

BACK-TO-OFFICE-REPORT

Pollution Control and other measures to Protect Biodiversity in Lake Tanganyika (RAF/92/G32). Special Study: 'Sediment Discharge and Its Consequences'

Draft back to office report for visit by G. Patterson to Burundi and Democratic Republic of Congo from 15 March to 26 March 1998

Separate copies

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1. Background

Terms of Reference for the trip were as follows:

- 1) set up co-operation with the University Dept of Chemistry (Evariste Nzeyimana) and the laboratory of Leo Goeyens at the Free University of Brussels, Belgium.
- 2) To find a mechanism whereby the project can arrange for a technician to install the XRD analyser at the Dept of Geography of the University (Louis Nahimana).
- 3) To visit IGEBU to discuss river monitoring in Burundi.
- 4) To visit Uvira and assess what we do to restore them into a functioning laboratory and to establish Terms of Reference to allow commencement of work for the sedimentation special study at Uvira.
- 5) If time permits to visit Dar es Salaam to liaise with Dar-based regional participants in the Special Study.

2. SUMMARY OF VISIT

15 March - Depart UK for Nairobi

16 March - Arrive Nairobi. Meet with Project Co-ordinator.

17 March - To Bujumbura (Kenya Airways)

View new project facilities at the old CRRHA site in the Department of Fisheries - met with Mamert and Ntakamazi who are working with the project as well as and Kanyaru (Director of Fisheries).

18 March (morning) - Long meeting with Mathias Sebahene (DG of DGGM) and Tharcisse Songore (same Department)

This meeting ran in to problems for a number of reasons:

- 1) That Coveliers and Goeyens had not shown them the respect they felt they deserved on departure (a debriefing). Nevertheless where people as senior as this are involved in the project is it necessary for visiting consultants to show due deference to their position.
- 2) In discussion it became obvious that I had to diplomatically remind them that they represented the whole study and not just DGGM point of view.
- 3) They requested that they should be able to see a report which included the budget division for Burundi within the special study (however small). This is currently not broken down in this way and GP agreed to look in to ways that this could be presented.
- 4) I proposed that they could play a role in training - I considered Lezzars input though later heard from Songore had been disliked on the cruise (at least by Songore). Maybe his possible role in running specialist sediment training must be reconsidered. GP made the point that it is for National Institutions to know their training requirements and to make specific demands of the project. This was pointed out to other institutions during the visit.
- 5) After some time, and suitable apologies it was agreed that DGGM would prepare a proposal with IGEBU based on the ToRs I had previously sent. TS and GP to go Gitega on Monday 23 March to visit IGEBU HQ to discuss (see below). These ToRs are repeated here in English (though previously submitted to IGEBU and DGGM in French).

Draft ToRs previously submitted

- 1a) Conduct desk research for a review report on available archival runoff and sediment data for the Burundian part of the Lake Tanganyika drainage basin
- b) Carry out familiarisation tour to existing and possible additional gauging stations on selected rivers of the Lake Tanganyika drainage basin in Burundi. The tour would assess the capacity of each of the currently operable stations as well as select suitable sites for new gauging stations on rivers to meet the requirements of the project
- 2a) Establish new and reactivate old (where necessary) discharge monitoring stations on the principal input rivers to the lake. Additionally, a total of four sediment stations to be established at current or projected gauging stations at locations identified by the familiarisation visit
 - b) Determine physical (pH, temperature levels, suspended sediment loads, etc.) and chemical (total dissolved load, conductivity, etc.) characteristics of water in streams draining into the lake on a regular short-term sampling interval.
 - c) Determine particle size distributions of bed material sediments transported by 4 rivers of Burundi with sampling to be conducted near river mouths.
3. Make preliminary assessments of the impact of human activities (such as tree cutting) on the hydrological regimes and other related aspects of rivers draining into the lake and liaise with the Project Socio-Economic Study group in this exercise.
4. Make some recommendations for low-level long-term monitoring programme for future sedimentological and hydrological modelling in Burundian part of the Lake Tanganyika basin.

It was decided that an initial set of ToRs should be formulated expanding on Part 1 of these ToRs with an approximate timetable of around three months (see visit to IGEBU below). A draft version of these (slightly expanded) are as follows.

