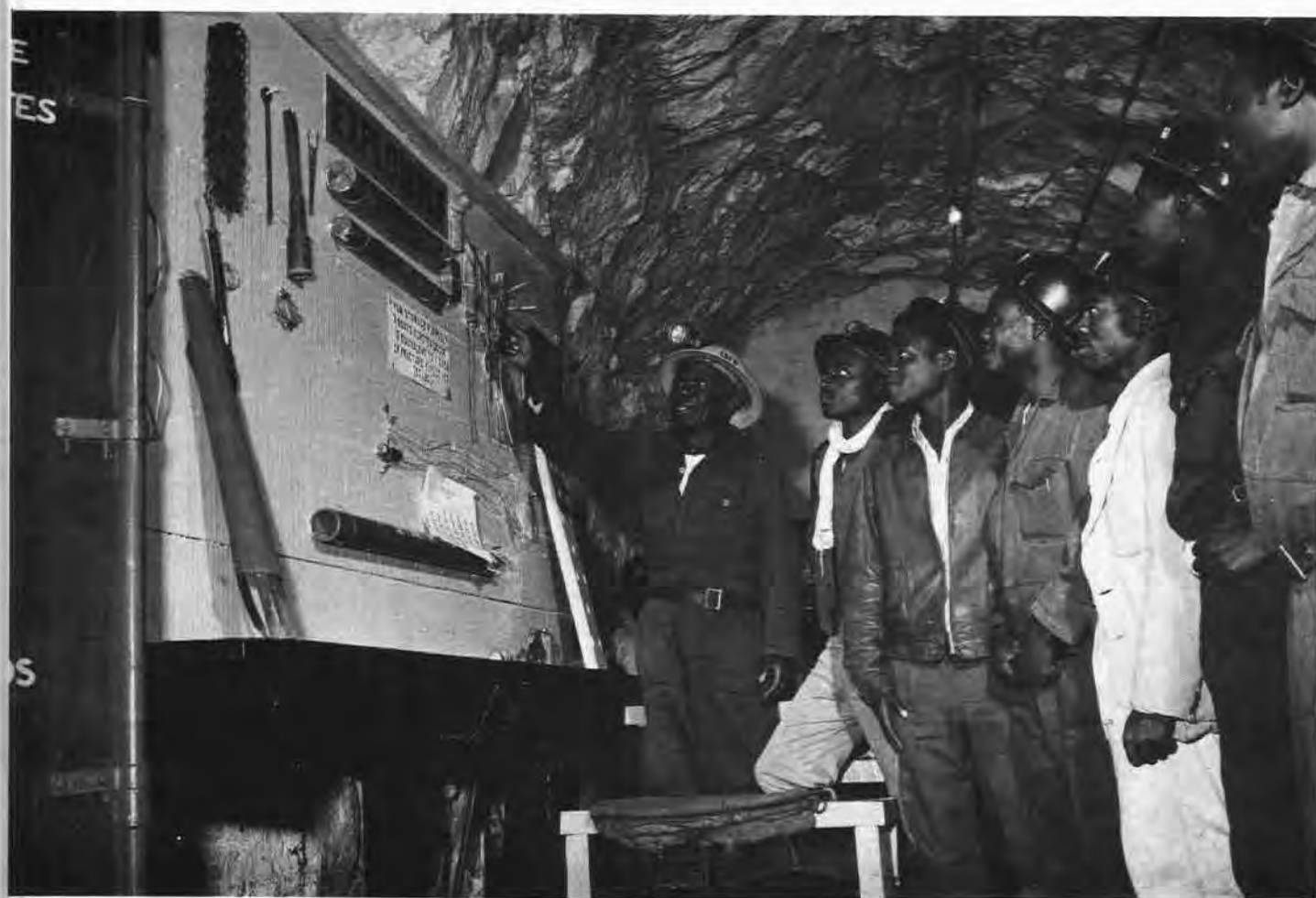


Education Division Documents No. 6

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Institutional Co-operation between The University of Zambia and The University of Luleå 1976-82

An evaluation made by Kaluba Chitumbo
and Sunit Ray



September 1982

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INSTITUTIONAL CO-OPERATION UNZA (UNIVERSITY OF ZAMBIA) AND LULEA UNIVERSITY. EVALUATION MISSION 26 JULY - 25 AUGUST, 1982

According to the specific agreement on education sector support between the Government of the Republic of Zambia and the Government of Sweden of June 25 1980, annual consultation shall take place in order to review the progress of ongoing activities, and formulate a plan of operation. In the second annual consultations, which took place in Zambia between September 14 - October 2 1981, it was agreed that an evaluation be made on the institutional co-operation between the School of Mines, University of Zambia (UNZA), and Lulea University.

The terms of reference for the Mission were as follows:

The evaluation mission shall review the operation of the Institutional Co-operation established between UNZA and LULEA in terms of the Agreement of 9 October 1975. It shall prepare a report for submission to SIDA and to the Government of Zambia, as well as to the co-operating Institutions.

The report of the Mission shall include but shall not be limited to the following:

- 1) a status report on the degree programmes in the School of Mines, the number of graduates, the number of students, progress towards the commencement of higher degree programmes, research activities,
- 2) a review of the staffing position in the School and how this has been promoted by the institutional co-operation,
- 3) a review of study tours undertaken in Sweden by members of staff from the School and an assessment of the contribution these have made to the development of the individual and of the institutions,
- 4) a review of the training programmes undertaken by students from UNZA who have gone to Sweden and an assessment of how these have contributed to the good of the individual and of the institutions,
- 5) a report on the participation by LULEA University in Studies with Zambian personnel aimed at improving teaching methods in Zambia,
- 6) the expenditure made under the project during the years of its existence and an examination of the method of disbursement and financial accounting in both institutions for project funds,
- 7) the benefits which have accrued to LULEA from the co-operation agreement,

- 8) an evaluation of the potential for future co-operation between the two institutions together with proposals as to how this might be financed,
- 9) examination of how the institutions co-operation has promoted or could promote joint research activities,
- 10) any other matter felt by the Mission to be relevant to the co-operation between the two institutions.

COMPOSITION OF THE MISSION

The Mission should consist of a consultant appointed by SIDA in consultation with the two institutions, assisted by a representative from Zambia.

LOCATION

The review should be carried out on site at UNZA and, at LULEA.

SCOPE OF WORK

The Mission shall work in close co-operation with SIDA and the two institutions and have access to relevant records and documents. The mission should work one week in Sweden and 3 - 4 weeks in Zambia (including report writing).

Between the two mission periods, necessary background material shall be compiled with the assistance of the two institutions.

The evaluation should be carried out early 1982.

FINANCING

The cost for the evaluation mission will be covered from SIDA-funds other than the funds for the development and co-operation programme with Zambia.

The members of the Mission were:

Dr K Chitumbo, National Council for Scientific Research, Zambia.

Mr S Ray, Consultant to Swedish International Development Authority, Sweden.

METHOD OF EVALUATION

The members of the Mission commenced the evaluation by studying in detail all relevant material made available to them. This research was conducted at:

- SIDA's Head Office in Stockholm, Sweden
- The University of Lulea, Sweden
- Swedish Embassy, Development Co-operation Office, Lusaka, Zambia
- The University of Zambia, Lusaka, Zambia

The members of the Mission in their preliminary discussions on the 25th July, 1982, drew up a plan of action, after having in detail studied its terms of reference. It was decided that besides studying relevant documents on institutional co-operation, a number of key persons involved in the programme should be interviewed. In accordance to this, a list of persons was agreed upon, and requests for interviews were immediately made in Stockholm, Lulea, and Lusaka.

The Mission then proceeded to identify relevant questions, and prepared a check list of the questions to be asked. Great care was put in ascertaining the order in which the questions were put to the interviewed persons, so as to ensure reliability in the answers, and facilitate later analysis of the interviews.

As part of its strategy the Mission agreed to include a question on its terms of reference. This so as to be informed directly by the interviewed, what specific question he or she expected answered by the Missions report. This was felt necessary because preliminary research had shown that the range of the investigation could not merely be restricted to an analysis of the exchange programme.

To get a valid view of an institutional co-operation it was found necessary to include information and data that preceeded the inception of the exchange programme. At its start, SIDA had already committed itself towards financing the building of the School of Mines and its equipment. This and other factors in the relationship between UNZA and Lulea could not be isolated in a viable evaluation. The Mission would like to point out that the terms of references should have been designed to evaluate the whole School of Mines project as such, and not just the institutional co-operation. The Mission has nevertheless done its utmost to set the institutional co-operation in perspective, and tried to review its performance on as wide a scale as possible. This was imperative so as to be able to make suitable recommendations for the future. A social benefit cost analysis on the School of Mines project, which would have included institutional co-operation could have resulted in a complete evaluation.

The Mission felt that the time allocated to it was not related to the demands made on it. The time, especially in Sweden was minimal. In the terms of reference the Mission was required to work in Zambia for 3 - 4 weeks.

The Mission would like to point out that no programme could be finalized before its first meeting in Stockholm. Thereafter, information was sent to the Development Co-operation Office in Lusaka. Unfortunately they arrived the day before the Missions arrival to Lusaka. Nevertheless due to the help extended, especially in the provision of transport, the Mission was able to carry out its itinerary although hard pressed for time.

An itinerary of the Missions programme is included as an Appendix 1.

The Mission would like to take this opportunity of thanking all those who assisted (in its preparing) by willingly complying to its requests for interviews, which were always very informative.

THE MINING SECTOR IN ZAMBIA

The mining sector in Zambia was initially almost totally dominated by foreign interests at the eve of Zambia's independence. The largest holding interests were concentrated to South African and British corporations. As part of the reforms to be implemented after independence, the state took over 51 % of the interests in the mining sector in December 1969, from the companies Roan Selection Trust and Anglo American Corporation. After the takeover, two new holding companies were formed, Roan Consolidated Mines and Nchanga Consolidated Copper Mines. Recently the mines have been re-organised as one concern called "Zambia Consolidated Copper Mines (ZCCM)."

