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Management Assistance to LCADP Transportation Logistics: Observations and Recommendations

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PREFACE

The purpose of this consultancy was to provide management assistance aimed at improving the logistics of transportation within the Lofa County Agricultural Development Project (LCADP). The work focused on the examination of factors that affect successful transportation support and the identification of appropriate, practical methods to improve maintenance and supply activities.

To achieve this purpose four (4) person-weeks of professional assistance were provided in August 1979 under the auspices of USAID Project 936-5300, "Organization and Administration of Integrated Rural Development." The assistance was rendered by David W. Miller, a management consultant to Development Alternatives, Inc. (DAI). The approach included interviews with project personnel, personnel of the principal supplier of parts, observation of transportation and transportation maintenance and supply activities, and examination of available documents.

Mr. Miller compiled his observations and recommendations on site and presented them to the Project Manager, Mr. Jeremiah Tulay, in written memo form before departing. USAID Monrovia was provided with a copy. The memo was written specifically and exclusively for the direct use of project management. It provided practical suggestions for changes and improvements that might be implemented without delay. The report that follows is based on the text of Mr. Miller's original memo.

During the consultation, numerous individuals provided invaluable encouragement and insights. Their assistance is gratefully acknowledged.

MANAGEMENT ASSISTANCE TO LCADP TRANSPORTATION LOGISTICS: OBSERVATIONS AND RECOMMENDATIONS

BACKGROUND

LCADP employs seven mechanics (two are bike mechanics), including a chief and assistant mechanic, five helpers (one for bikes), one electrician and one welder to maintain approximately 185 motorbikes, forty cars and trucks, five tractors and trailers, a road grader, a bulldozer and a front-end loader. This is a very small crew to provide a difficult, complex, and absolutely essential service to the project -- keeping its wheels rolling.

Vehicles and heavy equipment are housed at several widely scattered locations. Their day to day operations are directed by several divisions, each understandably expecting priority maintenance service. Very difficult road, terrain and weather conditions force a high incidence of breakdown. Spare parts, maintenance materials and bike oil are scarce in the project area. Workshop and Bike Shed facilities, equipment and tools are severely limited. Many of the vehicle drivers and most of the bike drivers are not well trained in preventive maintenance[1] procedures and techniques.

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[1] Preventive maintenance (PM) is maintenance <u>before</u> breakdown to <u>prevent</u> breakdown.

These circumstances generate such a large body of problems and obstacles that if presented as a hypothetical example to a seminar of management experts they would surely conclude that the project had failed. Clearly, LCADP Phase I is a success. That success is due in great measure to the perseverance of all levels of management in dealing with transportation maintenance difficulties.

The following pages address some of the problems that transportation maintenance currently faces, and include observations and recommendations for practical ways to attack them.

MOTORBIKE PREVENTIVE MAINTENANCE TRAINING

The underlying and most critical problem with motorbikes is the almost universal lack of PM by drivers. The bike ownership program[2] would seem to be a powerful incentive towards good bike care. Two essential ingredients, however, are missing: (1) a rudimentary understanding of a motorbike's mechanical operation and lubrication; and (2) the simple manual skills required to care for it (i.e., frequent cleaning, inspection, adjustment and lubrication). The ownership program should produce better results when aides understand the mechanical whys

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[2] Aides pay one-half the cost of the motorbike in monthly installments, after which they own their bikes.

and hows of good PM and relate it to less walking and bussing because of fewer breakdowns, and a higher resale value. In addition, the spare parts problem should be greatly reduced, and thus LCADP expenses reduced, because fewer parts will break, wear out or burn out. (Crankshaft burnout, a chronic LCADP problem, should never occur if aides pay close attention to oil level and use only two stroke or 30-weight -- not 40-weight -- oil. Far fewer sprockets and chains will be needed if drivers care for them properly.)

PM training for all current and future bike drivers is recommended. The framework for such training is provided below.

