their country

Wednesday, 3 November 2010

The third day of the workshop was completely dedicated to a training on the evaluation of measurement uncertainty. Michael Koch was the trainer.
Training started with a lecture on Basic Statistics (annex 4), followed by a lecture on a practical approach to estimate measurement uncertainties described in the NORDTEST-"Handbook for calculation of measurement uncertainty in environmental laboratories" and in ISO DIS 11352. This lecture is included as annex 5.
Michael Koch then explained an EXCEL file for the estimation of measurement uncertainty distributed to the participants on a CD. The file finally was used for 5 exercises how to estimate uncertainties based on method validation and quality control data (annex 6).

In the late afternoon the SADCWaterLab Project Management Committee had its meeting. Minutes will be prepared by the secretary. So only the main decisions are reported here:

- LC should also promote the EAC PT schemes
- EAC PT announcement to go directly to al LCs
- Shabbir Ghoorun to prepare a survey on existing fish PT and potential participants
- Chemistry brochure to be updated
- Fees for both PTs remain unchanged; next year the fee for the microbiology PT to be increased to 150US-$
- From next year on no reports will go to participants that didn't pay the participation fee
- LCs should be informed who has paid and who not
- Newsletter will be published electronically as soon as possible and then sent to all members
- Funding of national workshops from PTB: Organizer to send draft budget to PTB. PTB is willing to support those workshops, but not fully. Organizer to decide how to use the money.
- 2011 will be the last evaluation workshop fully sponsored by PTB. Form 2012 on as a first step travel costs have to be covered by the participants
- Mauritius volunteered to host the 2011 evaluation workshop

Thursday, 4 November 2010

SADCWaterLab General Assembly

SADCWaterLab had its General Assembly in the morning. There will be minutes prepared by the secretary.

Certificates

Certificates of attendance were distributed to all participants

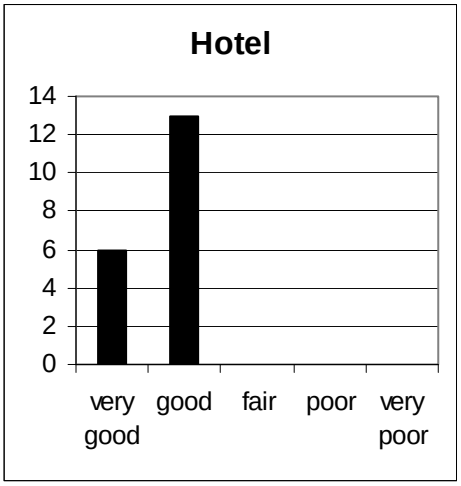
Evaluation questionnaire

M. Koch distributed an evaluation questionnaire (see annex 7) for the chemistry part of the workshop to be filled out by all participants.

The results of this questionnaire are given on the following pages:

Hotel and conference facilities

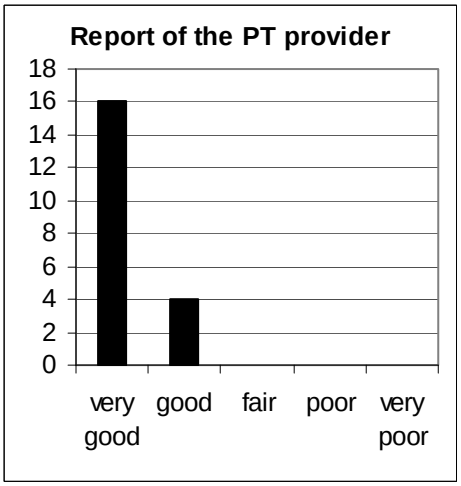
How do you judge the hotel (accomodation, food)?



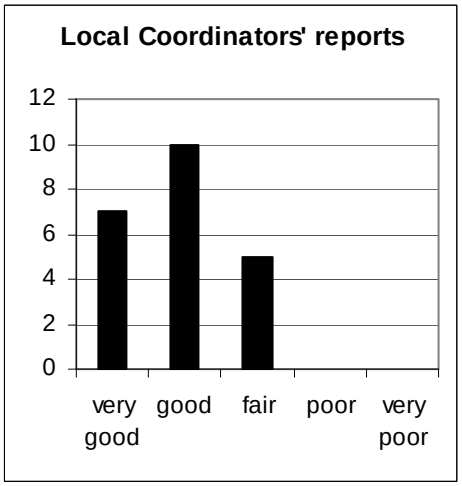
How do judge the venue of the workshop (conference room)?

How do you judge the different parts of this workshop?