The take-over was implemented via the emission of dollar stocks, which were used as payment to the former owners. It should be noted that the takeover resulted in no losses for the former owners, and was related to market rates for the stocks and shares. The former owners were promised full repayment for the dollar loans within eight to twelve years, and granted special privileges, in the form of stability in taxation until the dollar shares were repayed, profits for example, made during the period of repayment would be taxed less stringently for other companies and persons. However, the money thus generated was not reinvested in the mining sector by the former owners, and not of the finances required for new investments were procured via foreign loans.

As the former owners were further granted responsibility for the running, marketing and sales of the production from the copper mines, the situation left the Government of Zambia with a dilemma. The interests and other costs that were being paid to the former owners was substantially more than the profits made by the Mining Development Corporation. President Kaunda, decided in August 1973, therefore, to repay in full the former owners, to save further drain on the country's resources. The value of repatriation being around one billion Swedish kronors. The Zambian authorities took over the running of the mines at the same time.

At the planning stage of the School of Mines Project, a substantial number of skilled technicians, and engineers came from abroad. Their number in 1971 was around 5 600. The percentual ratio of foreign labour had, however, been reduced from a constant 16 % to around 9 % by the beginning of the seventies. Nevertheless, most of the higher posts were still held by expatriates. Zambia calculated that the need for qualified personnel to the mining sector at this time was around 3 000 persons. The number of available Zambian citizens in the sector was as low as 200 persons.

Around this time the training facilities available to personnel in the mining sector was restricted to the Zambia Institute of Technology, at the Northern Technical College. The training was not at university level.

The mining industry had themselves programmes for internal training and supplied stipendiums for around 500 students every year. It was hoped that some of these "staff learners" would continue to the university and acquire competence.

Planning from the Government of Zambia showed that the mining sector would need around 700 recruits with university qualifications between 1978 - 83. They analysed that the present needs were almost totally catered for via expatriate personnel. At the same time there was a tendency towards a regression in the recruitment of expatriate workers as Zambianization of the mining sector was brought into operation. It was therefore, envisaged that a mining faculty would cater for an increased Zambianization of the sector as outlined in the National Development Plan 1972 - 76, and pave the way for an increase in the number of Zambians at high technical levels, to replace expatriate staff.

One of the reasons that led to the establishment of the School of Mines was the interest being shown (by students and lecturers) in the faculty of Mining Technology, a part of the engineering faculty at the University of Zambia. A limited number of students were being financed via stipendiums from the state and mining industries at that time, and an increase was predicted for the future.

The mining school at the University of Zambia was at this time a direct development of the Mineral Engineering Department. This programme was initiated in June 1973 and had a limited curriculum directed towards mining technology. The programme was housed in temporary premises at the School of Engineering. The students in the mineral engineering department shared the curriculum with other engineering students during the first two years of the programme which was expected to be carried out over a period of five years.

The School of Mines Project started with an official request from Zambia in October 1973. This request was not made as a separate item, rather as part of the general lists of the areas of co-operation. The project was taken up in priority list B. The Ministry of Education, Zambia, further submitted a more detailed request to SIDA 1974-03-21.

The project as such had, however, already been discussed at the board of directors meeting at SIDA on February 4th 1974. Thereafter, planning of the projects details had been initiated.

SIDA appointed a special group in Stockholm to look into the feasibility of the projects different aspects. This group comprised of representatives from SIDA's education division, industry division, and country analysis division. The legal section of SIDA was also involved together with consultants from the Royal Technical University Stockholm, and The University of Lulea. After part of the groundwork a fact finding mission was sent to Zambia. This mission was led by Mr Oscar Wiklund, Professor Erik Forssberg, mineral dressing, Mr Leif Larsson, University Administration, and an architect Nils Larsson, from White Arkitekter AB. This mission visited Zambia during the period 1974-05-25 to 1974-06-02, thereafter they submitted a written report.

Based on this report and other information available to SIDA at that time, Sweden committed itself to the School of Mines Project. According to SIDA the goals of the project as they had been informed by Zambia, and through their own analysis showed that SIDA's involvement in the project would:

- help Zambia in its strive to train indigenous persons to eventually take over key positions in the Mining Industry,
- assist in filling the shortage caused by the difficulties then being experienced in recruiting expatriate workers. This would lessen the risks that could be faced if enough trained personnel were not available in the country, ninety-five percent of Zambia's export earnings at that time being copper,
- be an investment in education to serve the mining industry,
- serve to make the training faculty a centre of training for students coming from neighbouring countries such as Kenya, Malawi, and Tanzania, there being no other mining faculty in the area, other than the one in South Africa,
- further decrease Zambia's dependency on foreign interests within the mining sector.

SIDA, however, noted that the Swedish mission sent to Zambia in May - June had recommended certain changes in the planning of the proposed School of Mines buildings. The buildings it was felt would be too inflexible for future modification and expansion, especially in the areas of laboratories.

SIDA recommended the project to the Swedish Government and an agreement was signed between the Governments of Zambia and Sweden in October 1975. The Swedish commitment to the project was estimated at 20 million Swedish kronor.

AGREEMENTS AND CONTRACTS

Specific Agreement on Development Co-operation, School of Mines

A specific agreement on the School of Mines project was signed in October 1975. The agreement stipulated that in order to fulfil the objectives set out in the second National Development Plan, the Government of Zambia had decided to establish a School of Mines the main objective of which was to contribute to the Zambianization of the mining industry. The total capital for the School of Mines project was estimated to Kwacha three, five million, this being equivalent to 25 million Swedish kronor. Sweden made available the sum of 20 million kronor in grants towards the costs during 1974 - 1976, for the construction of the school buildings and student hostels, for equipment and for fellowships. The agreement also specified that the Swedish assistance would be made available in line with the general procedural provisions, follow the financial year, and the annual agreement between Sweden and Zambia on development co-operation. Finally Sweden undertook to bear the costs for fellowships, that would not exceed 780 000 Swedish kronor. The fellowships were to form part of an institutional co-operation between the School of Mines and a Swedish University. The details of such a programme was to be agreed upon by the two parties.

According to Article 3 of the specific agreement, Zambia agreed to make available funds, facilities, services and other resources in excess of those made available by SIDA for the implementation of the School of Mines. Swedish funds were not to be used to finance staff houses and other recurrent expenditures. The Ministry of Planning and Development, and Ministry of Finance Government of Zambia, would submit to SIDA the proposed plan of operation for the School of Mines for 1976, together with cost estimates. Further drawings of the buildings were to be supplied, together with reports of the construction progress. The agreement was to be valid until December 31, 1979.

Agreement between SIDA and the University of Lulea

Swedish International Development Authority and the University of Lulea agreed to abide by a contract signed on the 11th October 1976. The contract was in respect to the School of Mines Project.

In this contract (Annex 2) SIDA recruited the University of Lulea to carry out an "exchange programme", as specified for the School of Mines Project. The sum set aside for this programme was 780 000 Swedish kronor.

SIDA thereby gave the University of Lulea the responsibility of carrying out the "exchange programme". This in practice would amount to:

- advising the mining faculty at UNZA on its curriculum, and teaching materials,

- helping SIDA in recruiting personnel for the mining faculty at UNZA, or to other areas within the mining sector in Zambia, and preparing such personnel for field work by giving them relevant information on mining in Zambia,
- planning in detail and executing study programmes and study visits for persons holding stipendiums, or for teaching staff from the School of Mines as and when they were in Sweden, besides being responsible for all practical arrangements during their stay in Sweden,
- taking part in the preparation and execution of research activities which would result in an improvement of the educational programme within the mining sector in Zambia.

Besides these, the University of Lulea was required to propagate and inform persons and institutions in the Swedish mining sector of Sweden's involvement in Zambian mining education, thereby alleviating the level of information available to mining personnel in general.

Guidelines were set up in this contract relating to reimbursements. The University of Lulea was required to report to SIDA as and when required on future plans. These plans would have to be acceptable to the School of Mines. A financial report was to be submitted within 45 days after every three months period, on the current finances of the programme. The reports were to be written in English.

The contract specifically stated that the institutional co-operation between the School of Mines and the University of Lulea must pave the way towards lasting co-operation between the two institutions in future. Such co-operation was visualized taking place without investments in Swedish aid funds, and would be based upon mutual advantage for both UNZA and Lulea.

Early in 1972, a committee was set up by the ministry of Planning and finance, and Mining Development to examine ways and means of establishing a school of mines. The committee recommended that the School of Mines should be established in the already existing facilities at the University of Zambia. The School of Mines be an integral part of the University in common and comparable with other specialist schools of study in the University as shown in the organisational chart for the University in Appendix 3.

The School of Mines was established in Mining engineering Department of the School of Engineering and it consisted of three departments - mining, geology and metallurgy. The administration of the school has/is through the Board of studies, assisted by the advisory committee composed of members of the mining industry and allied fields in Zambia. The school is headed by the Dean and each department has a Head. The organisational chart of the school of mines is presented in Appendix 4.

The planning of the School of Mines was done by the staff of the then existing Minerals Engineering Department who were assisted by the University of Zambia Architect, Architects Whatkins Gray Woodgate, the University of Zambia Planning Officer and the Bursar.

Late in 1973, the Ministry of Planning and finance approached the Swedish International Development Agency (SIDA) for assistance in developing and financing the School of Mines within the University of Zambia. SIDA sent a study team to evaluate the plans for the School in May 1974. SIDA accepted to assist the Government of Zambia in establishing the School of Mines on 9th October 1975 with a sum of Kwacha 2.86 million (20 million Swedish kronor). The money was to used as follows:

School buildings - K 1.25 million (8.7 million Sw kr)

Student Accommodation - K 0.75 million (5.28 million Sw kr)

Equipment - K 0.57 million (4.00 million Sw kr)

Scholarships - K 0.11 million (0.780 million Sw kr)

Contingencies - K 0.18 million (1.24 million Sw kr).

