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ANNUAL REPORT FOR THE YEAR 1980
ERTS ZAIRE

FINAL REPORT
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PREFACE

This report is in two parts. The first describes progress of the project in 1980. The second summarizes the total project and evaluates its effect within the context of the Project Agreement and the Project Paper.

Part 1 - REPORT FOR 1980

ACHIEVEMENTS

- a. Demonstration project was initiated in North Shaba; an agricultural inventory of 60,000 square kilometers and geological mapping of 120,000 square kilometers resulted.
- b. All AID supplied materials arrived.
- c. At least 3 ERTS Zaire members have become better than average LANDSAT interpreters.
- d. Six natural scientists from at least two agencies were trained at ERTS Zaire in LANDSAT interpretation resulting in various valuable reports and five masters theses dealing with environmental aspects of LANDSAT applications.
- e. A visiting consultant assisted in the training of ERTS Zaire personnel and in preparing a report on the agricultural production of North Shaba.
- f. At least ten agencies were contacted regarding ERTS potential for national development and demonstrations were conducted for two such agencies.
- g. A LANDSAT mosaic of Zaire was produced in collaboration with the Institute Geographique du Zaire (I.G.Z.) at a scale of 1:2,000,000.
- h. Two ERTS Zaire members were sent overseas (the U.S.A. and France) for training in remote sensing in collaboration with the U.N.D.P.
- i. Two additional demonstration projects were initiated at ERTS, one in forestry, the other in pasture land analysis.
- j. Preparation of a proposal to create a Regional Remote Sensing Center under the aegis of the C.E.A.
- k. Training of various members of the I.G.Z. and ERTS Zaire to conduct geodetic ground control using multiple satellite overpasses.

Problems

Progress of this contract was affected in 1980 by the following:

a. Demonitization of the local currency in January 1980 caused lengthy delays in initiating the demonstration projects. The lack of funds curtailed activities for at least six months.

b. The assignment of ERTS to SPE, another division of the Presidency, and the replacement of Sendwe Ilunga as Director.

c. Inability of AID to address management problems at ERTS.

Achievements at ERTS Zaire during 1980-81

Inspite of the mentioned difficulties, there were significant achievements.

North Shaba Demonstration Project

I. Agricultural Demonstration:

1. Mapping of 60,000 square kilometers of land.
2. Inventoring of agricultural areas for:
 - a. 1957 (from aerial photos).
 - b. 1980 (showing 120% increase in Agricultural Land Use).
 - c. Parts of the area for 1973.
3. Inventory of areas planted in corn and prediction of the 1980 crop.
4. Training of two Zairians from ERTS Zaire to conduct such inventories.
5. Soils map for 60,000 square miles.
6. Agricultural potential map for 60,000 square miles.

II. Land use (environmental) demonstration:

1. Mapping of major land class types of four LANDSAT scenes.
2. Deforestation map for the Nyunzu area (project North Shaba) showing a large amount of deforestation in a limited area.

III. Geological Demonstration:

1. Mapping of geologic units in a four LANDSAT scene area.
2. Mapping of structures in a four LANDSAT scene area.
3. Location of at least one tin deposit during field work related to LANDSAT based hypothesis.
4. Development of a geomorphic model for the region.
5. Creation of a geologic model for the existance of diamonds in this area and possible location of Kimberlite pipes.
6. Creation of a model for the genesis of tin and colombo-tantalite deposits.
7. Training of one geologist and draftsman from ERTS Zaire.

Other Accomplishments Include:

- IV. The Initiation of a forestry inventory demonstration project in Northern Bandundu (two LANDSAT scenes). The project got underway on February 18, 1981 under Cit. Aduya as project manager.
- V. The initiation of a pasture inventory in Southern Bandundu (Gungu) by Cit. Ilunga which began February 5, 1981. This project is of great interest to the UNDP and World Bank.
- VI. A member of the Department of Agriculture, Cit. Bakajika, has been trained for 18 months with ERTS Zaire and with the consultants to conduct remote sensing surveys. He has demonstrated excellent capacity for this work and will, after training at the EROS Data Center in Sioux Falls, become the liaison with ERTS Zaire for all remote sensing projects at Department of Agriculture.
- VII. Five members of the Geography Department of the University of Lubumbashi have completed or are working on their masters theses using LANDSAT to evaluate the changes in animal/bird habitats and to map land use as it relates to national park management. This program will continue under the very capable leadership of Mme. Bourgeois, Professor of Biology and Geography at the University.

VIII. A large number of agencies were contacted and invited to participate in LANDSAT projects at ERTS Zaire. Unfortunately though interest was shown, formal agreements are required and further efforts must focus on debureaucratizing all agency heads in order to accomplish the goals.

The most effective work was carried out at the I.G.Z. where a geodetic positioning training program was initiated using Motorola units for ground control. In addition, some photolab work was done at I.G.Z.; aerial photos of demonstration areas were acquired and used, and most significantly a primitive but good mosaic of Zaire was constructed at a scale 1:2,000,000 with the collaboration of I.G.Z. and the Department of the Environment (S.P.I.A.F.). Future work with I.G.Z., the Departments of Agriculture and Environment should not be difficult. The Departments of Mines and Geology are controlled by the French Government (B.R.G.M.) and inroads are difficult if not impossible.

