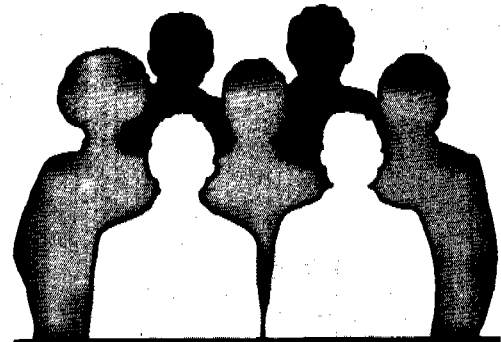


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Human Resources Development

CASE STUDY 3

Training programme gets a new profile

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Training programme gets a new profile

**How the Water Resources Institute
in Tanzania reshaped its curricula
to meet the country's need for
skilled technicians**

A Human
Resources
Development
Case Study
No: 3 in a series

IS S270
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Foreword

The World Health Organization (WHO) and the Swedish International Development Authority (SIDA) are jointly producing a thematic series of case studies focussing on Human Resources Development.

Our intention is to both illustrate and document various methods, used in different parts of the world, which aim at improving human performance.

Activities and projects selected for this series are all of an innovative nature. They show that there are usually a variety of methods other than classical classroom training to help people do their jobs better.

While country reports and project descriptions are common, one seldom finds detailed descriptions of techniques used. "What was done?" is answered more often than "How was it done?" In this series of case studies we aim to provide the reader with a total perspective of what was done, how it was done, why it was done and an assessment of its effectiveness.

These collected experiences should give the reader ideas, which can be adapted to improve other activities and projects in his or her own environment. We believe this series will be a source of inspiration for action and deliberate change.

Information for this specific case study was collected during a field visit to Tanzania in May 1988. Staff at the Water Resources Institute, local government officials, the consultant and expatriates involved in the project were interviewed. Reports from the consultant's many missions and other written material also form the basis of this case study. We thank everyone for their contribution.

Alice Petrán, 17 February 1989

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Summary

Time for a much needed change

Decision to develop new curricula

It is quiet in the classroom. Only the sound of scribbling pens can be heard. A teacher is writing on the blackboard, while students are doing their best to copy sentences. A set of unintelligible words is being transferred from a textbook over to the blackboard and into the students' notebooks. Someone yawns, another looks out of the window. Some desks stand empty.

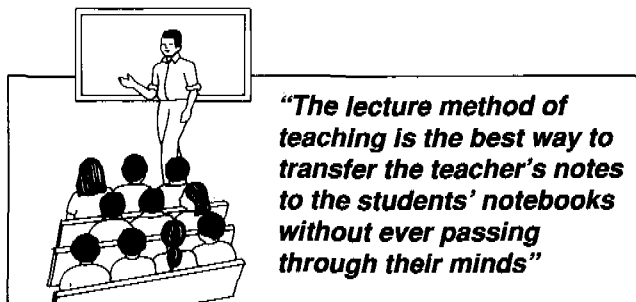
Who does not recognize such a scene? Lessons where the trainees do not understand what is being taught and where the teachers are not sure of the applicability of the knowledge they teach. It is a training model which is unfortunately all too common. At the Water Resources Institute (WRI) in Dar es Salaam, Tanzania, this also used to describe the average lesson — until 1984.

For ten years, since 1974, the WRI trained middle level technicians and skilled workers for employment in the Ministry of Water — with financial assistance from the Swedish International Development Authority (SIDA). It taught theory which was not particularly relevant to the water sector's needs. Employers often complained about the students' poor abilities after graduating and proceeding into practical field work.

Several evaluations revealed that the teaching did not give students the skills and knowledge required to carry out their tasks as technicians. The WRI staff itself recognized the need to correct the situation, but in the absence of specific information about the tasks and duties of technicians the problem remained unsolved.

In 1984 time had come for change. A firm decision was taken to develop new curricula. It was decided that the teachers would write the modules themselves and take full responsibility for this revision work. Contrary to what is usually done, a consultant was enlisted to only assist them through the process rather than do the actual work.

The revision took off with a field survey of the tasks of each grade of water technician. What exactly are a technicians' tasks? What do they



“The lecture method of teaching is the best way to transfer the teacher’s notes to the students’ notebooks without ever passing through their minds”

need to know and be able to do? What tools do they use? Only with answers to these questions could the teachers plan their new courses.