The funds for the buildings and equipment were transferred by SIDA through the Ministry of Finance (Zambia) to the Ministry of Education. The Ministry of Education then finally released the funds to the School of Mines, University of Zambia. The transfer of funds from SIDA was made according to the Agreements between the Government of Zambia and Sweden.

Education Programme at the School of Mines

1 Curriculum

The curriculum extends over five academic years. During the first year fundamental scientific subjects (mathematics, chemistry, physics and biology) are studied. The second year consists of continued studies of scientific subjects and basic subjects of engineering. From the second academic year onwards there is a dividing up on the specializations into mining, geology and metallurgy. Each year the students have to fulfil courses corresponding to four credits as a minimum. Some courses comprise a whole credit (365 hours) and some a half credit. The detailed list of courses are given in Appendix 5, 6 and 7.

Practical training is essential part of the degree course and is normally carried out in the third and fourth year long vacations (totally five months).

2 Academic Staff Numbers

The staff establishment of the University of Zambia is 22 and only 17 positions have been filled. There are no teaching assistants at present. The detailed listing of the staff numbers from 1973 to 1982 are given in Appendix 8. The list of names of the academic staff for 1982 are also included (Appendix 9).

3 Student numbers

The data in Appendix (Tables 1 - 2 and Figure 1) depicts the production targets, enrolment and output of graduates since the establishment of the School of Mines. Five foreign students have graduated (from Botswana and Zimbabwe) and others (13 Tanzanians) are currently taking under-graduate studies at the School of Mines.

4 Research and Post-graduate Programmes

Research activities at the School of Mines is limited. The evaluating mission was only able to identify one active project: The use of satellite images in evaluating structure of Zambia in relation to Mineral Occurrences, a project supported by SAREC funds. Projects like iron ore reduction, cobalt distribution in the smelter and geological work on precambrian Greenstones in Zambia have not really taken off the ground.

Because of lack of research activities at the School of Mines, post-graduate studies have not been established. However, the evaluating mission was informed by the Dean of the School of Mines that guidelines for post-graduate studies have been formulated and one student has been recruited for MSc degree. It is envisaged that the student will do 40 % of his research work at the School of Mines and 60 % in Zimbabwe and Holland.

5 Equipment

The evaluating mission was informed by the Dean, that the School of Mines is reasonably equipped for under-graduate teaching. The facilities for post-graduate and research work are limited. Most of the equipment available in the School of Mines (Appendix 10) have been bought through SIDA technical aid as per 9 October, 1975 agreement between the Government of Zambia and Sweden. The evaluating mission also learnt that the capital allocation by the University of Zambia to the School of Mines since 1978 has been non existent.

6 UNIVERSITY OF LULEA

The University of Lulea started in 1971 and is the only University in Sweden offering a degree in the classic mining sciences. This education provides theoretical knowledge and practical experience for mining engineers, metallurgists and geologists. The interaction between the University of Lulea and the School of Mines, UNZA, started in 1974 when Prof Erik Forssberg, the Head of the Division of Mineral Processing at the University of Lulea came to Zambia as part of SIDA study team to evaluate the plans for the building of School of Mines. Since then Prof Forssberg alone has functioned as the link between SIDA and the University of Lulea in matters concerning institutional co-operation between School of Mines and University of Lulea.

The relevant areas of interest to the School of Mines found at the University of Lulea are mainly in the two departments: Mineral Processing and Prospecting and, Mining and Underground Construction. The divisions in these departments include

inorganic chemistry, Mineral Processing, economic geology, applied geophysics, mining and rock excavation, rock mechanics and mining equipment engineering. The two departments employ 93 people including 58 working in teaching/research and have a total of 1 030 students with an intake of 30 students per year. The departments offer under and post-graduate studies. There are also strong research programmes covering the following areas: Mining Geology, geotechnical prospecting techniques, off-shore technology, methods of concentrating ore, after treatment of mineral products, geophysical prospecting for ore, water and industrial minerals, and interpretation of geophysical data, engineering geology, rock stability and mining mechanics, mining methods, machinery for mining and processing rock.

Because of the short stay (1½ days) of the evaluating mission at the University of Lulea, it was not possible to compile detailed breakdown of the course content and the extensive research facilities available in the two departments of Geotechnology. This data was necessary in identifying possible areas of institutional co-operation between the University of Lulea and the School of Mines.

7

INSTITUTIONAL CO-OPERATION/EXCHANGE PROGRAMME, SCHOOL OF MINES - UNIVERSITY OF LULEA

The Exchange Programme was part of the institutional co-operation between the University of Zambia, School of Mines and the University of Lulea.

On the outset it must be pointed out that an isolated analysis of the exchange programme between the two institutions would have a very marginal effect in the assessment of the institutional co-operation as a whole. It is therefore, imperative to make clear that "exchange programme" should be considered as only part of the co-operation. Institutional co-operation, the Mission feels, must be looked at in a wider perspective.

As per the contract signed between Swedish International Development Authority, SIDA and the University of Lulea on the 11th October 1976, 780 000 Swedish kronor were set aside from the framework of the total budget of the School of Mines to facilitate the implementation of an exchange programme. The sum of 200 000 Swedish kronor, was for use during the period 1976-01-01 to 1976-12-31. The remaining funds were to be used yearly as and when decided upon by the two institutions.

The funds were, however, retained by SIDA, and as the contract stipulated, paid out to the University of Lulea, after the University had submitted reports of expenditures incurred. Lulea administered independently, at the University of Lulea, the exchange programme was made the responsibility of Prof Erik Forssberg, and although no formal document exists to that effect, Prof Forssberg was expected to function as the coordinator for the exchange programme.

The fact that no formal agreement on the guidelines of the exchange programme existed is an important factor. The University of Zambia were not aware of the fact that a contract existed between the University of Lulea and SIDA. Besides,

this they claim that no detailed programme on the exchange procedures were reached. The programme was thus carried out informally in mutual understanding between the two institutions.

Financial reports were submitted by Prof Forssberg from the University of Lulea. They show the different expenditures that were incurred by the programme (Annex 11). The progress reports, are not very detailed, in as much they merely specify the activities that have been carried out without making a detailed analysis, or, expressing opinions as to their planning, implementation, evaluation, and effects. The programme met the expenditure of 2 (two) members of the teaching staff from the University of Zambia, School of Mines, and 18 (eighteen) students registered at that faculty. The programme also financed the costs incurred in maintaining 2 (two) academic staff members from Sweden at the School of Mines, and short visits from representatives from Lulea University to the University of Zambia.

The persons who visited Sweden from the School of Mines were Dr Mwalula, Dr Mwenechanya and 18 students from the third and fourth years of the five year curriculum at the School of Mines.

The persons who visited the School of Mines from Sweden were Prof Gotthard Bjorling, Erik Navarra, and Prof Eric Forssberg.

Prof Bjorling worked at the faculty in Zambia for approximately three months. Dr Navarra was a member of the teaching staff at the School of Mines for a period of two years. Prof Forssberg's visits were of shorter duration, in connection with the opening of the School of Mines, UNZA, where he presented a paper, at a seminar.

The financial statements made available to the Mission show that, some of the expenditures incurred with a number of visits such as airline tickets had been paid by either SIDA, or the Development Co-operation Offices at the Swedish Embassy in Lusaka, and not directly via the funds allocated to the exchange programme. This together with the 100 000 Swedish kronor that have been earmarked for the programme for 1982-83 would probably raise the total cost of the exchange programme to around one million Swedish kronor, as against the total costs incurred per 1981-12-31 of 812 021:40 Swedish kronor. The exchange programmes budget has therefore been more than the 780 000 Swedish kronor that were primarily allocated to the programme. The excess seems to have been financed via remaining funds from the total School of Mines project SIDA funds of 20 million Swedish kronor.

Dr Mwalula visited Lulea as the then Dean of School of Mines. His visit was primarily to orient himself on the University of Lulea's facilities, and discuss the exchange programme. He stayed in Sweden for a period of two weeks, in 1976. During his visit he could study at first hand the two main mining complexes Boliden, and LKAB in Sweden, where the students from the School of Mines were to be sent for their vocation training, Dr Mwalula had found the visit stimulating, but observed that the period of his stay was short.

Dr Mwenechanya visited Lulea in 1978. His mission was to acquaint himself on the resources available in Sweden. He was allowed to view iron ore reduction processes at some industries. This was important to the School of Mines, and Zambian mining as well, as there were ongoing discussions in the mining sector in Zambia on the feasibility of implementing iron ore processing. Dr Mwenechanya was impressed by what he saw, and would have liked to have been allowed a longer period of study.

Four of the 18 students were interviewed by the Mission at the School of Mines at UNZA. Besides this, the Mission studied in detail all the reports submitted by the students over the years on completion of their training. There is no doubt that the study visits were appreciated by those who went to Sweden. They had no serious complaints as to the practical arrangements around their stay in and around Lulea. They were, however, in some cases given very short notice prior to their departure. This had created problems in Zambia, in as much as their travel documents, had not been prepared. There seems to have been a communication problem in general between the University of Lulea, the University of Zambia, and SIDA's Offices in Lusaka. This no doubt due to the fact that Lulea are not able to communicate directly with UNZA via telex, and have had to rely on SIDA to co-ordinate their efforts. This physical lack of communication together with the absence of formal guide-lines on institutional co-operation has created difficulties and misunderstandings. The Mission feels that communication channels should have been planned out in detail, prior to the commencement of the programme to ensure a smooth implementation. The Mission has been unable to establish even how and why or by whom the student exchange programme was envisaged. There seems to be a general consensus at both institutions to the fact that students visiting Sweden during their vacation would be "beneficial". The students would get to see an industrialized country, and be allowed a total immersion in advanced technology for a period of six weeks. This would act as a stimulant for them on their return to Zambia. The above argument no doubt being true to some extent, the Mission feels nevertheless an analysis of the effects of such a programme, as compared to its investments should have been done. As it has been carried out, the students who have been sent to Sweden have not had their study trips, or as they are termed as UNZA vocational training, integrated to their regular curriculum. Only the best students from Metallurgy and Mining Departments at the School of Mines have been granted this opportunity, and the objectives set out for their programme somewhat diffuse. The School of Mines has prepared a check list of the study items they want their students to pursue. The students who were interviewed could not verify if this check list had been made available to Lulea and the industries they had been allocated. Exposure to advanced technology for six weeks must have a beneficial effect on the students as individuals. The Mission, however, fails to see any lasting effects on the mining faculty in Zambia and Sweden. The schools do not gain any substantial benefits from this student transfer. The vocation training of Zambian students in Sweden should not have been given priority in the first place, had it, however, seemed necessary

detailed analysis of the programme should have been made integrating it to the curriculum of the School of Mines. Finally, the programme if analysed absolutely necessary, should have been made available to all students at the School of Mines.

