

OFDA/USAID Supported Emergency Relief Projects

USAID Mission to Perú

1983 FLOOD DISASTER RESPONSE IN THE

DEPARTMENTS OF PIURA AND TUMBES

Lima, December 1983

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## INTRODUCTION

Beginning in November of 1982 and lasting through June of this year, the effects of "El Niño" were felt throughout South America, and in some areas the effects still continue to be a problem. In Peru, the northern Departments of Piura and Tumbes were drenched by record rainfalls and dangerous floods, which reeked havoc on agriculture lands, irrigation systems, transportation networks, private/public buildings and utilities. In the city of Piura over 2,200 mm of rain fell this year, 43 mm is the normal rainfall. In the south, droughts hit hard in the Department of Puno and parts of Cuzco destroying most of this years harvest. Disaster Declarations were issued for both regions and some adjacent Departments. With technical direction from the Peru AID Mission and financial support from the Office of Foreign Disaster Assistance (OFDA) a range of emergency relief projects were carried out in Peru. What will be discussed in this paper is AID's response to the flood disaster in the Department of Piura and Tumbes.

Two of the biggest problems affecting the north, as a result of the floods, was access to villages isolated by destroyed roadways and the deteriorating health conditions in many of the communities. The AID Mission decided to give priority to these two areas in their emergency assistance programs.

Below is a brief description of each of the projects AID carried out between the months of April and November of this year. A more detailed explanation of each project follows this introduction.

Project: Piura Paita Road Project

Description: The city of Piura and neighboring communities (approximately 200,000 residents) were essentially isolated between the months of March and June due to washed out roads and collapsed bridges. The principal road to the seaport at Paita (57 kilometers from Piura) was cut by over 20 quebradas and a lagoon, which covered another 5 kilometers. Without this road, Piura could not be resupplied with essential materials, such as fuel and food, to support this large population. The objective of this project was to construct an 8 kilometer detour around the lagoon and render the quebradas passable. This was much easier said than done. The project, which began the first part of May, had to battle continually with the rains which often times destroyed much of the rehabilitation work completed on the road. Tons of landfill and bedrock had to be brought in to stabilize the soft soil at each road break. Heavy machinery was used to build the detour and put the finishing touches at each road break. The project could only be completed in July and August, after the rains had ceased. The project provided a provisional re-opening of this road which allowed heavy commercial vehicles to travel this route in less than an hour, compared to the alternative route via Sullana which took 4 to 5 hours. The total cost of the project was S/.170'301,681.00 and was supervised by CORPIURA.

Project: Sewer Cleaning Machines

Description: Two Sewer Cleaning Machines were brought into Piura on loan to the Regional Sanitation and Water Authority (SENAPA) to assist them in the cleaning of the sewer lines clogged by sand/mud and other debris from the floods. Each machine is made up of two units, one with

a high powered jet spray system to clean the sewer lines and the other with a high power vacuum unit to suck up debris collected at the manholes. Both machines have been in Peru for six months and have cleaned 68 kilometers of sewer lines and over 1350 manholes in Piura, Castilla, and the neighboring towns of Paita and Talara. Both machines will remain in Peru for 3 additional months to complete work in the villages of Tumbes and Sullana. The cost of both of these machines together was \$250,000 and shall be returned to OFDA's stockpile in Panama, where they will be readied for any future disaster need.

Project: Medicine Distribution

Description: Due to the increasing incidence of disease and the lack of many medicines in the Sierra Region, cut-off by road communication from the rest of the Department, an emergency airlift of essential medicines were distributed to the villages in this area. With the assistance from the Augustinian Fathers, who have a network of health centers and short-wave radio communications throughout the Sierras, AID was able to coordinate the distribution of medicines. A list of ten essential medicines were identified to be the most needed in the area, packaged and airlifted by the Peruvian Air Force to the mountainous villages in hope that they would be able to provide enough assistance to the local medical units until the roads could be re-opened. The total cost of the medicines was approximately \$100,000.

Project: Portable Water Storage Water Tanks

Description: Villages located along the coast, south of the Capital, had their water supply cut when the pipe line from the Tumbes Water Plant collapsed into the Rio Tumbes with the Puerto Viejo. From OFDA's stockpile in Panama, 16 rubberized canvas water storage tanks, with a capacity of

3,000 gallons; were brought in on a loan basis to be placed in these villages. Daily they are resupplied from water tankers and will continue to receive water in this manner until the main line can be re-routed across the river. A few other tanks are located in other villages where flood victims had to re-locate. These tanks will be returned to Panama when they have fulfilled their usefulness in Peru.

Project: Sewer Rehabilitation Project

Description: The torrential rains, which hit northern Peru, caused extensive erosion to the steeply graded streets throughout the Municipality of Tumbes, leaving deep trenches and gullies in its wake. The water and sewer systems were also severely damaged, as lines were broken or washed away completely. Raw sewerage flowed through the streets causing a severe health hazard for the neighboring residents. The AID Mission decided to carry-out an emergency repair project of over 400 meters of the most critical sections of the sewer system. This was accomplished during the months of September and October at a cost of S/.51'000,000.

Project: Huarmaca Road Re-opening Project

Description: Approximately 70 kilometers of road to Huarmaca began closing down in December 1982 as a result of landslides. As the rains continued in this Sierra Region further deterioration to the road resulted, leaving a population of over 55,000 isolated from the rest of the Department. This project was to provide an emergency re-opening of the road. Nearly 70% of the road was destroyed and had to be re-cut in many areas. The work was extremely difficult, as the heavy machinery had to work in very precarious areas and steep grades in the mountains. Despite the difficult task to re-open 70 kilometers

of road, it was accomplished in less than 3-1/2 months with 3 bulldozers working 10 hours per day. The heavy road equipment arrived in Huarmaca to huge celebrations by the entire city. The project was supervised by CORPIURA, which was partially financed by AID (S/.149'507,098), and another S/.27'000,000 from CORPIURA.

Project: Water Rehabilitation Project

Description: In many of the rural villages in the Department of Piura and Tumbes, water systems were damaged, mostly by quebradas or flood waters washing away parts of the distribution system. In other areas the problems were somewhat worse where pumping stations or wells were damaged. The objective of this project was to assist the communities in the repair of their systems. Criteria for selecting villages to participate in the project was that only rehabilitation of existing systems could be financed, all laborers on the project had to be residents of the village, and no more than \$10,000 could be spent on repair in any one community. In Piura, eleven villages participated in the project which cost S/.59'589,600 and was supervised by CORPIURA. In Tumbes, five communities participated at a cost close to S/.58'000,000. The projects were carried out between the months of August and November.

