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FINAL EVALUATION

RURAL RECONSTRUCTION PROJECT (645-0224)

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USAID/SWAZILAND

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LIST OF ACRONYMS AND ABBREVIATIONS

CTA	Central Transport Administration
EOPS	End of Project Status
GOS	Government of Swaziland
MNRLUE	Ministry Natural Resources, Land Utilization & Energy
MWC	Ministry of Works and Communications
PACD	Project Assistance Completion Date
RB	Roads Branch
RRP	Rural Roads Project
TA	Technical Assistance
USAID/S	U.S. Agency for International Development/Swaziland
USG	U.S. Government.

1. PROJECT EVALUATION ABSTRACT

This project was designed to assist the government of Swaziland (GOS) to: 1) Improve its Capabilities to repair and maintain unpaved roads damaged by cyclone Domoina of 1984, and 2) Re-establish its capacity to monitor and allocate river water resources by repairing and/or replacing the infrastructure at nineteen (19) of thirty three (33) river flow measuring stations destroyed by the cyclone. The Roads Branch, the Central Transport Administration of the Ministry of Works and Communications, the Water Resource Branch of the Ministry of Natural Resources, Land Utilization and Energy (MNRLUE) were the three (3) implementing agencies of the GOS. A mid term evaluation was conducted in November 1985, the purpose of which was to measure progress to that date against targets in the PP. This end of project evaluation (Dec. 87) was conducted by a REDSO/ESA and GOS team in order to focus on end of project status (EOPS). Visits to the roads, review of project documentation, and interviews took place over a two week period. The end of project status, major findings and conclusions, and lessons learned are:

EOPS

1. 645 kilometers of unpaved roads of the 600 kilometers targeted were rehabilitated.

2. Three (3) Swazi Engineers, and many technicians, drivers, operators have improved engineering, supervisory and technical abilities.

3. Plant and equipment are operational at least 75 percent of the time.

4. Only nine (9) of the eighteen (18) recorders are purchased and installed; none of the three (3) telemetry units were purchased; none of the nineteen (19) towers to house equipment were fabricated and erected. Weir reconstruction by GOS did not take place.

Findings and Conclusions:

I. Implementation activities were hampered by the fact that GOS continued to exercise normal procedures for employment, procurement, budget allocations, etc., normally applied to a development project rather than in the case of an emergency relief activity such as this project.

II. Insufficient management roles were exercised by both GOS and USAID in resolving implementation problems dealing with other than technical issues.

III. Budgetary shortfalls in three consecutive years prevented the project in meeting certain targets in component 2) above.

IV. USAID and GOS did not act diligently enough to focus attention on the routine and periodic maintenance for the roads rehabilitated under the project.

V. Considerable amount of monies remain in the pipeline (U.S. $219,000) as of PACD (Dec. 31, 1987).

The Evaluation noted the following lessons:

(a) Disaster relief activities need to be clearly differentiated from ordinary development projects, between USAID and host government, if targets are to be met within life of project.

(b) Interministerial linkages are essential if more than one implementing office of the government is involved in project activities.

(c) Any infrastructure related project must have clear commitment on the part of the host government for continuing maintenance during and after project comes to an end.

(d) For implementing emergency assistance projects, private contractors should be considered as alternatives to government work forces.

(e) Control and oversight of private contractors are required by government so as to maximize the services of the private sector.

2. SUMMARY OF EVALUATION, CONCLUSIONS, AND RECOMMENDATIONS

The Rural Reconstruction Project 645-0224 provided the GOS $1,250,000 as part of the U.S. response to the damage caused by Cyclone Domoina which hit Swaziland in early 1984. By mid-1984, when the project was designed, estimate of the damage to roads and bridge structures caused by the cyclone was $37 million. The purpose of the RRP was to assist the GOS to repair and maintain unpaved roads damaged by the storm and to re-establish the GOS capacity to monitor and allocate water resources. The targeted 704 kilometers of unpaved roads which were to be reconstructed by the project represented a major part of the country's network of unpaved roads (fifty four (54) percent) and had been identified by the GOS as its highest priority for assistance. The project also planned to repair and/or replace nineteen (19) of the thirty three (33) river flow measuring stations which were destroyed during the cyclone. The original project completion date for the RRP was December 31, 1986 but it was extended by USAID/S twice for a total of twelve (12) months until December 31, 1987. Thus the life of the project has covered a period of forty months since the project agreement was signed with GOS in August 1984.

This end of project evaluation was conducted in December 1987 by two REDSO/ESA staff and a GOS Soils Technician. The evaluation methodology employed by this team was to combine the review of project documentation and project generated reports with interviews of the key participants as well as site visits. Lists of the documents which were reviewed, and persons interviewed are attached to the Evaluation Report.

The findings of the evaluation indicate that the Project, through its rehabilitation of unpaved roads, has made a positive and significant impact on restoring Swaziland's infrastructure to pre-cyclone standards. With the exception of the GOS budget contribution for reconstructing the concrete weirs for the USAID funded water gauges, all of the anticipated project inputs were delivered in sufficient quantities over the life of the project. In terms of the project's road rehabilitation output, although the original target of 704 kilometers was later reduced to 600 kilometers and an additional twelve (12) months were required to meet the target, this remains an impressive and significant achievement. In other areas the project has had spectacular successes in achieving some of the objectives established at the start of the project. For example, the project developed and refined an innovative private sector repair and maintenance scheme which allowed the project's plant and equipment to be available over seventy five (75) percent of the time. Likewise, the on-the-job training programs and short courses provided to the counterpart engineers and roads staff by the project-funded technical assistance has been both effective and cost efficient. In contrast to these clear successes, the project has failed to meet its target of restoring the operation of eighty (80) percent of thirty three water gauges destroyed by the cyclone largely due to the inability of the

GOS to provide funding for the weir construction. Except for the nine (9) of the eighteen (18) strip-chart recorders which were purchased and installed during the first part of the project, and some A&E services used to assess the damage to concrete weirs, no other water related activities have been undertaken. Nevertheless, in considering the many achievements of the project, this final evaluation clearly indicates that the Rural Reconstruction Project has been a success. While the shortfalls of the water gauging component are disappointing, its importance as an element of the overall goal of the Project reconstruction of infrastructure - is marginal in relation to the roads component.

In comparing the progress of the Project since its mid-term evaluation in November 1985, the Evaluation Team has noted dramatic improvement. At that time only 161 kilometers of roads had been rehabilitated and less than fifteen (15) percent of the project funding had been utilized. The acceleration of the project's implementation since the time can be attributed to a number of factors. First, some of the normal sorts of teething problems of any infrastructural development project were overcome about the same time. Second, by the end of 1985, the private sector repair and maintenance effort began to pay dividends and equipment availability remained above seventy five (75) percent. In terms of the recommendations of the mid-term evaluation, responsive follow-up actions were taken on each of them with the exception of the construction of the water weirs.

During this evaluation the Team identified three major issues which require Mission consideration before the project is terminated.

- First, in November 1987 the GOS submitted a written request to utilize project funding for the procurement of the water gauge equipment planned under the rural Reconstruction Project. However, to date, the GOS has still not demonstrated any hard evidence that it will provide the necessary counterpart contribution to construct the concrete weirs.

- Second, the unpaved roads, which were reconstructed by the RRP are not being effectively maintained. There are no plans in place to maintain these roads. More alarming is the fact that already some portions of these roads (approximately 100 kilometers) are in desparate need of maintenance, one bridge has been washed away and others have been seriously damaged by present and past rainy seasons.

- Thirdly, there are significant amounts of funds, approximately $200,000, which have not been used by the project. There are opportunities for using these funds to complete the projects objectives and protect the investments which have been made in this project.

The Evaluation Team recommends that USAID/S discuss these issues with the GOS prior to the project's completion date and consider the following three options:

Option 1: Consider the project completed as of December 31, 1987. Deobligate all remaining funds.

Option 2: Extend the PACD by a minimum of nine months to purchase the commodities for the water component conditional upon firm evidence of GOs budget contribution and that contracts for the construction of weirs and towers will be issued on or before April 1, 1988.

Option 3: Extend PACD by nine months and provide up to $100,000 in exchange for the GOS commitment to repair completed roads and provide a maintenance plan for the roads. (This option could be exercised on its own or in conjunction with Options 2.)

Decisions on these options should be made in conjunction with the finalization of this evaluation.

Regardless of the options selected above, the Rural Reconstruction Project has provided valuable experience in the design and implementation of disaster road reconstruction projects and rural road programs in general. The most important lessons learned are:

- Disaster relief activities are more effective when host country governments make a clear distinction between emergency and on-going development activities and, as a result, waive the wide range of bureaucratic procedures (either by Emergency Decree or on an ad hoc basis) that impede procurement of commodities, employment of labor, etc.

- The routine and periodic maintenance of any AID funded infrastructure project must be clearly established in the project agreement, religiously followed during implementation, and sustained after the project is complete.

- Emergency programs, given their very nature, may have design flaws which must be ironed out during implementation. A Steering Committee as established for the RRP may be used. However, such a committee must include all parties participating in the implementation of the project and have a built-in mechanism for taking problems or outstanding actions to higher levels of authority.

- For implementing emergency assistance programs, private contractors should be considered as alternatives to government workforces.

- Control and oversight systems are required by governments to maximize the services of private sector firms.