As it has worked to date, the programme gives the students the opportunity of working at two Sweden's best known mining complexes, Boliden, and LKAB. They have been sent to these industries through the efforts of Prof Forssberg at Lulea University, who has had to put down a lot of effort in arranging their stay in Sweden, and negotiating with the industries concerned on the subject of trainee positions. The students have been well looked after during their stay, and given a subsistence allowance. At the beginning they were given a small salary by the industries themselves. This was discontinued due to the Swedish labour unions objections, and the regulations governing employment in Sweden. In most cases they have had a cicerone at the plant, a contact man, who has helped them with their training. A small gratuity amounting to 80 Swedish kronor per day has been paid out to these persons. They have been allowed to actively participate in mining, or in the laboratory. A few of the students have pointed out that they were unable to find meaningful duties at the start, as the industry had not been fully briefed about them. Language was sometimes a problem together with the timing, as it has coincided with the Swedish industrial vacation. The overall impression of their stay was, however, positive a few students wanting to return. At its inception only fourth year students were sent to Sweden. Due to a clash in their curriculum which stipulated training at Zambian mines during the fourth year of their study, the exchange programme started catering for third year students. The third year students interviewed felt they would have benefited more if they had been given the opportunity at a later stage in their training, as they were not familiar with some of the theories which governed the processes they saw in action at the Swedish mines, thus confirming that, fourth year students were more suitable for the programme.

The Swedish content of the exchange programme were primarily Prof Björling from the School of Mines and Metallurgy at the Royal Institute of Technology, Stockholm, and Dr Erik Navarra from the University of Lulea.

Prof Björling stayed in Zambia from January 20th through April 19th 1977. He worked as a teacher giving a course in non-ferrous extractive metallurgy to fourth year students. He prepared a compendium for this course as well. Besides this he held a course in Metallurgical furnaces for the fifth year students at the School of Mines.

Prof Björling advised the school on the organization of its laboratories, and on programme for education of Masters of Science in Metallurgy.

Outside the School of Mines he performed a critical study on an assessment of Zambia Steel Project, undertook technical visits within the mining sector, and gave a lecture on Auto-genous smelting of copper concentrates.

During his time with the School of Mines at UNZA, Prof Björling made a number of observations on the educational programme. He found that the training offered was far too directed towards the present needs of the country, rather than befits a technical university, projected for the countries technical activities in the coming eight to ten years. The School of Mines role in Zambianization was given priority over the academic interests, and the needs of the Zambian mining/industrial sectors of the future.

He found that Zambia would benefit from reducing its unilateral dependence on copper, and make efforts towards starting up production of steel. This would stimulate indigenous steel based industry, make Zambia self dependent in the area, and even generate exports in the future.

The education that was being offered according to Prof Björling was more theoretical and academic than technical. He recommended the establishment of more laboratories to achieve this end. The School of Mines was, however, found lacking in planning and space utilization, and such laboratories would be difficult to establish due to bad planning of the school buildings. The laboratories were essential for research activities if the school wanted to establish a post graduate programme.

Commenting on the staffing situation, he observed that most of the staff were expatriates, and that it would take a considerable time to replace them. He advised the recruitment of teaching staff, especially young teachers from industrialised countries to alleviate the acute staff shortage at the school. He decried the absence of assistants to the academic staff, a prerequisite to such education. Finally he advised the stimulation of research activities, and pointed out that without a post graduate programme the basis of research activities would be limited. Research would have to be supported by processing required equipment, and ensuring proper administrative support together with a good library.

Prof Björling's impact in the School of Mines has been found to be of great significance by this Mission. Many of the observations made by him still holds. His stimulus in the field of research on iron ore reduction, has been taken up by one of the staff members of the school, and could eventually lead to a closer co-operation between the School of Mines and Lulea in the future.

Dr Navarra, was assigned to the school between July 1977 and July 1979. He was asked to give two courses in Physical and Engineering Metallurgy for third and fifth year students. In addition he was asked to teach a course in Chemical Thermodynamics to third year students.

Besides being responsible for these courses, Dr Navarra supervised one student working on a project every academic year, interviewed metallurgy students on vacation training in Zambian mines, organised excursions for fifth year students to the Research and Development Institute of the ZCCM at Kalulushi.

Even Dr Navarra, decried the dearth of assistants in his department of metallurgy, just as Prof Björling had done previously. This deficiency resulted in the lecturer having to besides lecturing and giving tutorials, even setting up laboratory exercises, and conducting their implementation. He observed that resources were very limited due to lack of funds, inadequate practical co-operation between the school and industry, and finally low interest on the part of the staff. Dr Navarra found the administration at the University in general and also the School of Mines inefficient, both in academic and auxiliary matters. He recommended that the staff in the Department of Metallurgy diversify their activities into research. He emphasized the need for graduate students or teaching assistants, and technicians to fully utilize the laboratories. This could be implemented by recruiting associate experts via SIDA. Dr Navarra suggested finally that the extremely high costs of Swedish experts be reviewed, as the University of Zambia had suggested the costs incurred in keeping him, more than they could afford.

Dr Navarra has not been replaced after his departure. The Mission found out that his efforts both in the classroom and in practicals very much appreciated. His suggestions on assistants were the same as those expressed by the School of Mines. His interest in research has resulted in a continued academic correspondence between himself and Dr Mwalula. The Mission understands that there are plans to implement a joint research activity should funds be forthcoming. A concrete activity of this nature would be very beneficial to the institutional co-operation between School of Mines, UNZA, and the University of Lulea.

FINDINGS

1) A formal contract/agreement on institutional co-operation between the University of Zambia, and the University of Lulea does not exist. The Activities carried out have been decided upon on mutual understanding. This has not resulted in actively generating co-operation between the two institutions. The Mission finds that a document stipulating the guidelines for institutional co-operation a prerequisite for the programme, and such a document should have been worked out by SIDA, UNZA and LULEA before the inception of the programme.

The absence of a formal agreement on the areas of co-operation has been handicap for the University of Zambia. UNZA has been unable to verify its actual rights and obligations. UNZA has, however, passively accepted the situation.

2) SIDA has not actively followed the exchange programme, and have besides transferred total responsibility to the University of Lulea. The Mission finds that SIDA's role as financier for the School of Mines project inconsequent with its participation

and the following-up of the programme to ensure that Swedish aid had been effectively used. A planning error has been the signing of a contract with only the University of Lulea. The contract would have proved more beneficial had it been reached with both the University of Zambia, and the University of Lulea.

3) The degree programmes at the School of Mines had during 1980/81 167 registered students. These were divided amongst the second and fifth year students. The number of graduates produced during 1980/81 totalled 31. See table. Referring to the graph one can see that the projections calculated in 1976 regarding the output of graduates has been fulfilled.

4) The School of Mines has commenced on drawing up guidelines for a post graduate programme which would give the student a Master of Science degree.

5) Research activities at the School of Mines is at present very limited. This is due to:

- a) the heavy workload on the teaching staff
- b) the absence of assistants or junior teachers
- c) the non existence of a post-graduate course, which is a prerequisite to generating research
- d) inadequate and under utilized laboratory facilities (for post-graduate research).

Potential for joint research between the two institutions exist and are outlined in recommendations.

6) The staffing situation is still unsatisfactory. Of the 22 staff position, 17 are at present filled. Four of these staff members are Zambian (see table). A higher content of Zambian staff would have been evident had three of the Zambian staff members not left to join other institutions and organisations. Had they stayed on, the staffing situation would not have been as acute.

UNZA does not present as attractive a position as other governmental jobs, or those offered by the mining industry. Institutional co-operation brought Dr Navarra to the School of Mines from Lulea University, and Prof Björling from KTH in Stockholm. Their work has had lasting effect at the School of Mines. Capacities of their kind would be needed in the future.

7) The members of the staff from the School of Mines who visited Sweden, Dr Mwalula, and Dr Mwenechanya, were favourably impressed by their study tours. They both found it beneficial.

8) The training programmes undertaken by students from the School of Mines at the Swedish mining companies are difficult to specify. The companies themselves have not submitted any documentation on the students training activities. The programmes can only be evaluated by the documents made available from the University of Lulea, in their quarterly reports to

SIDA and the students own reports after completion of their training together with the interviews conducted by this Mission. The quarterly reports are very brief, and give little information on the details of the training. The students reports, and the interviews conducted by the Mission with some of the students show that they have found their sojourn in Sweden beneficial. The exposure to modern mining technology they were offered, gave them insight into their future careers as mining engineers, and probably inspiration to continue in the mining industry. The School of Mines, however, does not gain directly from these visits. It can be hoped that some of the undergraduates who completed the programme would in the future take up employment or conduct research activities at UNZA, thereby contributing to its development. The Mission finds no evidence of Lulea University having benefited in any way other than culturally by being a part of the exchange programme. There were very few persons involved with the programme at Lulea, a factor which the Mission finds to be unfortunate.

9) The Mission finds that no specific activities, or participation from Lulea University in studies with Zambian personnel aimed at improving teaching methods in Zambia has taken place. However, Prof Bjorling and Dr Navarra have directly contributed to planning courses.