- Require three days of intensive PM training. (This is in addition to the usual two days of how to drive safely.) Devote the first day to teaching the basic theory and functioning of the engine, drive train and suspension systems. Emphasize the reasons for, importance of, and required frequency of cleaning (particularly chains), lubrication (engine oil, chain, shocks, etc.) and adjustments (chain, brakes, etc.). Add such things as the dangers of revving engines too high in neutral. (Abu Koroma, the workshop electrician, concurred that this is the major cause of another chronic bike problem -- fuse and headlight burn out.)

  Devote the second and third days to: (a) reviewing the lessons of the first day while giving actual "how to" demonstrations; and (b) closely coached practical exercises in all PM techniques with each student participating fully.

  During the second and third days alternate these teaching methods devoting not more than three or three-and-one-half hours total to the first method. Review and "how to" demonstrations should be performed by coaches (more on coaches and instructors later) with one coach and one bike per four students. Practical exercises should be performed with one

coach and two bikes per four students, going through each exercise at least twice and rotating bikes so that each student's bike is used at least once.

Whenever an instructor is thoroughly satisfied that a student appreciates the importance of and is capable of good PM, he may excuse the student from the remainder of classes. This can be used as a teaching incentive and will permit instructors and coaches to concentrate on those most in need of training.

- Each project officer responsible for employees with bikes should attend one three-day session.

- The maximum number of students per class should be 20. This means holding several three-day training sessions, but close, almost individual, student instruction and coaching is important.

- Hold classes at the Farmer Training Center for students from Foya and Kolahun and at the LCADP Training Center for those from Voinjama and Zorzor. Students from one area could be trained in another if better balance and scheduling would be achieved. The advantages of this are to: train approximately 40 people at a time and finish more quickly; establish a larger cadre of instructors and coaches; and require less student travel.

- Identify potential instructors and coaches among officers and aides. Obtain nominations from officers, deputies and managers. Probably several AEOs and COs have one or two aides who already know how to care for their bikes and have few or no breakdowns.

- Instructors and coaches should be assigned as follows: two instructors, one each training center; and ten coaches, five each training center (maximum four students per coach).

- Instructor and coach training:

  Send two instructors (and two coaches if SATCO[3] will accept four) to SATCO for three to five

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[3] Give SATCO (Swiss African Trading Company) a copy of this section of recommendations.

days of training. Let SATCO determine the number of days necessary. Mr. Richardson and Mr. Calhoun of SATCO have volunteered to provide such training free of charge. Instructors should study the Yamaha[4] shop manual before going to SATCO. Coaches should study the manual before instructors return.

Instructors return from SATCO and, with the help of the Training Division and Muhammad Carama, train coaches and prepare for classes.

- Task the LCADP Training Division to produce a detailed design of the PM Training Program using this report, the Yamaha shop manual, and advice and assistance from SATCO, the LCADP Workshop, and certain nominated instructors and coaches.[5]

MOTORBIKE PREVENTIVE MAINTENANCE PROGRAM

To amplify the beneficial effects of the PM Training Program, to increase and maintain awareness of the importance of PM, and to better insure that PM is actually performed, the Administration Division, with the assistance and cooperation of all divisions, should institute a PM Program. The program could be built around the following eight points.

- For those bikes without a permanent driver, the man who drives it most often should be responsible for PM.

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[4] The bike shop has a manual, and there should be two or three others around. Put out a call for them.

[5] DAI, under AID Project 936-5300, has the capability to design and present such a program should an outside team be considered useful.

- Require that every bike driver perform certain PM pre-operation functions each day before use, e.g., inspect chain and adjust and oil if necessary, fill engine oil. Also require that certain other PM functions such as cleaning, oiling and adjusting the chain and cleaning air filters be performed every seven days. The specific mandatory functions should come from the PM Training Program.

- Include a mandatory section in reports from aides as to what PM functions they actually performed and when.