Project: Ayabaca Road Re-opening Project

Description: An eight kilometer section of road was buried by a series of landslides between the communities of Paimas and Zamba on the Ayabaca Road. A provisional detour was built around the area, however, it was very temporary and was closed more than not. Under this project,

the slides were cleared and repairs to the main highway was carried out to provide safe vehicular traffic flow and avoid the bottleneck caused by the detour. The project was supervised by CORPIURA at a cost of S/.58'478,518, and carried out between the months of August and November.

## PIURA-PAITA ROAD PROJECT

The principal highway to Paita (57 kilometers), which is Piura's lifeline to the rest of Peru was closed in April as over 20 quebradas cut through the road and another 5 kilometers was covered by a lagoon near Congora. This highway runs across a low flat desert and the flash floods from the heavy rains were no match for the road, as some of the road breaks measured over 4 kilometers wide. Other highways from the north and south fared no better and it became apparent that a major thoroughfare to Piura had to be opened immediately in order to bring in essential supplies such as food and fuel, the latter to operate electricity plants and water wells, to support this large population of over 200,000 residents in and around Piura.

The primary objective of this project was to provide an emergency re-opening of the Piura-Paita Road by constructing a detour around the lagoon at Congora, which had formed as a result of the floods and the high water table in this low bowl-like area, and to make the quebradas passable again.

The project began the first week of May when the rains appeared to be letting up. Tons of bedrock were brought in to stabilize the soft areas at each road ~~break~~ and bulldozers began cutting a detour around the lagoon. It was expected that the road could be re-opened in ten days with equipment working 10-15 hours per day. However, this was not to be the case as torrential rains pounded the area once again and flash floods washed away most of the work completed. The lagoon nearly doubled in size burying a third of the new detour. Small extensions of the lagoon penetrated parts of the road between Congora and Paita, which turned 4

kilometers of road into a swampy bog, not even passable with 4-wheel drive vehicles. Despite this frustrating set-back the road was tackled once again. New landfill and bedrock had to be brought in and a longer detour around the lagoon made. Towards Paita, the biggest problem was stabilizing the swampy soil which the road now crossed. There was no way of going around it and bedrock had to be brought in continuously to firm up the ground.

However, with the continuing rains the project became a road builders nightmare. Building a stable roadbed proved to be very difficult due to the high ground moisture. Only by mid-June was the road made passable, but only for light-weight vehicles. Large commercial trucks could only reach Piura via Sullana, which took 4 to 5 hours when that road was open.

At this point a moratorium on the project was agreed, as it appeared that working on the road while the rains continued would just be a waste of funds. The project would only continue once it was assured that the rains had stopped for good.

In mid-July the project was restarted. Without the rains work progressed rather quickly and with less difficulty. The project was amended to allow for additional time and funds to complete the work. By mid-August the road was open to heavy commercial traffic. The remaining two weeks in August were spent improving the roadbed in the quebradas and around the lagoon. By the end of August heavy trucks were able to travel to Piura from Paita in less than an hour, which cut transportation costs down considerably.

Equipment and hours worked on the project are detailed below:

5	Bulldozers	1,289 hrs.
2	Front loaders	478 hrs.
15	Dumptrucks	3,409 hrs.
1	Roller	85 hrs.
5	Graders	771 hrs.
2	Water Tankers	383 hrs.

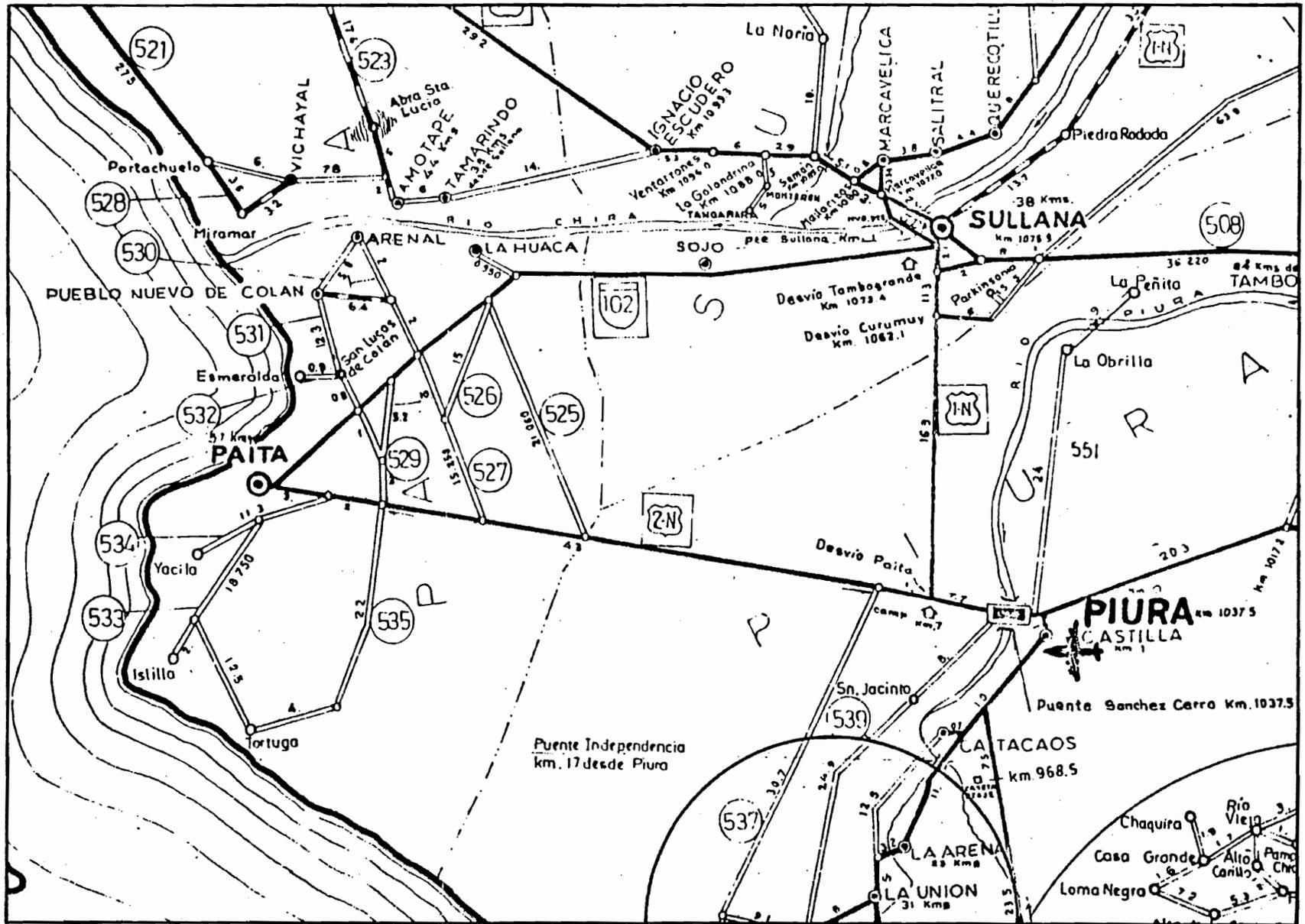
The breakdown of expenditures on this project are as follows:

Equipment	S/.143'434,604.
Materials	17'081,997.
Personnel	<u>9'758,080.</u>
Total	S/.170'301,681.

Timetable:

Project Signed:	April 27, 1983
Project Completed:	August 30, 1983
Project Duration:	126 days

The Ministry of Transportation is planning to carry out the full repair of this road. In the design, they will install a number of box culverts and badenes to protect the road from being washed away. They also plan to utilize the same detour around the lagoon, as it appears the high water table will keep the lagoon filled for the next couple of years.



PIURA-PAITA ROAD PROJECT

## SEWER CLEANING MACHINES

During the early months of this year most of Piura found itself flooded as a result of the heavy rains, damaging homes, roads, commercial centers, and other areas. The sewer system did not escape this fate, as hundreds of tons of sand/mud and other debris washed into the network clogging up pipelines and sending raw sewerage into the streets. AID/OFDA brought in two Aqua-Tech Sewer Cleaning Machines in mid-June, on loan to the Regional Sanitation and Water Authority (SENAPA) in Piura, to assist in the cleaning of the clogged up sewer lines.

Each machine is made up of two units, a truck carrying a powerful water jet system (Aqua-Jet) used to clean out pipe lines, and a trailer unit with a high powered vacuum system (Aqua-Vac) able to suck up sand/mud and other debris from manholes. The Aqua-Jet unit has a self contained water tank for feeding water, under extreme pressure, through a hose and special nozzle adapted to be inserted into sewer pipes. With this high powered jet of water, the hose is worked down the pipe washing out debris to access points, such as manholes or line breaks, where it can be removed with the use of the trailer unit. The Aqua-Vac utilizes a high powered suction pump which is capable of removing up to a ton of sand/mud and other debris through a 4" hose per day.

Two technicians were sent to Piura to train SENAPA personnel in the operation and maintenance of these machines. SENAPA agreed to pay for all operating costs and salaries for the operators while the equipment remained in Peru. An Engineer from SENAPA was placed in charge of the full operation of the equipment, and has done a good job coordinating the work of these machines.

Both of the Aqua-Tech Machines have been averaging 12 hours per day working 6 days a week. On Sundays, the equipment is brought in for a complete maintenance check.

The original plan was to use these only in Piura and Castilla, which suffered tremendous damage to sewer lines from breaks and blockages. Trying to unclog the blockages and repair the lines have been a slow and difficult jobs as the machines have had to work around broken lines and trenches throughout the city. Other neighboring towns were facing similar problems and requested assistance from SENAPA to bring these units in to clear their lines while they were still in-country. AID agreed to this proposal and has allowed them to work for a longer period in Peru to carry out some of this additional work.

To date 68 kilometers of pipelines and over 1350 manholes have been cleaned in Piura, Castilla, and the neighboring towns of Paita and Talara. A breakdown of this work is shown below. The units are programmed to remain 30 days more to complete work in Tumbes, Sullana, and the rest of Piura. If time permits, Catacaos, Chulucanas and Chiclayo may be considered. Upon completion of work in Peru, these machines will be returned to OFDA's stockpile in Panama, where they will be readied for future disaster needs.

Piura (from June 15 to November 30, 1983)

Sewer Lines cleaned:	35 kilometers
Manholes cleaned:	702

Castilla (from June 15 to November 30, 1983)

Sewer Lines cleaned:	20 kilometers
Manholes cleaned:	425

Paita (from September 1 to September 12, 1983)

Sewer Lines cleaned:	4 kilometers
Manholes cleaned:	75

Talara (from October 11 to November 30, 1983)

Sewer Lines cleaned:	9 kilometers
Manholes cleaned:	172

This is the first time that OFDA has used these machines in one of their disaster relief projects. However, the response has been very favorable and the equipment continues to do an excellent job at every site.

FUTURE RECOMMENDATIONS

Of course, there have been some breakdowns, however, SENAPA has managed to repair most of these fairly quickly. When parts weren't available they were made at a machine shop. Some recommendations for modification are included below as constructive suggestions for future use.

- Because of the very poor shape of the roads following the floods, there were many areas that the trailer unit, with its low suspension could not enter. Although the frame and body of the trailer could be elevated the axles running the width of the unit still would cause a problem. It is suggested that the trailer unit be modified to travel into rugged areas, since most of the work these units will face in the future will not have ideal roadways.

- Wisconsin Motor's Electrical System continuously was a problem. Batteries were constantly being drained, and had to be recharged nightly. The life span of the batteries on both units tended to be very short, due to the rapid deterioration of the cell plates. The cause is unknown, although many attempts were made to rectify the problem. Also, the starter motors for the Wisconsin motors were very delicate, and had

to be replaced with a heavy duty type.

- The 4" suction hoses which came with the units and later replaced with new ones sent down from the U.S. are too thin. The wire spring support within the hose tends to collapse and block any debris from being removed from the sewers. Tracking this problem down took many months, because the wire insert would only collapse when the machine was operating and revert to its normal form when the machine was turned off and the hose examined. Finally they were replaced with new ones purchased in Peru, which were stronger, and the problem solved.

- The metal suction tubes inserted into the manholes have couplings which tend to fatigue after use and cause leakage. An addition rubber O-ring had to be placed in the junctions to prevent this leakage, however, this will not stop the continued fatiguing of these couplings.

- Taillights on the trailer should be relocated to a higher level, especially since the units work around a lot of water after a flood situation. Corrosion and shorts have severely damaged the lights on these units.

- The spring supports for the trailer suspension have started to crack, however, they have been reinforced. This may be due to the excessive use of the machines in very poor terrain, rather than a problem in design.