Over one hundred technicians were interviewed and observed in the field. Tasks and duties were clearly detailed so that job descriptions could be written up. Based on these, the reshaping of the curricula could be closely linked to Tanzania’s needs. The teachers thus embarked on a long and strenuous process — more difficult than they had ever anticipated. The new modules were later reviewed together with technicians and other water professionals.

It took four years to devise a new training profile for technical education at the Water Resources Institute. Today the curricula are task-oriented instead of academic.

Although time consuming, this demanding work has strengthened the teachers’ positions in their work. They are not only completely familiar with the new curricula but also proud of it and have taken ownership of it.

Trial implementation which began in July 1988 has shown that the modules are well formulated with the need only for some adjustments here and there.

To better define why they teach certain things and to learn more about how to prepare practicals and exercises are two things the teachers feel an even greater need for today. Regular review seminars are held at the WRI and these ensure a consistent analysis of how implementation is going.◆

Technicians are interviewed

Demanding work

Setting the scene

Training is not relevant

**No specific training in
practical work**

The Water Resources Institute (WRI) was established in 1974 in response to an urgent need for skilled personnel to develop Tanzania's water sector. It primarily trains middle level technicians and skilled workers from all over the country, but also aims to research and collect information about water sector activities. Initially, the WRI was planned as a training institution for the whole of East Africa with regional financial support but this has never happened. Instead the WRI is run by the Tanzanian Ministry of Water with substantial support from the Swedish government.

By 1987, about 980 trainees had followed the three-year training programme leading to a Full Technician Certificate. They have been directed into different areas of water technology — hydrology; hydrogeology; hydrometeorology; water laboratory technology; construction and drilling; and planning and design. The courses have been theoretical, furnishing students with a general technical orientation.

Textbooks have been the primary training material and no instructor made material such as handouts, exercises or experiments have existed. Students have had to rely on lecturing. The possibilities for individual research were limited to a small, poorly equipped reference centre. The laboratory, classrooms and workshops for demonstrations have been unorganized and bare, lacking tools and equipment to provide trainees with practical insights.

By getting a Full Technician Certificate the trainees got a general theoretical and technical introduction but no specific training in practical technical work or in supervising and directing personnel, which would later be their jobs.

The old curricula consisted mainly of lists of subjects or course outlines with an arbitrary time allocated to each. There were no guidelines indicating how much information or what sort of information a student would use after graduating. Instead, the teachers would lecture about what

they thought students should know until time had run out and then continued with the next subject.

The curricula revision became all the more urgent because of various policy changes in the 1980's like the decision to decentralize several public services — rural water supply included — and to concentrate on low cost technology. These signalled increased requirements for basic practical competence. Attempts had been made to rectify the situation. On several occasions consultants wrote new curricula for the WRI but since the teachers were unfamiliar with them, they were left to collect dust on the shelf. This is why it was decided that this time the teachers would have to bring about the change themselves. ♦

Curricula revision becomes urgent



Tanzania's Water Resources Institute is located on the outskirts of Dar es Salaam. It trains middle level water technicians and is run by the Ministry of Water.

Part 1

Teachers proud of their own work

Changed approach to their work

The teachers involved in writing the new modules and developing new curricula had no previous experience of this type of work. Still, it was decided that they would do it themselves. They would thus, in a very practical way, learn about technicians' jobs and the objectives of their teaching. At the start of the process no one knew how long the work would take. Very few guessed that not until four years later would they be able to reap the fruits of their efforts.

One of the module writers is Mrs Judica Mnzava who is Head of the hydrogeological department. She explains how inappropriate her own teaching used to be: "What is the origin of the earth?" was one of the questions she used to ask her geology students and she got many different answers. "Some students quoted the Bible. Others just made up their own visions. Of course, I wanted them to give the geological theory which was part of the course and which they were supposed to have learnt".

Mrs Mnzava agrees with other teachers that it has been very tedious to rewrite the curricula. But she adds instantly: "Still we liked it, because we have learnt quite a lot by doing it ourselves. Also, we now look at it and wonder whether it will last ten years because once you start to adapt your teaching to real day-to-day needs, you realize that it is continuous work to keep it up to date."

The teachers testify how they have learnt to phrase themselves better. To be accurate in wording has become important. To various degrees they have changed their approach to their work. "The theoretical teaching must be directed specifically towards practical issues. It has happened that I have given the class a quiz without hardly getting any correct answers. So, no more of the origins of the earth just for the sake of theory", says Mrs Mnzava laughing and with a great deal of irony.