- Require officers to perform unscheduled, detailed inspections of each bike at least once each month. Officers should be qualified to inspect because they received PM training. Provide officers with several copies of inspection check sheets for guidance and to record results. PM training instructors could design the check sheets and use them in training.

- Require officers to include a section on PM in their formal performance evaluations of aides.

- Use maintenance records (see MAINTENANCE RECORDS) to spot problem drivers. Administration could circulate the Monthly Maintenance Sheet for each bike to appropriate division managers.

- Managers, deputies and officers take appropriate steps when inspections, evaluation or Monthly Maintenance Sheets reveal problems.

- Establish a PM and Safety Incentive Awards Program. A modest budget for bonuses might produce big dividends. Officers would nominate deserving drivers for the month by writing a short factual statement and attaching their inspection check sheet. Managers or deputies would add the Monthly Maintenance Sheet and their remarks to the file. Appoint a standing Project Manager's Awards Council to review these nominations and recommend the ten or so top drivers of the month for the Project Manager's PM and Safety Award Bonus. No driver should be awarded more than one bonus per quarter, but sustained outstanding performance could be recognized with an Honorable Mention.

PREVENTIVE MAINTENANCE FOR OTHER VEHICLES AND HEAVY EQUIPMENT

PM training and a PM program similar to those for motorbikes are quite desirable for other vehicles for the same reasons, though they are of somewhat lower priority. After experience is gained from the motorbike programs, the Administrative and Training divisions should turn their attention to similar programs for cars, trucks and heavy equipment.

MAINTENANCE PERSONNEL

Understaffing and low pay relative to others contribute to a reduced level of morale among transportation maintenance personnel below the supervisory level.[6] Reduced morale means reduced worker output.

Four other factors that affect maintenance worker morale are lack of driver care of vehicles (PM), lack of adequate tools and equipment, lack of spare parts, and the procurement of inappropriate substitutes for spares and materials ordered. These factors are treated elsewhere in this report and are mentioned here to make the point of their relationship to maintenance worker morale and output. (Their other, more serious impact, is obvious -- adverse impact on the quantity and quality of transportation.) The fourth, inappropriate substitutes, deserves further treatment.

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6 Lack of driver care is the major cause of this.

Consider the case of the welder, Momoh Johnson, who is skilled and motivated yet frustrated by the lack of suitable materials. He orders one kind of welding rod and receives another, one kind of I-beam and receives another. He knows that the trailer tongue he could make strong enough to last a year will be back for repairs next month or next week. He fears for his reputation.

Low Pay Relative to Others

Workshop salaries should be raised substantially with all automotive mechanics and the electrician raised to the senior aide level of $300 (from $275 for Stubblefield, $200 for Bouviquo, who Thomas considers his best mechanic, and $250 for the others). Raise the Chief Mechanic to the officer level of $500. The welder's skill deserves $250 -- between senior aides and aides with agriculture diplomas. Moses Kennedy has worked well as a laborer and been reqarded with heavier recordkeeping responsibilities in addition to his duties as a lubrication specialist. I recommend Kennedy be hired at the junior aide level of $150.

In the Bike Shed, Abraham Bay, a capable mechanic paid as a laborer, should be hired at $200 and Mambe Koroma's salary should be raised to $250.

The bike mechanic supervisor, Muhammad Camara, should receive up to six weeks of intensive on-the-job training at SATCO under the wing of their chief Yamaha mechanic, Anthony Watson. Again,

Mr. Richardson and Mr. Calhoun have volunteered this training free. At the end of training, Camara's salary should be raised to $250 and if, after four weeks, the Chief Mechanic, Administrative Manager and Project Manager are satisfied with his performance as supervisor, raise his salary to $275.

Understaffing

The transportation maintenance staff should be enlarged by three new hires: a welder helper (laborer); a tools, maintenance equipment and parts clerk at $150 to $200; and a bike mechanic at $200 to $250.