10) The expenditures incurred by the exchange programme have been accounted for by Prof Forssberg at Lulea University in the form of quarterly reports to SIDA, as per the contract between SIDA and the University of Lulea. The funds allocated, 780 000 Swedish kronor have been totally utilized. The accounting made available by Lulea shows that 819 021:41 has been spent by 1981-12-31. A detailed breakdown of each post was not available. There seems to have been funds utilized from the total budget for the School of Mines project to pay some of the travel expenditures. This together with the 100 000 Swedish kronor allocated for 1982/83 would possibly bring up the total costs incurred by the exchange programme to over one million Swedish kronor. The greater part of this budget has gone towards financing the maintenance of the visiting lecturers recruited by SIDA with the help of the University of Lulea (543 688:30 Swedish kronor, see Annex 11).

The University of Zambia has not been in any way responsible for the budget set aside for the exchange programme. The Mission has therefore been unable to trace any accounting pertaining to this programme. The University of Zambia and the University of Lulea have not had a common accounting system for the exchange programme.

11) The University of Lulea has not acquired any direct benefits from its co-operation programme. The programme as such has been the responsibility of one person at Lulea. This together with the lack of a formal agreement on co-operation procedures makes an evaluation of the benefits difficult.

12) The Mission finds that potential for co-operation between the two universities exists. In its recommendations, the Mission has outlined concrete steps towards implementing such a programme.

13) The money made available by SIDA to the School of Mines had to be transferred from Sweden through the Ministry of Finance, Government of the Republic of Zambia, to the Ministry of Education and finally to UNZA. The bureaucratic process had created delays in the release of funds by the Ministry of Finance. DCO has, however, negotiated this matter recently with Ministry of Finance and an agreement on a system of disbursement reached, to facilitate speedy transfer of funds Sweden to Zambia.

14) The Mission also noted that apart from SIDA's initial capital investments for equipment to the School of Mines, no investments have been forthcoming from UNZA to the School in the years 1978 - 81.

9

SUMMARY

The School of Mines Project was started in 1974. The Government of Sweden and the Government of Zambia signed a specific agreement on development co-operation on this project in October 1975. The total capital requirements for the project was calculated at 25 million Swedish kronor (approx three, five million Kwacha), Sweden agreed to make available a grant amounting to 20 million Swedish kronor towards financing the project.

The funds have been utilized to set up the School of Mines building at the University of Zambia Campus, and to equip its laboratories. Student hostels were also set up with these funds. One component of the agreement specified an institutional co-operation between the University of Zambia and a Swedish University, SIDA chose Lulea University to co-operate with the School of Mines.

A contract was signed between University of Lulea and SIDA. No contract was, however, signed between Lulea and UNZA. This has caused the programme to function very informally.

This informality is evident also in SIDA's choice of making the programme almost totally the responsibility of one person at Lulea.

Institutional co-operation resulted in the sending of 18 Zambian students to do vocational training at Swedish mines. It provided for the maintenance of two lecturers from Sweden at the School of Mines. The costs incurred by maintaining them have accounted for the largest part of the 780 000 Swedish kronor that had been earmarked for institutional co-operation.

The money spent in training students for six weeks in Sweden benefits the students as individuals, but not directly any of the two institutions.

SIDA should along with the two institutions try and organise the institutional co-operation in a more specific way so that any future activity is allowed better guiding.

- 1) The institutional co-operation as per the specific agreement on the School of Mines project, 1975 should continue between UNZA and the Swedish University of Lulea.
- 2) An agreement of the institutional co-operation should be signed between UNZA and University of Lulea establishing direct links between the two institutions. SIDA should play an active role in preparation and the implementation of such an agreement.
- 3) The objectives of the institutional co-operation should be identified and well defined from the beginning and should at least include the following:
 - a) Establish Collaborative research programmes
 - b) Promote the staff development programmes in the School of Mines (Zambianisation)
 - c) Assist School of Mines increase its output of graduates.
- 4) The Mission recommends an initial co-operation period of five years to ensure the continuity and full development of specific co-operation projects.

To fulfill the objective recommended by the Mission the institutional co-operation must take the following framework.

A) Collaborative Research

Collaborative research projects should be immediately undertaken, and the following subjects included:

Metallurgy and Mining

- a) Iron ore reduction
- b) Bacteria leaching
- c) Rock mechanics

Geology (covering areas of interest in Zambia).

B) Staff Development Programme

The School of Mines should recruit one staff development fellow each year for a Master's training course. The fellow should undertake theoretical courses at the School of Mines and the practical work at the University of Lulea. The staff development fellow will get UNZA's MSC degree. This arrangement should be considered temporary during the time the School of Mines develops its research facilities.

C) Staffing

To alleviate the shortage of teaching at the School of Mines, the University of Lulea should provide one teaching assistant each year in the fields of Metallurgy, Mining and Geology during the contract period - Recruiting Swedish assistants would incur less expenditure than recruitment

of Swedish lecturers. Finally assistants would then diversify into research activities. Zambia technical staff from the School of Mines should be allowed to undergo training at the University of Lulea.

d) There should be a yearly academic exchange of visiting lecturers from both universities with planned programmes based on institutional needs.

e) There shall be established in each institution a person or a group responsible for the operation of the programme of co-operation and for the implementation of its details at each end. The responsible authorities in each institution shall exchange annual reports on the operation of the agreement, and shall submit copies of these reports, with full financial details, to the offices of the financing authority.

5) The Mission recommends that Zambian under-graduates vocational training in Sweden should be discontinued.

6) The areas of exchange of personnel outlined by this Mission include the training of post-graduate students from Zambia in Sweden, along with staff development training, of both academic and support staff. Emphasis should be given to the staff development training scheme as this is deemed to be a priority requirement at the University of Zambia. Financial assistance could also be given by SIDA to the recruitment of teaching assistants, and technicians.

7) The Mission finds that a system of topping up of salaries offered by UNZA to teaching assistants recruited in Sweden should be forthcoming from SIDA. In this scheme the teaching assistants would be offered a normal UNZA salary, and prerequisites, while SIDA would be able to assist with the difference in payments between a Swedish salary and that offered by UNZA to expatriate teachers. The contracts it must be emphasized would have to be with UNZA and the recruited person. SIDA's responsibility would be limited to the difference in pay that would be verified. The recruits would have to be chosen from Lulea, or by Lulea from existing personnel resources in Sweden. The same could apply to lecturers from Sweden to the School of Mines. The Mission recommends that Lulea assists in the recruitment of this personnel category, on UNZA terms, and that a financial settlement be made between SIDA and the two institutions as to the difference of pay scale.

8) Technical staff could be trained in Lulea either by means of scholarships or funds made available by UNZA, the University of Lulea the Swedish Educational system, or SIDA. The possibilities of financing via international organizations, or UNZA funds should be given priority.

9) The Mission recommends that the two institutions collectively identify the funding needs, and thereafter seek financial resolutions. The Mission does not recommend a unilateral dependence on SIDA funds, although it recognizes SIDA's responsibilities in the School of Mines project, which has been primarily implemented through Swedish aid.

10) The Mission recommends that SIDA investigates and prepares a brochure containing guidelines which can be utilized in future projects involving institutional co-operation. The guidelines should clearly define SIDA's role.

A P P E N D I C E S

<u>DATE</u>	<u>TIME</u>	<u>EVENT</u>
25.7.82	p.m.	Meeting Mr. Ray & Dr. Chitumbo
26.7.82	a.m.	Discussions Ray/Chitumbo
	p.m.	Discussion Ray/Chitumbo and Gunnel Mellbring Education Division, SIDA.
27.7.82	a.m.	Research SIDA archives.
	p.m.	Intervie Mr. P. Kokeritz, SIDA EDU. DIV.
28.7.82	a.m.	Flight Lulea
	p.m.	Discussions with Prof. E. Forssberg Dept. Mineral Dressing Univ. of Lulea., Interview Dr. E. Navarra.
29.7.82		Interview Prof. Forssberg. Research into documents provided by Luleau.
30.7.82		Discussions Ray/Chitumbo, on Lulea visit. Planning for Zambia.
31.7.82		Free.
1.8.82		Ray departure Zambia.
2.8.82		Ray arrival in Zambia.
3.8.82	a.m.	Discussions Lena Schildt, D.C.O. Swedish Embassy, Lusaka.
	p.m.	Discussions Ray/Chitumbo.
4.8.82	a.m.	Intervie Lena Schildt. Interview Brih Ostberg, Dev. Cooperation Attache', Swedish Embassy.
	p.m.	Dr. E. Jere Dean, School of Mines.
5.8.82	a.m.	Research Swedish Embassy
	p.m.	Interview Dr. E. Jere 4 undergraduate Students, School of Mines.
6.8.82	a.m.	Interview Dr. J.B. , Head/Dept. Metallurgy S.O.M.

<u>DATE</u>	<u>TIME</u>	<u>EVENT</u>
6.8.82	p.m.	Research, School of Mines.
7.8.82		Planning & discussion Ray/Chitumbo.
8.8.82		Free
9.8.82	a.m.	Interview Mr. Mwanang'onze, Perm. Sec. Min. of Mines. Mr. Mufaya Mumbuna, Minister of Mines.
10.8.82	a.m.	Interview Ministry of Finance Mr. Dhalabhoy Accountant Interview Father Kelly Vice Chancellor Univ. of Zambia.
	p.m.	Departure 15.00 hours for Kitwe.
11.8.82	a.m.	Interview Dr. Mwenechanja Manager MITS, Klulushi.
	p.m.	Discussions Ray/Chitumbo
12.8.82	a.m.	Return to Lusaka
	p.m.	Analysis of interviews.
13.8.82	a.m.	Interview Mr. Suko, National Comm. for Development Planning.
14.8.82	a.m.	Analysis of interviews
	p.m.	Drafting parts of the report.
15.8.82	a.m.	Analysis of material
	p.m.	Drafting report.
16.8.82	a.m.	Interview, Dr. Jere, School of Mines Prof. Turner, School of Mines Prof. Misra " " " Prof. Unugru " " "
	p.m.	Analysis and drafting.
17.8.82	a.m.	Analysis
	p.m.	Drafting

<u>DATE</u>	<u>TIME</u>	<u>EVENT</u>
18.8.82	a.m.	Analysis
	p.m.	Drafting
19.8.82	a.m.	Analysis
	p.m.	Drafting
20.8.82		Total report writing 1st draft
21.8.82		Analysis & modification of 1st draft.
22.8.82		Final draft.
23.8.82		Presentation of final draft.
24.8.82		Mr. Rays departure for Sweden.