3. PROJECT EVALUATION METHODOLOGY

The purpose of this evaluation has been to assess the end of project status and the impact of the road rehabilitation project.

This was the second of two (2) evaluations described in the Project Paper. A USAID/Swaziland consultant prepared a scope of work which primarily attempts to focus on the End of Project Status (EOPS). The format of HB. 3, Ch. 12 was followed.

The evaluation team included the following persons:

Carlos E. Crowe	REDSO/ESA	Team Leader/Civil Engineer
William Jeffers	REDSO/ESA	Private Sector/Training
Hamilton (Fani) Sibiya	GOS	Roads Branch

Observers working with team were:

Ms. Elizabeth Martella	USAID/S	Project Manager
Mr. Richard Solloway	USAID/S	Controller
Mr. David Van Vuuren	Consultant	(formerly with the RRP project)

The methodology used for this evaluation included interviews, review of project documents and consultants reports, and site inspections Interviews were held with 1) key personnel of the GOS who were still and/or had been involved in the implementation of the project, 2) foreign donors/consultants, 3) private sector firms, and 4) USAID/S personnel. See Attachment 1 for list of persons contacted by the evaluation team. A list of project documents reviewed by the team is described in attachment No. 4.

To review the road work under the project, the Team Leader travelled a representative number of roads (9) consisting of 230 kilometers or about 38 percent of the rehabilitated kilometers. These were inspected on December 7 and 8, 1987.

4. PROJECT SETTING AND EXTERNAL FACTORS

Identify and discuss major changes in project setting, including Socio-economic condition and GOS priorities, which have an impact on the project. Examine continuing validity of assumptions.

Swaziland as a land locked country in southern Africa has probably suffered from few disasters like the Cyclone Domoina of January 1984. Therefore, the country was not prepared nor experienced in responding to such emergencies. Moreover, the country suffers from a shortage of qualified national professionals at all levels of the government and thus most of the assessment and preparatory work for this project was carried out by foreign nationals most of whom came to the country for that task and left soon after. The project design assumed that the GOS would implement the reconstruction of its infrastructure in a two year period because it was an emergency. This assumption proved to be over optimistic. The implementation procedures used for the project were the same as a development project thus disrupting the original workplan for the project. This approach has resulted in a "disaster relief project" which has taken forty (40) months to implement instead of twenty four (24) months as planned.

It is obvious that from the time of the disaster to the completion of the project, the priorities of the GOS changed regarding the reconstruction of the country's river flow measuring stations. In the government's request to AID for assistance in April of 1984, the attachment to letter ECO.C/19/92 dated 27 April 1984, from the PS of Dept. of Economic Planning and Statistics to USAID/S, describes that the request for emergency funding is because, "water is the most important renewable resource in Swaziland. Water is the key to agricultural development, which is the backbone of the Swazi economy at the present time and for the foreseeable future". Further down, under the heading of "Relation of River Gauging to Development", the request for funding says, "where stations have been destroyed, the agreements (international) can not be enforced, flows can not be monitored and waste of water ensues".

However, the reconstruction of the river flow measurement stations did not take place at all as envisioned by both GOS and USAID/S. The GOS did not budget its counterpart funds for this component of the project for three consecutive years.

5. PROJECT INPUTS

Are there any problems with commodities, technical services, training or other inputs as to quality, quantity, timeliness, etc.? Any changes needed in the type or amounts of inputs to produce outputs?

A. Roads Component

(i) Technical Assistance (TA)

An estimated ninety (90) person months of technical assistance has been financed and supplied by the project. At the completion of the project $513,772 have been disbursed. All technical advisors have completed their assignments and met the expectations of the GOS and USAID/S. The inputs from the technical advisors have had a long lasting effect in the areas of road reconstructions; plant and equipment refurbishing and upkeep, improved administrative procedures for both CTA and the Roads Branch. The Evaluation Team consistently received praise and recognition for the combined effort that all technical advisors provided to the various local nationals at all levels of the government.

(ii) Training

The Project Paper indicated that the AID-financed project engineers would provide on-the-job training to their Swazi counterparts. This task was to be accomplished through the presentation of a training workplan which stipulated the objectives, goals, and assignments for the counterpart engineers and made provision for diminishing amounts of supervision. This training plan was to be revised every six months. This initial plan was prepared and submitted to the MWC, USAID, and the World Bank in December 1984. The program was never formally approved and no further revisions were made to it.

Nevertheless, there was significant on the job training provided under the Project and a summary list is included as Attachment No. 2. This training included the Swazi counterpart engineers as well as supervisors, plant and vehicle operators, and road technicians. During the interviews with Swazi staff at CTA and the MWC, there was general agreement that in all cases the project supported training was sufficient to sustain road rehabilitation efforts after the technical assistance departed. In addition, there were several of the courses which the MOW staff felt were extremely useful and should be provided to other divisions of the Roads Department. On-the-job training, and informal, one day to two week courses have been appropriate and sufficient training has been given to achieve the road rehabilitation objectives of the RRP.

(iii) Equipment Maintenance

The initial analysis of the Rural Reconstruction Project indicated that the GOS could mobilize the road equipment required to meet Project objectives from its existing fleet. This analysis also highlighted the fact that the CTA, which is charged to repair and service road equipment, could not expedetiously provide the major rehabilitation of the equipment needed for the project nor provide assurances that it could keep the overall operational availability of the road equipment at or above the target level of seventy five (75) percent.

Based upon these findings, USAID established equipment maintenance as one of its major inputs for the Project. The Project Paper budgeted $500,000 to finance the repair/overhaul ($200,000) and recurrent servicing ($300,000) of sixty eight (68) units of plant and equipment, required for the road rehabilitation component. AID financing was earmarked for procuring private sector services, through time and materials maintenance contracts, which could supplement the CTA services and achieve the high levels of equipment availability required to successfully implement the Project.

The GOS Roads Department provided the necessary labor and equipment to undertake the RRP as described in the Project Paper. In late 1984, the first priority of the technical assistance team was to assemble the fleet of road equipment which had been identified in the Project Paper. Although several months were required to locate and acquire the sixty eight pieces of equipment which had been counted as the GOS contribution to the project, by end of February 1985 the Project was fully equipped. Due to the fact that 5 rather than expected 4 GOS Road Branch Units were combined to form the RRP Rehabilitation Unit the total fleet size ended up being 104 items.

The GOS Central Transport Administration (CTA) was able to provide the expected levels of preventative maintenance and minor repairs required to implement the road rehabilitation program. Although complete information is not available, it is believed that forty (40) percent of all repair requests were handled by the CTA and the remaining sixty (60) percent by private garages. In terms of the overall expenditures for road equipment maintenance, CTA's share was considerably less since major repairs were almost exclusively done by the private sector.

By way of several intermediate steps, time and materials contracts were established and utilized to repair, overhaul, and service project plant and equipment. The initial project design was deficient in analyzing the complexity of the GOS procurement system and procedures. At the start of the project there was no precedents for modifying any of the GOS procurement procedures nor were there any controls in place at CTA which would adequately monitor time and materials maintenance contracts. During the initial stages of the project, each procurement request to repair a vehicle in a private

garage required going out ot tender, evaluating bids, obtaining the approval of the Tender Board and awarding the contract. This process took up to six weeks regardless of the size of the job. In order to simplify these procedures it was necessary to devise a system that could waive the GOS Tender Board requirements for the procurement of spare parts and repairs for the equipment assigned to the Project. To do this the RRP Equipment Repair Specialist negotiated with the Tender Board to permit sole source contracts with five companies for predetermined pieces of equipment with fixed prices on standard repairs, and a lump sum ceiling arranged in advance. This system was introduced in June 1985 and remained in force through December 1986. In May 1986 negotiations with the Tender Board created the opportunity to get waivers from competition in less than 24 hours, where before it had required three weeks. This breakthrough combined with the difficulties CTA faced in auditing garage invoices with respect to the original cost agreements established in the general sole source contract, generated the momentum for introducing time and materials contracts.

Draft time and materials contracts were submitted to the Steering Committee in September 1986. These contracts required private firms to quote fixed prices for labor, parts, services and buyouts. There were no value limitations on these contracts. Individual waivers from Tender Board procedures deferring competition were still required but were obtainable in a day. Ten time and materials contracts were awarded in December 1986. The time and materials contracts offered major benefits to the CTA in that it was easier to audit invoices against a set of standard unit prices. This ease of administration increased the likelihood that this system could be sustained after the completion of the project.

In general, the quality of services provided by the private contractors improved over the life of the project. At the start of the project the workmanship of the private garages was adequate but there were unacceptable service delays which were comparable to those encountered in the public sector. There were also major problems with obtaining the appropriate job documentation from the private garages. As a result, after the first year, several garages were no longer given RRP repair business.

The quantity of resources USAID/S allocated to the maintenance programs was sufficient to achieve and maintain the equipment availability targets and complete the road work of the Project. The financing made available by USAID/s for the Project for equipment maintenance was calculated on the basis of a twenty four month life of project. During this time frame, the overhaul and major repair of road equipment was less expensive than the $200,000 which was anticipated. However, over the actual forty months which was required to implement the Project this estimate was surprisingly precise. Likewise, the remaining $300,000 budgeted for more general repairs procured through the private garages was also very close to the actual amounts required. Of the $500,000 budgeted, to date $575,384 has been provided for private sector repairs.