The welder helper would free mechanics from assisting Johnson on big jobs and, with training, free the Chief Mechanic from welding jobs at the Workshop when Johnson is away. The tools and parts clerk is very important to stop the loss of tools and make them more readily available to mechanics, to keep maintenance equipment in good condition, to take the administrative burden of ordering parts off the mechanics, and to create well organized, complete with bins, salvage parts departments for the Workshop and Bike Shed. Since new spare parts are scarce and expensive, salvaged parts are an important resource. Mechanics now waste valuable time searching through scattered piles for salvageable parts. The additional mechanic is needed because 185 bikes with more coming are too many for three people to handle.

MAINTENANCE PHYSICAL PLANT

The Bike Shop has a security problem. Wide open as it is, the supervisor cannot control tools effectively and his necessary attempts to do so waste mechanic time. Similarly, he has had only limited success in preventing parts and accessories from disappearing from bikes in for repair, and his attempts to do so cost time. A secure gated fence enclosing the front of the shed and out several feet would improve security. Access could effectively be limited to maintenance personnel.

As noted previously, salvage parts departments should be created for the Workshop and Bike Shed. Bins and shelves should be built in both locations to organize salvage parts. More bins for new parts are needed in the upstairs area of the Workshop.

MAINTENANCE TOOLS AND EQUIPMENT, MANUALS, AND MOTORBIKE OIL

Tools and Equipment

Tools and equipment are severely limited. The air compressor is small and takes up to four hours to bring a grader tire up to pressure. A battery charger is needed. Neither the Workshop nor the Bike Shed has a serviceable bench vice. Broken vices probably resulted from not having one large enough for the big jobs. One very large and one medium vice should be obtained for

the Workshop and another medium one for the shed. A drill press table would make possible such repairs as rebushing bike crankshafts rather than ordering (and waiting for) entire new assemblies.

Obtaining tools and equipment should be given high budget and procurement action priority. Too often the question "How can we do the work if we don't have the tools?" is asked and observations have shown the question to be justified. Several maintenance personnel, including Joe Border, drew up lists of needed tools and equipment, some of which need refinement and expansion. (In some cases, catalogues from Monrovian vendors are needed to write accurate purchase orders.) These lists were attached to the original memo.

SATCO does not stock special Yamaha shop tools. It would take three-and-a-half to four months to get them from Japan by air. They could be obtained from England in four to six weeks, but the cost would be considerably greater. It would be worth it.

Manuals

Shop manuals for Toyota are also needed and should be a priority for procurement. Mr. Thomas can list them.

Motorbike Oil

Proper oil is vital to motorbike operation; without it the machines quickly die. Proper bike oil, however, is very scarce

in Lofa. Special two-stroke engine oil is specified by Yamaha, but ordinary 30-weight oil is an acceptable substitute. 40-weight oil is as good as no oil and should not be used. Unfortunately, there is plenty of 40-weight in Lofa. Vendors often sell aides 40-weight and call it 30.

The solution is to formally implement the idea already considered by management in the Workshop and Administration Division: project distribution from Voinjama and Foya of at least one gallon of oil per month to each aide. Monthly purchases of two-stroke or 30-weight oil by case or drum from Monrovia should be arranged and added to the high priority procurement list.

SPARE PARTS AND MATERIAL STORES AND PROCUREMENT

Spare Parts and Material Stores

The internal system for requesting and issuing spares and recording transactions works well, but is a bit cumbersome. Most orders for local procurement of spares are of two types: emergency orders for an item not in LCADP stock, or large infrequent orders based upon Workshop estimates of needs for two to six months. Usually, these estimates are not based on recorded historical usage data. In the case of bike parts they are often inflated to counter anticipated shortfalls by vendors.