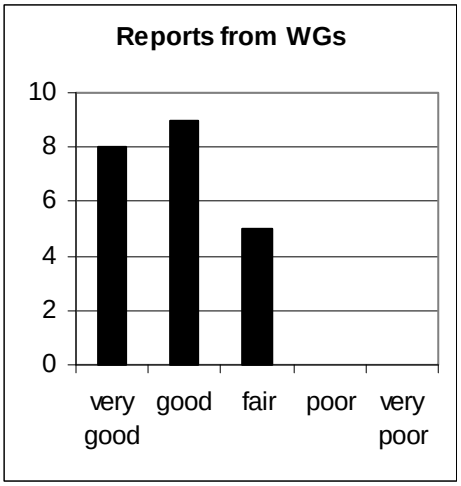
Report of the PT provider



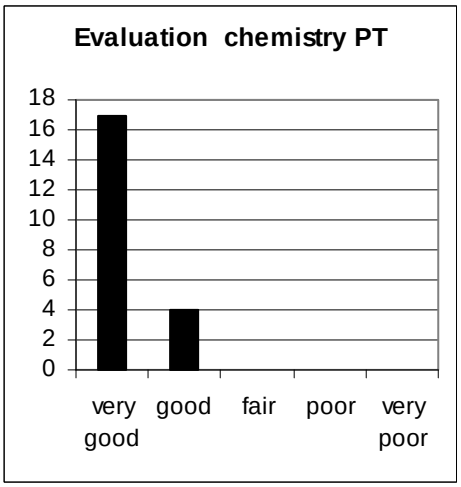
Local coordinators' reports



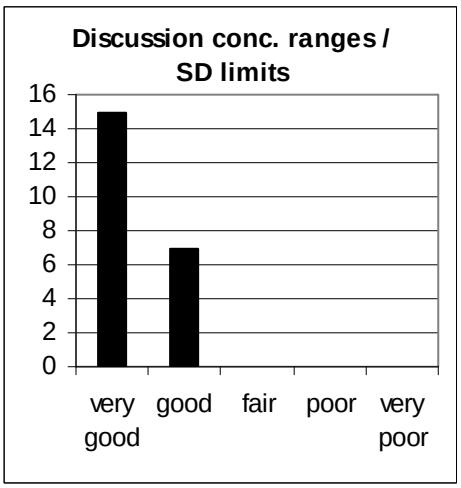
Reports from the working groups



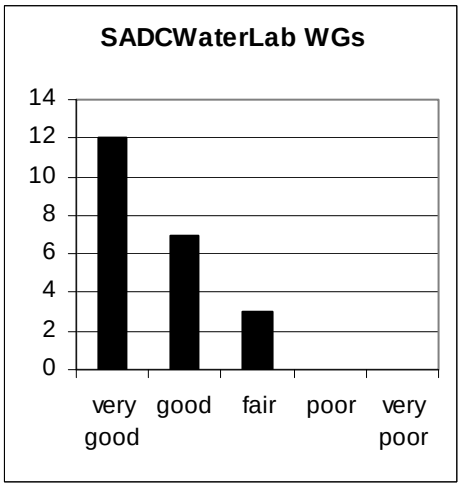
Evaluation of the chemistry PT



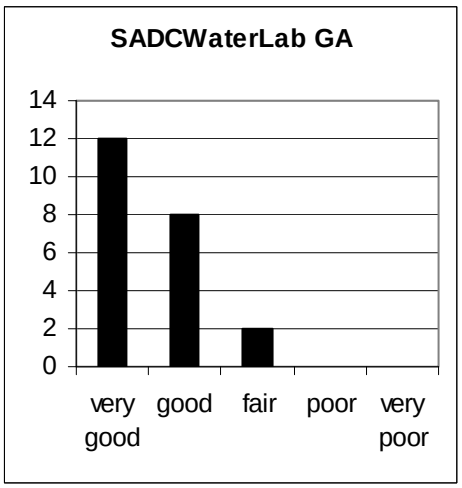
Discussion about concentration ranges and standard deviation limits



SADCWaterLab WGs “methods” and “survey”



SADCWaterLab General Assembly



The five most important topics

- Measurement uncertainty training(22)
- Evaluation of PT results (15)
- Discussion of concentration ranges and standard deviation limits (9)
- Measurement uncertainty exercise (7)
- Working groups and group discussions (7)
- Basic Statistics (6)
- PT provider report (6)
- Working group reports (2)
- Variations – changes (1)
- Standard deviation (1)
- General assembly (1)
- Feedback on method selection and recommendation (1)
- Preparation of PT samples (1)
- The way forward for SADC workshop (1)
- Exchange of ideas (1)
- Local coordinators' activities (1)
- Registering at SADCWaterLab (1)

Expectations fulfilled

- Yes 21
- No 0

Benefits

- The benefit of the exercise although it is not easy.
- Measurement uncertainty made easy.
- Encouraged to do better.
- The workshop enabled me with another opportunity to share my experiences with others. It was also a chance to learn new developments in chemical analysis of water.
- Gained more insight into calculation of measurement uncertainty and the excel program provided.
- Different approach on measurement uncertainty.
- The workshop has allowed me to appreciate the difficulties that exist in the region for laboratories to produce acceptable results. It was also made me realize that PTB cannot fund the PT evaluation workshop forever and that national institutions need to contribute in this effort for their own common good. The use of the excel worksheet was very appreciated in the estimation of measurement uncertainty.
- The workshop enabled me to review the method validation procedure currently implemented in our labs.
- On the problems faced by different labs and how to improve on these problems. So basically choosing proper methods for analysis fro quality results.
- Uncertainty course. Training of trainer program seems like a very good initiative.
- Excellent way to make measurement uncertainty a pleasure for laboratories.
- Measurement uncertainty.