A forestry inventory using LANDSAT was conducted by ERTS Zaire on an area mapped by S.P.I.A.F. (Service Permanent D'Inventaire et Amenagement Forestier). The results were excellent. Agreement between the field data and LANDSAT derived data was better than 90 percent.

- IX. Training of various members of the ERTS Zaire team under the aegis of AID or UNDP has benefited the ERTS Zaire team enormously, notwithstanding any conclusions AID may have drawn to the contrary. The trainees quickly realized, upon their return, that the exposure had provided them with a much less parochial view of remote sensing. Whereas previously they had been well trained theoretically they now have a good, if limited, practical knowledge in LANDSAT use.
- X. Demonstrations of the North Shaba work were presented at ERTS Zaire to the staff and visiting students, to AID, to the U.S. Embassy, to the Department of Agriculture, to the Service Presidential d'Etudes. Other demonstrations were scheduled for the month of March 1981 in agriculture and geology...
- XI. A proposal was prepared for submittal to the C.E.A. for the establishment of a Regional Remote Sensing Center

in Kinshasa. This proposal and its budget is to be voted on during the meetings to be held at Bamako in March, 1981. This proposal calls for expenditures of 2 to 3 million dollars over 2 years and additionally 12,000,000 Zaires. If this project is funded, careful attention should be given to the make-up of the consultant staff and assurances obtained that the management of all affairs will be shared.

Part 2 - SUMMARY OF TOTAL PROJECT

The project was meant to achieve certain goals as described in the Project Agreement. Most of these were met. However, because of lack of funds, local mismanagement, limited AID Mission support, and Zairian political infighting, the project cannot be said to have met its potential.

Various previous reports detail the reasons for this. Some additional reasons should be mentioned and some repeated, as they relate to the Project Agreement.

1. It was nearly impossible to provide ERTS Zaire the all important photolab to supply outside customers with LANDSAT images, because of lack of dollar funding.
2. It is highly unlikely that any one individual could effectively carry out the requirements of the Project Agreement under the financial and management conditions prevailing at ERTS Zaire and at the AID Mission. It is unlikely that these goals could have been met had the conditions been optimal because these goals were too ambitious and funding was insufficient.
3. There was limited AID Mission involvement in the project.
4. The discrepancies between the Project Agreement and the contract provide a clue to the insensitivity of various parties to the needs of such a project and its potential for success.
5. The lack of specific guidelines regarding the role of the consultant at ERTS Zaire were a major factor in whatever failures occurred.
6. The lack of specific guidelines regarding financial management and control of counterpart funds also played an important role in undermining the effectiveness of the consultant and the ultimate success of the project.
7. The Zairian budget did not meet the specifications set forth in the Project Agreement. The Zairians could barely pay their salaries and had no operating funds other than those from counterpart. Total counterpart funds expended for the years 1977-1981 were approximately 900,000 Zaires.

Benefits of LANDSAT Project to Zaire and Its Economy

Though the results are tentative, the demonstration projects proved that LANDSAT Imagery can be used to evaluate the resources of a country like Zaire, that Zairians can be trained (easily) to conduct such work themselves and that this information can be used as a data base for agricultural inventories, rural development, mineral industry expansion, environmental monitoring and the planning of national and international development programs. The project also demonstrated that the products of high technology may be applied to development needs without introducing socioeconomic problems.

Recommendations:

1. Any future program should be of three years duration.
2. Should employ three Americans; one administrative with financial control, one scientific, and one technical.
3. Funding in U.S. dollars should be at a level of 2-2.5 million dollars and local (counterpart) funding should be at 4 times that level. (See proposal for "International Remote Sensing Center" prepared for C.E.A.).
4. The ERTS program should be depolitized and the staff should be reduced.
5. The AID Mission should use LANDSAT regularly in planning and executing its projects.
6. The Project North Shaba area should be inventoried regularly using and improving on the data and methodology provided under this contract.

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Appendix A

This Appendix includes discussion of specifics of ERTS Zaire Management and of the ERTS Zaire staff as related to the implementation of Contract AID/afr-C-1483. These matters have previously been addressed by the consultant and may fall outside the requirements of the Final Annual Report for 1980.

Specifics of ERTS Zaire Management

Management at ERTS Zaire has been the major problem confronting this AID financed project.

In February 1980, the Director of the Presidency, (the Organization with oversight at ERTS) Me. Niny removed Sendwe Ilunga and placed ERTS Zaire under the control of the Service Presidential d'Etudes, Professor Malu wa Kalenga in charge.

There was no initial opposition to this change, partly because Professor Malu immediately instituted some management and financial controls which seemed to augur well for ERTS. However, after two to three months it became apparent that no major changes would be forthcoming and that Professor Malu's workload was too great to permit efficient control and development at ERTS.

