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Self-Sufficiency for the Rural Road Maintenance Association of Upala

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Final Report

Submitted to:
USAID/Costa Rica

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*Self-sufficiency for the Rural
Road Maintenance Association
of Northern Costa Rica*

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AMV Strengthening Project

ACDI Final Report

*Self-sufficiency for the Rural
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Project Goal and Purpose

The goal of this project was to contribute to the integration of the poverty stricken, isolated Northern Zone within the Costa Rican economy, and to increase the economic well-being of its residents.

The project purpose (means of accomplishing the above goal) was to facilitate the development of the Asociacion de Mantenimiento Vial (Road Maintenance Association) into a *self-sustaining private sector business* for the maintenance of gravel feeder roads in the Northern Zone.

Format of this Report

The ACDI assistance to the AMV accomplished or exceeded all of its proposal and logframe goals, as previously reported to the AID Mission. The main purpose of this report is therefore to summarize the lessons learned during the project, to create a useful guide for others who would attempt another road maintenance association. At the request of various participants, this report will therefore be translated into Spanish.

ACDI project approach to community road maintenance

According to the foremost road engineers, the principal challenge of an AMV is organizational and administrative. The technical part is carpentry, not architecture. The main elements are how you get the community to work together, attract local and central government funding, administer the resources responsibly, and program the road work in the field. The only main element in place in May, 1992, when ACDI began work, was the exemplary way the community was working

together, the continuing legacy of Harry Peacock's eight years of tireless organizing and promotion.

Aside from the basic technical and management building blocks noted in our previous reports, we were guided by an over-arching, conscious technical assistance method learned previously: to foster lasting linkages between the AMV and key individuals in the Costa Rican road building technical and political community. Costa Rica is a small country, and its leaders naturally run things based on old fashioned, village-style personal contacts. The AMV is now socially integrated into the road-building community, and there is general approval at high levels of their private sector, community-based organizational structure. Technical ability and funding alone are not sufficient in this setting. In Costa Rican terms "Para hacer cosas, hay que tener patas" (to get things done, you must have influential friends).

Summary of AMV's status at project start-up

At the beginning of this project, in early 1992, the prevalent opinion in the AID Mission was that the AMV would do some road work and disappear, but at least the road work would remain, justifying the AID investment, and the municipalities would salvage some equipment. This thinking was confirmed in an AID-sponsored evaluation of the AMV, by a team led by Howard Harper, dated December, 1991. It presented a long list of AMV weaknesses, such as an ill-prepared staff, friction with the Ministry of Planning (MIDEPLAN), and a lack of community ability to pay for road services. The evaluators also commented "there is no work plan, nor goals to be achieved...beginning in 1993 there will be a serious deficit that would make the AMV collapse from the beginning of the year." The evaluation concluded "to date, the AMV has not produced visible results and there appears to be no sound evidence that it can become a self-sustaining organization."

Even the AMV's original manager and some on the board expressed similar initial expectations. When ACDI came on the scene the AMV was not quite dead on arrival, but its life signs were very weak.

Summary of AMV's status at project end

As of this writing, in April 1995, the AMV is currently far more successful than anyone thought possible. They have contract bookings through the end of 1996. They have the confidence of the Ministry of Planning (MIDEPLAN), The Ministry of Public Works and Transportation (MOPT), the National Emergency Commission, the municipalities and the national legislature, all of which continue to provide them road and bridge contracts, not grant funding. They are operating a model drainage pipe factory using their own and MOPT funds, along with pipe molds donated by the GTZ (AID) of Germany. This has reduced their pipe cost by 60% while creating 10 jobs beyond their basic staff of about 20.

The AMV board of directors has experienced leadership from both major parties, who keep getting re-elected, and they continue to dodge the bullet of pressures by politicians of questionable methods, from either major party, who would eliminate the strong bi-partisan tradition of cooperation on the board. The AMV board continues to require local community financial participation, cash in advance, with projects scheduled on a first-come, first-serve basis, and there is a long waiting list.

AMV managers know their operating costs per day and per kilometer, and they have a state-of-the-art customized computer accounting system provided by ACDI. They are turning away work and are maintaining their standards of quality and price. They own their equipment, office and shop free and clear, with a total value of about \$700,000. They have an equipment maintenance trust fund of about \$90,000, created at the instigation of ACDI, and a separate operating reserve of about \$120,000. Their operating budget for maintenance projects and overhead in 1995 (not counting Route 4) is about \$910,000, all of which is funded by various agreements, which will allow them to increase their operating reserve at year's end by a projected 50%.

The AMV is still subject to possible future threats: loss of the current outstanding management to higher paying jobs in the city, political interference on the board, manager burnout, political or legal reprisals from competing private contractors, or the inability of the GOCR to continue hiring their services. None of these seem to be serious threats in the near term.

Obviously, problems were solved and lessons were learned along the way, providing the focus of this report. Some problems were solved as planned, while others developed surprising solutions counter to the original ACDI plan, such as Route 4, and river-use permits. Some key problems are not yet fully solved, such as the occasional attempts at political interference with the board. The following is a discussion of the principal problem areas, based on the output section of the logframe in the ACDI proposal of March, 1992.

1. Problem: lack of a long range plan and vision for the future

The AMV grew out of the Northern Zone Project, an AID-funded, government run (MIDEPLAN) project which made numerous, significant grants for basic public works, education, land titling and so on. The government grant mentality infected the AMV from the beginning, and was not fully overcome until the third, current manager moved into the position in mid-1994.

The vision of the AMV as a temporary conduit for channeling road improvement grant funds was the original plan from 1988, and was part of the original organizing presentations. In about 1990 AID added a requirement that the AMV should attempt to be self-sustaining as a community business. As an AID employee said, "self-sufficiency" as a project goal was coming into style in AID world-wide at the time.

ACDI was hired by AID for three weeks to carry out a planning exercise with the AMV in

September, 1991, resulting in their first business plan. Nevertheless, there was clear resentment on the part of many AMV participants at having the self-sufficiency goal imposed on them post facto. There was no example to emulate, no vision of how it could work given the low ability of the community to raise funds, and little belief that technical help could make it possible. Some participants made it clear they would "dance to AID's tune because they control the funds," but had no commitment to the idea after AID withdrew. This was especially true of the original manager, who announced he would be resigning as soon as the AID funds were spent.

AID was slow in addressing this situation, and in providing the technical assistance needed, because there was another problem to be solved first. AID's consultant engineer, Betty Facey, in a project saving report, pointed out in October, 1991 that the AMV would fail unless removed from the smothering influence of the MIDEPLAN bureaucracy. At that time, major AMV decisions required over 20 authorizing signatures from various government agencies.

The difficult process of negotiations to extricate the AMV from MIDEPLAN took six months, until May, 1992. During that time the AMV started some overly expensive, poorly designed rehabilitation contracts, and failed in basic managing chores such as keeping the accounting books. AID's constant threats to cancel the AMV project during the previous year had intensified the AMV's desire to spend the money as fast as possible, so that an early close of the AMV was becoming self-fulfilling. Therefore the AMV was hell-bent for self-destruction when ACDI finally came aboard in May, 1992, and the AMV barely escaped its 1992 audit because ACDI began helping them months before, on a volunteer basis.

1. Solution: educating the board, encouraging the replacement of personnel, demanding marketing effort

The problem of lack of planning and vision is only overcome by improving management. Regarding the first two AMV managers, this was a case in which the public sector mentality was impervious to training or persuasion. The solution came from 1) constant formal and informal training and persuasion of the board, which eventually accepted the goal of self-sufficiency and hired a manager with business training and understanding of private sector methods, and 2) in the AID requirement in mid-1994 that the AMV obtain non-AID funded road contracts or go out of business. This challenge to get marketing results was the idea of Arturo Villalobos of AID. It was the defining event in the coming of age of the AMV, its first major step toward self-sufficiency.