Table 2. ToRs for current consideration by IGEBU and DGGM

- 1) Conduct desk research for a review report on available archival runoff and sediment data for the Burundian part of the Lake Tanganyika drainage basin
- 2) Carry out familiarisation tour to existing and possible additional gauging stations on selected rivers of the Lake Tanganyika drainage basin in Burundi. The tour would assess the capacity of each of the currently operable stations as well as select suitable sites for new gauging stations on rivers to meet the requirements of the project
- 3) That the assessment aim to sample approximately 5 rivers in the catchment. Choices should be made from the following rivers:

Rusizi
Murembwe
Dama
Nyengwe
Rwaba
Karonge
Kirasa
Nyamusenyi
Gatororongu

- 4) Choices will be made depending on factors relating to previous records, ease of access, and security. Note previous work that IGEBU carried out on behalf of Gaspard Ntakamazi at the University of Burundi would for a good basis for further work. GN at the LTBP office has copies of the various reports. Also complimentarity with the catchments selected for the coring cruise of January 1998 would be beneficial - DGGM has a copy of the cruise report.
- 5) Other factors to include in the assessment will be logistical requirements including materials, staffing and transport in order to assist with costing the study. This should define the responsibilities of the various participants in the work, particularly the separate responsibilities of DGGM and IGEBU.
- 6) A report will be produced within 3 months of the commencement of this work summarising the findings of the above and describing a workplan for a 1 year programme to carry out parts 2-5 of the full ToRs given above (Table 1). The work will commence on 1 April 1998 (with the consideration that some work has already been completed to date by these four persons). The objective will be to report quarterly with the first quarterly report being the write up of the desk study and reconnaissance mission proposed in the ToRs (due on July 1) .

Note also DGGM has interest in the core samples and it may be useful if Tharcisse is somehow involved in some part of the analysis here and/or involving their skills in making thin sections. This will be investigated with University of Arizona by GP.

Sebahene informed of my schedule with respect to my visit and the proposals I have (these sent previously as part of a fax to announce my visit).

18 March - afternoon

University of Burundi

Afternoon meeting with first Marie Josee Bigendako the head of Research. At the University again very helpful. Told her of plans regarding Nzeyimana - these were stated as acceptable to the University.

Brief meeting with Nzeyimana to learn that he is travelling to Belgium under separate funding (on the evening of the 18th). It is appropriate therefore that a later meeting is arranged with Nzeyimana in Brussels together with staff from the Dept of Chemistry at VUB (Vrije Universiteit Brussel) to consider the possibility of extending his stay there to commence training. This got the support of both Nzeyimana and Bigendako.

Met with Louis Nahimana of the Dept. of Geology, UoB to discuss the work proposal he has made which involves the installation of the X-ray diffractometer. This is a story which runs and runs. To recap the equipment was delivered some years ago, has never been unpacked (apart from the computer with which it was supplied) and the installation manuals are not available (these may or may not be at the residence of one of the departmental technical staff who died some months ago). GP has followed up with Philips Ltd. regarding sending an installation engineer but they feel that without the installation guide this may not be possible. Philips have no record of the exact specifications of the equipment shipped. The decision made in consultation with the Phillips engineers is that the cost of sending an installation engineer (c. \$10,000) is not worth it unless they have all the required documentation. LN will endeavour to see if he can recover the installation documents from the estate of the deceased technician and G. Patterson to explore whether a cheaper technical option exists i.e. sending out a technician to either install or at least produce a more detailed report of the further requirements. LN has produced a research programme for support of the project and requiring the XRD. This is given in the Appendix.

The equipment was examined and all seemed in good order as well as an appropriate place to install the equipment. The 675 MB computer seemed in good order though there was no evidence of software for the XRD loaded and discs could not be found (maybe with the installation manual!). It was also expressed that a water pump would be needed which may or may not be available locally and previous comments were that the detector could well have to be replaced after so much time in storage.

Evening drinks with the new Head of INECN and National Co-ordinator Mr Jean Berchmans Manirakiza.

20 March 1998

Trip to Centre Recherche de Hydrobiologie (Uvira).