- Learnt techniques for calculating degree of uncertainty.
- The examples on Measurement uncertainty will help us a little closer to prepare for accreditation. The range of methods applied on this scheme helped me to broaden my scope of knowledge in this regard.
- Information on measurement uncertainty and the recommendations from the working groups.
- Experience on the methods. New knowledge on all the presentations.
- Networking for future technical and business correspondences.
- To estimate practically measurement uncertainty.
- I will implement the techniques gained in the uncertainty course in my lab.
- The workshop was important for me, especially I will perform my analysis according to what I learnt about standard deviation.
- To be able to share with others the problem of test methods. Able to validate our methods, calculate uncertainty of measurement.
- Got a lot of knowledge from the resource persons.

Comments

- More information should be provided in the hotel rooms especially in respect of
    - how to communicate with other extensions and the reception
    - other services available
    - how to make international calls and rates/minute

Closure of the meeting

Kezia Mbwambo, Donald Masuku, Kathrin Wunderlich, Katrin Luden and Michael Koch closed the workshop and thanked all participants for their cooperation.

All decisions and tasks from the evaluation workshop are summarized on the next pages.

Report prepared by

Dr.-Ing Michael Koch
Stuttgart, 29.12.2010

Summary on decisions and tasks

- Working group I (methods) to develop list of recommended methods (**Merylinda Conradie**)
- Working Group II to coordinate and support national workshops and to create a database of trainers from the member countries. For that the WG will contact all participants of the training of trainers (**TD**). Other suitable persons trained elsewhere (NMISA, SADCAS, …) should be reported to the WG chair (**all LCs**).
- Promotion of the SADCMET scheme as well as the EAC PT schemes is an ongoing duty for **all LCs**
- **All Local Coordinators** to make sure that they fulfil their duties to the best of their abilities (see description of the "ideal" local coordinator in this report)
- National workshops will be supported by PTB (**PTB**)
- PT schemes to be supported in national workshops (**all**)
- Prepare samples with concentrations around the WHO values at least for the lowest concentration level in the next PT (**Merylinda Conradie**)
- 10% shall be used as standard deviation limit for all parameters, except for more challenging heavy metal samples, where 20 % shall be used, and for Aluminium, where 25% shall be used throughout (**Merylinda Conradie**)
- PT provider to check, if the anion samples could be used to determine total dissolved solids in addition (**Merylinda Conradie**)
- Decisions and tasks from WG methods:
    - Sulfate: **Shabbir Ghoorun** and **Jean-Paul Munongo** will look after the turbidimetric and gravimetric methods.
    - Chloride: **Jeanne-Francoise Kabanyana** and **Shabbir Ghoorun** will tale care of the argentometric method; **Merylinda Conradie** will identify participating labs that performed well with this method.
    - Fluoride: **Merylinda Conradie** to identify participating labs that performed well with photometric method; **Silke Kriess** will take care of the ISE method.
    - Nitrate: **Merylinda Conradie** to identify participating labs that performed well with photometric methods.
    - Phosphate: **Silke Kriess** to identify problems.
- Decisions form WG gaps:
    - **Teddy Dithsabatho** will contact all participants of the training of trainers in Livingstone (Zambia) to ask them, what topics they would be ready to teach.
    - **Donald Masuku** to contact SADCAS in order to also include SADCAS trainers in the database
    - **All other members and local coordinators** to notify Teddy Dithsabatho of other suitable trainers (trained elsewhere) in their country
    - Database on trainers will be created and will be available mid of January 2011 (**Teddy Dithsabatho**)

Summary on decisions and tasks (continued)

- Decisions from the PMC meeting
  - **LC** should also promote the EAC PT schemes
  - EAC PT announcement to go directly to al LCs (**Kezia Mbwambo**)
  - **Shabbir Ghoorun** to prepare a survey on existing fish PT and potential participants
  - Chemistry brochure to be updated (**Donald Masuku**)
  - Fees for both PTs remain unchanged; next year the fee for the microbiology PT to be increased to 150US-$
  - From next year on no reports will go to participants that didn't pay the participation fee (**Merylinda Conradie**)
  - LCs should be informed who has paid and who not (**Merylinda Conradie**)
  - Newsletter will be published electronically as soon as possible and then sent to all members (**Donald Masuku**)
  - Funding of national workshops from PTB: **Organizers** to send draft budget to PTB. PTB is willing to support those workshops, but not fully. Organizer to decide how to use the money.
  - 2011 will be the last evaluation workshop fully sponsored by PTB
  - **Mauritius Standards Bureaus** volunteered to host the 2011 evaluation workshop