AMV Strengthening Project--ACDI FINAL REPORT

AMV STATUS 5/92 (PROJECT START)	AMV STATUS 4/95 (PROJECT END)
LONG RANGE PLAN--VISION FOR FUTURE	
Government project mentality: AMV temporary conduit for funds, to close '94	AMV ongoing, self-sufficient community business with written plan
MANAGEMENT/BOARD	
Manager with limited business, financial, marketing skill	Manager with business/financial training and marketing skill
Board uninformed of facts and their powers over manager	Board trained on getting facts and supervising/firing managers
ADMINISTRATION	
Books, administrative manuals, procedures missing, ignored, or inadequate, weak financial analysis	Computerized books, statements, streamlined manuals, good controls and good financial analysis
Overstaffed with underskilled employees with government backgrounds, heavy reporting to government	100% replacement of employees, manager and engineer twice each, government reports minimal
No marketing plan other than to use AID funds for 90% of costs until gone, community providing 10%	Written marketing plan, projects sold to non-AID sources through '96 at 90-100% levels, long wait list
Lax management of project equipment, heavy usage and wear, poor maintenance, no equipment reserve	Project equipment under close watch, abuses controlled, maintenance improved, \$90K equipment reserve
TECHNICAL ROAD WORK	
Equipment ordered by AID undersized and incomplete	New backhoe and 2nd road grader double annual output
Rehabilitation contracts very costly and inefficient	Rehabilitation contracts eliminated, same work done at half cost by AMV
Route 4 absorbing 60% of management/board time, morass of Route 4 lawsuits, maintenance ability threatened	P.L. 480 portion of Route 4 almost complete with minimum time loss, GOCR to finance remainder through AMV
Use of government road maintenance specs causing high costs, slow progress to rehabilitate 270 km maintenance market base; Early close, eternal subsidy need	Using SAMV (Jorgensen) cost system 226 km rehabbed, projected 300+ by 12/95 and 400+ km by 12/96, assuring survival without government funding

1. Lessons learned

It is time consuming, expensive, and dangerous to the client's organizational health to make a mid-stream change in the basic assumptions about the nature of a project. However, in this case, the imposition of "self-sufficiency" by AID made it possible to multiply the benefits to the community several-fold with the same AID resources, establishing a model organization which will continue fixing road for years to come.

Most importantly, the project is proving that the decentralization and partial privatization of central government road functions is not only feasible but in many ways desirable, especially in backward, frontier areas needing to catch up with the rest of the country. An idea which seemed highly risky and experimental in 1990 is now, in 1995, considered natural and highly desirable by all levels of the GOOCR and the community.

2. Problem: management with inadequate skills to run a complex business

This problem is more than just hiring a manager with a private sector orientation. Under a decree of the legislature, the AMV is a "private organization which has been declared of public interest." It has both public and private sector aspects, and thus it requires a manager who can operate the AMV like a private contractor, but who also has the political skills to obtain preferential government contracts, to satisfy a demanding bi-partisan community board, and to protect that board from local politicians who would attempt a takeover. These are tall orders requiring a special individual.

2. Solution: recruiting and training management

One of the biggest problems of rural organizations and businesses in Costa Rica is the fact that talented managers insist on living in the capital, San Jose. The AMV project is currently successful, in part, because talented business management was discovered and nurtured by ACDI in Upala, and because experienced technical engineering management from outside the area was available part-time. The general manager and engineer complement each other and appear to get along well. As late as mid-1994, however, the management of the AMV as a weakness and point of conflict.

2. Lesson learned

There is no single form of assistance more important than helping find and train the appropriate management, both administrative and technical. This brings with it the chore of encouraging the transition from one manager to the next. In Costa Rica, the hardest step in

improving an organization is changing managers, because face-to-face conflict between individuals is avoided. Conflict and change take place, but indirectly and slowly. To make this project work within the time frame, the AID Mission and ACDI had to lean on the AMV board to encourage manager change, not once but twice. Even with the outside encouragement, each of the first two managers had about 18 months to mature into their roles. With each manager replacement, the board was pleased with the resulting improvement and gained the self-confidence to make future changes as needed.

3. Problem: the board of directors was uninformed about the AMV's business, or that they could and should demand results from management

In 1992 the board of directors was unaware of numerous weaknesses in the AMV's operation, such as the lack of accounting, the relatively high prices being paid for road rehabilitation, and their impending early close from over-spending. As with many new organizations, the board had to be informed in order to get things moving, and management needed clear goals and supervision, from the local board and not some temporary outside presence.

3. Solution: training the board on its role and functions, and opening the information flow

ACDI carried out a series of week-end seminars with AMV board and management to educate them on business and road maintenance. The first of these focused on financial planning, high costs, and management-board relations.

From the beginning ACDI was forced by time constraints and the seriousness of AMV problems to play the devil's advocate. Because open criticism and the resulting conflict are often avoided in Costa Rican organizational life, this role most often fell to the chief of party.

Balancing such strong, direct criticism of AMV problems, ACDI's management and marketing trainer, Jorge Cespedes, sold the missing concepts of good business management for associations to the AMV board, and later, in the field, demonstrated firsthand the barnstorming community marketing method now used by the AMV. He did this with engaging humor, speaking in his preferred vernacular while carrying on a running debate with AMV people over the championship potential of his favorite football team. This sounds frivolous, but the informal Cespedes style is powerfully effective in teaching business concepts to everyday people, especially country people, with whom he has a special bond. There were so many things wrong with the AMV in the beginning that humor, enthusiasm and optimism were vitally important in keeping the participants trying hard for improvement. The AMV board needed a firm but friendly leader to bring them from deep in the woods of weak management, and they also needed Cespedes' knowledge of how government, the principal source of road contracts, works at the highest levels.

When the original management resisted opening up the information flow, and waged a campaign with the AID Mission to discredit ACIDI's work with the board of directors to bring them up to date, the AID project officer, Arturo Villalobos, formed an advisory coordinating committee led by himself, with key AMV management and board, ACIDI, and a MIDEPLAN representative. This committee met religiously every two weeks for the duration of the project, and was instrumental in making key recommendations to the board, with which it sometimes met jointly prior to board meetings. Thus it became clear to the board that if they had a problem with AID, it was not simply an ACIDI invention. Furthermore, the board was able to learn first hand that AID and ACIDI were sincerely concerned with the success of the AMV, and were ready to help in numerous ways, but only if the board was willing to act decisively and learn some independence in solving obvious problems.

The AMV board continues the tradition set when organized by Harry Peacock. It is made up of the most honest and committed of local community leaders, typically farmers, teachers, or shop keepers. When given accurate and complete information about their business, they make solid decisions. The current management keeps them informed and knows what to expect if they don't. Although Costa Rican law requires election of half the board every year, the AMV has developed a core of stable, veteran board members who tend to be re-elected as long as their patience allows.

3. Lessons learned

With luck and persistence, and given the important element of strong community commitment, it is possible to turn around a community organization by challenging its leaders to develop a business focus, resulting in improved management. It takes teamwork by the technical advisers, and strong backing from the funding sponsor, in this case AID. A board kept in the dark weakens this kind of organization, making progress unlikely.

4. Problem: the accounting books, administrative manuals, and administrative procedures were missing, ignored, or inadequate; unrealistic budgets, no analysis of costs, no financial statements, low reserves

Part of the original "grant mentality" of the AMV was the idea that obtaining resources is mostly a matter of filling the proper forms, or creating and filing a required document. There was an obvious divorce between the written word, as intent, and action in the real world. AID had encouraged this by hiring previous consultants to write enormous, unwieldy administrative manuals for the AMV. The manuals went beyond even the level of detail required by the government general accounting office, the Contraloria. These documents made a weighty thump when tossed on a desk, but there was no indication that the AMV ever opened them. The overly complicated procedures in the manuals were inappropriate in any case.

As the Harper evaluation (December, 1991) had pointed out: "There are norms and procedures established...as well as administrative manuals, procedures and accounting directives. However, the lack of administrative experience significantly reduces the use of the norms and procedures established...*Manuals and agreements are of no use if neither the capacity nor the administrative will to use them exists.* (emphasis added) In this case there is no capacity nor authority (Board of Directors at AMV) to impart order."

We of ACDI thought the Harper evaluation must be exaggerating on this point. The AMV had a full time professional accountant on its staff for most of 1991. Then we were approached by the AMV manager, in early 1992, who asked our staff CPA to certify their books as a requirement for continued AID grant funding. Our CPA asked to see the books and found them to be so inadequate that he commented "there is nothing there to certify."

In the second half of 1992 we found that the AMV budgets were mere shopping lists, without any of the detail we had built into their September, 1991 business plan, which was being ignored. Likewise there was no analysis of costs, inadequate financial statements, and projected financial reserves were inadequate.

4. Solution: reconstructing the missing books, streamlining the manuals, demanding compliance with procedures, and teaching financial analysis and reporting

ACDI's CPA, Manuel Carballo, hired originally for a coffee credit project, had previously worked seven years in MOPT doing feasibility studies for roads and bridges. He played a key role in the first business plan ACDI did for the AMV in September, 1991, which kept them alive at a time when the Mission was considering dropping them.

In early 1992 Carballo saved the AMV from disaster by reconstructing their non-existent books, volunteering to work week-ends, around the clock, to prevent their de-certification as an AID grantee. It became painfully clear that the Harper evaluation was accurate. The AMV staff accountant, who resigned in October, 1991, had defined his job as making deposits and writing checks, and management was unaware and unconcerned that more work was required.