Professor Malu recommended various changes at ERTS Zaire which were not enacted by the G.O.Z. After a period of political problems in ERTS Zaire, the President re-established that agency as an autonomous program and Mukoni was appointed Chargee de Program in early 1981. Since Mukoni's accession work has resumed and morale has returned. Unfortunately the organizational change did not eliminate various counterproductive elements from ERTS Zaire. The effect of these management changes cannot be overemphasized. Since February 1980 there has been a marked decrease in work done. Most of the work was done by four staff members, two of whom were associated with the North Shaba Demonstration Project.

Work on the North Shaba Demonstration Project was continuously halted for a variety of reasons, but mostly because ERTS Management failed to facilitate the disbursement of the necessary counterpart funds.

The consultant at various times requested the AID Mission discuss the problems of ERTS Zaire at the highest level of the G.O.Z in order to solve management problems. This apparently was either beyond the authority of the mission or was not effective.

The financial problems at ERTS Zaire during 1980 were extremely grave and can be outlined as follows:

- Demonitization delayed work by at least two months and although counterpart funds should not have been affected by the belt tightening imposed on national programs, the Director of the Presidency cut the budget outright for the North Shaba field work from 91,000 Zaires to 32,000 Zaires. This cut all operating funds and left only per diem and air travel in the budget.
- Various sums of counterpart funds budgeted for field work were borrowed by ERTS Zaire to pay medical bills and other non-budgeted items. Approximately 60,000 Zaires were borrowed to pay medical expenses whereas an additional 80,000 were not accounted for although the Directors Office promised to have the Zairian Department of Finance conduct an audit.
- Upon the takeover by Professor Malu, further financial problems occurred. ERTS Management did not know how the counterpart funds were budgeted, disbursed or controlled. Even though the consultant had requested greater control of these funds by AID and the consultant, the controls continued to be in the hands of ERTS/SPE. Notwithstanding the fact that AID had finally acquired the power of cosignatory and the consultant prepared the project budget, no information concerning disbursements was made available to the consultant or to the AID Mission from the time of the Malu accession. Money was not made available to the consultant except through a most difficult and lengthy procedure (sometimes as long as four months). This same process continued after the arrival of Mukonki.
- These financial problems provoked so many difficulties that the final reports on the demonstration projects were not completed until the last day of the consultant's stay in Zaire and would not have been had the consultant not used money from the sale of project furniture to pay for many of the required items.

Problems with ERTS Zaire Staff

The ERTS staff continued to cause problems relating to the effective completion of this AID contract. Although management problems existed, Sendwe Ilunga was much interested in and relatively knowledgeable about remote sensing. He was fair to his employees and amenable to necessary changes. Many changes had been made before Sendiwe's departure and the foundation had been laid for an effective operation at ERTS Zaire. The firing of Sendiwe created grave problems in as much as it permitted the dissident (and least effective) group to reestablish itself.

On Professor Malu's arrival, it became obvious that he was a tough manager who would brook no breach of discipline and who was ready to fire the non-productive elements in the organization. His attempt to do this was unsuccessful.

After five months of the consultant's efforts, the ERTS Zaire staff accepted the fact that counterpart funds existed for at least ten ERTS field demonstration projects and that no major additional funding would be required.

To be fair to Malu, it must be said that he might have done a good job had Me. Niny not Jeopardized Malu's position by handing him ERTS Zaire in defiance of the presidential edict which was the basis for its existence.

Based on this action by Niny, the more effective members of the ERTS Zaire staff joined in an effort to overthrow Malu and return ERTS Zaire to an autonomous status. The effect of this was to produce an equally strong reaction from Malu's camp and that of the group mentioned earlier which had been responsible for Sendwe's departure. The result was that little work was done at ERTS from June 1980 to January 1981.

In the consultant's opinion there are ten useful members of the ERTS Zaire staff. The best are: Kazadi, Ilunga, Musungaiy, Aduya and Buhendwa. In addition Kaziumba, Ngoy, Wale, Dueme, Kalala could probably be made to work effectively.

Finally two of the best workers were not members of the ERTS staff, but one, Bakajika was detached from the Department of Agriculture and the other was a draftsman "moonlighting" from the National Geographic Institute (I.G.Z). This group of people, provided with good management and normal working conditions, could in the consultants opinion, produce work of a caliber equal to any in "developed" countries. The problem is that their efforts were continuously undermined by the remaining non-productive and politically motivated members of the staff.

It is the consultant's belief that those members named, and considered effective, profited a great deal from the impact of the AID contract, the materials and images sent to Zaire, the training programs and personal contact with the consultants. I believe that under proper conditions each of these individuals could easily have produced a major LANDSAT interpretation effort which would have benefited various sectors of Zaire's economy.

In addition, at least five scientists are ready to provide other members of the scientific, business and university communities in Zaire with the guidance envisioned in the Project Paper as it relates to a Remote Sensing User and Training Center. In the context of this last topic, namely a Remote Sensing Training Center and User Facility, Cit. Etina Ndoita should be mentioned as a qualified teacher.