(iv) GOS Contribution

The GOS provided in kind services like personnel equipment, furnishings, POL, offices and/other facilities as planned for during the entire life of the project. These levels of resources provided by the GOS were significantly higher than anticipated, in the Project Paper. It is estimated that the GOS contribution to the Project was the equivalent of $4.5 million; nearly thirty (30) percent higher than expected. Most of this increase can be explained by the longer life of project.

(v) Other inputs

The United Kingdom (U.K.) provided two (2) engineers assigned to the Roads Branch (RB) for two years each at a cost of approximately U.S.$250,000. The World Bank provided some of the loan financing for some of the operational costs of the roads component.

B. Water Component

(i) Commodities

The original amount obligated was U.S. $173,000 for the procurement of eighteen (18) strip-chart recorders; three (3) telemetry stations, nineteen (19) equipment housing towers, all for the river flow measuring stations. $22,000 from these funds have been disbursed for nine (9) strip-chart recorders.

(ii) GOS Contribution

The GOS inputs for the Water Component of the project was the reconstruction of concrete weirs. However, the GOS failed to provide, although the evaluation team understood that repeatedly, budget requests were made, the equivalent of U.S. $144,000 to reconstruct these weirs. Without this GOS budget contribution the stations could not be erected and the project progress toward achieving the purpose and goal of the project was hindered by this lack of GOS contribution.

However, on December 15, 1987 there were indications that the GOS may be resurrecting its interest in the component. The team was verbally advised that the current 1987/88 budget request from the MNRLUE to reconstruct the weirs has been approved and that approximately El.25 million will be made available to the implementing unit of the GOS in April of 1988 when the new budget takes effect.

The evaluation team recommends that in light of repeated attempts and delays in securing this contribution from the GOS, and that if no written confirmation and commitment for the counterpart contribution from the GOS is secured by USAID by the current PACD USAID/S should not purchase additional commodities for this component and that monies left in the project's pipeline be deobligated.

6. PROJECT OUTPUTS

Measure actual progress against projected output targets in current project design or implementation plan. Comment on significant management experiences. If outputs are not on target, discuss causes. Are any changes needed in the outputs to achieve purpose.

The discussion of the project's expected outputs will be done following the list of the four (4) outputs as they appeared in Annex B of the Project Paper. (Logical Framework)

A. Training of three (3) Swazi Engineers

As indicated in the Project Paper, the project expected to train at least three (3) Swazi Engineers to better design, manage, and supervise road repairs and maintenance.

The Evaluation Team was able to ascertain that in fact three (3) Swazi engineers were assigned to this project and, although not all three (3) were involved in the implementation activities at the same time, the minimum time that one engineer spent in the project was twelve (12) months. One Swazi engineer is now in charge of the project since the first TA advisor left the country over a year ago.

The Evaluation Team was also able to confirm that the other two (2) Swazi engineers after serving on the RRP have been able to move into senior MWC positions. One engineer is now acting Senior Road Engineer while waiting for a U.N. funded expatriate to arrive in country. The other engineer is in charge of contracts and contract administration. It is expected that the three (3) Swazi engineers will be the counterparts to the construction, maintenance, and planning engineers of the U.N. team sometime in early 1988. From the interviews with the Evaluation Team, these individuals feel they have significantly benefitted from RRP training and their skills have been improved.

It is difficult to ascertain the degree to which the Swazi counterpart engineers are better able to maintain roads. Certainly, many of the skills which they obtained in the rehabilitation of the 645 kilometers of roads are valuable for maintenance programs as well. However, since only minimal Project efforts have been directed towards assisting the GOS road maintenance programs, the Team was unable to come to definitive determination on this issue.

B. Roads System Establish

The Team has observed that the Project has helped to improve the road rehabilitation capability of the Roads Branch. The Roads Branch can now deal more effectively with the planning, design, construction and supervision activities of road construction and reconstruction. As mentioned in other sections of this report the

Swazi engineers, trained under this project, have had responsibilities for the implementation of this project since the first of the USAID funded U.S. engineers left the country over a year ago.

With the assistance of project financing, the RB established a system for the rehabilitation of the roads that closely followed the assessment of the damaged roads that was made soon after the Cyclone. This system included: 1) A prioritized road classification that takes into account primarily: traffic volumes; the seriousness of the damage; the effect upon the road by the next rainy reason; and the future cost of leaving that road unattended. As a result the RB classified the roads into four priorities and arrived at a composite numerical weight.

This methodology assisted the RRP and the RB to keep a systematic account of the roads that were appropriate for the project. Excellent Equipment and Construction control systems are in place. Site visits and feedback from supervisors provide material for monthly reports which describe physical progress, problems, actions needed, etc.

The Swazi engineers have demonstrated to the evaluation team a professional capacity and motivation sufficient to indicate that, as long as they remain employed by the GOS, the systems established by the project will continue to assist the GOS to improve its capabilities for repair and maintenance of damaged roads.

C. Average operational availability of equipment is at least 75%

The success of the maintenance program for the roads equipment has made a major contribution to the Project with respect to road rehabilitation. Over the life of the Project the average rate of equipment availability was seventy five (75) percent. In January 1985 when the Project got started, the equipment was only available forty (40) percent of the time. By July of that year, the availability rate had increased to seventy five percent. Over the period between September 1986 and September 1987 this figure climbed to eighty one (81) percent. As noted in the final report of the engineering advisors "without this level of mechanical support the production (road rehabilitation) would not have been achieved."

The Project design described a four echelon maintenance strategy which would be used to achieve and sustain the high level of equipment availability required to meet the planned road rehabilitation targets. The first echelon was preventative maintenance by drivers. The second echelon called for the establishment of mobile repair units by CTA. The third and fourth echelons, relating to the off-site repair and overhaul of plant and equipment, was maintenance contracts with the private sector.

The implementation of the first echelon of this maintenance strategy which included daily vehicle inspections by drivers covering oil, water level, lubrication joints, tyre pressure, etc. did not receive much attention until mid-1985 due to the small size of the supervisory staff and the higher priorities attached to getting the recently assembled fleet of vehicles operational. By the end of the Project, the technical assistance had developed and put into place a comprehensive driver maintenance system, complete with tools, procedures, and documentation.

The second echelon of the maintenance strategy, namely the establishment of CTA mobile maintenance units, never really got started. Instead, arrangements were made to locate two mechanics and one assistant at each site with a vehicle and a set of heavy duty tools. This plan was not fully implemented until mid-1986. In addition, CTA's workshops and depots were used for repairs when manpower and parts were available. By provided these resources, CTA's support and commitment to maintaining RRP plant and equipment exceeded the expectations at the start of the Project. However, if the mobile units had been established and functioned as planned, the availability rates could have been significantly higher at an earlier stage of the project and probably would have been less expensive.

The private sector maintenance and repair contracts which related to the third and fourth echelons of the maintenance strategy were, by far, the most effective tools for maintaining the high availability of road equipment. The initial sole source contracts and eventual time and material contracts through which these private sector services were procured are described in Section (iii) of

Inputs (5A) above. The Project Paper anticipated that the private garages would only work on major repairs and servicing. Since the mobile units never materialized a large part of the business provided to the private garages was for field repairs. Therefore, the private sector played a large role in the second maintenance echelon in addition to what had been originally expected.

The private sector offered some obvious advantages over the public sector. The most efficient private garages demonstrated superior skills at putting repair teams in the field and sourcing spare parts. These characteristics became clear to CTA, in a very short order, and resulted in increased amounts of business for these particular garages.

The original project design anticipated that the time and materials contracts would be awarded to franchised dealers of the equipment. Three of the four sole source contracts were given to these dealers. Based upon this experience, it became evident that some of these franchised dealers were either too remote or not staffed and equipped to respond effectively to the maintenance requirements of the project. Another outcome of this experience, however, was that, in some cases, local independent garage owners were eager and able to take on greater amounts of maintenance work. In these instances, the independent garages were more efficient on site visits since they were able to attend to a broad range of equipment (i.e. not restricted to brand name). On this basis, independent garages were permitted to bid on the time and materials contracts which were subsequently awarded. While the Evaluation Team has listened to criticisms of the independent garages as more expensive and less technically qualified than the franchised dealers, these claims are generalized and the Team has not found any evidence to substantiate them.

In the final analysis, the competitive environment between both franchised dealers and independent garages, as well as the close monitoring by the CTA, provided the types of performance from the private sector which was anticipated at the design of the project.

The impact of the private sector maintenance contracts was clearly demonstrated in mid 1986. At that time, the GOS modified its decision to use private sector maintenance contracts for project equipment and redirected RRP repairs to CTA workshops rather than the contractors. During a three month period when this policy was in effect, the availability of equipment dropped from eighty six (86) percent to seventy four (74) percent. While the GOS ultimately reinstated the private contractor policy, it is estimated that 15 kilometers of additional road rehabilitation was lost during this time.

Also, despite the high level of overall availability of plant and equipment, the shortages of key pieces of equipment adversely affected the Project. Specifically, the lack of a dependable lowbed to move heavy equipment and constant problems with front end loaders significantly reduced the effectiveness of the other machinery.