The first change in the ACDI work plan to help the AMV was to quadruple the amount of our CPA's time dedicated to the project, from 2 days per month to 9. After reconstructing the books, he helped the AMV to streamline the bloated administrative manuals, in coordination with the Mission Controller's Office and the Contraloria. Most importantly, he provided in-person supervision and training to the AMV accountant/administrative director, documented by long, detailed memos of procedural instruction to the manager. He assisted the AMV in answering and implementing the numerous findings in the first outside audit, which covered the period prior to our involvement.

Carballo simultaneously tackled the AMV budget and other financial tools, supervising the design and use of the custom computer accounting program by our programming consultant.

This system now produces the monthly statements. Crossing over into the engineering and field operation area, Carballo teamed with our engineer Baltodano, working out project costing methods which were then computerized, and together they taught management to use daily cost tracking and break-even analysis.

Carballo's most important contribution was in teaching and supervising the individual who rose to become the current manager, with whom he was in frequent phone contact at all hours for over two years. Carballo and Cespedes promoted the career of Carlos Campos with the AMV board, a key intervention which is reflected in the AMV's current success.

Carballo accomplished all of this in a firm but friendly style, attaining the trust, respect and admiration of the AMV staff and board. He was at the eye of the storm in most of his work, suffering undeserved criticism from persons he found unwilling to learn, some of whom complained to the AMV board. He took it all in serene good humor. His letters to management, on how to administer and utilize the books and records, if compiled, would make an instructive volume for use in new organizations which tend to repeat the same mistakes.

As with both the manager and engineer positions, the third individual to have the accountant/administrative director job was the one who eventually succeeded. After Carlos Campos was promoted to manager the job was reduced to a bookkeeper position, as Campos continued to perform the major administrative functions.

4. Lessons learned

For the AMV to survive in the private sector, it needed more than separation from MIDEPLAN and bureaucratic interference. It needed immediate, intense emergency help to survive audits. It also needed experienced, trained personnel with an understanding of private sector accounting and administrative tools, and a board which understands and demands this.

Finding and training administrative personnel in a backward rural community involves luck, skill, and dogged determination. Overcoming the inertia of a politicized community organization involves a war of nerves requiring considerable technical and political skill, not to mention resilience to political counter-criticism.

The AMV was a case in which it took three management changes to get it right, in each of three key areas: managerially, administratively, and technically.

Improving management and administration is not enough to assure success. The essential task of assuring success in the private sector is teaching the use of financial tools to analyze the profitability of field operations on a daily, monthly, and annual basis. Without debt service or the need to return profits to owners, the AMV needed to learn to charge enough for its work to

assure the replacement of worn out equipment and the covering of all contingencies.

5. Problem: the AMV was overstaffed with underskilled employees with government backgrounds, and sinking under the weight of reports to government.

According to the Harper report of December 1991, the AMV "spends most of its time covering the documentary and procedural needs of the PCZN (MIDEPLAN office in Upala)...The amount of written communication that is generated between PCZN and the AMV is voluminous; it is such that approximately 40 to 50% of its staff time is allocated for answering letters and memorandums, as well as for meetings about issues such as budget and administration."

This was at a time when the AMV had six professional employees. They spent inordinate amounts of time on a war of memos with MIDEPLAN's Upala office, and on government/AID meetings in San Jose, while there was limited outreach to the community. They also spent too much time writing memos to each other or filling out long forms from their inappropriate administrative manual.

As the Harper report pointed out, the AMV was set up as a duplicate, parallel organization to the PCZN/MIDEPLAN office in Upala. The war of memos was about the struggle to control the AMV and keep it as a sub-unit of the Upala MIDEPLAN office. The AMV saw itself as an independent target of a political takeover. This controversy was settled when AID and the Minister of Planning agreed in early 1992 that the AMV would truly become independent of MIDEPLAN, with direct road maintenance funding from AID, and in exchange the PCZN/MIDEPLAN office in Upala would be spun off into a private foundation to be called FUNDANORT. At one point the Mission offered ACDI funding via FUNDANORT to help the AMV, but knowing the tendency for politicization of some foundations in Costa Rica, we declined. As of this writing FUNDANORT has all but disappeared in a cloud of political accusations.

It should be added that the government general accounting office, the Contraloria, also made demands on the AMV staff, since the AMV was seen as a unit of government as long as it received its funding from MIDEPLAN. The Contraloria creates very long delays and in some cases prevents necessary efficiencies in government projects. It ruled that even though the AMV received AID funding, as long as that funding passed through a government agency first, it had to be considered government funding subject to all government rules. This effectively forced the issue of independence for the AMV for the purpose of road maintenance. For purposes of Route 4 (see below), since the funds are from PL 480 under MIDEPLAN, the AMV must still follow government rules.

5. Solution: get people to focus on productive tasks, push for replacement of those who can't or won't, and encourage promotion from within

A first step toward a solution came with the negotiated divorce from MIDEPLAN. But with the same personnel in place at the AMV in mid-1992, the syndrome repeated itself: too many meetings in San Jose and too many government-oriented controversies cropping up, with MOPT and the Contraloria over Route 4, or with AID over the criticism then coming from ACDI. At this time the ACDI consultants were all performing their roles helping their AMV staff counterparts, and as the information began to flow to the board of directors as to who was doing what, the board naturally began making staff changes.

By the beginning of 1993 there was only one original employee left, the manager, who left in mid-1993. More staff replacements followed, each time resulting in improvements. More importantly, the most talented people hired gradually rose through the ranks while watching and learning from the fate of their predecessors. The current manager, engineer, and administrator are all in this category. All three have been on board, but in lesser capacities, for more than 2 years. The current management is the third wave, but they are veterans of the second wave hired in 1993. All have had some government service experience, but that is not their main nor preferred frame of reference. All have very highly evolved political skills and a bi-partisan approach.

5. Lessons learned

To obtain the independence of a government project so it can move toward the private sector, a funding source such as AID will probably have to give some consideration in return. In this case it allowed for the spin-off of FUNDANORT. Unfortunately FUNDANORT did not have the bi-partisan support of the community, which the AMV has largely managed to retain, leading to FUNDANORT's steep decline with the next change of government in 1994.

It is also true that sending a new organization to fend for itself in the private sector requires private sector-style technical support, more so when that experience is initially lacking on both staff and the community board.

When the project has already existed several years without taking off, creating high expectations and confusion about goals, methods, and resources available, getting all the parties to steadily pull in the same direction requires strong, concerted effort. Turnover of personnel and other temporary unpleasantness will result. This project was fortunate to jell within only 33 months (ACDI's grant period), given the AMV's long original list of problems.

6. Problem: the AMV had no marketing plan other than to use AID funds for 90% of road costs until gone, with the community providing 10%.

The marketing of AMV services has two basic aspects: convincing local communities to pay cash and donate labor, and selling various central government agencies the concept that they need the AMV to help them do their work.

The original cost sharing plan for individual road projects agreed to by AID and the AMV in early 1991 was as follows:

--Phase I (demonstration): AID funds would pay 90% of *road rehabilitation* costs, with the community paying 10%, half due before completion. This was to be roughly the first half of the AID project period of early 1991 to early 1995. These projects were to cost up to \$12,000 per kilometer, and were to be bid out to private road contractors.

--Phase II (rehabilitation with equal participation): AID funds would pay 50% of *road rehabilitation costs*, with the community paying the other half, under the same payment terms. This was to be roughly the second half of the project period. These projects were to cost the same or slightly less than under Phase I, and were also to be done by private contractors.

--Phase III (ongoing maintenance under self-sufficiency, after AID project end): The community would pay 100% of *maintenance* costs, which would cost between \$1,000 and \$1,500 per kilometer, with the same payment terms. These projects would be done by the AMV with its own equipment.

Phase I was meant to get the initial projects moving in spite of community reluctance or disbelief, and to fix the most vital, expensive to fix, and in-demand local roads. Phase II was meant to take advantage of the demonstration effect of Phase I in attracting hoped-for national government funding to local groups, and to get communities mobilized to seek such funding. Phase III was based on maintaining the "minimum maintenance market base", determined by previous study to be about 270 kilometers, which would result from Phase I and II rehabilitation work.

An important early feature of this plan, which has continued to work well, was "first come, first serve," which gives a community an assured position on the waiting list upon cash payment of 5% of project costs. This feature could have resulted in inequitable distribution of the benefits of the subsidized projects, favoring bigger or wealthier communities, but this has not been the case.