- Because the machines have been putting in an average of 12 hours per day, it was recommended that the back of the truck be equipped with flood lights for operating late in the evenings. Clean-up work was often done after the sun went down, which was difficult and hazardous.

- There was some concern for the amount of fuel that the Wisconsin motor used and whether it was wise to have the Aqua-Jet pump operating with a diesel motor, and the Aqua-Vac pump operating with a gasoline motor, instead of one type with the same type of fuel. This is up to the technicians to figure out.

## MEDICINE DISTRIBUTION

Although this project was not funded by OFDA, it was one of the principal emergency relief projects carried out in the Department of Piura. With permission from the Ministry of Health, funds were made available from AID's Extension of the Integrated Health Project (527-0219) to purchase medicines and oral rehydration salts for immediate distribution in the flood zones in the north.

In the mountainous areas of Piura and the region south of the Department Capital, known as Bajo Piura, significant increases in disease incidence and infant mortality were occurring, all related to the flood disaster. The local Ministry of Health posts were completely out of basic medical supplies and couldn't provide adequate assistance. The AID Mission identified nine essential medicines, along with oral rehydration salts, which would have the greatest need and impact in the communities. After a long process of negotiating a waiver clearance for the non-competitive emergency purchase from local sources, AID was immediately able to buy enough supplies in Lima for the project.

With the assistance from the Peruvian Air Force, two Buffalos and a number of Helicopters were used to deliver the medicines from Lima to Piura and then from staging points in Chulucanas & Piura to 10 dispersed locations around the Department. Mechanical difficulties and poor weather conditions delayed some of the deliveries, and some of the supplies had to be taken by burro into the mountains. AID also agreed to assist in cost of transportation of approximately 15 tons of materials during the months of May and June.

The Augustinian Fathers working out of Chulucanas have a Radio 'Net' throughout the Sierras, and were valuable in coordinating the air lift of these supplies to the villages scattered around the mountains, where they were issued to the local medical authorities for their use in the area.

In Bajo Piura, CIPCA (The Centro de Investigaciones y Promociones del Campesinado) was responsible for the distribution of medicines where they have a number of on-going projects.

The total cost of the purchase of the nine medicines and rehydration salts was close to \$100,000. Below is a list of the medicines and amounts purchased for the project:

<u>Medicine</u>	<u>Quantity</u>	<u>Use</u>
1. Penbritin (ampicilin) capsules (250 mg)	387,000 bottles	antibiotic
2. Penbritin Suspension (125 mg/5ml)	4,000 "	"
3. Septrin (Sulfatrimethoprim) (250mg/60ml)	60,000 "	"
4. Septrin Suspension (60ml)	3,000 "	"
5. Cloromicetin Palmotato capsules	170,000 "	antibiotic, typhoid
6. Cloromicetin Palmotato suspension	3,500 "	" "
7. Cicatrin Cream (10gr)	7,500 tubes	skin ointment
8. Tetracycline ophthalmic ointment (5gr)	8,000 "	eye ointment
9. Panadol Syrup (60m)	1,000 bottles	cough medicine
10. Oral Rehydration Salts	100,000 envelopes	Rehydration

Following is a list of the areas where the medicines and oral rehydration salts were distributed:

1. Morropon
2. Chulucanas (upper)
3. Chulucanas (lower)
4. Huarmaca
5. Frias
6. Santo Domingo
7. Chalaco
8. Huancabamba
9. Tambo Grande
10. CIPCA-Bajo Piura

PORTABLE WATER STORAGE TANKS

The collapse of Puente Viejo, which supported the main water supply line from the Tumbes Plant to all of the villages running along the coast south of the Capital, has resulted in cut-off of water to a population of nearly 50,000 people. From OFDA's emergency stockpile in Panama, 12 collapsible rubberized canvas water storage tanks, with a capacity of 3,000 gallons each, were brought in on loan to the Development Corporation to be placed in these villages. Daily they are resupplied with fresh drinking water by water tankers from the Army and private sources. Approximately 10 kilometers of pipe line have to be rerouted and cross the Rio Tumbes via Puente Nuevo. This work is not expected to be completed before April of 1984. In the meantime, these tanks are providing an emergency solution for these communities. A few of the tanks are also located in areas where flood victims had to relocate.

All of the tanks are in good condition and properly shaded from the sun to protect them from excessive deterioration. It is estimated that they will need to remain in Peru through the middle of 1984. At that time those tanks without major defects will be returned to OFDA's stockpile in Panama for future use.

Below is the current distribution of the water storage tanks in Tumbes:

2 ZORRITOS  
1 CASERIO SAN ISIDRO  
1 COMUNIDAD "EL MOLINO" SAN ISIDRO

- 1 LOMA DEL VIENTO (CORRALES)
- 1 TABLAZO CORRALES
- 2 CONSEJO DISTRITAL DE CORRALES
- 1 PUERTO PIZARRO
- 1 CASERIO LA JOTA
- 2 CORTUMBES

There are also 4 more of these tanks on loan to the Development Corporation in Lambayeque.

SEWERAGE REHABILITATION PROJECT

Many of the streets, in the Municipality of Tumbes, with steep grades were destroyed by excessive erosion caused by the heavy rains, which left deep trenches throughout the city. The water and sewer systems in many of these areas were completely destroyed leaving homes without water and raw sewerage running through the eroded streets.

The raw sewerage was becoming a severe health hazard, especially for children playing in the trenches and the neighboring residents. The AID Mission decided that repairs to the most critical sections of the system would be undertaken with the emergency relief funds available.

With the assistance from the local SENAPA office and CORTUMBES a project was designed and a budget of S/.51'000,000 put together. A convenio between AID and CORTUMBES was signed on August 10. The areas to be repaired were identified and supervised by SENAPA. They are listed below:

24 de Julio	156 linear meters
6 de Julio	39 linear meters
Pasaje Lima	92 linear meters
Ureta	33 linear meters
YahuarHuaca	83 linear meters
	<u>403 linear meters</u>

CORTUMBES lacked personnel to properly administer this project and selected to carry it out on a contract basis. Bids were invited and the lowest bid accepted. Repairs to the system included rehabilitating the line, construction of 3 main holes and providing a protective layer of landfill (80 cm) over the pipe to protect it from any damage. CORTUMBES was to be responsible for filling in the trenches to what was

the original road level once repairs were completed.

Work began on September 10 and was completed by mid October.