Initial meeting was to examine the centre itself to establish priorities for refurbishment of the building and labs themselves as well as for basic equipment requirements. GP broke off from these discussions (which will be reported elsewhere by West and Menz) have discussions with the team from CRH who are likely to be involved with the sedimentation study.

These were¹:

Kagogozi, Bombi
Tshibangu, Kalala
Mbemba, Mavula
Kahindo, N'djungu
Mwenyemali, Banamwezi

The team seemed willing to commence a study on sediment inflows from some of the rivers close to the lab in Uvira. It was felt that the most appropriate course of action would be to build up a river monitoring programme in stages.

Stage 1. For the staff to commence a programme that could be started immediately.

(this programme would identify what archive records may exist on these rivers and to design a monitoring programme for stage 2 and the equipment requirements for the development of the programme to enter stage 2, at stage 1 it may be possible to gauge river heights on a daily basis)

Stage 2. To develop this programme with the provision of some basic equipment which could be sent to Uvira as quickly as possible by the project (this would probably include, filtration equipment and flow monitoring equipment)

Stage 3. To develop proposals for a more wide-scale monitoring programme which could be in place when full equipment has been supplied and refurbishment of the Uvira base has been completed.

¹ (Also Mudala (Geologist at the Institute of Natural Sciences) may be involved in this study - Kagogozi to approach him and, if he is willing to be involved, to define a role for him within the proposal)

Once confirmation has been received that work has commenced it was agreed that Kagogozo would compile a quarterly report indicating the contribution that each of those named above had made to the programme - this would initiate payment of the monthly Performance Related Allowances (PRAs).

22/3/98

CRH

A further attempt was made to travel to Uvira. This was aborted due to problems of immigration. However it was possible to meet Tshibangu of CRH at the border when clarification of the payment schedules to staff involved in the river monitoring at CRH, Uvira were made. The proposal is to involve the following staff at the following rates:

Tshibangu, Kalala(\$125 per month)
Kagogozo, Bombi (\$125 per month)
Mbemba, Mavula (\$100 per month)
Kahindo, N'djunga (\$100 per month)
Mwenyemali, Banamwezi (\$100 per month)

It was clarified that staff may be possible for them to be involved in more than one special study but these rates are based on their being involved in the Lake Tanganyika Biodiversity Project as a whole, and therefore will not rise if they become involved in other special studies

GP to complete ToRs for the initiation of this study (see above) and inform PCU to initiate payment from 1 March 1998.

Visit to Rusizi National Park and meeting with park warden (with KW). Also observed the Main Rusizi gauging station just north of the bridge.

23 March 1998

Trip to Gitega with Tharcisse Songore of DGGM

Met with Manassé Nduwayo head of IGEBU and discussed with him and Tharcisse the structure of a proposal to initiate river monitoring in the Tanganyika catchment. It was decided that parts 1a) and 1b) of previous ToRs sent to initiate this study should be carried out with a target to complete these by May 31 1998.

The four participants within this study should be

Mathias Sebahene of DGGM (\$150 per month)
Tharcisse Songore of DGGM (\$125 per month)
Manassé Nduwayo of IGEBU (\$150 per month)
and Gerard Ntungumburanye of IGEBU (\$125 per month)

be involved in this initial stage. Add to the ToRs should be the following:

The work will commence on 1 March 1998 (with the consideration that some work has already been completed to date by these four persons). The objective will be to report quarterly with the first quarterly report being the write up of the desk study and reconnaissance mission proposed in the ToRs.

GP to produce more comprehensive ToRs for this piece of work for transmission to DGGM and IGEBU as soon as possible after his return to UK. GP also to inform PCU of agreed input of these 4 personnel and initiate payment of PRAs (see above).

The previous DG of IGEBU, Longine Ndorimana, (present at Inception Meeting) was also met briefly in Gitega.

A courtesy call was made to the Head of INECN and National Co-ordinator Mr Jean Berchmans Manirakiza in his Gitega Office.