The staff who have teacher training emphasize how much more preparation they need themselves while others who have arrived fresh from university

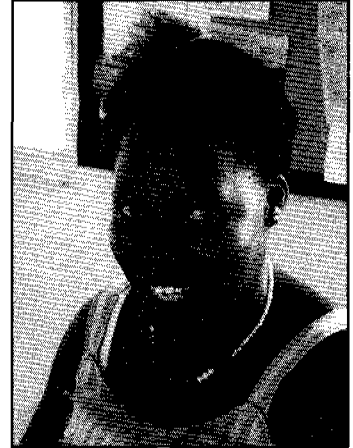
are less aware of the importance of the new performance-oriented training style.

In recent years student numbers have declined from an average of 115 to 75 per year and the core of teachers has grown. The student/teacher ratio has thus steadily increased but without a parallel improvement in the standard of teaching. For the year 1988/89 there are 25 teachers, which in certain subjects gives a ratio of one teacher to seven—eight students. Many of these teachers have been recruited fresh from university or college and have had no training as instructors. They know little about technicians' jobs in the field and are unfamiliar with practical exercises to prepare WRI students for their jobs.

One thing which worries most of the staff is the shortage of equipment, books and teaching material and the lack of training facilities. Two secretaries and a few typewriters make Mrs Mnzava ask rhetorically: "How do you avoid the blackboard when we do not have the capacity to prepare handouts?"

Technically, module writing was not difficult according to Mrs Mnzava and several of the others. "After having produced the modules, they must be put in sequence and that required a lot of moving back and forth. For example — a certain specific technical thing cannot be taught in the third year if the theory is missing. The relevant theory then has to be included at a much earlier stage and so on", she says.

Although not difficult, the rewriting has demanded a lot of the teachers' time and energy. Most have periodically got time off to write the modules but still complain that it was difficult to get 'quality time'. Their offices are fairly small and all open onto a busy courtyard. Free lunches, allowances and a rent subsidy have been incentives for the teachers to undertake the work in a situation where their salary is low. ♦



"It has been very tedious to revise the curricula, still we liked it because we have learnt quite a lot", says Mrs Mnzava one of the WRI teachers.

Part 2

Five steps to a new training model

Although it was decided that the WRI staff would produce the new curricula themselves, they would be provided with professional guidance. The World Health Organization (WHO) was asked by SIDA to assist in the process. The WHO recommended the following to design a new modular, task-oriented training:

1. INFORMATION GATHERING

- a) design questionnaires
- b) conduct interviews
- c) observe technicians in the field
- d) organize and document data
- e) verify data

2. TASK ANALYSIS & JOB DESCRIPTIONS

- a) prepare task and duty statements
- b) write performance-oriented job descriptions
- c) list requirements in skill and knowledge
- d) list required resources (tools, equipment etc)
- e) verify information in technical panels

3. DEVELOP DRAFT CURRICULA

- a) develop curricula guides
- b) develop module objectives
- c) develop learning objectives
- d) prepare syllabi drafts

4. CURRICULA STRUCTURING

- a) structure curricula into three year programme
- b) compute module duration

- c) develop annual time-table
- d) develop certification plan

5. PREPARATION FOR IMPLEMENTATION

- a) review syllabi drafts
- b) develop and conduct staff development seminars
- c) instructional planning
- d) test and evaluate performance
- e) develop instructional aids
- f) plan programme control and monitoring system ◆

Part 3

Revision kicks off with field survey



Before any restructuring of the curricula or writing of modules could take place it was necessary to determine exactly what the work of different water technicians entailed.

Information gathering

An interviewing team consisting of two teachers from the WRI and the WHO consultant started off by designing a **Task Inventory and Analysis Sheet** (see page 29). It contained questions about what kinds of tasks the job holder would do, how frequently she or he would perform them and how important each task would be to the overall effectiveness of the job.

These work sheets were used to conduct over one hundred interviews with technicians and senior staff in regional water engineers' offices, with staff from the Ministry of Water and SIDA. Several different water technician job categories were identified, defined and analyzed in this way.