Likewise, there were liabilities, not necessarily related to the project, associated with maintaining the targeted seventy five (75) percent availability rate. One of these relates to the large investment which was required to keep old equipment operational. During the first two years of the project, out of 104 units of project equipment, only one light duty vehicle, two rollers, and three caravans were replaced. This situation necessitated repairing and maintaining existing equipment far beyond their normal economic lives. It has been reported to the Evaluation Team that, in some instances, the cost of repairs exceeded the price of replacing the equipment. A second consequence of maintaining such a high level of availability for the RRP equipment, which was reported to the evaluation team, was that other divisions of the Roads Department and GOS received less attention to RRP repairs as a result of the higher priority given to RRP. Since the RRP used mostly private sector contractors it is unclear as to how their repairs affected other departments. In fact the reverse argument could be made. However, there may have been individual instances where RRP equipment received priority attention from CTA (for RRP repairs over other departments.)

D. Eighty (80) percent of the cyclone damaged stations operational:

The Project Paper, indicated that some thirty three (33) stations had been destroyed by the cyclone. At this time (PACD of the project), some twenty (20) stations are operational and all nine (9) of the strip-chart recorders bought under the grant are installed and provide the GOS with usable river flow data.

Nine (9) more recorders and three (3) telemetry units are pending procurement since there are no rehabilitated stations on which to install them. The cost of these nine (9) recording units is approximately U.S. $30,000. The cost of the three (3) telemetry equipment units is approximately U.S. $28,000. Also, nineteen (19) equipment housing towers were going to be fabricated and erected at a cost of approximately U.S. $91,000. None were fabricated or erected. From the above description of targets that were not met during the extended life of the project the evaluation team has concluded that this project output has been unsuccessful.

In exploring the reasons why this project output has not been achieved, it is clear that the GOS did not take significant steps to provide the inputs anticipated at the start of the project, namely the equivalent of U.S. $144,000 for the reconstruction of concrete weirs. Initially the GOS felt it could find other donors to finance this input. However, it failed to realize that even though Swaziland enjoys generous donor support, most donors would not want to participate in partly funding the concrete work on which instrument housing towers were going to be funded and built by USAID. In retrospect, it would have been more useful to fund the reconstruction and repair of the concrete weirs under the project as they form an integral part of the river flow measuring stations.

Nevertheless,USAID/S should have also recognized at the time of the mid term evaluation that the GOS was not taking action on the water component. The budgetary shortfall was clearly identified at that time. At question is could USAID/S have put additional pressure on the GOS to provide its contribution or reprogrammed the budget for other activities?

Although the Evaluation Team has been told that this issue was frequently discussed with the GOS, there is a lack of written communications between USAID/S and the GOS regarding this shortfall in the GOS contribution.

7. PROJECT PURPOSE

Quote approved project purpose. Cite progress toward each End of Project Status (EOPS) condition. When can achievement be expected? Is the set of EOPS conditions still considered a good description of what will exist when the purpose is achieved? Discuss the causes of any shortfalls in terms of the casual linkage between outputs and purpose or external factors.

The purpose of the Rural Reconstruction project as stated in the Project Paper was to assist the GOS to: 1) Improve its capabilities to repair and maintain unpaved roads damaged by Cyclone Domoina; and 2) Re-establish its capacity to monitor and allocate water resources.

The End of Project Status conditions described in the Project Paper, anticipated the impact of the RRP. The EOPS are described and evaluated below:

Planned EOP No. 1: Six hundred kilometers of unpaved road rehabilitated. (Target of seven hundred and four was revised by Pil No. 21)

Results:

1. The country reportedly has an inventory of unpaved district roads in the magnitude of one thousand three hundred (1300) kilometers. The Project as of September 1987 had rehabilitated six hundred and forty five (645) Kilometers or about fifty (50) per cent of the entire inventory compared to one hundred and sixty one (161) kilometers rehabilitated by the mid-term evaluation in November of 1985. This significant portion of the total inventory was rehabilitated through a combination of inputs mentioned in other sections of this evaluation. Even though the project had some technical difficulties in reaching this end of project status and it necessitated twelve (12) additional months, the project exceeded the revised target of 600 kilometers that had been anticipated.

However, the Evaluation Team is concerned that the maintenance of the reconstructed roads has been seriously neglected by the GOS. The project paper assumed that the maintenance was going to be undertaken by the maintenance units of the Roads Branch under their regular maintenance program. At the purpose level the PP indicated that the project would "assist the GOS to improve its capability to repair and maintain unpaved roads damaged by Cyclone Domoina." The project has not placed any emphasis on maintenance and the GOS is not maintaining these roads, as a result the reconstructed roads in some locations already require reconstruction rather than regular maintenance.

The Team found out that even though the project had a Steering Committee composed of representatives from the Roads Branch, Ministry of Works and Communications, Central Transport

Administration, and USAID/S Project Manager, the regular maintenance of the reconstructed roads was never formally transferred to the Maintenance Units of the Roads Branch of the Ministry of Works and Communications. On page five (5) of the Steering Committee minutes of its meeting held on November 24, 1987, the maintenance of roads under this project was once again discussed, and even at this late date in the project's life, it is an unresolved issue. The Team was informed that there are sufficient economic resources budgeted in GOS fiscal year '87-'88 for road maintenance. (E8.0 million.) However, there are other major maintenance constraints Equipment availability for the country's seventeen (17) maintenance units is low; responsibilities and priorities are too numerous; CTA's cooperation to repair plant and equipment is very limited. While there is very little hope for improving maintenance, the overall road maintenance strategy is expected to improve upon the arrival of the U.N. funded technical assistance team in early 1988. The team concluded beyond any doubt, that portions of some project roads will be destroyed by the effects of past and current rainy seasons and not by any cyclone like Domoina.

Recommendation: The team recommends that USAID/S issue a formal communication to the GOS alerting them of USAID's serious concern about the lack of repair and maintenance of the unpaved roads, rehabilitated by the project.

Planned EOP No. 2: Three Swazi engineers with improved engineering skills and supervisory abilities

Results: This EOP is the same as the first project output. As discussed in section 6A (Outputs) of this Evaluation the three (3) Swazi engineers have demonstrated their skills to the Evaluation Team. More importantly, they remain in the employ of the GOS and occupy senior positions in the MWC.

Planned EOP No. 3: Repairs to plant and equipment take half the time planned prior to the project; seventy (75) percent plant and equipment are available on an annual basis.

Results: This EOP is similar to Output No. 3 As stated in other sections of this evaluation, as late as September 1987, the overall operational availability was 82 percent, well over the average 75 percent expected during the life of the project. Furthermore, the CTA has promised the RB in writing that it will maintain a seventy five (75) percent availability of equipment after the project is completed.

Planned EOP No. 4: Flood damaged river gauging stations are reporting usable data.

Results:

As described in section D (Outputs) of this Evaluation, the GOS failed to provide its counterpart contribution for this component of the project. At the end of the project the data that is being reported is that from nine (9) of eighteen (18) strip-chart recorders that were purchased during the initial phase of this project. Therefore, this EOP has only been partial fulfilled.

8. PROJECT GOAL

Quote approved goal, and subgoal to which the project contributed. Describe status by citing evidence available to date from specified indicators, and by monitoring the progress of other contributory projects. To what extent can progress toward goal be attributed to purpose achievement, to other projects, to other casual factors? If progress is less than satisfactory, explore the reasons.

The stated goal in the logical framework of the project is: to rehabilitate the infrastructure of the country to a state comparable to that which existed prior to cyclone Domoina.

Through verification indicators as suggested in the Project's Logical Framework, the Evaluation Team concluded that the project's goal was achieved as planned.

The country's road infrastructure is repaired at an even higher standard than that prior to the Cyclone. Goods, services, and people can now enjoy the benefits of the rehabilitated roads. The other donors have assisted the GOS in reconstructing the remaining of the road infrastructure including major bridges and paved roads outside the scope of this project.

The Team determined that the two (2) PACD extensions that together allowed the project additional twelve (12) months for the completion of implementation activities, contributed greatly to achieving the project's goal. The Team also recognizes that these extensions might have not been necessary had USAID and GOS agreed on an accelerated "implementation of emergency activities" through the execution of a National Emergency Decree. This decree would have temporarily waived all or part of: 1) Civil Service requirements for hiring workers; 2) National Treasury requirements for the issuance of order books and purchase of materials; 3) CTA regulations regarding assignments of personnel and support to the equipment allocated to this project. The Team also determined that progress toward achieving the goal would have been accelerated by a combined effort by USAID and GOS in determining the causes for the lack of commitment on the part of the GOS for its contribution toward the reconstruction of the river concrete weirs.

The Team also believes that other contributing factors in the achievement of the project's goal were the inputs from other donors like the World Bank's funding of the MWC's operational cost to reconstruct the roads, and its funding for the reconstruction of main (paved) roads and bridges. Also, the Governments of Canada, the U.K., the EEC, AFDB and other donors responded to the disaster relief activities on a timely basis thus contributing to this project's goal. The consultancy services provided to CTA through the German government (GTZ/GOPA), provided some managerial support to CTA which aided the GOS in meeting the project's goal.

9. PROJECT BENEFICIARIES

Identify the direct and indirect beneficiaries of this project in terms of appropriate FAA criteria. Summarize data on the nature of benefits and the identify and number of those benefitting, even if some aspects were reported in preceding questions on output, purpose, or goal.