"First come, first serve" has been tempered by another early feature of the project design, the "gentlemen's agreement." This informal arrangement provides that four of the seven board positions will be allocated to principal rural areas of the Northern Zone. This has assured that

each locality has the information needed to raise funds and apply for road work in a timely fashion. This was an important feature because some of these areas were isolated precisely from a lack of passable roads, and participation by their board representatives required extraordinary communication and transportation effort by the AMV to maintain the geographical coverage intended in the "gentlemen's agreement."

Some concern was raised in AID that "first come, first serve" would result in isolated sections of improved roads, with gaps that would not add up to a usable network. This has not been the case. The local communities insist on being connected to markets, schools and hospitals in regional towns. The geographical make-up of the Northern Zone and the existing, but very run-down road network helped to make the connection possible. It is important to point out that if the AMV had not undertaken the upgrading and paving of Route 4, the spinal column of the network, this would not have been the case. In 1992 huge sections of Route 4 had deteriorated into impassable or unusable condition, despite having been improved from a cow trail to a high-speed gravel highway by AID in 1987.

The above cost-sharing plan was a given when ACDI entered the picture in early 1992. The plan worked well, in retrospect. However, in early 1992 there was scant commitment in the AMV to carry out Phases II and III. The pattern of spending at that time demonstrated an intent, planned or unconscious, to spend all the AID funds as soon as feasible on Phase I projects, involving unusually high costs per kilometer and maximum levels of AID subsidy. The Harper evaluation confirmed this, projecting an early close of the AMV when funds would run out. Therefore the thrust of ACDI's assistance was to encourage reduced costs per kilometer, first to allow the fixing of more roads and more equitable distribution of road improvements, but also to give the AMV time and resources needed to make self-sufficiency possible.

In addition to paying 10% of road project costs, the community was asked to perform hand road maintenance. The project provided extra piles of gravel along the road for community volunteer crews to fill potholes with picks, shovels and wheelbarrows. Hand implements belonging to the AMV were loaned to the community, long term, from 1992 to 1994, until the funding for this purpose ran out. There was a need to provide follow up and encouragement to the AMV to get hand maintenance moving. This activity was a necessary part of marketing AMV road services to the communities.

6. Solution: teach marketing in the field, encourage lower costs and the elimination of costly contracts to outside firms, require marketing results from non-AID sources "or else go out of business now," help get hand maintenance moving.

The above list of early assumptions comprises a cost sharing plan, not a marketing plan. The marketing plan was necessary to obtaining progress on Phase II and III projects, and to move toward self-sufficiency. Once the local communities were sold on the idea of contributing their

share, then the key to marketing the AMV's services was in having an efficient, capable AMV and making a believable, well-orchestrated presentation to key government officials.

The first part of the marketing effort was in selling the local communities on the idea of attempting to obtain 50% of the cost of rehabilitation projects under Phase II. The communities were hard pressed to obtain 10% previously, and to many 50% seemed impossible. When in early 1993 the AMV staff was reluctant to go to the field and try this, Jorge Cespedes gave them planning help and encouragement, and went along personally to help make the presentations to the communities. The results were promising, but the communities needed time to work with congressmen, mayors, and wealthy neighbors, as well as doing their traditional fund-raising.

By this time our engineers had started making progress on teaching the use of the SAMV (Jorgensen) system of cost estimating to AMV technical staff, so the cost was no longer \$12,000 per kilometer, but closer to \$5,000 (see chart, lines 6 to 11). Therefore 50% of the cost to the community became about \$2,500 rather than \$6,000 per kilometer.

Also by this time, in late 1993, the AMV's own equipment pool had arrived, and demand from the community for maintenance projects was not strong. We suggested that the AMV cut out the costly and troublesome middlemen, the road contractors, and hire themselves to do a rehabilitation project, using the SAMV cost estimates. To do this they needed three missing elements: 1) permission from AID to do rehabilitation, previously declared off-limits as "construction," 2) an experienced road construction foreman, and 3) a backhoe, to do essential drainage pipe installation. The backhoe was missing from the equipment pool due to the previous AID bias against "construction."

Based on our recommendation, AID allowed the AMV to do rehabilitation with the newly-arrived AMV equipment. ACDI hired an experienced foreman, at our expense, and the AMV rented a backhoe. The first Phase II "50%" project was in Santa Cecilia, a very poor community directly on the Nicaragua border which had previously obtained a revenue sharing grant from the GOCR to fix its roads. The quality of the AMV's work was very high, and the cost was under \$6,500 per kilometer in spite of the backhoe rental. Subsequently the AMV stopped hiring contractors altogether, and the following "heavy maintenance" projects were even cheaper per kilometer, averaging under \$4,000 per kilometer as the AMV began to master the theory and practice of "heavy maintenance." (see chart, lines 13 to 24)

Nevertheless, the AMV management still was reluctant to look for a steady source of GOCR funds to help the communities with the 50% requirement of Phase II. The elements were in place to obtain such help: good contacts in government through our engineers and local officials, and a good track record by the AMV using its own equipment to lower costs. This reluctance to sell, combined with the lax management of AMV equipment in mid-1994, led to the resignation under pressure of the second AMV manager.

In a bold and decisive move, AID project officer Arturo Villalobos, a professor of marketing at the University of Costa Rica in his spare time, made the unilateral decision to bring Phase I to a close and draw a line in the sand to the new AMV management. He announced the AMV was required to submit a written marketing plan, and all future grant disbursements would be linked to contracts in the same amounts between the AMV and a non-AID funding source which would have to provide the missing 50%.

The plan was written by AMV management, with ACDI help, and in a matter of weeks the MOPT offered a series of non-competitive contracts providing 50% of the cost of "heavy maintenance," for projects running through the end of the AID project on March 31, 1995. The first of these projects, Dos Rios-Buenos Aires, cost under \$5,500 per kilometer, and the MOPT sent out film crews in October, 1994 to record the new model of cooperation. By February, 1995 both MOPT and MIDEPLAN PL 480 were offering 90-100% contracts to the AMV for the period beyond the AID project, to carry the AMV through the third quarter of 1996.

In regards to hand maintenance, ACDI and the AMV sent 2-person teams into the communities to follow up and provide training and encouragement. Hand maintenance is much more than just filling potholes. The most important part is the cleaning of the drainage system to make sure it is functioning properly in the beginning and during the rainy season. A small amount of hand ditch and pipe cleaning will pay substantial dividends in eventual machine maintenance costs. In addition to cleaning advice, ACDI offered to donate bags of cement, transportation of sand and gravel, and concrete retaining wall design assistance, to make drainage systems last. The teams consisted of a respected local organizer and an experienced road technician or engineer.

The amount of organized hand maintenance activity actually generated varied tremendously. The most active communities tended to be the ones with the worst drainage problems, such as Santa Cecilia and Buenos Aires, where mountainous rushing rivers and creeks cut the roads to shreds without hand work.

Santa Cecilia had a very effective hand maintenance crew, which also built some clever, low-cost small bridges. Buenos Aires (a new small farmer settlement organized by the IDA land reform agency) had crews piling rocks at the ends of their drain pipes. This is very labor intense and not very effective. With our cement and design help they built proper concrete retaining walls on the ends of 20 sets of drainage pipes, which were so large they were essentially bridges. Santa Cecilia and Buenos Aires also happened to be among the poorest communities in the area. Their work is an example to the other AMV communities, and should be copied.

Some of the other communities were not particularly interested in hand work and let their drainage pipes suffer erosion around the outlets, not to mention pot holes, and there were also communities making a medium effort. In some cases the AMV is in a position now to demand attention to the hand work commitment before scheduling a return of the equipment

for maintenance.

In general, the hand work was followed up where the community was already organized and willing, and the loan of the tools was not an important incentive in hand maintenance. Some of the most active communities never received hand tools, and some of the least active ones took the hand tools and used them very sparingly.