The team restricted its interviewing to three regions in North Tanzania, where SIDA assists the water sector. The massive foreign aid to Tanzania's water sector has been organized in such a way that each donor has been assigned certain regions. Donors often use their own technology, and so technicians' jobs differ somewhat between the regions. Therefore, information collected in the Lake Regions was later checked by a representative group of technicians and professionals of the Tanzanian water sector as a whole.

The team later refined its work using a **Task Verification Sheet** (see page 30), which was used on a smaller group. Except for frequency and importance, this sheet helped to verify whether tasks listed corresponded to those undertaken in reality. Were any tasks omitted? Or maybe tasks listed, which are never undertaken?

A **Task Analysis/Detailing Sheet** (see page 31), identified operating procedures, materials, tools and equipment needed. For example, when testing

the pH level of water, a technician needs a water sample, a 25 ml graduated cylinder, a 1 ml calibrated dropper, a pH meter etc. This Task Analysis/Detailing Sheet underlined the knowledge and skills that would be required to perform satisfactorily.

In addition to the interviews, team members observed a number of technicians at work to see under what conditions technicians would perform their tasks. These observations served to clarify and verify information from interviews.

Both interviews and field observations were conducted independently by the team members. By using standardized sheets and with some coaching, the WRI teachers could conduct interviews despite their lack of experience. The exercise was carried out over a few weeks and evidently there could be omissions since the team members were new to the exercise. Verification by technical panels would later iron out this problem.

Task analysis and job descriptions

This systematic asking of WHAT the worker does, HOW he does it, WHAT he USES to do it and what SKILLS and KNOWLEDGE he needs to perform the tasks yielded the information needed to draft performance-oriented job descriptions.

The completed task analyses made it possible to formulate job descriptions for five job categories:

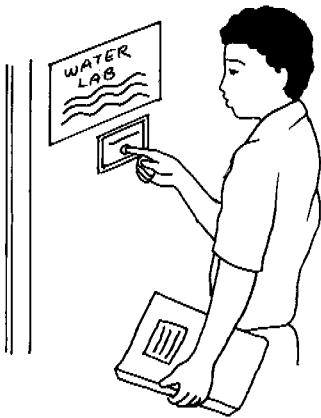
- Water Laboratory Technician
- Hydrogeology Technician
- Water System Planning and Design Technician
- Hydrology/ Hydrometeorology Technician
- Water Systems Construction and Installation Technician

These job descriptions formed the basis of good curriculum design and of the different course options which students could choose from.



The job descriptions include title, reporting position, grade, job summary, specific duties and responsibilities and requirements to perform them. Lists specifying in detail the training needed for the jobs were prepared to be used when outlining modules and curricula guides.

In retrospect, a member of the interviewing team is doubtful about the categories of technicians which they defined. He comments that with a performance-oriented training programme students only learn the tasks within their own specialization. "A student in hydrogeology is limited to performing specific tasks in that area. As there is often a shortage of tools and equipment, hydrogeological technicians do not always have full time work. But as they only learn this, they may not be useful for other duties". This man is not convinced that the modules are entirely appropriate to real conditions — for example, the lack of tools — but still fully agrees to the revision.



The verification process

So far only the interviewing team had been involved. Time had come to put together technical panels to verify information compiled. These panels prepared final lists of task and duty statements, skills and knowledge requirements, resources required and under what conditions tasks are performed in reality.

Each panel consisted of a WRI staff member, who would be the module writer, a senior staff engineer/scientist and supervisors and technicians from the field. Initially there were six panels — Water Laboratory; Construction and Installation; Drilling (this group later merged with Construction); Hydrogeology; Hydrology/Hydrometeorology; and Design and Planning.

"In the beginning I was very worried that the changes at WRI would lead to the training of craftsmen instead of technicians", says Mr Chitakila, a panellist in the Construction and Drilling group. He

graduated from the WRI in 1979 and remembers very well how little he knew about the job when he started it. "To draw a storage tank was no problem, but constructing it was something else. Students from the WRI have been unable to perform tasks in practice". Mr Chitakila is still somewhat sceptical about the reorientation at WRI, but by having become more familiar with the new ideas, he thinks future students will be much more competent than he was when he graduated.

The uncertainty some of the Tanzanians involved still feel about reorientation shows that it takes time to change attitudes. Teachers are used to selecting what they think students should learn and simple lecturing is a well rooted tradition. It is difficult to reverse the process and ask teachers to justify everything included in the curricula. However, like a physician diagnoses before administering a cure, the instructor must analyze training needs before teaching. Only by producing new modules by themselves have teachers been able to fully reflect on the content of their teaching.