## HUARMACA ROAD RE-OPENING PROJECT

Huarmaca is located in the Province of Huancabamba in the southeast corner of the Department of Piura. In December, as a result of the heavy rains, the road between Canchaque (1,200 meters in altitude) and Huarmaca (2,100 meters), an approximate distance of 76 kilometers, began closing down due to landslides covering or washing away the road. Only a few kilometers from Canchaque, a large landslide cut-off the rest of the population (approximately 55,000 residents) in December 1982 to vehicular traffic. As the rains and ensuing floods continued through the month of June, further deterioration to the road continued to occur. In May and June, AID had a very difficult time airlifting relief medicines into Huarmaca, one of ten villages participating in the project, because of the precarious location and bad weather conditions in the Sierras. Other supplies had to be carried in by burro, which took at least two days to reach the town of Huarmaca.

In July the AID Mission took on the responsibility of re-opening this important road in their emergency relief program, as the welfare of the residents, who had been isolated up to this time for 7 months from the rest of Piura, was a major concern for the Agency. With financial assistance from the Office of Foreign Disaster Assistance (OFDA), a project was quickly designed and budgeted with the assistance of Engineers from the Development Corporation in Piura (CORPIURA). A damage assessment of the entire length of the road was impossible due to its inaccessibility, however, an estimate of the damage was determined through numerous interviews with people travelling by foot or horseback from the affected area. From the information gathered a budget was put together for the emergency

re-opening of this thoroughfare. CORPIURA agreed to carry out the completion of this project should the budget fall short of its target.

The project provided for a provisional opening only, to allow immediate access to the communities along this route. Once that objective was completed further consideration to improving the road and protecting it from future damage could be examined for additional financing.

A convenio between AID and CORPIURA was developed and signed on August 1, 1983 with a budget of S/.149'600,000 (approximately \$80,000). An engineer from CORPIURA, Antonio Orellana, was assigned to supervise the project, and preparations were made to begin work immediately. At the initiation of the project it was difficult to locate available machinery (bulldozers) to work the Sierra. There was a large number of other projects currently underway with a limited number of tractors available. Contractors preferred working in the coastal area, where they were closer to home and could facilitate repairs easier, should there be a breakdown in equipment. After a two week delay, one tractor (a D6D) was finally located and arrived on August 15 to begin working. Two more units (a D6D and a D7F) followed three days later.

One of the smaller units was primary responsible for making initial road cuts in the areas blocked by slides or washouts, while the remaining two carried out the bulk of the work, which entailed reshaping the road through the removal of heavy debris, widening the road and making the remaining quebradas passable. The D7D also put the final touches on leveling the road, constructing the road bends and cutting proper gradients, so that traffic could pass smoothly. The tractors were contracted on an hourly basis for work completed and paid on an established base rate set by CORPIURA for all of their projects. All three machines were in excellent

mechanical shape and averaged 10 hours of work per day. There were only a few short delays due to minor breakdowns.

A work crew, averaging 40 persons, but sometimes reaching as many as 60, followed a few kilometers behind the machinery digging drainage canals along the edge of the road in the most critical areas. Two dump-trucks, one working only part-time, worked primarily with the road gang.

There was a resident technical assistant, under the supervision of Ing. Orellana, on sight at all times. A senior Controller working with four assistants supervised the operation of the tractors and worked with the foreman, who was responsible for the road gang. Under the guidance of Ing. Orellana, the project was superbly managed and precise accounting for hours worked and expenses was maintained throughout its duration. Ing. Orellana also had the assistance of his senior supervisor, Ing. Luis Morales, who is an experienced road engineer and available for technical advise.

During the first 40 days of the project the tractors were able to advance fairly rapidly, completing 35 kilometers of road in this time. The terrain in this area was not exceptionally difficult to work, and although there were numerous slides along this section of the roadway they did not pose a very big problem for the equipment. However, the remaining 36 kilometers of the road to Huarmaca proved extremely hard, as well as, dangerous. In the higher elevations the terrain was more precipitous and some of the rock faces much too difficult to work with tractors. Over 250 kilograms of dynamite had to be used in this area in order to allow the machines to pass and build a suitable roadbed. This remaining section of road took nearly two months to complete.

The first tractor arrived in Huarmaca on November 12 to a huge celebration by the townspeople. Many present said that President of Peru couldn't have received a better reception. Work is still continuing on the last few kilometers of road near Huarmaca by CORPIURA, as this section of the road required additional rehabilitation.

The project proved a huge success and provided a much needed access to the area for essential supplies to the residents of this area. After 11 months of isolation the population was very desperate to have this road re-opened. Bringing supplies by burro was not only slow but very expensive. AID can be very proud of the work completed, which is recognized by the authorities and the residents alike along the entire length of the road.

AID's contribution to this project totaled S/.149'507,098. For this project also, CORPIURA has continued to work on the project and have invested an additional S/.27'000,000 into the project. A summary of the cost breakdown and project statistics is shown below:

Disbursements:

Materials:	S/. 2'280,202.00
Personnel:	24'199,925.00
Equip. & POL:	<u>123'026,971.00</u>
Total	S/.149'507,098.00