A V T A L

Mellan Styrelsen för Internationell Utveckling (SIDA) och Högskolan i Luleå har denna dag följande avtal träffats

1

Bakgrund

Sverige lämnar bistånd till Zambia. Varje område för bistånd behandlas i ett (vanligen flerårigt) insatsavtal (specific agreement). De medel som varje år av Sverige ställs till förfogande för finansiering av biståndet inom de olika områdena avtalas i ett årsavtal (annual agreement). Procedurer m m regleras i ett stående proceduravtal, som emellandt ändras.

Sverige och Zambia har ingått bifogade insatsavtal om stöd till gruvfakulteten i Zambia. Av den beräknade kostnaden för utbytesprogrammet, 780 000 kronor, har 200 000 kronor avsatts för perioden 1 januari 1976 - 31 december 1976. Återstoden avses tas ur kommande års anslag.

Kontakter har redan förekommit mellan högskolan och gruvfakulteten.

2

Uppdraget

SIDA uppdrar åt högskolan att genomföra utbytesprogrammet enligt insatsavtalet i den omfattning som avgörs av de belopp som varje år avsatts för detta ändamål.

Detta innebär bl a att högskolan skall

- bistå gruvfakulteten med råd angående undervisning och undervisningsmateriel inom gruvområdet;
- hjälpa till när SIDA rekryterar personal för tjänstgöring vid gruvfakulteten eller därmed sam-

manhållande verksamhet och därvid bl a orientera utresande personal om de förhållanden i fråga om gruvdrift och undervisning som de kommer att möta;

- detaljplanera och genomföra utbildning och studiebesök i Sverige för stipendiater och lärare vid gruvfakulteten samt svara för de praktiska arrangemangen kring deras vistelse i Sverige. Som riktlinje för ersättningar till besökande zambier skall tjäna Svenska Institutets praxis i motsvarande fall;

- delta i förberedelser och genomförande av utrednings- och smärre forskningsuppdrag, som syftar till förbättrad undervisning inom gruvområdet i Zambia.

Sveriges stöd till gruvfakulteten väntas medföra den sidospejken att kännedomen ökar i Sverige om förhållandena i Zambia inom gruvdrift och undervisning inom gruvområdet. Högskolan skall stödja detta genom att aktivt sprida information i fackkretsar.

3

Ersättning

Högskolans ersättning skall utgå ur de belopp som enligt insatsavtal och Årsavtal avsätts för insatsen.

Ersättningen omfattar:

- a) Arvode motsvarande mistade avlöningsförmåner för det antal timmar högskolans personal lagt ner på uppdraget jämte däremot svarande sociala utgifter. Ersättning utgår för högst åtta timmar per dag och person
- b) Biljettkostnader i turistklass (flyg); andra biljettkostnader enligt statens resereglemente
- c) Hotellkostnader och uppehälle i enlighet med statens utlandsresereglemente, resklass B, för svenskars besök i Zambia och i enlighet med Svenska Institutets praxis för zambiers besök i Sverige.

Ersättning utbetalas i efterskott mot faktura, kvartalsvis alternativt månadsvis. I faktura skall noggrant anges art och omfattning av utfört arbete. Utlägg skall vara skäligen styrkta. Betalning erläggs av SIDA inom 30 dagar från mottagandet av faktura genom inbetalning på postgirokonto nr 76 08 13 -1.

SIDA äger rätt att ta del av högskolans räkenskaper i den mån dessa avser uppdraget.

4

Rapportering

Vid tidpunkt som överenskommes mellan SIDA och högskolan skall högskolan för SIDA:s godkännande förelägga en plan för verksamheten under respektive budgetår. Planen skall vara godkänd av gruvfakulteten.

Högskolan skall inom 45 dagar efter varje kvartals utgång till SIDA rapportera hur genomförandet av planen gestaltat sig och vilka ändringar som föreslås för resten av planens giltighetstid. Rapporten skall också redovisa utfallet av budgeten.

Planen och rapporten skall vara på engelska.

5

Upphovsrätt

a) SIDA har rätt att fritt utnyttja rapporten och allt annat material som erhållits av högskolan i samband med uppdraget. SIDA äger låta publicera sådant material eller tillåta dess utnyttjande även utan samband med uppdraget efter högskolans medgivande.

b) Högskolan har rätt att utnyttja det ovannämnda materialet för ändamål som saknar samband med uppdraget först efter samtycke från SIDA.

6 Utlämnande av handlingar

Handlingar som utarbetas av eller överlämnas till högskolan med anledning av uppdraget får inte utan SIDA:s medgivande utlämnas till, visas för eller på annat sätt återges för tredje man i annan mån än som krävs för uppdragets genomförande.

7 Framtida samarbete

Ett av syftena med detta avtal är att förbereda ett framtida samarbete mellan högskolan och gruvfakulteten. Ett sådant samarbete tänkes ske utan stöd av biståndsmedel och grunda sig på de ömsesidiga fördelarna för parterna.

8 Giltighet

Detta avtal skall träda i kraft vid undertecknandet och gälla till 31 december 1979. Uppsägning dessförinnan kan ske med sex månaders varsel.

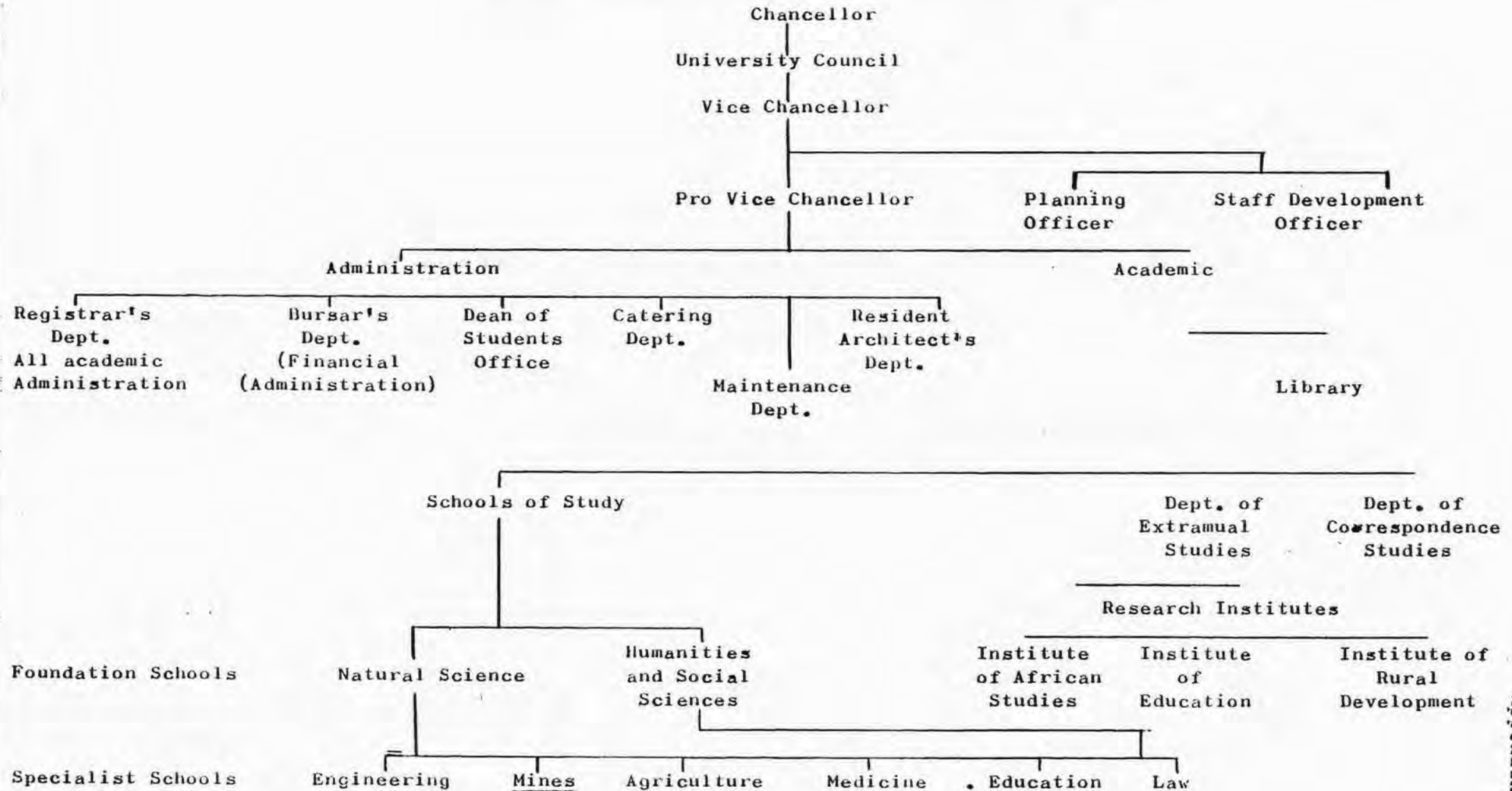
Detta avtal har upprättats i två exemplar, varav parterna tagit var sitt.