A. Direct Beneficiaries

The Project Rationale and Description of the PP identified, the direct beneficiaries of this project as members of the staff at the Roads Branch, CTA, Water Resource Branch, whom through the life of the project experienced a great deal of technical, managerial, financial, and human interactions.

The Evaluation Team interviewed various members of these staff groups. Overall an estimated 250 persons including construction laborers, technicians, drivers and equipment operators received employment benefits, and training as a result of this road reconstruction project. In addition to the benefits to these groups anticipated in the PP, at least five (5) local nationals are in higher technical and managerial positions than before this project. While these promotions can not be attributed exclusively to the project, there is little doubt that the superior performance of these individuals on project activities was useful in preparing them for their promotions.

Transporters in rural areas benefited by the RRP through lower operating costs and time savings.

The GOS benefited from the installed nine (9) flow recorders which are providing hydrological data.

B. Indirect Beneficiaries

It is impractical to try to quantify the indirect beneficiaries of this project. However, it is useful to examine the various groups of people who have derived significant benefits from the improved roads.

The first group includes the rural people, government agencies and private businesses, all of which travel over the project funded roads. Some of the reconstructed roads were built below standards and therefore the roads were passable only during the dry seasons. However, now the users are enjoying all weather roads and experiencing lower operating costs and saving significantly more time than before the reconstruction effort began.

The second group of indirect beneficiaries includes those people whose production and/or consumption is enhanced by improved roads. For example, inputs for small farmers may now be more accessible and less expensive than if the project had not been implemented. Likewise, the purchasing power of rural consumers is enhanced by lower transport costs. Better rural roads also have made government services more accessible to the rural people.

10. PROJECT IMPLEMENTATION CONSIDERATIONS

1. Implementation activities were severely hampered throughout the life of the project by the government not reacting to the "emergency nature" of this project and instead exercising normal procurement, employment; and budgetary allocations normally applied in the case of a development project. Neither the Civil Service Commission, Ministry of Labor, National Treasury, nor the Ministry of Finance were reacting to the need for emergency procedures even though the project was planned as an emergency assistance grant. Communications between USAID and the government although effective at the technical level, were insufficient at higher levels to bring attention and actions for overcoming the red tape which slowed down the implementation of the project.

2. The creation of a Steering Committee was effective to the extent that technical problems between the Roads Branch and the Central Transport Administration of the government were discussed and actions were delegated. USAID/S project manager's attendance to the monthly meetings of this committee was very casual during the first half of the project and more regular during the second half. However, issues that involved other ministries like Labor, Finance, Planning, National Treasury, etc. were seldom solved in a timely fashion because the Steering Committee was chaired by an expatriate senior road engineer, who had no responsibilities for bringing unresolved managerial and financial issues to any higher level in his ministry or anywhere else in he GOS.

3. The Steering Committee did not include the other implementing agency of the government, the Ministry of Natural Resources, charged with the restoration of the river gauging stations. Thus, this agency had limited communication with USAID, and GOS counterparts.

4. Budgetary shortfalls for the reconstruction of concrete weirs, a problem early in the life of the project, was raised as an issue in the mid-term evaluation, and yet the team found no written evidence that USAID advised the government of this shortfall in fiscal years '84 through '87.

5. Even though the conflict between the RB and the project advisors regarding the interpretation of road standards was raised in writing by the U.S. Advisors as early as June of 1985, and in the mid term evaluation of November 1985, it took USAID/S and GOs until June of 1986, exactly one year, to agree on modified standards (PIL No. 17, dated June 1986). This clearly identifies lack of interest, involvement, and capacity on the part of USAID and GOS levels of project management to resolve a rather simple technical conflict.

6. The team found no written evidence that in-house project monitoring tools were used to follow-up the implementation issues raised above, i.e. Project Committee, PIR reports prepared and discussed with USAID/S management.

7. The modifications applied to the FAR by USAID/S in early 1987 resulted in a more accurate account of USG monies which were paid to CTA for equipment repairs. Early in the life of the project, fifty (50)percent of estimates for repairs were reimbursed, this was later modified to fifty (50) percent of actual invoices.

11. PROJECT LESSONS LEARNED

A. The Team determined that in any AID supported disaster relief activity, the host country must be agreeable to distinguish and enforce certain implementation procedures which are applied differently when implementing a development project than when reacting to a disaster. Employment of workers; procurement of commodities; issuance of approvals from National Treasury, Civil Service Commission; and Budget allocations must be expedited if targets agreed in the Project Agreement are to be met within life of project.

In most developing countries, the issuance of an Emergency Decree for particular activities tends to resolve these problems.

Otherwise, established targets become unrealistic resulting in time extensions and higher administrative costs.

B. Any technical discrepancy between the host country and the project advisors regarding technical standards or specifications must be dealt by Mission and government as soon as the problem is identified. Outside resources may be needed if necessary for Mission to address problems with host country. Otherwise, targets become unobtainable and costs go higher.

C. In the judgement of the evaluation team, the routine and periodic maintenance of any AID funded infrastructure project must be rigidly agreed in the Project Agreement. To assume that the host country has the institution capacity and resources to take over the maintenance of the infrastructure at the completion of the AID funded activities is over optimistic and naive. Without scheduled routine and periodic maintenance the funded infrastructure deteriorates and the investment of USG resources suffers from a diminishing impact on the target population for whom the project was aimed to assist. The end result is a loss of investments and credibility.

D. The team determined that in an AID funded project where more than one implementing agency of the host government is involved, and when that results in the involvement of one or more line ministries, the strong linkages within ministries must be quickly recognized and established for the benefit of the Project. Otherwise, communications like those of a steering committee between implementing agencies are minimum, management and financial controls are inoperative, and more importantly the higher levels of authority in the government are unaware of implementation bottlenecks which can not be resolved by the technical personnel executing the project.

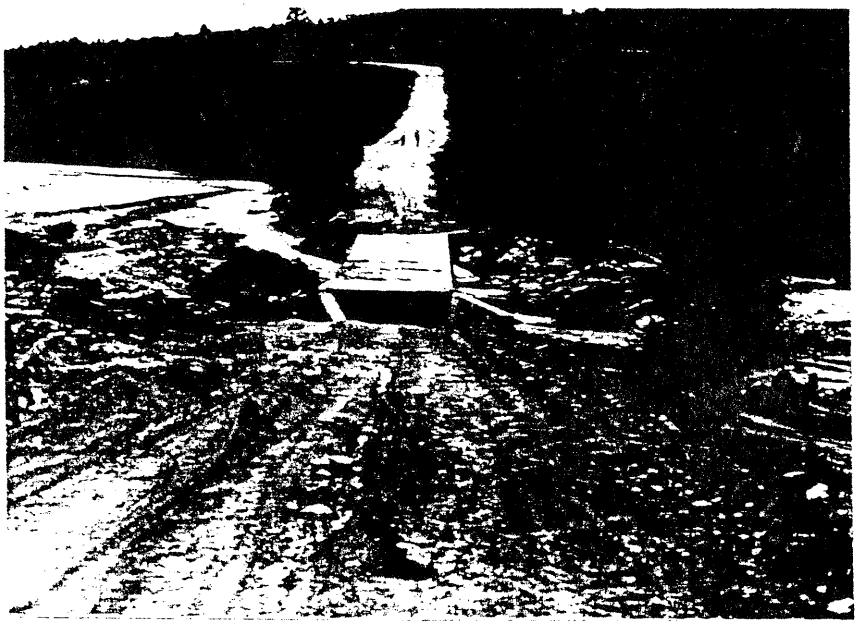
A mechanism which can provide effective communication between all implementing agencies at higher levels of government must be put into action before any crisis takes place. AID must take the initiative for the establishment of such mechanism.

E. For implementing emergency assistance programs, private contractors should be considered as alternatives to government work forces.

In the environment of Swaziland, the private sector offers a distinct advantage in its ability to mobilize resources, especially in rural areas, to respond to emergency reconstruction requirements. Also, in this case, the smaller sized private firms do not have the bureaucratic red tape that characterizes government bureaucracies. Another aspect of working with the private sector is that the customer/client relationship with the private firm is normally stronger than with other government departments which have a broad range of competing priorities which they must juggle.

F. Control and oversight systems are required by Governments to maximize the services of the private sector firms. As demonstrated by the RRP Project, the participation of private sector businesses is able to increase the efficiency of government programs. However, it is important to recognize that success of this aspect of the project was due, in a large part, to the monitoring, inspection, and control systems introduced by the RRP. The most important control systems included defining scope of work; controlling time and type of services given to private garages; regular inspection of work being performed; and through review of payment invoices.