Rehabilitation And Heavy Maintenance

Rehabilitation - Outside Contractors with MOPT Specifications

Location	Length/KM	Cost \$1=175C	Cost per KM
1. El Alto-Santa Rosa	11.3	\$85,091	\$7,530
2. El Areno-Santo. Domingo	10.5	113,460	10,806
3. Cano Negro	32.0	327,670	10,240
4. Villanueva-El Delirio	7.5	52,700	7,027
5. Aguas Claras-Las Colonias	16.0	96,590	6,037
subtotal	77.3	675,511	AVG \$8,739/KM

Rehabilitation - Outside Contractors with SAMV (Jorgensen) Specifications

6. San Pedro-Cuatro Bocas	4.0	14,420	3,605
7. La Gloria-Aguas Claras	4.9	14,490	2,957
8. El Triunfo-Rio Celeste	12.0	50,170	4,180
9. Ramal Colonia Naranjena	3.0	10,520	3,507
10. San Rafael-Santa Fe	20.0	107,010	5,350
11. Rio Celeste-La Florida	1.0	5,140	5,140
subtotal	44.9	201,750	AVG \$4,493/KM

Heavy Maintenance - AMV Equipment Using SAMV (Jorgensen) Specifications

13. Cuatro Cruces-Puntarenas	7.0	16,000	2,286
14. Santa Cecilia	19.7	124,570	6,323
15. Piedras Azules	8.0	20,630	2,579
16. Dos Rios-Buenos Aires	9.0	48,057	5,340
17. N Zelandia-Dos Rios-Bras.	22.0	67,340	3,061
18. Villanueva-El Delirio	7.5	11,680	1,557
19. Canalete-Higueron	10.0	26,410	2,641
20. Cuatro Cruces-Puntarenas	7.0	33,830	4,833
21. Calles Canalete	1.5	7,430	4,953
22. Moreno Cañas-Santa Clara	5.0	9,140	1,828
23. San Jose Upala-La Union	1.5	8,570	5,713
24. San Jose Upala-Camilias	2.0	8,570	4,285
subtotal	100.2	382,227	AVG #3,815/KM

Total Rehab + Heavy Maint.	222.4	1,259,488	AVG \$5,663
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Maintenance: Using AMV Equipment and SAMV (Jorgensen) Specifications

25. El Salto-Santa Rosa	7.5	5,710	761
26. Aguas Claras-Colonias	16.0	19,430	1,214
27. Birmania-Santa Cecilia	21.0	3,540	168
28. San Isidro-El Cachete	22.0	9,710	441
subtotal	66.5	38,465	AVG \$557/KM
Paving Streets of Upala	4.0	62,860	AVG \$15,715/KM

We observed that the most sparsely populated communities, along the longest road projects, where there is little elevation variation (slow flowing creeks and rivers, more gradual seasonal damage), for example Cano Negro, are the least likely to fully meet their hand maintenance commitment. The most densely populated communities with shorter road projects over steeper terrain (meaning sudden, severe rain damage) were the most likely to do hand work. The quality of local leadership, especially the AMV board member from the area, is also a factor.

While the results of hand maintenance are inconclusive, requiring years of further educational and organizing effort, the original AMV policy regarding community bridges was a complete success. The original policy was that the AMV does not help with local bridges, leaving that to the community. Since without a bridge you don't have a road, there is an established tradition of community cooperation to build and maintain small bridges, and sources of donations are relatively easy to identify. This policy was tested early when the Santa Rosa community asked to have their 10% cash contribution refunded for emergency bridge work, arguing that the rehabilitation work done by the AMV had exposed them to heavy traffic which ruined their principal rustic bridge. The AMV stood firm, refused a refund, and the policy continues. Anything less would have led to the destruction of the AMV operating reserves.

6. Lessons learned

To paraphrase Franklin D. Roosevelt, people can accomplish amazing things, in spite of having been previously convinced of their impossibility, if only they are given compelling reasons to try.

The line in the sand to "market your services or go out of business" was the turning point of the project. This challenge by Arturo Villalobos was properly timed to be possible.

The ACDI project approach to give the AMV high-level Costa Rican friends in the road building community gave good and timely results. These are genuine friendships, not merely acquaintances or exchanges of favors. This is a resource which the AMV must learn to manage and protect like any other. The AMV now has a list of top professionals who will gladly take calls at home and help resolve major problems "por amor a la patria. (for love of country)." These professionals know that their future form of payment may be no more than an unexpected invitation to go fishing or the surprise gift of a sack of Upala beans. One of them has already taken home a singing bird in a cage.

The current manager and engineer of the AMV are comfortable and pleased to be in long meetings, doing AMV marketing business, any time of night or on weekends, with the highest or lowest members of Costa Rican society. This combination of selling ability and social skills is also a resource which needs to be preserved. This takes the project beyond the written plan, to action in the field and the capital. As the Harper report pointed out, the written plan is of no use without the will to carry it out. Nowhere is this more true than in marketing.

There remains a great need for organizing and convincing in the hand work area, and that will fall to the board members of the AMV. The entire northern zone is subject to high rainfall and resulting damage to gravel roads, some areas more than others.

Hand maintenance is highly cost effective and saves the community money in the long run, especially when focused on cleaning the drainage system at the beginning and during the rainy season.

The communities which have the most successful hand maintenance programs should be used to teach the others. The nature of hand maintenance is such that the communities will pay a small amount, through donated labor now, or pay a much larger amount in cash later. This "pay now or pay more later" argument is the only type of training or marketing that works for a sizable portion of any community.

The AMV policy to leave the problem of local bridges to the community was a success and should be continued, since it increases the community contribution to the overall project and is an established tradition.

7. Problem: lax management of project equipment, heavy usage and wear, poor maintenance, and no equipment maintenance reserves

According to a joke among old hands in internationally funded road projects, there are two kinds: the ones where the equipment rots in the jungle, and the ones where the equipment rots in the desert sun. The vision of this happening motivated AID personnel to remind us often to take all reasonable steps to avoid this dreaded outcome.

At the level of the founding members of the AMV board, this fear was expressed differently: "In response to community demands, one of our organizing principles is that we will not hire anyone with a MOPT background to operate equipment for us."

Nevertheless, at the beginning of the project the staff had a government outlook, including a tendency to be very hard on project equipment. We saw this firsthand, when ACDI loaned a vehicle to the AMV for several months in 1992 and it came back with serious damage, of the kind we had never seen in our previous rural projects (a cracked chassis and broken steering box, to name two). This pattern continued with the first two AID-donated vehicles (admittedly undersized models of a notoriously inferior U.S. make and model), which developed serious suspension and drive train problems with very low miles. There was also a pattern of lax care for tools and parts.

These problems were to be expected. The roads were very bad, the equipment was undersized, and the AMV staff was on an urgent community mission. However, In early 1994 some outgoing members of the 1993 board of directors had heard rumors of AMV equipment

operators charging community members directly for small, informal jobs done with AMV equipment. ACDI had previously hired one of the former board members to work for us on equipment crew management. Farmer Antonio Salgado was formerly the fiscal (non-voting investigator) of the board of directors. He began working closely with the new fiscal of the board, Gerardo Cubero, a school teacher and political rival of the other party. With the help of the chief of party they spent two weeks in the field interviewing community people and equipment operators. The new fiscal made a scathing written report to the board and demanded wholesale firings, which he got. A former ACDI consultant with a MOPT background was also accused of charging community members directly for loads of surplus dirt delivered to fill holes in front yards, supposedly for a "social fund for the drivers."

Unfortunately, these kinds of abuses are all too common among road construction workers in the public and private sectors in Costa Rica. The original AMV founders' bias against the public sector was borne out in bitter experience.

7. Solution: teach inventory and routine maintenance, help with repeated equipment breakages, help the community to expose equipment abuse, and persuade the AMV to set up an "untouchable" equipment maintenance trust

As the saying goes "Lo que es de todos, no es de nadie. (If it belongs to everybody, it belongs to nobody)."

Regarding the routine problems, ACDI helped by developing a tool marking, inventory, and storage program, and our engineers provided the AMV with succinct, durable forms from the private sector to keep track of routine maintenance. When the AMV dump trucks developed repeated axle breakage, we got the U.S. factory representative to help. The reason was found to be a combination of under-sized, underspecified equipment and driver carelessness, which was eventually controlled (not fully solved) when management offered instant firings of drivers in cases of future unjustified axle breakages. The factory representative swore they had no such problems with their trucks elsewhere.

We also provided specialized training, in San Jose, in tire repair and general mechanics, and we donated over \$5,000 in heavy duty welding and repair tools to the AMV for their shop. The most important item donated was a portable welder/generator for heavy repairs in the field, which will reduce repair costs and down time substantially.

Regarding the abuse of equipment for personal gain in mid-1994, we assisted the board of directors in their own clean-up of the situation, which helped to bring down the second AMV manager for errors of omission. We documented the process for the Mission, which confirmed for itself in the field that there was a satisfactory series of corrective measures. Among these, an AMV board member and our employee Salgado became in-field policemen for 90 days. Their qualifications were to be fearless (a boxing coach and a champion bull rider) and to be

from opposing political parties.

In January, 1995, the AMV began to have the possibility of 90-100% of road project funding from the GOCR. The chief of party saw this as an opportunity to suggest that the AMV use its remaining AID funds to set up an equipment repair and replacement fund in a bank-managed trust. The Mission could not allow this, due to understandable time constraints. The project was 60 days from its non-extendable termination date, and the Mission's contractual commitment was to fund only AMV road work. We then suggested that the AMV use some of its delayed project income from MOPT and MIDEPLAN for this purpose, and we enlisted the AMV manager to sell the board and assembly on a voluntary bank trust agreement drafted overnight for this purpose. The AMV assembly voted to establish the trust in March, 1995.