Stockholm den 1976

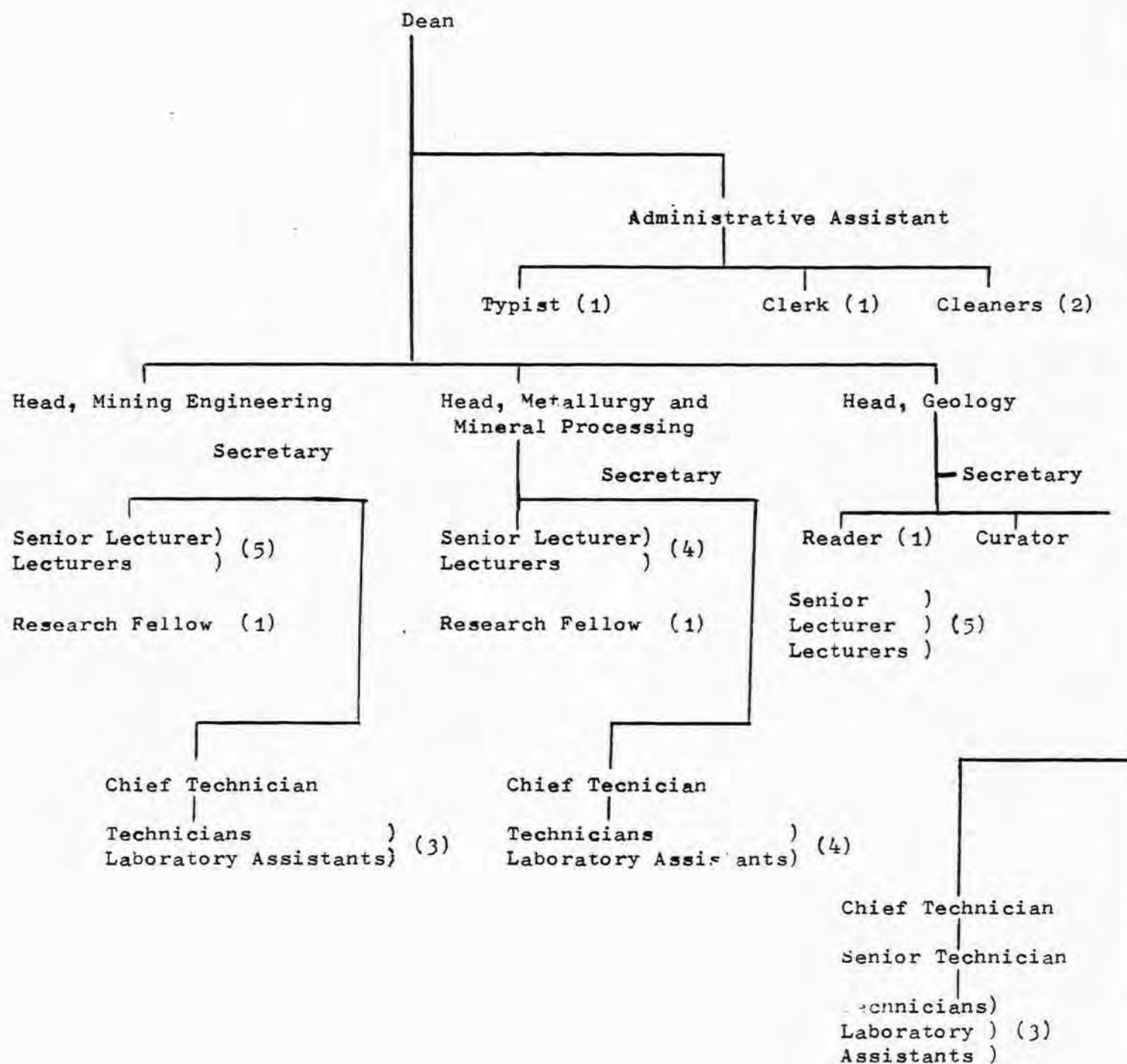
Styrelsen för Internationell Högskolan i Luleå
Utveckling

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ORGANISATIONAL CHART FOR THE UNIVERSITY OF ZAMBIA



Organisational Chart for the School of Mines
(as envisaged for 1977, at full establishment)



CURRICULUM
GEOLOGY DEPARTMENT

M 210	Mathematics
P 270	Physics
C 220	Chemistry
GG210	Principles of Geology

YEAR 3

GG310	Mineralogy and Petrography
GG321	Geomorphology and Photogeology
GG332	Structural Geology I
MI 224	Introduction to Mining Engineering
C 320	Analytical Chemistry
M 261	Statics

YEAR 4

GG410	Igneous and Metamorphic Petrology
GG421	Sedimentology and Stratigraphy
GG441	Economic Geology of Metalliferous Ores
GG452	Resources, Energy and Mining Geology
CE473	Surveying
MG313	Computer Techniques

YEAR 5

MG 510	Project
GG 511	Independent Mapping
GG 522	Geology of Zambia
GG 531	Hydrogeology
GG 542	Engineering Geology
GG 551	Applied Geochemistry
GG 562	Applied Geophysics

METALLURGY AND MINERAL PROCESSINGDEPARTMENTYEAR 2.

EM 210	Engineering Mathematics I
ME 203	Engineering Drawing
MM 213	Introduction to Metallurgy, Mineral and Rocks
CE 200	Applied Mechanics
C 220	Chemistry

YEAR 3.

EM 310	Engineering Mathematics II
P 260	Physics
MM 321	Chemical Thermodynamics
MM 313	Physical Metallurgy I
MG 313	Computer Techniques
CE 363	Fluid Mechanics.

YEAR 4.

MM 413	Mineral Dressing I
MM 420	Extractive Metallurgy
MM 420	Theory of Metallurgical Processes
MM 443	Transport Phenomena
MM 453	Solidification and Casting
MM 553	Furnaces and Refractories.

YEAR 5.

MG 510	Project
MM 510	Special topics in Extractive Metallurgy
MM 533	Mineral Dressing II
MM 523	Physical Metallurgy II
MM 563	Equipment and Process Design
MG 543	Economics in the mineral Industry

MINING ENGINEERING DEPARTMENTYEAR 2.

EM 210	Engineering Mathematics I
CE 280	Applied Mechanics
ME 203	Engineering Drawing
GG 210	Principles of Geology (offered in Geology Department)
MI 224	Introduction to Mining Engineering

YEAR 3.

EM 310	Engineering Mathematics II
EE 213	Principles of Electricity I
ME 343	Thermodynamics I
CE 383	Fluid Mechanics I
MI 313	Rock Mechanics in Mining
MI 323	Technological Processes of Mining Engineering
CE 473	Surveying

YEAR 4.

MM 413	Mineral Dressing I
MM 313	Physical Metallurgy
EE 313	Principles of Electricity II
MI 412	Mining Technology
MI 423	Operations Research in Mining
MI 431	Mines Surveying
GG 452	Resources, Energy and Mining Geology
MG 313	Computer Techniques

YEAR 5.

MG 510	Project by all 5th year students
MI 553	Course Project on Mining Engineering
MG 533	Mine Management
MI 513	Mine Environment and Safety Engineering
MI 523	Mine Mechanisation
MI 533	Mine Planning
MG 543	Mine Economics

STAFF NUMBERS

<u>ACADEMIC YEAR</u>	<u>NON-ZAMBIAN</u>	<u>ZAMBIAN</u>	<u>SDF.</u>
1973/4	12	1	2
1974/75	* 14 (1)	1	2
1975/76	14 (1)	3	1
1976/77	11 (1)	3	1
1977/78	12 (1)	3	0
1978/79	12 (1)	3	0
1979/80	13 (1)	4	2
1980/81	15 (1)	4	3
1981/82	13	4	4

* The number in brackets indicates the number of teaching assistants.

SDF stands for Staff Development Fellow. Two SDF's are to return this year (one with M.Sc. and another with a Ph.D). One of the other two just started his Ph.D. programme while the other started on his M.Sc. this academic year.

LIST OF ACADEMIC STAFF FOR 1982DEAN

Dr. E.H. Jere B.Sc. (Rutgers), M.Sc., Ph.D. (Lehigh)
Senior Lecturer.

DEPARTMENT OF GEOLOGY

Prof. D.C. Turner B.Sc., Ph.d. (London), Professor and Head
Prof. R. Unrug M.Sc. (Krakow), Ph.D. (Jagellonian), Professor
Dr. A. Skowronski M.Sc. (Krakow), D.Sc. (Krakow), Associate Professor
Dr. C. Mdala B.Sc. (UNZA), Dip (Jerusalem), M.Sc. (UNZA),
Ph.D. (Colorado), Lecturer.
Dr. V.N. Rao M.Sc. (Andhra), M.Sc. (Vikram), Ph.B. (Sagar)
Lecturer
Mr. L.S. Andersen Cand. Scient., M.Sc. (Copenhagen) DANIDA expert

DEPARTMENT OF MINING ENGINEERING

Dr. M.M. Mpande B.Eng. (UNZA), M. Eng. (McGill), Ph.D. (Leeds)
Lecturer, Acting Head
Mr. M.P. Singh B.Sc., Post graduate Diploma in Management
Studies (Wales), Lecturer
Dr. V. Pronin M.Sc., Ph.D. (Moscow), Associate Professor
Prof. G.B. Misra Associate India School of Mines, M.Sc.
(Melbourne), Ph.D. (Kharagpur), Visiting
Professor under UNESCO
Dr. A.L. Sokov M.Sc., Ph.D. (Moscow), Senior Lecturer

DEPARTMENT OF METALLURGY AND MINERAL PROCESSING

Dr. J.B. Mwalula B.Sc., M.Sc., Ph.D. (Ljubljana), Senior
Lecturer and Head
Dr. I. Imris M.Sc., Ph.D. (Kosice), Associate Professor
Dr. L.K. Imris M.Sc., Ph.D. (Kosice), Senior Lecturer
Dr. E.H. Jere B.Sc. (Rutgers), M.Sc., M.Sc., Ph.D. (Lehigh)
Senior Lecturer
Dr. S.J. Mwenechanya B.Sc. (Newcastle), M.Sc., Ph.D. (MIT), Lecturer
Dr. S.K. Roy B.E. (Calcutta), M.Tech. (Kharagpur)
Ph.D. (Kharagpur), Lecturer
Dr. D.V. Singh B. Tech., M. Tech (Kharagpur), Dr. Ing.
(Freiberg), Lecturer
Mr. J.W. Deelder B.Sc., M.Sc. (Delft), Lecturer under NUFFIC