In discussions with SATCO, Mr. Calhoun, Mr. Richardson, Mr. Koisee, (assistant parts manager), and Mr. Soloe, (chief parts clerk), made a convincing argument and plea for regular, frequent, more reasonable bike part orders from LCADP. They urge LCADP to learn and adopt the widely accepted principle of establishing re-order levels by keeping and analyzing historical usage data and pipeline time from the manufacturer, and projecting usage increases and decreases from anticipated changes in project activity. They desire to cooperate fully and vigorously with LCADP in this matter, and volunteer to train and assist LCADP stores people free of charge. Jacob Goe and the recommended new hire, the tools and parts clerk, should be sent to SATCO for exhaustive training as soon as possible.

Improvement in the spare parts procurement situation will be slow. PM promises the fastest route to improvement.

Procurement

While procurement procedures were not examined in detail in this visit, many instances of the spare parts or maintenance material received being different from the item order were observed. This happens when the buyer does not know the difference and the seller either errs (not likely) or doesn't have the item, but wants to make a sale. The solution requires procurement officers or whoever actually makes the purchase to be tough and demand proof or a money-back guarantee that the item sold is the item ordered, or an equally workable, completely satisfactory, substitute.

MAINTENANCE RECORDS

Maintenance record systems have been many, and frequently abandoned. A record system should aid in controlling work flow and provide data for analysis of the quality of Workshop/Bike Shop maintenance, of the quality of driver PM and of the condition of the vehicle.

Attached to this memo are two maintenance record forms designed with the assistance of the Chief Mechanic, and adapted from existing forms and procedures he already had in use. They should be printed and put in use as soon as is practical. The Workshop and Bike Shed should be provided with substantial file boxes for them.

The Workshop Job Card is attached to and stays with a vehicle as long as it is in the maintenance area. When the vehicle departs, data is transferred to the Monthly Maintenance Sheet. The Workshop Job Card is filed in the Workshop or Bike Shed and the Monthly Maintenance Sheet is forwarded to the Administration Manager for appropriate use, including those procedures described in the Preventive Maintenance Program section of this report.

ORGANIZATION

Two organizational changes or additions have already been recommended: establishing a controlled tool room with the

additional responsibilities of parts requisition (Workshop to Stores) and salvaged parts stores; and designating a position to keep Maintenance records.[7]

A third organizational change originated with Workshop staff and would be beneficial. A bike mechanic should be stationed in Foya to provide readily accessible Workshop (Bike Shed) level maintenance to bikes in the Foya/Kolahun area. Daniel Goe has suggested that the radio man there could be pressed into service as the spare parts storeman. A thatched maintenance shelter could be built for quick, inexpensive, construction; and a permanent one when the idea proves itself.

It appears that LCADP would benefit from hiring a Deputy Manager for Stores and Procurement under the Administrative Manager. The time alloted this visit did not permit full analysis and development of this important recommendation. There is ample evidence[8] to suggest a need for such a position.

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[7] Moses Kennedy, see Maintenance Personnel.

[8] See Spare Parts and Material Stores and Procurement for related discussion.

APPENDIX A:

MAINTENANCE RECORDS

8 inches

5 inches

WORKSHOP JOB CARD

Date and Time In _____ Vehicle or Bike # _____ Division _____

Date and Time Out _____ Make and Type _____

Mechanic Assigned _____ Mileage _____

WORK NEEDED _____

_____

WORK NOT DONE AND WHY _____

_____

OTHER REMARKS _____

_____

Signature _____
Mechanic

Signature _____
Chief Mechanic or Bike Shed Supervisor

LCADP Form #_____. September 1979.

MONTHLY MAINTENANCE SHEET

MONTH _____

Vehicle # _____ Division _____

Make _____ Year _____ Type _____

Date: _____ Mileage: _____ Type of service:	Remarks
Date: _____ Mileage: _____ Type of Service:	
Date: _____ Mileage: _____ Type of Service:	
Date: _____ Mileage: _____ Type of Service:	
Date: _____ Mileage: _____ Type of Service:	
Date: _____ Mileage: _____ Type of Service:	
Date: _____ Mileage: _____ Type of Service:	

LCADP Form # ____ September 1979