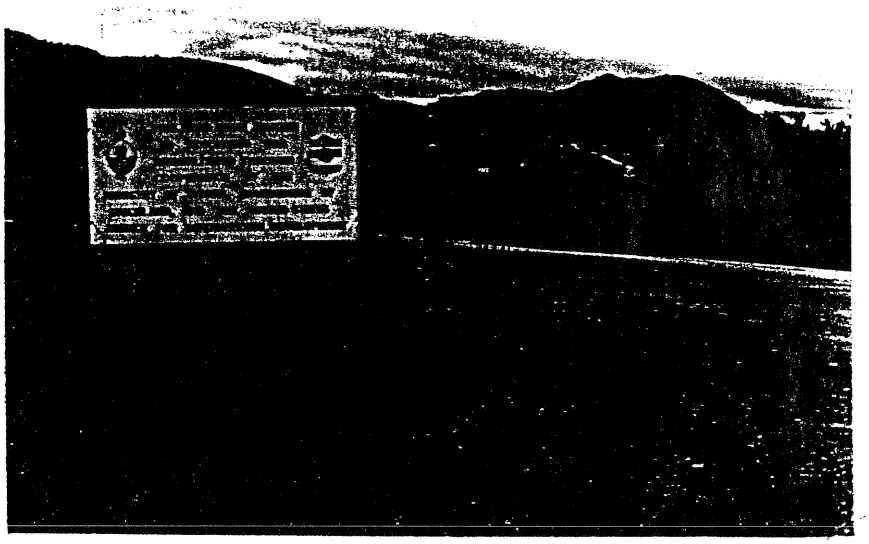
SELECTED PHOTOGRAPHS



Road D-59 illustrates lack of periodic maintenance

D-36 Road needs more than this level of maintenance

SELECTED PHOTOGRAPHS



Road Signs clearly identify the GOS, USG participation

Road D-10 provides all weather access to even new areas of the country

ATTACHMENT NO. 1

RURAL RECONSTRUCTION PROJECT

PERSONS CONTACTED BY THE EVALUATION TEAM

Government of Swaziland

R. Thabede	Sr. Water Eng. MNRLUE
G.F. Dhlamini	Deputy Principal Secretary, MWC
L. Zwane	Project Engineer, R.B. MWC
A. Manana	Acting Sr. Road Eng. R.B. MWC
A.F.L. Radebe	P.S. MNRLUE
C. Mavuso	General Transport Manager, CTA
J. Bongwe	Deputy General Transport Manager, CTA
P. Dlamini	Senior Mechanical Engineer, CTA
I. Mhlanga	Mechanical Superintendent, CTA
A. Mazibuko	Financial Controller, CTA
K. Klinge	Consultant, GTZ/GOPA, CTA
P.P. Mahomali	Manager, Water and Sewerage Board
G. Mhlongo	Roads Branch, MWC

Private Sector Firms

A. Santana	Manager, Atlas Motors/Mbabane
P. Cochran	Barlows, Caterpillar Reps./Manzini
A. Schutz	Tracar, Nissan Reps./Manzini

USAID/Swaziland

Roger Carlson, USAID Director
Harry Johnson, Deputy Director
Allan Reed, Program, Project Development Officer
Joan Johnson, Evaluation Officer
Richard Solloway, Regional Financial Manager
Columbus Spaine, Assistant Controller
Elizabeth Martella, Agricultural Development Officer/Project Manager

ATTACHMENT NO. 2

TRAINING ACTIVITIES OF THE

RURAL RECONSTRUCTION PROJECT (645-Ø224)

Following is a schedule of training activities which involved the counterpart engineers and technicians:

12/84 Two-day workshop covering the hydraulic design of culverts and low level crossings. Presented by RRP engineers and assisted by MNR hydrologist. Attended by counterparts and technicians.

2/85 Three day operator training course presented by Galion Dresser Ltd. covering preventative maintenance safety. Attended by RRP technicians and motor grader operators.

3/85 Two day workshop covering elements of worksite management and introducing the newly designed RRP reporting system. One day was devoted to techniques and procedures for addressing roadside drainage problems and including a field visit, the second to site management. Presented by RRP engineers and attended by counterparts and technicians.

4/85 One-day workshop presented by RRP engineers covering the use of RRP reporting system to monitor and control work activities. Attended by counterparts and technicians.

4/85 On-the-job training of counterpart engineers to prepare detailed work programs of RRP roads using aerial photographs and the road inventory. Presented by RRP engineers.

7/85 A two-day seminar was organized and planned by the RRP engineers covering field identification of suitable road building materials, ways and means for the RRP to make use of the RB soils laboratory, CTA/RRP contract repair procedures focussing on field reporting of mechanical problems, lessons for site supervisors in basic troubleshooting of site plant and how to supervise operator maintenance on site. Sessions covering upgrading/ rehabilitation guidelines and plant utilization and management were also planned. The seminar was to be presented by CTA, RRP engineers and a GTZ soils expert. Twelve RRP, CTA and GTZ participants were identified and 14 additional participants were recommended to be invited. The seminar was cancelled because MOW would not authorize the funds nor could funds be made available from USAID.

8/85 One-day workshop presented by USAID/CTA equipment specialist covering the basics of daily vehicle and plant maintenance as well as reporting procedures for breakdowns and repairs. Attended by counterparts and technicians.

8/85 Two week seminar presented in Tanzania by ILO/World Bank covering project appraisal and attended by one counterpart engineer.

10/85 The South African Institute for Civil Engineers Training Board was invited to come to Swaziland to assess the training needs of RRP technicians and engineers and to propose an appropriate training program. Late approval of funds for accommodation and transport of SAICETB staff resulted in cancellation of the trip.

10/85 One-day workshop presented by D. Van Vuuren to CTA senior staff, site mechanics and RRP engineers covering site communication and responsibilities between CTA and RRP.

12/85 Training workshop planned during the Christmas shutdown period was cancelled because all the technicians were taking annual leave.

1/86 One-week course covering project management and appraisal presented by Swaziland Institute of Management and Public Administration and attended by RRP counterpart engineers.

6/86 Introductory computer course presented by Computronics Inc. and attended by RRP clerk (course personally funded by RRP engineer).

6/86 One-day workshop covering the implementation of RRP preventative maintenance program and site communications and responsibilities presented by T. Herbert and D. Van Vuuren. Attended by CTA field mechanics, RRP technicians and engineers.

6/86 One-day workshop covering the use and applications of hand levels for planning and quality control, presented by the RRP engineers to counterparts and technicians.

7/86 One-day workshop covering equipment utilization, site planning and discipline, presented by RRP engineers to counterparts and technicians.

7/86 One-day workshop covering operator, CTA site mechanic and RRP responsibilities for the preventative maintenance program, presented by T. Herbert and D. Van Vuuren at the Siteki worksite.

8/86 One-day workshop covering job planning and quantity estimating presented by counterpart engineer to RRP technicians and engineers.

8/86 Three month computer training program for two RB technicians started. The program was presented by P. Argo and covered the use of software and programs which were used by the RRP with the goal of expanding these programs to the whole of RB.

8/86 One-day workshop covering site reporting, service schedules and job planning during the rainy season was presented by D. Van Vuuren and the RRP engineers and attended by counterparts and technicians.

10/86 A short session was given by the Ministry of Works Training Officer to the technicians on training and career opportunities open to them.

10/86 Proposal were received from two sources for operator and motivational training courses. The proposals were forward to the Department of Establishment and Training for consideration.

11/86 A two day seminar was conducted by T. Kramer on gabion design, application and installation for supervisors and technicians.

2/87 A two day workshop was conducted by T. Kramer on the design, installation and maintenance of low level crossings and culverts attended by site supervisors and technicians.

3-5/87 Two training courses were conducted over a continuous period of 14 weeks by the Bloemfontein Training Centre. The first was a one week motivational and communications course which preceded the second course and which was attended by site supervisors, technicians, site "foremen" and all operators and drivers. This course was designed to improve site morale, understanding of each employees role and the expectations of management and the rights of all employees. It stressed communication at all levels but through the proper channels. It was conducted in Mbabane.

The second course was for 5 days and was attended by operators and drivers and their immediate supervisors. It was conducted in the field and on site. It covered the daily and weekly servicing and operation of vehicles and equipment.

6/87 A 5 day seminar financed by the GOS, was held at SIMPA conducted by the Institute of Development Management covering site management and design of concrete culverts. It was attended by site supervisors and technicians.

6/87 A one day workshop was held by L. Zwane covering site and production control and management. It was attended by all site supervisors and technicians. This workshop was also funded by the GOS.

Highway Technicians:

I talked to two highway technicians, Sibusiso and Thabane Dlamini who were directly involved with the RRP from the beginning to the end of the project.

The most effective training they expressed was in drainage design (culverts, mitre drains, etc.), selection of material, distribution and control of plant site management programming and planning of work etc. The training was in two ways, theory (in class) and practical work i.e. on-the-job training.

Presently they are confident in tackling various aspects they have experienced.

Drivers, and Plant Operators: A training scheme was organized to reinforce the production capability in the use of Plant and vehicles. The training was done by a private team from Bloemfontein S.A. This a was a five day theory and on-the-job training work. The response I got from the people who were involved was very much appreciable. It exposed some new techniques of which they were not aware of, so they say.

Counterpart Engineers (CE): As the CE were working hand-in-hand with the U.S. Engineers (Peter Argo and Terry Kramer) a great deal of experience was gained. This range from the management level to the actual construction work.

The overall scope of the project was more clearly identified after about 5 months, as explained by the people involved.

The overall training program is explained in the counterpart training program report.

The project mobilization extent as stated by the people directly involved in the RRP project; the project took about 5 months to gain its full momentum capacity.

The outline project of the project was reasonably identified. This can be proved by objectives stated in the memorandum entitled "Counterpart training program"; This clearly clarifies the duties of the people involved on the management level, and further experience training that can be gained.