Performance-oriented training has been a new concept to almost everyone involved. In Tanzania, as in many other countries, theoretical studies have a higher status compared to practical training. Lecturing is used more often than participatory teaching methods which involve students in experiments and exercises.

Task analyses, writing performance objectives, developing an outline for modular curricula and drafting curricula guides were all new exercises for the WRI teachers. The WHO consultant, therefore, conducted workshops and seminars to brief and train the panellists, the module writers and other WRI staff in these concepts. It was important that everyone involved become familiar with performance-oriented training and how it should differ from the old curricula. ♦



"In the beginning I was very worried that changes at WRI would lead to training craftsmen instead of technicians", says Mr Chitakila who gave advice during the revision process.

Part 4

Writing of modules begins

Enthusiasm is high

Before starting to write, the teachers identified three broad areas in which training had to be provided:

1. General Education
2. Basic Supervisory Management — prepare for personnel relations
3. Technical Competency

All the modules would fall into one of these areas. A fourth area was identified — optional electives. These would be subjects students could choose as supplementary courses, if they had additional time .

By going through the task and duty statements and looking at what the technicians do in their jobs, the tasks could be grouped under suitable headlines and packaged into modules. This work resulted in a draft outline of about 57 training modules falling into one or another of the areas above.

The framework for the curricula revision was now set and detailed writing could start. This was in June 1985, eleven months after the first step. The WHO consultant had been to the WRI twice. Considering that the WRI staff were new to this sort of work, the consultant thought they had progressed very well. Enthusiasm was high among the teachers and the others involved. No one expected the frustration everyone would soon experience when starting to write.

The curricula revision was moving into a new phase: the actual module writing and production of curricula guides, which help teachers to prepare for classes. The modules would thus have to indicate learning objectives, syllabi content and required amount of hours divided between theory and practical work.

"Writing these guidelines has probably been the most demanding and difficult part in this process", says Vice Principal Mr Mabuba. "If you take drilling, for example, and training a drilling technician. It is quite easy to talk about drilling in



In writing the new modules, teachers incorporated more demonstrations and practical exercises into the curricula.

general, but to find the specific verbs to describe the action step-by-step is rather complicated”.

In all, several hundred guidelines would be developed. The consultant noticed that the capacity among teachers was great when dealing with technical issues, while they were considerably less competent in supervisory tasks or educational skills. To write guidelines in these areas was apparently hard-fought. The consultant therefore arranged workshops on how to prepare them. The so called curricula guides have during the process been renamed Instructional sheets (information sheets, operation sheets, assignment sheets).

Being amateurs but still ‘doers’, the WRI staff required professional assistance to continue this work they knew very little about. As long as this was provided, the consultant noticed a high workpace and great enthusiasm. But there was no clear plan for the whole revision process — plans were drafted but never adopted.

Consultant arranges workshops

Energy injections

In June 1985, the consultant expressed fear in his report that module writers would soon feel despair and become disillusioned unless they were assured of 'energy injections' referring to his coaching. But despite this, missions continued to be arranged on an ad hoc basis and neither WRI staff nor the consultant knew when the next one would take place.

Teachers lack time to concentrate

The fear that the work would become erratic proved to be well founded. A whole year passed during which the curriculum writers had to figure out by themselves how to format things and find solutions to problems. Some selected for writing still had classes and could hardly find time for this additional work. "We lacked quality time" is the way most WRI teachers explain the lost momentum, meaning that they had little time to concentrate, in silence, in order to pursue the work.

Others, released from their normal duties, could still not find 'quality time'. They were disturbed by finding other income sources, by sick children or being sick themselves. For example, hardly anyone ever ate anything during the day, which made them tired.

Newcomers need to be phased in

"Other factors affecting us negatively has been the noisy office area and, of course, the heat. If we could have had a quiet and cool place and time to work on the curricula revision, away from everything else, it would have been much more satisfying", say several teachers.

Not until a year later — in the summer of 1986, two years after the reorientation started — did the consultant get back to the WRI. He found that a lot of time had to be put into just building up new enthusiasm again. As the staff kept changing fairly frequently, newcomers had to be phased in and become familiar with the concepts. Those who were involved from the beginning also needed regular briefings as they had not been exposed to modern training methods before.