The creation of the fund and bank trust was completely voluntary on the part of the AMV. As proof, they used their own, unrestricted funds. This is a sign of their maturity as an organization at all levels, especially since they voted to make the trust "untouchable" without advisory committee approval for five years.

The advisory committee consists of Jorge Cespedes, formerly with ACDI and now representing the bank, which is charging a token management fee, Arturo Villalobos, on behalf of AID, and the AMV manager. An engineer hired by the trust will provide the committee with advice on the cost of equipment repairs. The board and assembly are showing strong confidence in their manager to convince the advisory committee of their needs.

Beyond the matter of equipment, the trust committee provides a forum for much needed continuity now that ACDI and AID have no official role with the AMV. The trust structure also provides partial insurance against contingencies, not the least of which could be an attempted takeover of AMV resources by misguided local politicians.

7. Lessons learned

As we were originally advised, the road construction equipment operators are a "gremio difencil (tough, hard to manage category of workers)." However, with careful selection, painful trial and error, and oversight, a team of responsible operators can be gradually built. The AMV now knows this is not easy and requires on-going vigilance. Equipment operators customarily don't stay on the job long, and this is accentuated by the isolation and harshness of the Northern Zone.

The AMV board was on the trail of the equipment abusers before we were informed. We did not instigate an investigation, but we helped. The AMV showed organizational maturity in applying a bi-partisan solution to the equipment abuse matter, at the most politically polarized time in Costa Rica, directly after the Presidential and congressional elections, when the AMV board itself was changing political composition. The solution involved the new, mostly

Liberacion board firing or pressuring for the resignation of employees who were their own political compatriots, along with others, which they accomplished.

The original design of the project, done prior to ACDI involvement, had no clear, mandatory provision for an equipment maintenance and replacement fund. The third manager saw this as a problem, as we did, and vigorously pursued our original suggestion to work with his board and membership to enact the voluntary fund. The fact that it is "untouchable" shows the confidence of all the parties in each other, and the apprehension of all concerning a possible political takeover such as took place at FUNDANORT. By placing part of their reserves in a restricted fund, the AMV puts itself under the gun to market its services and keep payments flowing. This may or may not help prevent the GOOCR from taking AMV liquidity for granted at the time of payment for services.

The AMV, a project riddled with strife in the first years, ended its formal relationship with ACDI and AID in an uncommon, rapid team effort to set up a complicated trust mechanism. During the March, 1995, assembly meeting which voted on this measure, the entire ACDI team and Arturo Villalobos of AID were made honorary AMV members.

8. Problem: the original equipment ordered by AID was inadequate to make the AMV self-sufficient

The AMV was given five dump trucks, a grader, a front loader, a bulldozer, a lubrication truck, two pick-ups and a vibrating compactor. While not exactly miniature, all of the equipment, except for the grader, is undersized. For example, the dump trucks carry 5 cubic yards instead of 12, and the other items are similarly small. This is the result of the original AID insistence, dating to about 1990, that the AMV should only do maintenance, not road construction. There was a concern that AID not subsidize unfair competition to private construction firms, which would presumably not find gravel road maintenance attractive.

As discussed below, the AMV has found a market niche which is somewhere between construction and maintenance. With its equipment pool designed for light maintenance, the AMV has higher costs for labor, parts, and fuel than its competitors, although the AMV is freed from debt service.

The absence of a backhoe from the list was a glaring omission which could have caused great difficulties for the AMV. The secret to gravel road maintenance in high rainfall areas is drainage. Drainage is more important than fixing the road surface, yet the AMV had the emphasis backwards. Under-the-road drainage pipes make roads passable year round and reduce maintenance costs significantly. The only practical way to install them is with a backhoe, and the entire chain of equipment must wait until this preparatory work is done.

The AMV left drainage out of its original project designs in 1991-92, apparently to comply

with the previous AID prohibition on "construction." This was in keeping with an early recommendation from a consultant from Guatemala, who suggested a plan to organize volunteer community crews to install drainage systems. There was no technical or economic study of local conditions to justify this, and field experience showed it was the most inappropriate early feature of the AMV plan.

8. Solution: proving the need and obtaining delivery

Therefore ACDI immediately lobbied the Mission to correct this mistake by purchasing a backhoe, and based on a study done by our accountant and engineers, to obtain a second road grader. The second grader makes it possible to work on two fronts, greatly increasing the annual production of the AMV, with no increase in overhead costs. Most of the procurement work related to specifications, bids, and delivery was done by the chief of party. The backhoe and second grader were delivered in September, 1994. They are equipment brands and models which are compatible with the existing equipment at the AMV. They are not undersized.

The backhoe and the AMV land, offices, and shop, purchased and built by the AMV at our persistent recommendation, made it possible for the AMV to go into the concrete pipe business, which is greatly reducing their costs of installing drainage, while creating 10 steady jobs. This activity has increased the AMV's visibility and image locally and nationally, and has given them a foot in the door with the German AID (GTZ). The AMV now plans to buy more land next door to expand the pipe factory.

8. Lessons learned

It was apparent to us when we began work on this project that there was inadequate original input from experienced, hands-on road maintenance engineers in the planning phase. The Mission eventually provided the flexibility and funds to deal with most of the effects, however.

Regarding equipment selection, we accept that Aid had sound reasons, at the time, to provide smaller equipment aimed at maintenance only. With the benefit of hindsight, however, the harsh conditions of areas like the Northern Zone cause the same wear and hazards to equipment whether it is used for maintenance or construction. A load of gravel hauled up a steep, rocky, slippery slope could be for maintenance or construction. U.S. equipment manufacturers deserve to have their reputations protected by AID specifying the toughest equipment for the toughest jobs. For example, Mack trucks (or their equivalent) do not break axles, from what we have been told.

The AMV cannot be expected to survive in the private sector with the built-in diseconomies of scale resulting from under-sized equipment. The AMV therefore has near-term plans to replace all eight of the trucks granted them by AID, and a bigger gravel loader has been

obtained on a lease-purchase.

In high rainfall areas, gravel roads disappear without proper drainage. Drainage repair is more important than fixing the road surface. Drainage work must be done in timely fashion, before fixing the road surface, or the investment in the road surface will be lost in the first rainy season. A backhoe is needed to keep the entire chain of equipment moving. Hand labor is therefore not a suitable substitute for a backhoe for an AMV-type organization.

Having a backhoe makes the AMV into the equivalent of the "road fireman." Local communities now call the AMV to open up flooded, collapsed or washed-out roads, which they could not do without the backhoe. This can involve life and death drama, as well as the economic viability of the local community. The AMV board takes great pride in this role, and AMV management uses it to polish the AMV image, not to mention helping generate future business.

9. Problem: use of government road maintenance specifications was causing high costs and slow progress of rehabilitation contracts

ACDI's consulting engineers were Federico Baltodano, Jr. and Jose Manuel Saenz. Baltodano is a former general manager of a major road building company, and Saenz had supervised the building of the first paved road to Upala (from Canas), financed by AID in 1987. Both had worked on a prototype AMV in San Vito. As consulting partners who belong to opposite political parties, they had learned years ago to focus on the technical essentials and set aside temporary political concerns. This is extremely important in Costa Rica, where roads are one of the principal benefits which politicians must deliver to their local districts if they expect to continue in politics.

We had the same experience with engineers as Harry Truman, who was thrust into politics based on his honest, efficient administration of county public works in Missouri. Truman had two distinguished consulting engineers, one Republican and one Democrat, and he never approved a project budget or a contract unless both engineers were in agreement.

As defined by our engineers, the technical challenge consisted largely of simplifying and demystifying the technical road work in the minds of AMV personnel, so they could do things in the field better and more cheaply than they had been led to believe necessary. Unfortunately, the MOPT has no standard specifications for gravel road rehabilitation, and the specifications in use by the AMV in 1991 were based on a MOPT variation of tar and gravel road construction, which was far too expensive.

9. Solution: lowering costs, stretching the funds with "heavy maintenance," and surpassing the minimum "maintenance market" of 270 kilometers of rehabilitated gravel roads

Baltodano and Saenz taught the AMV staff and board about the Jorgensen system of low-cost road maintenance budgeting from the U.S., with a written manual and detailed project estimating forms. This system (called SAMV in Spanish) is based on the concept of using actual field conditions to do the project budget, rather than a theoretical or adapted costing system. At first there was inexplicable resistance; the original AMV management fought to keep costs high and had to be replaced by the AMV board, for whom this point was common sense. (It should be pointed out that the AMV's initial mistaken desire to spend money on projects at higher than necessary rates had two historical roots: well justified fear of an oft-threatened AID pull-out from the project in 1990-91, and overly costly MOPT technical standards). Eventually the cost per kilometer of rehabilitation was more than halved.