Some of the problems encountered prior to the full operational swing were: 1) The whole site team were not aware of the changes

between the pre-cyclone conditions and the finished road conditions expected from them at the end of the day; 2) The lack of plant and equipment due to the then CTA disorganized structure; 3) The lack of appropriate usable personnel i.e. re-employment was needed and familiarization of personnel relevant duties.

These problems resulted in a marked 5 months delay. Despite this snag the project finished within the right time according to the initial contract conditions, thus it could be unfair to rule it as deficient.

Fani Sibiya
H.A.D. Civil Engineering

DECEMBER 1984

COUNTERPART TRAINING PROGRAM

In partial fulfillment of the objectives of the Rural Rconstruction Project, the following Counterpart Training Program is set out.

It is the recognized responsibility of the Roads Branch to insure that a satisfactory national road network is provided to the public to meet its transport need. To meet this end, the Roads Branch is ultimatly charged with

1. planning of the road network,
2. design of the road network,
3. construction of the road network, and
4. maintenance of the road network.

The above functional elements are carried out through the most economically acceptable combination of direct labor and contract works.

The stated purpose of the Rural Reconstruction Project is to focus on the rehabilitation of damaged gravel and earth roads through direct labor forces. Road rehabilitation is a combination of the elements of design and (re)construction. Specific sites will obviously require varying amounts of input for each element.

Overlying this process of combining elements is the concept of management. The function of the Project Engineer will be to to bring these elements to a successful and economic completion. This training program proposes a method whereby the counterparts are introduced and exposed to a system of procedures and methods to carry out direct labor road rehabilitation.

OBJECTIVES

The principal objective of the Counterpart Training Program will be to involve the Counterpart Engineer in the process of design, construction and management for direct labor road works. Prior to being an effective manager, however, the Counterpart Engineer must be conversent in all aspects of design and construction methods. Then, and only then, will the Counterpart Engineer know what is possible, what is effective and what is economic.

More specifically the objectives can be stated as:

a. To improve the counterparts understanding of construction methods and procedures;

b. To bring to the attention of the counterpart the Roads Branch design policy, use of design standards and selection of material standards while stressing the importance thereof;

c. To introduce to the counterpart methods for effective management and organization.

GOALS

In achieving the stated objectives, the Counterpart Engineer will be able to carry out the following functions:

1. specify equipment, materials and labor for site work
2. schedule work on site to effectively utilize resources
3. keep acurate records of equipment usage
4. develop job costs

5. select appropriate design standards
6. select appropriate material standards
7. prepare working drawings, if appropriate
8. monitor compliance with standards and drawings

9. complete fleet management/reporting system
10. schedule work programs
11. monitor production and job costs
12. develop budget estimates

ACTIVITIES

As a part of the project start-up tasks, the Counterpart Engineer will assist the Project Engineer in the following tasks during the first six months:

1. Assess work already completed by District Units against previously prepared priority listing for each District,

2. Establish reporting procedure for plant and vehicle availability and productivity,

3. Establish the four road rehabilitation units,

4. Develop the short term (rainy season) work programs, and

5. Begin longterm work programs.

TYPICAL ACTIVITIES AND EXPERIENCES FOR TRAINEES - APPENDIX I

HIGHWAY TECHNICIANS DURING THEIR ON-THE-JOB TRAINING

GENERAL

- familiarisation with the organisation of the Ministry.
- understanding of the functions of the Ministry.
- appreciation of the functions of the Roads Branch.
- appreciation of the roles and duties of the staff of the Roads Branch.
- knowledge of administrative procedures within Roads Branch.
- familiarisation with the administration, classification and condition of the road network.
- routine office duties (filming, photocopying, etc.)

HIGHWAY MAINTENANCE

The Districts:

- role of the Road Camps.
- relations with work force.
- compilation of records (orders for materials, plant and vehicles records, expenditure recording, production, etc.).
- supervision of highway maintenance work. (Team Maintenance Units, routine maintenance).
- identification and appreciation of maintenance work activities and methods (routine, periodic, rehabilitative, emergency).
- preparation and implementation of work programmes and schedules.
- utilisation of plant and equipment.
- maintenance of plant and equipment.
- preparation of highway inventory.
- identification of material sources and their quality (e.g. gravel pits)
- quality control of maintenance works.
- location and marking of drainage facilities and highway structures.
- location and establishment of kilometrage markers.
- recognition of common defects and their repair.
- execution of pavement deflection surveys.
- appreciation of the functions and maintenance requirements of highway maintenance, plant and equipment.

The Bitumen Unit

- methods of patching and local reconstruction of failed areas of surfaced pavement.
- use of premixed and hand mixed materials.
- preparation and resealing of a pavement.
- operation of the distributor and other resealing equipment.
- recognition and testing of quality of materials.

3. PLANT AND VEHICLE USE AND CONTROL

- compilation and update of plant and vehicle inventory.
- maintenance of plant and vehicle downtime records.
- processing of information from field on availability and utilisation.
- communication procedures with CTA.
- recording of plant and vehicle movements and locations.
- filling and recording of accident, damage and defect reports.
- collation of daily authorised journey records.
- compilation of records of maintenance attention to plant and vehicles.
- issue and recording of fuel allocations.

4. DESIGN/DRAWING OFFICE WORK

Draughtsmanship:

- use of instruments.
- methods of projection, sectioning and layouts.
- appropriate use of scales and lettering.
- colouring and shadings.
- reproduction methods.
- production and revision of drawings:
  survey plots,
  route locations,
  site plans,
  general arrangements,
  detail plans and section,
- detailing of materials and work schedules.
- interpretation of sketches.
- interpretation of special drawings.

Design:

- use of design theory, British Standards and Codes of Practice.
- compilation and updating of technical literature and data.
- production of simple sketches.
- design and/or checking of construction details.
- revision and update of details.
- construction methods and their effect on design.
- selection of materials and specialist contractors (where applicable).
- interpretation of surveys and maps.

Documentation:

- taking off, abstracting, billing quantities.
- preparation of bills of quantities.
- production of cost estimates from:
  a) approximate estimates,
  b) unit rates/costs,
  c) contract comparisons.
- assisting in the preparation of tender documents.
- analysis and comparison of tenders.
- analysis of construction programmes.
- recording of progress and final construction details.

5. CONTRACT SITE ORGANISATION AND CONTROL

The Contractor

Establishment of the Site:

- layout of offices, staff accommodation, stores and stores compound, sanitary facilities, etc.
- plant yard and organisation of maintenance facilities.

Operation of the Site:

- administration of site office.
- relations with labour - personal communications, human relations, unions, organisations, supervision and training of work-force.
- interpretation and implementation of master programme, and preparing and updating programmes.
- interpretation of drawings and schedules, construction methods and techniques including temporary works, timbering, shoring,

ground support systems, scaffolding, testing out and checking of works, quality control, work study procedures.

- cost consciousness - economics of plant utilisation, control of small plant and tools to avoid loss and misuse, avoidance of unnecessary cost, prevention of waste.
- materials requisitions, disposal of spoil and surplus materials.
- advantages of site orderliness and tidiness.

Completion and Clearance of the Site:

- listing and completing outstanding works, connection of services.
- phasing of handover, handover inspections.
- clearance of plant, materials, site offices, return of drawings and site documents.
- transfer and discharge of labour.
- preparatory work leading to final certificate.
- maintenance inspections.

Site Safety:

- knowledge of statutory acts, regulations and notifications.
- compliance with safety, health and welfare regulations.
- completion of accident book.
- completion of statutory registers and forms.
- displaying of statutory and warning notices.
- knowledge of safety precautions.
- awareness and behaviour of the individual in relation to safety.
- knowledge of the consequences of safety precautions to the individual.
- provision of protective clothing, e.g. headgear, footwear and oilskins.
- accident prevention and site tidiness.
- promoting safety at all levels.
- knowledge of effects on morale and production.
- knowledge of insurance aspects.
- the watching, lighting and protection of works.
- control of site traffic.
- appreciation of the cost of accidents.

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Subcontractors:

- nominated subcontractors)
- labour only subcontractors) the legal position.
- forms of contract.
- starting and finishing dates.
- liaison with, and co-ordination of subcontractors.
- temporary light, power and water.
- use of scaffolding and falsework.
- facilities and attendance on subcontractors' work.
- daywork.

Site office routine:

- office procedure - control of drawings, specifications, bills of quantities, filing systems.
- preparation of temporary works drawings.
- time-keeping and compilation of wages sheets.
- keeping records, site diary, making progress reports.
- stock-keeping - materials inwards and outwards.
- bending schedules.
- schedules of finishings.
- maintenance of records of variations.
- maintenance of weather reports.
- preparation of daywork sheets.
- labour returns and other routine returns to head office.

Cost control:

- understanding of the requirements of a system of cost control.
- relationships with quantity surveyor.
- experience in the analysis of costs.
- the coding of expenditure.
- allocation of expenditure.
- experience in measurement and valuation.
- comparison of cost and valuation.
- presentation of results by graphs or diagrams.

Quality control:

- importance of quality control - economic benefits.
- effect on cost and time of remedial work.
- interpretation of specifications.
- compliance with specifications.
- protection of finished work.
- field tests for materials and workmanship.
- inspection of "off-site" fabrication.
- effect of weather on working methods.
- checking formwork and reinforcements.
- assessment of ground formation.
- accurate setting-out.