This may suggest that there should be some sort of commitment made by all parties involved

when initiating a project like this. The financing institution must be able to commit itself. This would allow for a clear long term plan. The facilitator should preferably also be prepared to assist throughout the whole process, like it has been at WRI. It is also important that the ones who will be doing the job commit themselves. As there is no system of sanctions and carrots at the WRI the writers, according to the consultant, sometimes got away too easily with not having done things long after the deadline.

At this stage so many activities were going on that a coordinator, other than the Principal, should have been involved in suggesting the upgrading of teachers and writers. Maybe it would have been advisable to have had a 'shadow', a person following the consultant all the way. That person could have kept up work pace in between missions. The work would probably have proceeded much more smoothly. ♦

Long term commitment

Part 5

Preparing for the trial run

Although the writers had encountered difficulties and some of the text had to be rewritten as it was just copied out of books, the WRI staff nevertheless was able to present a first draft of a performance-oriented syllabus in December 1986. This was a major accomplishment.

Once there were draft curricula, there was a skeleton to work with, to hang additional information on and to reshape. Different review seminars were arranged to encourage the writers to develop modules further and for technical panels to assist in refining the curricula.

Certain modules like management and supervision had been difficult for the staff to develop and guidance was required. Modules in language, communication and general studies were other areas in which the writers needed assistance.

Several workshops took place in order to help the revision process along. Topics included:

- **Syllabus format.** Discuss examples used by others, select one and demonstrate the actual preparation by inserting parts of the initial curricula draft.
- **Performance or instructional objectives.** Review basic criteria for these objectives and their application.
- **General review of process and strategy.** Review existing curriculum in comparison to the newly drafted one and request the Ministry of Water to comment.
- **Resources assessment seminar.** Prepare Resources Inventory form to determine potential deficiencies or shortages in existing equipment, tools etc. It is important that conditions for training are similar to those in the field.
- **Staff development seminar.** Lead the teachers to focus on evaluation of students' achievements, instructional materials, instructional methodology and problem solving.

- **Review seminars on new curricula draft.** Regular discussions on curricula formulations and structures.

Apart from constant upgrading through seminars, some of the teachers were sent on study tours to neighbouring countries where more performance-oriented training took place. As they were approaching implementation of their new curricula, the teachers needed to see different teaching styles being practised and examples of better organized teaching.

"The last problem is the training of trainers", says Mrs Senkoro, who is Head of the Laboratory Department. "The pioneer students will not experience a very different teaching method compared to before as many of us teachers are not trained in new instructional techniques". Her statement is fully supported by another trained teacher, while others believe teaching is an inborn talent. ♦

Study tours to neighbouring countries



"One problem is that many of us teachers are not trained in the new instructional techniques", says Mrs Senkoro, Head of the Laboratory Department.

Part 6

**Ready,
set, and
going
well**

Trial implementation of the new curricula at WRI began in July 1988. Comments received from staff members in February 1989 indicate that things are going well.

"It has been quite challenging to implement the new curricula" says WRI Vice-principal Pius Mabuba half-way through the new training programme. "The teachers are enthusiastic about their work and not too many changes have been necessary in the new modules".

Teachers feel they need to elaborate on teaching objectives in order to define more precisely why they teach certain things. Also, the time allocated to certain subjects has had to be adjusted.

"Before implementation we should have been better prepared in how to devise information sheets, practicals, exercises, experiments and demonstrations", continues Mr Mabuba. "Maybe a whole year should have been used just to train us teachers in instruction techniques".

Every two weeks teachers meet for an hour to discuss any problems they are encountering. After each of the year's four modules, they have had a two-week seminar to go over what changes need to be made.

After two such seminars staff realize that for a certain time at least, continuous adjustments will have to be made to the curricula. Emphasis and timing has had to be changed here and there. Otherwise, most of their efforts over the last four years are in line with what is needed to prepare the technicians Tanzania requires. ♦

Revision timetable

Nov 1983	WHO assesses training programme at WRI	<i>WHO /SIDA mission</i>
1984	Decision is taken to start curricula revision	
Aug 1984	Task analyses Verification process	<i>Mission/consultant</i>
June 1985	Technical Advisory Groups Module writing	<i>Mission/consultant</i>
May 1986	Module reviewing	<i>Mission/consultant</i>
Dec 1986	First draft curricula	
May 1987	Workshops and reviewing by technical panels Refining modules	<i>Mission/consultant</i>
Sept 1987	Resources assessment workshops Refining modules	<i>Mission/consultant</i>
March 1988	Study tours to Zambia, Kenya	
June 1988	Final changes to modules	<i>Mission/consultant</i>
July 1988	Trial implementation	

For the future

Lessons learned

➤ **Task analysis is necessary to make training performance-oriented.** Several weeks were used to conduct interviews and carry out studies at job sites to get a picture of the different technicians' tasks. This information was verified with other regions and professionals in the industry. The consultant to WRI believes the information gathering process could have taken less time but emphasizes above all the importance of doing it thoroughly.