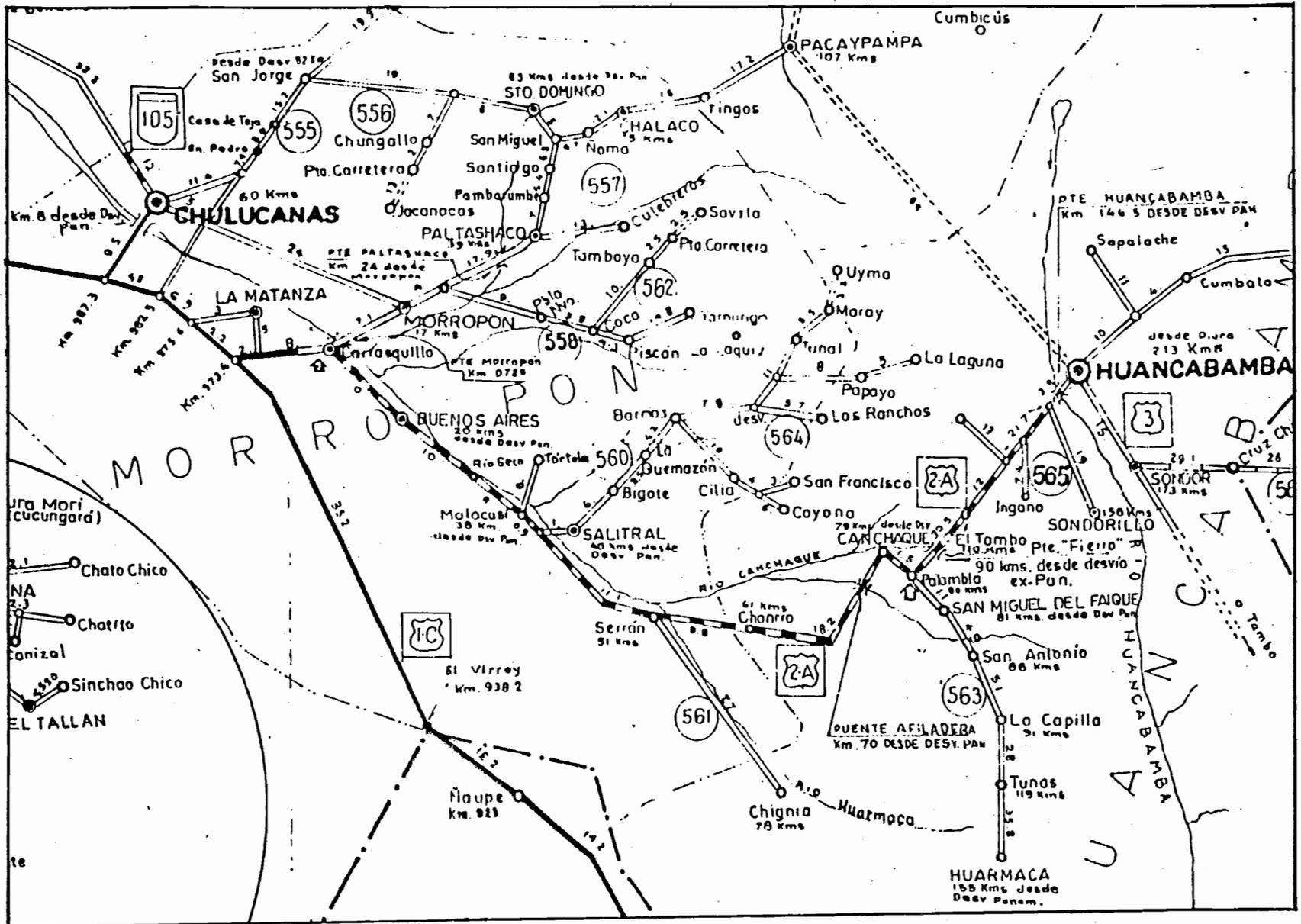
Timetable:

Project Signed:	August 1, 1983
Project Completed:	November 15, 1983
Project Duration:	107 days

Equipment Used:

2 - D6D	727.5 hours
1 - D7F	423.5 hours
2 - Dumptrucks	566 hours

A major follow-up project is now in the final planning stages, which will provide for proper road protection from future road closures. This will include a permanent drainage system, the installation of causeways and bridges, and the re-cutting of some of the turns to provide for a smaller road gradient. This project will be presented to INADE at the beginning of December for AID funding. It is hoped that work could begin by the early part of January 1984, providing there are no rains to delay work. The preliminary estimate for this project is \$835,000 and will take between 4 and 5 months to complete along the entire 76 kilometers of road. With the completion of this project very little maintenance work will have to be carried out in the following years and fewer problems with road closures foreseen.



HUARMACA ROAD RE-OPENING PROJECT

## WATER REHABILITATION PROJECTS IN THE DEPARTMENTS OF PIURA AND TUMBES

The primary objective of this project was to assist rural communities in the repair of their potable water systems damaged by the floods. By accomplishing this task the population would not only have easier access to water, but the health situation in each village would improve through better sanitation of the population and reduced spread of disease from contaminated water collected from stagnant ponds or shallow communal wells, which was the current practice.

An initial damage assessment of the water systems in rural villages was undertaken to see how much work was involved in repairing these systems. Some required only the replacement of a few sections of pipe to get the system back in order, where others had more serious problems with their distribution network. In some of the villages wells and pumping equipment needed rehabilitating, were damaged beyond repair, or found to be sitting at the bottom of recently formed lagoons. However, most of the repairs were not very complicated and could be carried out relatively fast with some technical supervision from the Development Corporations.

Since it was impossible to study every village and develop budgets and work plans for each area to present to AID for funding consideration, a more general design was put together, which would facilitate the many types of repairs, some small, some not so small. The criteria set for allowing a community to participate in the program was as follow:

- only rehabilitation of systems which existed prior to  
the floods could be considered,
- no extensions to existing systems would be permitted,

- the total cost of repairs in one community could not exceed \$10,000,
- to the degree possible, repairs should be undertaken by the residents themselves.

Agreements were signed between AID and each of the Development Corporations in the Departments of Piura and Tumbes, in the amount of S/.62'900,000 (approximately \$32,000) each. Although it was recognized that this was not enough money to cover all of the problems in each of the Departments, it was considered enough to test the success of the program with the Development Corporations, and be used as a model for additional funding consideration should the project turn out to be successful.

Each of the Development Corporations were required to carry out the project in at least 5 communities, but no more than 15. Each project area had to be agreed upon and a budget worked out between the Development Corporation and the resident AID Representative prior to committing funds to that individual community.

In the Department of Piura, the project concentrated in the area south of the Departmental Capital known as Bajo Piura, where damage to water systems were very extensive. An Engineer from the Development Corporation was assigned full time to supervise this Project. Visits were made throughout Bajo Piura, meeting with the village authorities and representatives from the Community's Junta de Agua Potable, to get a clear picture of the problems. During the visits it could be determined right away whether the village met all of the criteria to participate in the program. If so, measurements of the damage and requirements to repair

the system were collected. Initially nine villages were identified and two more added later. Budgets for each were made up in a matter of a few days after visiting the site, and purchase orders requested for materials were written up immediately afterwards. One of the delaying factors in the project, was the unavailability of materials in Piura, which had to be ordered from Chiclayo or Lima, often taking 2-4 weeks to arrive in Piura.

CORPIURA itself purchased all materials for the project and delivered them to the sites. In the village a foreman was selected, usually an individual responsible for the maintenance of the water system, to oversee the proper installation of pipe lines and other materials. CORPIURA's Supervising Engineer coordinated all work in the village with this individual. Where repairs required someone with technical expertise, not available in the village, outside assistance was solicited. Laborers on the project were hired from the same village where the project was being carried out and were selected on the basis of being currently unemployed and suffering extensive losses as a result of the floods, directly or indirectly; and supporting a family. These laborers were paid in cash for days of work completed.