A further meeting was held with Gaspard Bikwemu, ex National Co-ordinator and now Lecturer in Dept of Agriculture of the University of Burundi (in Gitega). Bikwemu's CV was obtained and we discussed his further involvement in the Project. GB agreed to summarise his ideas for activities in pollen/vegetation studies. Andy Cohen (University of Arizona and Chief scientist on the coring work) has also been approached to consider an input by GB and the possibility of a complimentary upland pollen record to match that of the lake cores. Cohen's initial reaction is summed up as follows:

Bikwemu. I like the idea of a complimentary upland/marshland pollen record. Bikwemu should be able to recover this by himself, in fact with a simple hand corer. I can't speak for Dan [Livingstone] vis a vis Bikwemu though that is the obvious support laboratory, I think though that you should contact him and see what he says. If Bikwemu can collect some comparative onshore cores, cut them up and prepare them for analysis, and if Dan is interested in helping out then we could run the C-14 AMS dating here.

GP to promote this discussion to find mutually agreeable role for GB - later developments involved a suggestion by GP of reducing the 1 year posting of Emma Msaky (Tanzania) to one of six months and recruiting Bikwemu to continue to job for a further six months. To date no response has been received from Arizona - this may be inappropriate due to the effort required to train a person for this job may make 6 months - too short a productive period.

GB was also asked about the suitability of Jean Paul Ledant as Environmental planner, they having previously worked together. This was acceptable as far as GB was concerned.

24 March 1998 Final visit to DGGM. Sebahene absent due to illness but Songore was debriefed. Also a further visit was made to the Nahimana at the University but the findings there are rolled in with the report on the visit made on the 18th March (see above).

3. Action Points

Lateness of this report has rendered this section redundant. Basically all actions points have been followed up by the SS leader and the PCU

G. Patterson
26 June 1998

Appendix 1

Note sur la contribution du Département des sciences de la Terre au Projet sur la Biodiversité du Lac Tanganyika

Introduction

Dans le cadre du Projet sur la Biodiversité du Lac Tanganyika, une étude sur l'impact des apports minéraux sur l'environnement du lac est envisagé. Cette étude sera menée en tenant compte du facteur humain. En effet, l'accroissement de l'occupation par la population de la région surplombant le lac Tanganyika a eu comme conséquence l'augmentation de la superficie cultivée et par là exposée à l'érosion.

Méthodologie

Des estimations sur les quantités de terre transportées par les eaux de ruissellement seront faites pour quelques bassin-versants des cours d'eau se déversant dans le lac Tanganyika et situés non loin de Bujumbura tels que ceux de la Russizi, Ntahangwa, Kanyosha et Mugere.

L'analyse multitemporelle des images satellitaires "spot" devrait fournir des données sur l'évolution de l'occupation humaine sur les 20 dernières années. Elle donnerait également des enseignements sur la variation annuelle et pluriannuelle de la turbidité du lac Tanganyika.

Des indications sur l'accroissement de l'érosion devrait être également recherché dans les sédiments accumulés à l'embouchure des rivières ci-haut citées. Pour cela, il serait réalisé dans ces sédiments des prises d'échantillons sur les lesquels on effectuerait des analyses granulométriques, minéralogiques palynologique ainsi qu'une détermination d'âge.

Contribution du Département des Sciences de la Terre

Afin de pouvoir procéder aux analyses minéralogiques, le Département des Sciences de la Terre dispose d'un laboratoire de confection de lames minces et sections polies qu'il pourrait mettre à profit du projet sur la Biodiversité du Lac Tanganyika. Le Département des Sciences de la Terre est également prêt à disponibiliser un assistant pour mener des

recherches sur la pollution minérale induite par l'érosion et la sédimentation. Le Département dispose d'un diffractomètre des rayons-X non fonctionnel faute d'installation. Au cas où il venait à l'être, des analyses minéralogiques seraient effectuées pour le compte du projet dans des conditions particulièrement avantageuses.

Contribution du Projet sur la Biodiversité du Lac Tanganyika

Le Département des Sciences de la Terre sollicite le concours du Projet sur la Biodiversité du Lac Tanganyika pour l'installation de son diffractomètre de marque Philips type PW-1820.

Le Projet fournirait également des données sur des images satellitaires couvrant le lac Tanganyika et ses environs ainsi que des logiciels d'interprétation ainsi que des accessoires de traitement de données tels que des lecteurs de CD-Rom.

Remarque finale

Les contributions identifiées ci-dessus ne constituent qu'un minimum. Une intensification dans les interventions des deux parties est envisageable.

Fait à Bujumbura , le 18 Septembre 1997