The Resident Engineer:

- administration of site office.
- communications with contractor, engineer and client, relationshi with subcontractors.
- site diary.
- liaising on the updating of programmes and the recording of progress.
- issuing site instructions, variation orders, drawings and amendments.
- checking and recording dayworks, other extra charges, and contractors returns.
- measurement of work.
- agreement of interim and final certificates.
- periodic reports to engineer.
- organising site supervisory staff, interpretation of specification, supervision of quality control, approval of construction methods.
- conducting site surveys.
- supervision of site laboratory.
- production of "As built" records.

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6. QUANTITY SURVEYING AND MEASUREMENT OF WORK

Preparation of contract documents:

- interpretation of working drawings.
- knowledge of relevant specifications.
- familiarity with various forms of contract,
- use of standard method of measurement.
- taking off, abstracting and billing.
- subcontracting procedure.
- provisional and prime cost items.
- estimating ability.
- examination of tenders.
- discussion of variations with contractors.
- checking of contractors' accounts.
- site measurement.
- final certificate.

7. SURVEYING AND SETTING OUT

- use, care and adjustment of instruments (tapes, chains, level staff, tripod,theodolite, tachometer).
- use of level books and field books.
- maintenance of accurate records.
- linear measurement and corrections.
- line ranging (a) over hills (b) around buildings.
- base lines and setting out lines.
- use and interpretation of ordinance sheets, and knowlege of national grid referencing.
- bench marks (temporary and permanent).
- transfer of levels.
- site girds and contouring.
- conducting and plotting site survey.
- preparation of plans and sections.
- calculation of earth work quantities.
- traverse surveys and computations.
- angular measurement.
- interpretation of drawings.
- extraction of setting-out information.
- calculation of data for setting-out purposes.
- setting-out and checking - buildings sewers, earthworks, roads.
- curve ranging (vertical, circular and transitional).

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- use of profiles, boning rods and sight rails.
- plumbing and alignment of tall structures.
- checking alignment of formwork.
- measurement of existing buildings.

5. SITE INVESTIGATION AND SOIL TESTING

- elementary classification of soils and rocks.
- analysis of soils.
- methods of soil sampling (disturbed and undisturbed).
- booking, protection and handling of samples.
- use of bore holes and trial pits.
- recording field compaction trials.
- conducting field tests (vertical load, deep penetration, lateral loading, vane and permeability tests, density measurement).
- recording test results.
- plotting and analysis of results.
- preparation of reports.
- interpretation of surveys and maps, e.g. geological, geographical, site investigation and bore holes, ordnance. hydrographic, aerial.
- conducting and plotting site surveys showing types of soils, location of water table, existing services, position of bore holes.
- laboratory work.
- organisation of boring equipment and labour.
- conducting soil surveys:
  a) preliminary work,
  b) site reconnaissance,
  c) determination of soil profile and collection of samples,
  d) location of water table,
  e) preparation of reports.
- investigation of the safety of existing work, including:
  a) inspection of sub-strata,
  b) examination and testing of samples,
  c) compiling data and records.

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LABORATORY WORK

Soils:

- use of general laboratory apparatus for grading, weighing, drying and sieving materials.
- preparation of disturbed and undisturbed test samples.
- classification of soils and rocks.
- analysis of soils for organic and carbon content.
- determination of moisture content, plasticity, specific gravity, particle size distribution and shrinkage limit, dry density.
- carrying out compaction tests (BS compaction, and ASSHO).
- capillary water absorption test.
- carrying out unconfined compression, C.B.R. and plate bearing tests.
- use of machines for triaxial, shear box and consolidation tests.
- use of sensitive instruments.
- design of apparatus for special purpose.
- knowledge of calibration methods.
- appreciation of degrees of accuracy.
- production of accurate and reliable results.
- interpretation and co-ordination of results.
- presentation of results.
- preparation of reports.

Concrete:

- mix design procedures.
- interpretation of specification requirements.
- selection and analysis of aggregates.
- selection of appropriate cements.
- assessing aggregate particle shape and sieve analysis.
- analysis for organic impurities (aggregate and water).
- conducting silt and moisture content tests.
- conducting trial mixes; production of cement test certificates.
- tests for workability (slump, compacting factor, Vebe).
- making, curing and testing concrete specimens (cubes, prisms, cylinders and beams).
- use of accelerated testing methods.
- use of admixtures.
- establishing quality control procedures.
- compiling results for statistical analysis.

Bituminous road materials:

- recognition of bituminous paving materials.
- sampling and testing of individual components:

a) Binders:

Bitumen	)	Penetration
asphalt cement	)	Softening point (R & B)
Pitch bitumen blends	)	Ash, etc.
Tar	)	Equi-viscous Temperature
Cut-back bitumen	)	Distillation, etc.

b) Aggregates and sand:

Sieve analysis

Physical tests e.g. Water absorption
Aggregate crushing value
Abrasion
Polished stone value.

c) Filler:

Sieve analysis

Bulk density in toluene

- sampling of mixed materials, the differing techniques required in varying sampling situations, e.g. mixing depot, road finisher or road surface.
- testing of mixed materials to specification, using BS 598 method or other relevant standards.
- Marshall testing:
  a) mix design in accordance with standard practice.
  b) field determinations.
- special tests:
  a) calculation of superage for road surfacing materials.
     emulsion - testing in accordance with BS 434, etc.
- knowledge of mixing methods and appreciation of importance of temperature control at mixing plant and site laying.
- investigation into road failures:
  a) site examinations (ravelling, cracking, stripping).
  b) sampling if necessary.
  c) examination of road base.
  d) recognition of faulty materials and assessment of cause.

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10. CONCRETE TECHNOLOGY

Concrete:

- mix design.
- selection of suitable mixing and batching plant.
- materials storage and handling.
- batching by weight and volume.
- methods of transporting and placing concrete.
- methods of compaction.
- surface finishes (hand and machine; decorative).
- selection of additives.
- repairs to concrete.
- methods of curing concrete.
- organisation and training of concreting gangs.
- prediction of labour requirements.

Reinforcement:

- detailing of reinforcement.
- preparation of bending schedules.
- handling and bending bars.
- cleaning, placing and fixing reinforcement.

Formwork:

- physical properties, weight size and re-use, cost and flexibility considered in relation to selection of materials and the design and construction of formwork.
- concrete outputs, concrete pressures, live and dead loads.
- use of types of construction and movement joints.
- striking times, fixing and striking methods.
- effect on cost and time of standardised units.
- patent systems of dixing and striking methods.
- use of props, struts, decking and scaffolding.
- surface finishes; surface treatment of formwork.
- formation of cavities and fixings.
- cleaning out formwork.
- purpose made formwork.
- slip form technique.

11. TRAFFIC MANAGEMENT AND TECHNIQUES

- study and interpretation of street maps and development plans.
- recording and plotting of street furniture, road markings and public services.
- preparation of land acquisition drawings.
- surveying intersections and plotting sight lines (see 8. Surveying and Setting Out).
- compiling, recording and up-dating office data, including technical literature.
- investigation of public road transport arrangements, e.g. stops, bays, shelters and terminals.
- analysis of other forms of public transport.
- conducting and recording traffic and pedestrial surveys (use of automatic counters; collection and assembly of data from roadside interviews; origin and destination surveys).
- conducting surveys of parking facilities (location and duration; analysis of public comments for appropriate action).
- conducting and reporting on accident studies.
- preparation of data for cost/benefit analysis and economic studies.

ATTACHMENT NO. 3

FINANCIAL ANALYSIS IN U.S. $

(AS OF 12/19/87

SOURCE : USAID MACS - PO7A

ACTIVITY	OBLIGATIONS	EARMARKINGS(%)	COMMITMENTS(%)	EXPENDITURES(%)	PIPELINE(%)
Technical Assistance by U.S. Advisors (3)	577,000	515,072 (89)	513,772 (89)	459,812 (79)	117,188(21)
CTA equipment repair and Water Branch new equipment purchases	673,000	622,238 (92)	597,499 (89)	554,874 (82)	118,126(18)
TOTAL	1,250,000	1,137,310 (90)	1,111,271 (89)	1,014,686 (81)	235,314(19)

*Outstanding Technical Assistance billings are expected to use $35,000 of the pipeline when postings are made at the end of the month.

ATTACHMENT NO. 4

LIST OF SELECTED DOCUMENTS REVIEWED AND AVAILABLE IN USAID/ADO OFFICE FILES

1. RRP Project Paper
2. RRP Project Grant Agreement
3. RRP Mid-term Evaluation
4. CTA Request for proposals covering a time and materials contract for repairs to the CTA/USAID RRP Fleet
5. RRP Master Mechanic's bi-monthly report for Sept/Oct. 1986.
6. Investigation into the cause of failure of gearboxes on Nissan LIG 700 trucks
7. RRP Final Report by U.S. Advisors
8. RRP Master Mechanic's report for four month period ending Feb. 1987
9. RRP Master Mechanic's report for three month period ending May 1987
10. USAID/S RRP Scope of Work for End of Project Evaluation
11. RRP Minutes of Steering Committee
12. CTA Job functions for Receiving and Processing Job Orders
13. CTA Report on fleet repair expenditures by Contractor
14. RRP Summary of Project closing and present status
15. RRP Final FAR reconciliation