The project ended up a success beyond expectations. Not only were the residents appreciative of having a repaired water system, but the small amount of work available for the damnificados provided an additional bonus, all of which earned a tremendous amount of goodwill for USAID. The average investment in each village was a little over S/.5'000,000 (about \$2,500)! It was not uncommon to see the community end the project with a huge dedication ceremony honoring AID and CORPIURA.

The eleven sites which participated in the project are listed below with the cost of repairs in each;

La Arena	S/.6'343,370.00
Vice/Chalaco	13'649,330.00
Chato Chico	2'256,830.00
Chato Grande	3'815,920.00
Cura Mori	7'450,736.00
Rinconada/Llicuar	1'388,340.00
Rio Viejo	682,000.00
Vichayal	3'397,592.00
San Clemente	11'793,280.00
Catacaos	4'216,060.00
Loma Negra	4'496,148.00
	<hr/>
Total	S/.59'589,606.00
	=====

The actual model worked exceptionally well in Piura, as it was able to carry out the smallest projects costing only a few hundred dollars, as well as, serve the needs of the larger ones costing closer to \$8,000. In Piura there still remains a large number of villages without water and a project is now being developed based on the above model to be carried out in other parts of Bajo Piura and Alto Piura. The project ceiling for each village will be increased from \$10,000 to \$15,000, although only a few of the villages will require this amount of money to carry out repairs. The average cost of repairs to the new areas will be between \$5 - \$8,000 and will be carried out in 20 to 30 villages. Another project is also being developed to carry out repairs in villages costing more than \$15,000, however, these will be presented to INADE and AID with project designs and budgets for each village.

Most of the sites which will participate in the project are areas covered by the Regional Ministry of Health Office, however, they lack personnel and financial support to carry out a large scale repair program throughout the Department. Although, addition rehabilitation of water

systems in rural villages will be coordinated with this institution.

A detailed breakdown of the costs, areas repaired, people employed and other project data for each of the villages which have just participated in the Water Rehabilitation Project in Piura follows below. The description of the Water Rehabilitation Project in Tumbes follows afterward.

1. La Arena

I. Materials: (200 linear meters)

- 55 meters of PVC Ø6"
- 130 meters of PVC Ø4"
- 15 meters of PVC Ø3"

II. Laborers employed:

- 13 persons

III. Project Disbursements:

- Materials	S/.4'994,770
- Personnel	1,062,000
- Equip. & POL	286,600
	<hr/>
	S/.6'343,370

IV. Project Duration:

- 15 days

V. Area Rehabilitated:

- Calle La Libertad
- Calle Cuzco
- Sector Chiclayito

2. Vice/Chalaco

I. Materials: (528 linear meters)

- 528 meters of Eternit Ø4"
- accessories: 3 tees Ø4"  
2 crosses Ø4"
- construction materials for pumphouse

II. Laborers employed:

- 28 persons

III. Project Disbursements:

- Materials	S/.9'121,610
- Personnel	4'027,720
- Equip. & POL	<u>500,000</u>
	S/.13'649,330

IV. Project Duration:

- 52 days

V. Area Rehabilitated:

- Calle San Jacinto
- Calle Piura
- Calle Bolognesi

3. Chato Chico

I. Materials: (265 linear meters)

- 265 meters of PVC Ø3"
- accessories: 8 unions Ø3"

II. Laborers employed:

- 11 persons

III. Project Disbursements:

- Materials	S/.1'477,030
- Personnel	719,800
- Equip. & POL	<u>60,000</u>
	S/.2'256,830

IV. Project Duration:

- 11 days

V. Area Rehabilitated:

- Calle Atahualpa
- Calle Señor Cautivo
- Calle "28 de Julio"
- Calle San Francisco

4. Chato Grande

I. Materials (510 linear meters)

- 510 meters of PVC Ø3"
- accessories: 10 unions Ø3"

II. Laborers employed:

- 12 persons

III. Project Disbursements:

- Materials	S/.2,797,760
- Personnel	958,160
- Equip. & POL	<u>60,000</u>
	S/.3'815,920

IV. Project Duration:

- 11 days

V. Area Rehabilitated:

- Av. Sanchez Cerro
- Av. Alfonso Ugarte
- Av. La Cruz
- Calle San Sebastian

5. Cura Mori

I. Materials: (410 linear meters)

- 10 meters of PVC Ø3"
- 400 meters of PVC Ø2"

II. Laborers employed:

- 17 persons

III. Project Disbursements:

- Materials	S/.4'286,620
- Personnel	2,864,116
- Equip. & POL	<u>300,000</u>
	S/.7'450,736

IV. Project Duration:

- 30 days

V. Area Rehabilitated:

- Av. Grau
- Jirón "2 de Mayo"
- Jirón Gulman
- Jirón Sullana
- Jirón Moquegua
- Jirón Ica
- Jirón Piura

6. Rinconada/Llicuar

I. Materials: (40 linear meters)

- 40 meters of PVC Ø3"
- accessories: 2 gate valves Ø4"  
2 gate valves Ø3"

II. Laborers employed:

- 6 persons

III. Project Disbursements:

- Materials	S/.821,940
- Personnel	566,400
- Equip. & POL	<u>    .-</u>
	S/.1'388,340

IV. Project Duration:

- 10 days

V. Area Rehabilitated:

- Principal distribution line along Avda. Perú

7. Río Viejo

I. Materials: (50 linear meters)

- 50 meters PVC Ø4"

II. Laborers employed:

- 3 persons

III. Project Disbursements:

- Materials	S/.492,700
- Personnel	159,300
- Equip. & POL	<u>    30,000</u>
	S/.682,000

IV. Project Duration:

- 9 days

V. Area Rehabilitated:

- Principal distribution line

8. Vichayal

I. Materials: (130 linear meters)

- 110 meters of PVC Ø4"
- 20 meters of PVC Ø1/2"
- Radiator core

II. Laborers employed:

- 5 persons

III. Project Disbursements:

- Materials	S/.3'048,992
- Personnel	318,600
- Equip. & POL	<u>30,000</u>
	S/.3'397,592

IV. Project Duration:

- 9 days

V. Area Rehabilitated:

- Calle Principal
- Calle Almendros
- Connection to 1° Education Center

9. San Clemente

I. Materials: (1,180 linear meters)

- 710 meters of PVC Ø4"
- 470 meters of PVC Ø2"