ACADEMIC STAFF ON STUDY LEAVE

Mr. W.C. Lombe B. Min. Sc. (UNZA), M.Sc. (London)
Mr. C.C. Mwaba B. Min. Sc. (UNZA)
Mr. C. Chama B. Min. Sc. (UNZA)

Items procured with SIDA funds by the School of Mines

Geology Department

Thin section - making machine
Rock Mineral specimens
Microscopes and optical equipment
Magnetic separator
Chemicals
Polished Ore Minerals, Hardness tester
Microscope Photometer
Engineering geology apparatus
Geologist compasses
Mirror stereoscope
Microscope slide cabinet
Diamond cutting disks
Gas pyrometer

Metallurgy

Mechanical tensile equipment
Leaching apparatus
Buehler dilatometer
X-ray equipment

Mining Engineering

ROC 601 crawler rig with COP BO drill
BBC 120 FC
Compressor
BB46 sloper
Atlas Copco Pixie Ioning drill
Bench Mount diesel saw CCW015
Saw Blades CCW015

continue

Activities carried through the period 1976-1981	Budget	Spent by 31.12.77	Spent by 31.12.78	Spent by 31.12.79	Spent by 31.12.80	Spent by 31.12.81	TOTAL
j) Sojourn of lecturer 1979 Dr Navara	265 000			241 129			241 129
k) Sojourn of 4 4th year students from the School of Mines to work in Sweden	95 000			43 102:56			43 102:56
l) Administrative cost Högskolan i Luleå				170:90			170:90
m) Compasses bought by Biståndskontoret				1 160			1 160
n) Administrative cost Högskolan i Luleå				5 318:85			5 318:85
o) Sojourn of 4 4th year students from the School of Mines to work in Sweden					44 068		44 068
p) Administrative cost Högskolan i Luleå					4 943		4 943
q) Sojourn of 4 4th year students from the School of Mines to work in Sweden						54 555	54 555
r) Administrative cost Högskolan i Luleå						4 251	4 251
TOTAL		90 505:25	288 621:80	330 353:76	50 734:30	58 806	819 021:4

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EXCHANGE PROGRAMME SCHOOL OF MINES - HÖGSKOLAN I LULEÅ

Activities carried through the period 1976-1981	Budget	Spent by 31.12.77	Spent by 31.12.78	Spent by 31.12.79	Spent by 31.12.80	Spent by 31.12.81	TOTAL
a) Visit by dr Mwalula to Sweden 2 weeks	10 000	10 653:64					10 653:64
b) Administrative cost Högskolan i Luleå		244:40	223:50				467 :90
c) Björling as lecturer in extractive metallurgy	80 000	67 256:30					67 256:30
d) Participation by 2 repr from Högskolan i Luleå in the official opening of the School of Mines	15 000	12 022:35	8 758:35				20 780:70
e) Sojourn by 2 4th year students from the School of Mines to work in Swedish mines and metallurgical plants	20 000	328:86					328:86
f) Sojourn of lecturer 1978 Dr Navara	240 000		235 283				235 283
g) Sojourn of 4 4th year students from the School of Mines to work in Swedish mines and metallurgical plants	40 000		35 485:56	28 585:95	1 723:30		65 794:81
h) One member of staff from the School of Mines to visit Sweden for two weeks in 1978	15 000		8 871:39	8 957:85			17 829:24
i) Administrative cost Högskolan i Luleå				1 928:65			1 928:65

Table 1

STUDENT NUMBERSForecast of Student Number as per planned in 1976

Session	Student Number				Total	Graduates			Total
	Year 2	Year 3	Year 4	Year 5		Met	Min	Geo	
1976/77	27	35	13	12	87	6	3	3	12
1977/78	32	22	32	13	99	6	6	1	13
1978/79	23	26	21	32	103	13	13	6	32
1979/80	38	18	24	21	101	8	8	5	21
1980/81	38	30	17	24	109	10	10	4	24
1981/82	41	30	28	17	116	6	6	5	17
1982/83	40	33	28	28	129	11	11	6	28
Total					129	60	57	30	147

STUDENT PROGRESSION

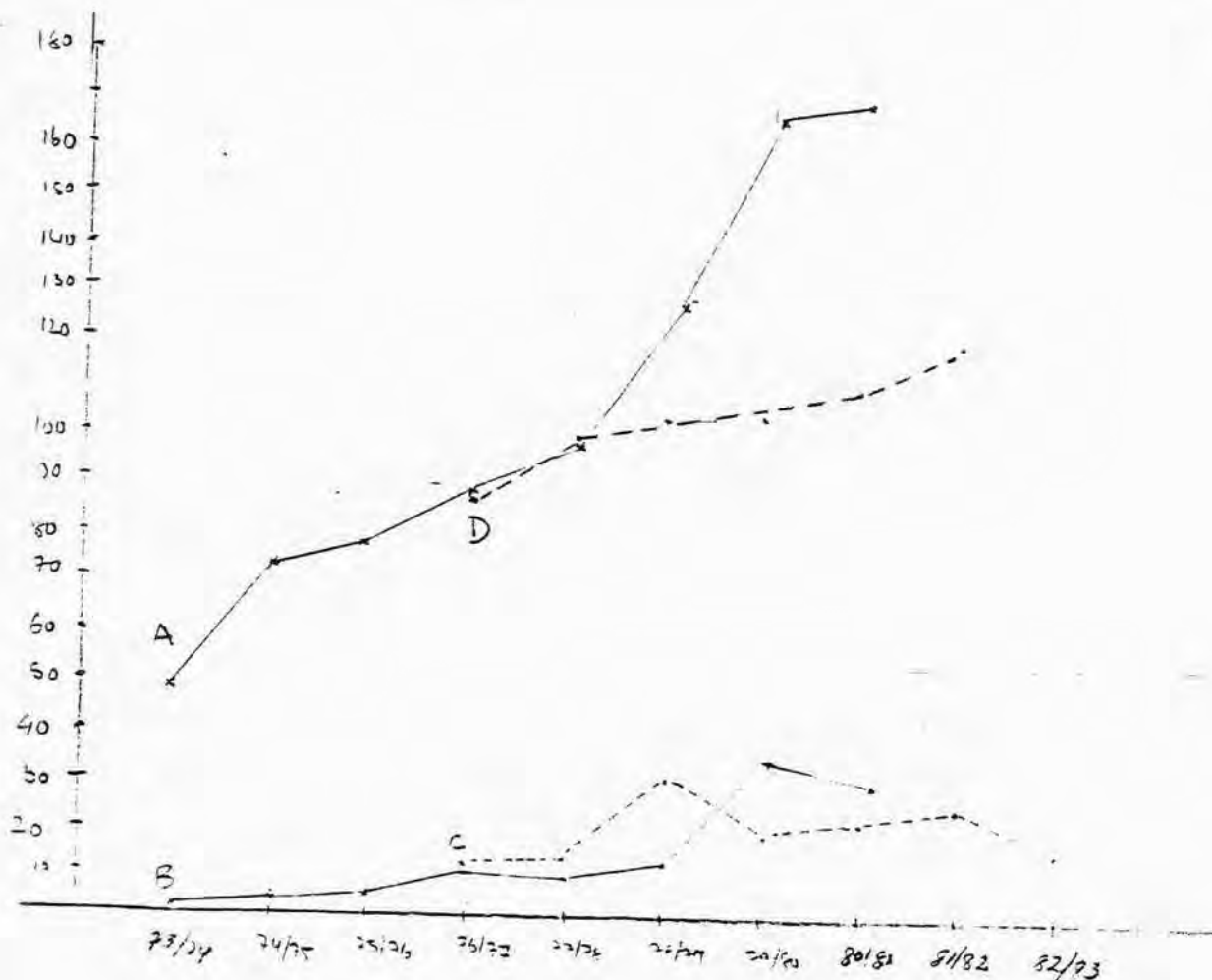
Session	Student Numbers				Total	Graduates			Total
	Year 2	Year 3	Year 4	Year 5		Met	Min	Geo	
1973/74	35	5	5	3	48	-	3	-	3
1974/75	45	20	5	4	74	2	2	-	4
1975/76	45	14	12	5	76	3	2	-	5
1976/77	42	25	10	11	88	6	2	3	11
1977/78	41	34	13	10	98	4	5	1	10
1978/79	49	32	35	13	129	5	5	3	13
1979/80	59	41	31	35	166	11	14	10	35
1980/81	49	57	30	31	167	9	14	9	31
TOTAL					846	40	46	26	112

Met. Metallurgy & Mineral Processing

Min. Mining Engineering

Geo. Geology

Figure 1



- A. TOTAL NO. OF STUDENTS REGISTERED AT SCHOOL OF MINES
- B. TOTAL NO. OF GRADUATES PRODUCED
- C. NUMBER OF GRADUATES PROJECTED IN 1976 (VICE CHANCELLOR'S FIGURES)
- D. NUMBER OF STUDENTS (INTAKES) 1976 - 81 (VICE CHANCELLOR'S FIGURES) (PROJECTIONS)

The Education Division at SIDA initiates and implements a large number of studies regarding education and training, especially in SIDA's programme countries.

In order to make these studies more readily available, they will be published in a series called "Education Division Documents".

Included in this series:

**No.1: "Education and Training in Sri Lanka" by O.Engquist,
L.Jivén, K.Nyström**

**No.2: "Education and Training in Botswana 1974-80"
by J.O.Agrell, I.Fägerlind, I.Gustafsson**

**No.3: "The Indian Non-Formal Education Programme"
by O.Österling, J.Persson**

**No.4: "Education and Training in Bangladesh" by A.Gorham,
J.I.Löfstedt**

**No.5: "Education in Guinea-Bissau 1978-81" by R.Carr-Hill,
G.Rosengart**

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Zambia and The University of Luleå 1976-82" by K.Chitumbo,
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