David Heesen, of the AID staff, offered in 1992 that he had seen good road projects in Asia which had done "heavy maintenance," a level of work between rehabilitation and maintenance, both of which are rigidly defined terms which traditional road engineers hold sacred. Heavy maintenance assumes a minimal operational standard: the goal is a low-speed road which is passable by a light, 2-wheel drive vehicle, year round. Based in part on this suggestion to find a practical middle level of service and cost, and partially on the actual technical need in the field as determined under the Jorgensen system, the AMV evolved toward this new kind of road work, which was unanticipated in the original workplans.

The cost of heavy maintenance falls between the costs of maintenance, at around \$1,000 to \$1,500 per kilometer, and rehabilitation, which can cost \$7-12,000 per kilometer. The AMV paid outside contractors an average of about \$8,700 per kilometer for rehabilitation, but charged an average about \$3,815 per kilometer for heavy maintenance done by the AMV with its own equipment. The quality of the heavy maintenance done by the AMV was comparable to that of some of the rehabilitation projects contracted to outsiders at more than twice the cost.

The Betty Facey report had established a minimum "maintenance market" of 270 kilometers. By her calculations the AMV could survive if it first rehabilitated 270 kilometers of road, which would then be maintained every year or two by the AMV, at a cost the local communities could afford. By the end of the AID project on March 31, 1995, the AMV had rehabilitated 222.4 kilometers, and had maintained 66.5 kilometers. The goal of 270 kilometers will be met at some point in the second half of 1995. However, more importantly, the survival of the AMV is now assured by the very strong demand for heavy maintenance.

The AMV is giving value to its government and community clients, having placed itself in a market niche which other contractors are not filling. When the market for heavy maintenance is saturated, at least 18 months from now according to the current waiting list, the AMV will have a "maintenance market" of close to twice the Facey projected survival minimum, in the neighborhood of 400+ kilometers. At that point the ability of the GOCR to fund AMV contracts will not be so vital to the AMV. Theoretically they could survive on maintenance work costing around \$1,000 per kilometer, which is demonstrably within the local community

ability to pay. *Having the second road grader is vital to this scenario, since it almost doubles the annual maintenance capacity to about 400 kilometers, and allows the AMV to do maintenance and "heavy maintenance" on two fronts simultaneously.*

These ball park numbers do not count income to the AMV for administering Route 4 and major bridge projects, which were originally considered distractions, but which the GOCR currently considers ideal for the AMV.

9. Lessons learned

The original assumptions of the project about the types of road work needed, and therefore the future market for the AMV, were in retrospect too rigid. "Heavy maintenance" was an unknown concept, but has developed into an ongoing natural market niche for the AMV, one which does not require AID subsidy and continues to build the "minimum maintenance market," which will grow well beyond 270 kilometers.

By learning to use the Jorgenson project budgeting system, the AMV has made itself very competitive with other private sector contractors, and may cause them to react by reducing their prices, taking some form of legal or political reprisal, or by urging the AMV to raise their prices. There is no sign of this at present.

If the concepts of the Jorgenson system and heavy maintenance had not come along, or if the AMV had successfully resisted using them, they would have run out of funds in 1993, as projected by the Harper evaluation. As it turned out, there was difficulty for the AMV to use up the AID funds prior to project end, because their costs per kilometer had gone down by more than half, and they obtained GOCR matching funds to carry out projects from late 1994 onward.

10. Problem: Route 4: a major distraction becomes a major accomplishment

In 1991 the AID Mission insisted that the young, weak AMV take on responsibility for supervising and paying the contractors doing the paving of Route 4, in order to insure proper controls over P.L. 480 funds. We opposed AMV involvement at first, when we saw that AMV board and management spent far too much time on Route 4, to the neglect of gravel road maintenance. Route 4 made our initial job much harder when competition among contractors got the AMV embroiled in a flurry of lawsuits lasting over a year.

10. Solution: working out a truce between the contractors, putting them under ACDI engineer supervision

With more funds provided to ACDI by AID for lawyers and engineers, and after a negotiated truce between four contractors, brokered in ACDI's office, eventually Route 4 became a good project. The lead role taken by AID project officer Arturo Villalobos was essential to the success of Route 4. He kept MIDEPLAN informed and supportive in its role as disbursing of PL 480 funds, and he gave our engineers encouragement to play a strong role.

In retrospect, Route 4 gave the AMV another technical/administrative arrow in their sling, meaning eventually another 2.5 million dollars in direct contracts now in the legislative hopper, for a total of about \$7 million from that one project. It also gave the AMV some initial administrative redundancy at no cost, which resulted in timely improvements in the gravel maintenance program. The Route 4 engineer and his assistant answered the challenge starting in mid-1994, by handling both technical areas (Route 4 paving and gravel maintenance), at greatly reduced overall cost. The component we feared could drag the AMV down in fact lifted the AMV up.

10. Lessons learned

In retrospect, we were mistaken to oppose AMV involvement with Route 4, and the Mission was right to encourage the AMV involvement. It took 14 months of project time to get Route 4 out of the courts, however, and the maintenance activity suffered somewhat at first.

The AMV's image was greatly enhanced, locally and nationally, by the tough but fair way they handled the Route 4 contractors, under our engineers' close guidance. Our engineer Baltodano, a former MOPT road inspector as well as former manager of a major road construction firm, oversaw the MOPT inspection, literally holding classes in road construction. And he taught the AMV how to demand and get results. The AMV successfully showed they could efficiently administer a public works project, as a private group acting as agent of the GOCR, respecting all the public contracting laws and rules.

Route 4 provides the essential backbone of the network of roads in the Northern Zone, and now links Atlantic and Pacific across northern Costa Rica. The gravel roads leading from Route 4 are the AMV road maintenance market for the future.

11. Problem: the AMV could not obtain gravel without environmental permits under new, untested laws designed to protect riverbeds and other wildlife habitat

More than merely obtaining permits, it was hoped that the AMV would set an example for other road contractors, by extracting gravel from rivers and quarries with the least environmental damage, and by requiring the same methods from the Route 4 contractors being

paid by the AMV. This has happened, but not quite in the expected way.

The AMV not only needs gravel, but it needs it in at least 10 separate sites around the Northern Zone, so that the trucking costs to the road work site are within reason and competitive.

It was assumed that the AMV could, using about \$30,000 budgeted for this purpose in the original AID grant, simply hire the services of the professional geologist required in the law, have the applications and impact studies done, and wait the time required for government (MIRENEM) review of the application. Presumably, in 2-3 years the AMV would have about a dozen permits in the geographical areas needed, at a cost of less than \$3,000 per permit.

11. Solution: hire professional help to apply for permits, learn the best methods of gravel extraction, use them at all times, and demand them of others.

The AMV hired the geologist required by law (paid for the first 4 months by ACDD) and the AMV spent more than the budgeted amount. But now, three years later, they have only one permit and hope of eventually obtaining one or two more. This is due to the following unexpected developments:

--Permit process slowness, especially if done well. The permit application process, supposedly 2-3 years in duration, is closer to 3-4 years in actual practice. Among other delays, there was the AID-sponsored OMA (environmental management) component requirement that the impact studies be first class, which is usually not the case in Costa Rica, even on big, expensive projects. OMA donated considerable time and resources to help, setting the standard of quality for the rest of Costa Rica. Also, the AMV geologist had a baby, limiting her time in the field, and otherwise got distracted when OMA hired her to work on the restoration of the Guacalito River.

--Uniquely delicate sites. Some of the sites were ruled out by their environmental delicacy, in one case to save a colony of river otters.

--The "MOPT" permit short-cut. In view of the time required, in most cases it became imperative for the AMV to use the faster "MOPT" permit alternative described below. A less formal version of this is to work under the auspices of the municipality, with no permit but with municipal approval, which they can grant for short emergency periods.

--Working responsibly without a permit. For some small, low-cost projects, it became necessary for the AMV to work without permits, as is customary for competing contractors, but while following the environmentally benign methods learned under this project, which is still not customary for other contractors or the municipalities.

The "MOPT" permit alternative was made available to the AMV as part of the Route 4 project. In effect, one government agency (MOPT) is allowed to short-cut the permit process of another government agency, the Ministry of Natural Resources (MIRENEM), when there is a recognized public need for road work. This was done by the four contractors hired by the AMV to pave Route 4, who obtained their permits in about a year. Since the quarry sites for Route 4 are large and located at strategic sites in the Northern Zone, there was material available in good locations for use by the AMV. This saved the AMV from having to work outside the law in most of its projects, however, it was not the ideal solution for river protection, since the contractors were not using proper extraction methods, at least at first.