➤ **Teachers must take ownership of the revision process.** An easier way of getting a new training programme would have been to have others write it for the WRI staff. But, as previous experience had shown, 'foreign produced' curricula tended to remain standing on the shelf as teachers were not familiar with the content.

➤ **Continuity is a key word and can only be ensured through a long term commitment.** To ensure a smooth process there must be a long term commitment from all parties involved. That allows for laying out work plans and setting sub-goals and check-up stations, which makes it possible to appraise accomplishments. Those involved don't lose enthusiasm as easily when they can see results and know how much assistance they can count on. In the case of the WRI, the lack of commitments made the process more time-consuming, erratic, unnecessarily complicated and tedious.

➤ **Broad time margins are necessary.** None of the parties involved expected it would take four years to develop new curricula. It must however be taken into account that curricula revision at WRI was slowed down due to lack of concrete plans. The consultant believes that one should reckon with a minimum period of three years.

➤ **Favourable conditions must exist to enable staff to concentrate on writing.** To ensure that revision proceeds at a steady pace, the writers should be released from their daily duties at least for a certain

period. They must be able to concentrate on the writing and not have to squeeze it in between other activities. Although some of the WRI teachers did get time off, the most common constraint they mentioned was "lack of quality-time" — time when conditions were favourable for doing some work of quality.

➤ **Planning ahead and follow-up of implementation are crucial.** Before starting any revision process it is useful to plan all the steps involved and the time required to complete them. Likewise, it is important to plan a follow-up phase to monitor and adjust things during implementation. Plans for curricula revision at WRI were drafted but never adopted or adhered to.

➤ **Follow-up and monitoring trainees' performance after graduation is essential.** No on-the-job evaluation of former WRI trainees ever took place and thus teachers were unable to follow-up how relevant their teaching was.

➤ **The teachers at the WRI have learnt by doing.** None of them were familiar with curriculum development, performance-oriented modules or participatory training before. Still it is important that they have produced most of the modules themselves. Today they describe themselves as more confident and proud of their work. The new syllabus is not being imposed on them as a new, unknown document. Instead it is something they know by heart. Also, they realize the deficiencies in their old teaching styles.

➤ **Coaching is needed at least every six months.** As the teachers are amateurs but still the doers, they need a lot of assistance and coaching. The WHO consultant believes that outside support must be given at least every six months in such a process. A lot of the work he did during his missions could have been done outside the country in between his visits to the WRI. That way, more seminars

and workshops could have been conducted. As there was no long term plan, this did not happen.

➤ **Incentives are often required.** One way to encourage staff to work harder on the project is to provide benefits like extra pay, trips abroad, free housing or free lunches. Some of the teachers at the WRI are now getting new houses with beneficial rents, others have been abroad on study tours, but as government salaries are modest, many still worry about their living conditions. Free lunches and allowances have played an important role in this context.

➤ **Dialogue with water sector staff from around the country is necessary in order to make training relevant.** The WRI did not continuously communicate with district and regional water authorities in order to adapt its syllabus to meet Tanzania's needs. Employers sometimes complained about the poor performance of graduates but WRI staff had difficulties in changing the situation.

➤ **The same consultant should preferably assist the whole process.** Teachers at WRI have all become quite familiar with the WHO/SIDA consultant. They all attest to his professionalism and to the enthusiasm he generated. Had it been a different person arriving each time, the teachers would have felt less confident about writing and being able to make mistakes.

