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| <b>Course Completion Report<br/>Laboratory Quality Control</b> | Course 4.7 | <b>NORPLAN</b>  |
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## 1 CONTENT

- Course data
- Course objectives
- Course materials
- Field and theoretical work.
- Brief comments on course design implementation
- Lessons learnt about course and participants about course appropriateness
- Course evaluation: comments from participants
- Follow up issues
- Recommendations for next or other courses.

## 2 COURSE DATA:

|                         |  |
|-------------------------|--|
| Name of course:         | Laboratory Quality Control   |
| Number of participants: | 12 ( from RuWatSIP, MEW, MoPH(Kabul and Kandahar section), DACAAR) |
| Location for training:  | RuWatSIP Conference room and RuWatSIP lab                          |
| Date of implementation  | 15 <sup>th</sup> – 17 <sup>th</sup> June 2013.                     |
| Course organiser        | Svein Stoveland  |
| Supporting presenters   | Prof. Eqrar, Sabour, UNICEF  |

## 3 COURSE OBJECTIVES

The objective of the training course was increasing the quality of the results from analysing water samples in Afghanistan. NORPLAN noticed problems with local laboratories and for its project it had to send samples abroad for analysis. The problems with local laboratories were thought to be lack of a quality control system rather than technical analytical problems. Thus this quality control course was proposed for experienced laboratory personnel from key water laboratories.

The course hoped to explain how a quality control system could benefit the quality of water laboratories and to build consensus for applying improved systems for laboratories in Afghanistan.

## 4 TRAINING FOCUS GROUP

Experienced laboratory personnel responsible for planning and analysing water samples. Since UNICEF had provided support to MRRD and MoPH to establish water testing laboratories, these laboratories were targeted. In addition, staff from MEW and DACAAR was also invited to the first course which was limited to 10–12 participants. The training took place with 3 staff from RuWatSIP lab, 2 from DACAAR, 4 from MoPH from Kabul and Kandahar, and two from MEW lab.

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### 5 Practical and theoretical work.

The course included laboratory work as well as water sampling. The participants were preparing for sampling collecting necessary equipment from the lab and then finding a water tap in the MRRD compound to apply appropriate sampling techniques. This exercise was used to exemplify what would be analytical techniques and what would be more linked to a quality control system.

In the classroom, the participants were given group work which included analysing which errors could be made from planning to sampling to analysing a water sample. This exercise created awareness of all potential areas where things could go wrong from poor instruction about the sampling, lack of clear sampling procedures, forgetting to check to calibrate instruments or date of expiry of chemicals to potential errors in labelling and marking of samples to inaccurately, lack of adherence to analytical procedures of analysis just to mentioned some of the potential sources of errors. The course introduced the participants to how international quality control systems work and how these QC systems require procedures and checklists to be developed, training programmes and certification of staff to be organised and management structures to be clearly defined. In a QC system, everything has to be documented and checklists signed so that now key functions are forgotten or overlooked. This makes it possible to trace analysis of samples to identify and verify that the samples were analysed correctly.



In the lab, analysing for arsenic following good analytical procedures with UNICEF trainer Sabour supervising



Field analysis of water sample. pH analyser.



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|                                   |                                     |
|-----------------------------------|-------------------------------------|
| Training in analytical techniques | Discussing quality control systems. |
|-----------------------------------|-------------------------------------|

## 6 Lessons learnt about course and participants about course appropriateness

It quickly became apparent that few understood what a quality control system was. Some thought that they had been given the best training in analytical techniques and did not see the purpose of the QC. Though presentation, group work and many discussions, the idea that QC was a system complementing good analytical techniques so as to render the overall results trustworthy.

It was also quite apparent that most of the participants had been well trained in laboratory analytical methods. However, the different laboratories used different methods ranging from standard international methods to quite basic field methods.

During the discussion, some of the participants indicated that the analysis they did while out sampling was not as accurate as the methods in the lab. However, none could quantify what quality meant or how analysis with different methods should be reported. There was apparently a recognised gap as how to assess accuracy of analytical methods.

Some of the laboratories had prepared checklist as what type of equipment they should bring along for collecting samples in the field. However, there was no checklist to indicate that any of the procedures or quality checks had been made or could be documented as checked. This could be such important issues as use of correct procedures, daily calibration of equipment, checks that chemicals used were not out of date, checks that sampling bottles had been appropriately rinsed and cleaned, checks that samples had been appropriately conserved included correctly cooled. Particularly when the issue of sampling was discussed, there were no standard procedures. In some cases empty bottles were just handed out to anybody who collects a sample without any training and instruction how to collect samples.

Often samples were delivered to the different laboratories where the client just asked for necessary analysis to be done, whatever that meant. There was a consensus that it would be good for all laboratories to have a common understanding what a full analysis, basic analyses or similar category of sample analysis could be or be defined. The laboratories could agree different set of analysis to be applied when client not very familiar to water analysis asked to the laboratories to check if the water was fit for drinking, or other uses.

During discussions and as awareness about what a QC system would mean, the interest grew to do something about it and to follow up the issue.

The course presenter suggested that the participants could consider the following:

- Would it be desirable for professional laboratory staff forming a Water laboratory QC group for Afghanistan to assist each other to develop unified approaches, procedures, checklists, training programmes and certification of staff for Afghanistan?
- The different laboratories could consider to participate in regular ring tests of samples so as to check accuracy of analysis of different laboratories and also to see if some of the analytical methods were particularly difficult to use.

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- All laboratories could make a plan to establish an internal control system so that they could regularly check that the methods they used could identify the correct concentrations of different parameters by analysing standard solutions.

## 7 Course evaluation: comments from participants

The course evaluation is available on the web in full with comments. In summary the questions for evaluation were as follows:

**Question 1:** Did the training course meet your expectations? 1=Completely, 2=Partially, 3= Not at all,

Response: Completely : 30%, Partially 70%, Not at all 0%.

**Question 2:** What do you think about the overall relevance of training of the course considering topic and relevance to your work? 1= Very relevant, 2= Partially relevant, 3 = Not at all

Response: Very relevant : 81%, Partially relevant 19%, Not at all 0%.

**Question 3:** What do you think of the overall length of the course? 1=Too short, 2 = Just right, 3 = Too long

Response: Too short: 45%, Just right 55%, Too Long 0%.

**Question 4:** Was the topic of quality control for laboratories new to you and can this help improve the standard of results in your lab?

Response:

- More training is needed.
- Follow up training needed.
- Hand-outs in Dari
- Should be trained at University
- Participants should meet regularly for follow up to learn more to reduce errors.

## 8 RECOMMENDATIONS IF THE COURSE WAS TO BE REPEATED:

1. The course duration of 3 days seems appropriate for awareness generation about QC systems. If the participants are to be assisted or trained how to develop procedures, checklists etc, the course needs to be extended by a further 2 days.
2. If the participants were to participate in a course no 2, this could have form of a workshop where the participants were assisted to structure what procedures and checklist already was available among the different local laboratories and then prepare a list of documents to be prepared.
3. Clear examples of procedures, checklists should be developed with the participants.
4. The participants should/could be assisted to address how to report deficiencies in the QC system given that inadequacies and lack of material and equipment was often a problem. ( Perhaps the labs could assist each other)

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5. The laboratory technical staff could form a body to meet regularly with the focus of raising the general quality of water analysis in Afghanistan and also with the longer term view of being accredited laboratories.
6. Experience with running this course clearly showed the value of being two or more resource persons during discussions and interaction with participants for effective training and tutoring.