The "MOPT" river permit holders were contractors being paid by the AMV to pave Route 4. When one of these contractors invaded the Gaucalito river and destroyed more than a hectare of river bank and its trees, without permits of any kind, the local community was outraged, and OMA as well. The AMV withheld payment and forced the contractor to restore the riverbank, at an un-reimbursed cost of over \$80,000. This is the first known example in Costa Rica in which a contractor has restored a river extraction site.

The AMV, while not totally without blemish in its initial gravel extraction, nevertheless led the way in enforcing the law against its own Route 4 contractors. At project end the AMV had adopted the environmentally benign techniques of river extraction taught to them by our engineers, who worked closely with Carlos de la Rosa of OMA, head of the AID environmental component for the Northern Zone. Furthermore, at ACDI insistence, those techniques are to be written into a pamphlet which, for the first time, summarizes the laws and proper methods of gravel extraction from rivers. This pamphlet will be used to educate the people at the field level (heavy equipment operators) who are responsible for most of the damage to riverbeds. The successor to OMA, the environmental foundation called FIREMA, will produce and sell it to contractors, using the proceeds for environmental work.

11. Lessons learned

The most important overall lesson learned was that well maintained, properly constructed gravel roads are an environmental plus, greatly reducing the damage caused by the erosion and silting created by dirt roads or deteriorated gravel roads. Therefore environmental agencies look well on gravel road construction, and try to help, as OMA and Carlos de la Rosa did in this case.

The most important specific lesson learned was on how to extract gravel from rivers while doing the least environmental damage.

You learn the most from situations where the rules are still being written even as you go about your work. In effect, the AMV was Costa Rica's guinea pig for gravel extraction with adequate river protection. MIRENEM does not have the resources to enforce the new,

advanced, complicated laws on the books, and doesn't even have a written summary of how they affect the practical use of rivers. The AID-sponsored OMA project did have the resources to at least monitor river use and complain about abuses, and Carlos de la Rosa studied the entire body of river-related laws, producing a brief list of the relevant portions. This list said "what not to do," but fell short of telling how to extract gravel in an environmentally sound fashion.

Throughout this project, and at all levels, we had to deal with a dual mentality: the assumption that one set of laws and rules is appropriate on the meseta central around the capital of San Jose, and another set of laws and rules is appropriate in frontier areas "on the other side of the hill," such as Upala. The environmental battle placed this contrast in plain view. There is a huge educational gap regarding the environment in rural Costa Rica, and this is especially true of Upala, one of the last parts of Costa Rica to be deforested and opened to the rest of the country. We at ACDI were occasionally guilty of having too much of a short-term view, and sometimes we erred on the side of action to get things moving at the AMV. De la Rosa took the AMV to task more than once, but then we challenged him to help us put it in writing, in simple usable terms, for all of Costa Rica.

The proper methods of extracting gravel from a river bed while doing the least environmental damage can be summarized as follows: don't work where there are important or endangered river-dependent animal colonies close by; avoid or minimize damage to the riverbank, its trees and plants; don't put the body of digging machinery in the water, using only the non-oily, scooping parts on their extended booms; don't put trucks, bulldozers or other vehicles in the water at all; find ways to work on dry islands created length-wise parallel to the river flow on one side only, extract and load on the dry island starting downstream and working upstream; use sedimentation traps downstream; don't "wash" the material in river water; don't destabilize the riverbank by working too close to it or by digging too deeply; and repair all incidental damage and restore lost trees or plants.

Until the ACDI engineers sat down with Carlos de la Rosa and the geologists (at the insistence of the chief of party, since the sides were somewhat reluctant, this meaning some face-to-face conflict), nowhere in Costa Rica was there such list of methods which combined common sense, the legal and environmental imperatives to avoid or minimize the damage, and the practical need to extract the gravel. This was a very important lesson learned under the project, coming out of one of those creative sessions which started as hot debate, ending with the clouds parting and rays of consensus unexpectedly flooding the room. Consensus building is a Costa Rican tradition which is possibly a reason for, or outgrowth of the tradition of conflict avoidance.

Another bit of Costa Rican folklore came out in this process. Our engineer Baltodano said that the tradition in the construction business is to "take action without permission, and then to ask for forgiveness." The costs and delays in obtaining permits are often so onerous that builders assume they should go ahead without permits, the cost of the sanctions usually being minimal.

This was the philosophy followed by the contractors who built the EARTH campus using AID funds. According to AID engineer Heriberto Hernandez, at the end of the 3-year campus construction process, the permits applied for in the beginning were finally approved.

Current events are showing that the costs of sanctions are going up in Costa Rica. Environmental groups and concerned individuals are learning to use the Costa Rican courts to make contractors think twice about filing late or shoddy environmental impact statements, as in the case of the massive Papagallo tourist project, now suspended by the courts. Baltodano predicts that contractors will eventually start asking permission, by filing for permits before the fact.

12. Ten things the AMV should do to survive in the future

- 1) **Avoid being dependent on only one customer, whose ability to pay might put the AMV in a life or death situation. Try to have several major customers, not all from government. Have a plan for survival if government can't pay for any more road work for a time.**
- 2) **Avoid going deeply in debt. Grow slowly, if at all. Don't promise more than you deliver.**
- 3) **Maintain the admirable tradition of bi-partisan composition of the Board of Directors. It is the AMV's most important resource, without which it will fail. Recognize the example of FUNDANORT and keep broad-based community support, while working with politicians and board members of both parties.**
- 4) **Have a plan for surviving national elections no matter who wins. If a small group tries to take over the board, have a bi-partisan plan to resist, with help from the top of Costa Rican leadership.**
- 5) **Keep a clean image and avoid abuses of equipment and resources.**
- 6) **Continue setting an example on the environment, because it is good business, good for the company image, and cheaper than the alternative, in the long run. This requires constant education of employees.**
- 7) **Do good works in the community, as long as you can afford it, because it is also good business.**
- 8) **Keep an active, informed board and well-qualified management. Remember the manager position is not a political appointment, nor a gift for a friend, but is to be filled by a professional who must perform.**
- 9) **Know your financial worth and maintain it, and set aside funds to replace equipment.**
- 10) **Possibly most important in the short term, learn to charge realistic (higher) prices for services which take into account the hidden costs of dealing with government, such as long waits for payment, cash flow gaps and interest costs, and not being paid at all when there is a change of governments or hard times.**

Conclusion

After the recent (4-94) change in governments, our engineer Saenz became a close advisor to the new Minister of MOPT, giving the AMV immediate access, cooperation, and substantial non-competitive MOPT contracts. Saenz is now using the AMV as an example for proposed legislation to set up more AMVs. The AMV's first non-competitive MOPT contract had been obtained with the help of Baltodano in the previous government.

This was an intended outcome of ACIDI's assistance from day one: the integration of the AMV into the highest levels of the road building social and political circle. Based on their hard-earned image as honest, competent and representative of the community, the AMV has found the marketing of their services relatively easy, given this open door.

We learned a basic lesson from the overall project. When private contractors are receiving relatively high prices to perform public works, there is room for AMV-type organizations, in spite of their inherent democratic fragility and initial technical assistance needs which make start-up difficult and expensive.

For ACIDI's team of Costa Rican professionals, the AMV project took on the flavor of a campaign to set a local example which could help return efficiency and accountability to public works projects. The members of the AMV board and staff were on a small crusade of their own: they wanted roads to make their families more prosperous, educated and healthy, and they wanted to escape their previous bad experiences concerning road improvement, such as being passed over as a region and being asked for gifts and favors by public and private road personnel supposedly being paid to do road improvement. Thus we had an essential ingredient needed for a good project: everyone involved, professionals and community people alike, had various strong reasons to make the AMV successful. Everyone made an extra effort, despite severe setbacks along the way. A major lesson is therefore the importance of selecting an experienced, highly motivated team to make an innovative project take off. Highly effective people attract and motivate other highly effective people.

The new Minister of MOPT, partially in response to recent negative press reports, has announced plans for improving public contracting methods for fixing the country's congested, dangerous roads with a shrinking budget. He has met with the AMV leaders in Upala and promised contracts and support for their efforts on the same basis, as a way to get more roads fixed at a lower cost.

The current government has also created a new Ministry, called the Ministry for Reform of the State, the equivalent of the Gore Re-inventing Government project. In April, 1995 the Minister announced plans to privatize and decentralize a number of government functions and institutions, using "private organizations officially declared to be of public interest," which are one or more layers removed from the debilitating oversight of the Contraloria (National Controller) and the bureaucracy. The AMV is a prototype organization of this type, and is therefore in the right place at the right time.