➤ **A 'shadow' ought to follow the consultant through the whole process.** To keep up a consistent workpace, it is advisable to have a second person communicating and working closely with the consultant right from the start. The WRI Vice-principal became the local coordinator and managed to partly fulfill this role. ♦

Examples of survey forms

WORKSHEET NO. 1

TASK INVENTORY AND ANALYSIS SHEET

1. ORGANIZATION MINISTRY OF WATER ENERGY AND MATERIALS

2. JOB POSITION/JOB TITLE WATER TECHNICIAN - (WATER LAB)

4. INTERVIEW CONDUCTED BY PASCAL KUSARE (WRI) 4. DATE 14.8.1984

BABILI MUKONO (WRI)

CODE Supervised and checked by QUINCE FRANCIS (WHO)

- * Frequency
 (5) daily or more frequently
 (4) weekly
 (3) monthly
 (2) quarterly (every 3 months)
 (1) at intervals longer than 3 months

- ** Criticality/importance
 (5) extremely important
 (4) very important
 (3) important
 (2) fairly important
 (1) of minimal importance

List of tasks performed	Frequency of Performance					Level of criticality or relative importance of task to the effectiveness of your job					Remarks
	1	2	3	4	5	1	2	3	4	5	
1. Organizes and participates in field trips to collect water samples		X								X	
2. Registers, labels and stores samples			X							X	
3. Prepares chemicals and supervises the preparation of instruments for water analysis.					X					X	
4. Analyses water samples and report results.						X				X	
5. Handles external and internal correspondence on water quality surveillance.					X				X		
6. Supervises the work performance of junior water analysis staff					X				X		
7. Supervises and maintains laboratory equipment and manages laboratory supplies.			X							X	
8. Prepares and monitors daily and monthly work schedules for Lab. section.				X				X			

WORK SHEET No II

MWANZA

TASK VERIFICATION SHEET

Checked by
Quince Francis (WHO)

JOB TITLE/POSITION WATER TECHNICIAN - LABORATORY

Directions The list of Tasks recorded on the sheet relate to the Job of _____ : Please review each and answer the questions related to each Task as outlined. You may also add any additional comments.

CODE

- * Frequency
 (5) daily or more frequently
 (4) weekly
 (3) monthly
 (2) quarterly (every 3 months)
 (1) at intervals longer than 3 months

- ** Criticality/importance
 (5) extremely important
 (4) very important
 (3) important
 (2) fairly important
 (1) of minimal importance

NB Please list all additional Tasks you perform at the bottom of Tasks listed.

JOB TASKS	Do you perform these Tasks on your job?		How frequently do you perform these Tasks?					How important are these Tasks to efficiently carrying our your job?					Additional Comments on each Task	
	YES	NO	1	2	3	4	5	1	2	3	4	5		
1. Organizes and participates in field trips to collect water samples.	X				X						X			
2. Registers, labels and stores samples.	X			X							X			
3. Prepares chemicals and supervises the preparation of instruments for water analysis.	X			X							X			
4. Analyses water samples and report results.	X				X						X			
5. Handles external and internal correspondence on water quality surveillance.	X										X			

TASK ANALYSIS/DETAILING SHEET

JOB TITLE/POSITION WATER TECHNICIAN - LABORATORY

INTERVIEW CONDUCTED BY Q D FRANCIS - WHO

DATE 16/8/84

TASK No 4 (as listed on Worksheet II "Task Verification Sheet")

TASK DESCRIPTION Analyses Water Samples and Report Results Operation, makes PH test.

How is the task performed? (list the steps)	What do you use in the performance of the Task? List all tools, materials equipment, etc.	What knowledge skills or understandings do you require to successfully perform the task?
<ol style="list-style-type: none"> 1. Fill clean 25-ml graduated cylinder with water sample 2. Pour sample in a clean cell. 3. Add 1-ml of wide range indicator and mix. 4. Fill another sample cell of 25-ml original sample water and place in cell holder. 5. Insert the wide range PH meter scale in the meter and adjust the wave length dial to 520 NM. 6. Adjust the light control so that the needle rests at the far end of the are. 7. Place prepared sample in the cell holder and read PH value. 	<ul style="list-style-type: none"> - Water sample - 25-ml graduated cylinder - 1-ml calibrated dropper - PH Meter - Wide range PH Meter scale - Wide range indicator - Cells 	<ul style="list-style-type: none"> - how to read and measure with the graduated cylinder - how to measure and use dropper - how to operate the PH meter - how to take readings on the PH Meter - how to mix chemical solutions - how to recognise and match colours - how to determine active or inactive indicator - how to follow instructions - how to clean glassware and instruments

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A copy of any of the above can be obtained by writing to the WHO. If you want more information about a specific case study, or the project, or maybe have ideas about HRD activities to be shared with others, please contact:

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