II. Laborers employed:

- 21 persons

III. Project Disbursements:

- Materials	S/.8'794,060
- Personnel	2'249,220
- Equip. & POL	<u>750,000</u>
	S/.11'793,280

IV. Project Duration:

- 16 days

V. Area Rehabilitated:

- Calle "28 de Julio"
- Calle Maravilla
- Calle "2 de Mayo"
- Calle Ayacucho
- Calle Tacna
- Calle Piura
- Calle San Blass
- Calle San José
- Calle Tarata
- Calle Grau

10. Catacaos

I. Materials: (233 linear meters)

- 4 meters of Eternit Ø6"
- 64 meters of Eternit Ø4"
- 165 meters of PVC Ø3"

II. Laborers employed:

- 12 persons

III. Project Disbursements:

- Materials	S/.1'798,792
- Personnel	2'337,468
- Equip. & POL	<u>79,800</u>
	S/.4,216,060

IV. Project Duration:

- 23 days

V. Area Rehabilitated:

- Avda. Real
- Avda. Comercio
- Avda. Tambogrande
- Avda. Independencia

11. Loma Negra

I. Materials: (379 linear meters)

- 24 meters of Eternit Ø4"
- 30 meters of PVC Ø4"
- 55 meters of PVC Ø3"
- 250 meters of PVC Ø2"
- 15 meters of PVC Ø3/4"
- 5 meters of PVC Ø1/2"
- accessories: 1 elbow Ø3/4"
- 1 reduction 3/4" to 1/2"
- 1 pipe tap with valve 3" to 3/4"
- 1 6" nipple Ø3/4"

II. Laborers employed:

- 13 persons

III. Project Disbursements:

- Materials	S/.2'023,426
- Personnel	1'950,272
- Equip. & POL	<u>622,450</u>
	S/.4'596,148

IV. Project Duration:

- 28 days

V. Area Rehabilitated:

- Principal distribution line

In the Department of Tumbes, the damage to the water systems and the project developed were much different than those carried out in Piura. In only one of the villages, Garbanzal, did the project deal with the rehabilitation of a distribution network. In the villages of San Jacinto, Pampas de Hospital, and La Palma the river flooded pumping stations located on the shore and caused severe damage to the equipment inside. Much of this equipment had to be replaced in order for the villages to have water again. In the last area, Cristales, Malval and Realengal, a different problem arose. The water to Malval and Realengal was supplied from Tumbes via Corrales. However the old bridge crossing the river Tumbes, which supported the main supply line for the two villages via Corrales, collapsed cutting them off from water indefinitely. The solution was to run a line from the neighboring town, San Jacinto, to Malval and Realengal via Cristales, which formed a permanent solution to their problem.

In respect to the supervision and coordination of the projects, CORTUMBES did not have the capacity to carry out these projects, nor did they attempt to remedy the situation. After working three months with them, it is quite obvious that they are unprepared to deal with the rehabilitation phase of work, and require some outside direction if they are going to accomplish anything during the next few years. The AID representative had to carry out the execution of the above projects, with CORTUMBES only putting their visto bueno on purchase orders. Until they are able to get their act together, it would be very hard to see them oversee any additional projects.

Below is a detailed description of each of the projects that were undertaken in the above villages.

Garbanzal (pop. 1,000)

Garbanzal is located approximately 8 kilometers east of Tumbes on the northern shore of the Río Tumbes. The source of water for this village comes from the neighboring town of San Juan de la Virgen and arrives by gravity to a storage tank in Garbanzal. The water is re-pumped to an elevated tank nearby, which supplies the community's distribution system.

The heavy rains caused severe erosion throughout the village, not only taking tons of soil with it, but large sections of the distribution system. The objective of this project was to identify the damaged lines and repair the system as before. Over 650 meters of PVC and Eternit pipe was repaired and in some areas lines were relocated along better routes to mitigate future damages of a similar nature. The pipe was installed by the community, and priority to paid laborers went to those who had suffered the most damage to their personal property and livelihood and were still without work. Installation of the pipe was completed in 9 days after the arrival of the materials.

Futile attempts were made by the local Ministry of Health Office to repair the motor and pump at the re-pumping station. This equipment will be replaced by the Health Office using their own reconstruction funds.

Project Costs:

Materials:	S/.7'138,694.
Installation:	<u>876,497.</u>
Total	S/.8'015,191.

Project Specifications:

Materials:

300 meters of Ø3" PVC Pipe  
80 meters MZ C105 Ø3" Eternite (Asbestos-  
Cement) Pipe  
6 meters of galvanized pipe Ø3"  
260 meters of Ø2" PVC Pipe  
Accessories

Installation:

15 workers at S/.4,400/day  
1 foreman at S/.6,500/day

Timetable: 9 days installing pipe following  
delivery to village of materials

La Palma (Pop. 1,100)

La Palma is located along the Río Zarumilla on the border with Ecuador. Water is supplied from a tubular well located a few meters from the river's edge and is pumped to an elevated tank in the center of the village. During the floods the river engulfed the pumphouse damaging the motor, pump and filled the well with sand and other debris. The distribution system was also damaged in many areas.

The community repaired the distribution lines with their own funds and labor, but reached a financial stumbling block when it came to resolving the problem of equipment repairs. Under the rehabilitation project, the pump was removed and underwent major repairs, the well was cleaned using a high power compressor, and a new motor was purchased and installed to replace the severely damaged unit.

This project was supervised during its final stages by an Engineer from CORTUMBES. Although this village is under the auspices of the Ministry of Health in respect to the water system, we were unable to get very much cooperation from their local office.

Project Costs:

Repairing & Installing Equipment:	S/.1'304,000
Purchase of Motor:	7'000,000
Cleaning of Well:	<u>2'100,000</u>
	S/.10'404,000

Project Specifications:

Materials:

1 22 Hp Diesel Engine "Ruston" (Made in India)

Installation:

The well was cleaned by AFATER and the pump repaired and installed with the new engine by a contracted mechanic.

Cristales, Malval & Realengal (Pop. 3,100)

The above three villages are located along the southern edge of the Río Tumbes between the towns of Corrales and San Jacinto. Prior to the floods, the villages of Malval and Realengal were supplied with water from Tumbes via Corrales; and Cristales was supplied with water from San Jacinto.

The Río Tumbes washed away most of the old bridge which supported an 8 inch supply line running to Corrales and other coastal towns further south. A provisonal well outside of Corrales was tapped to supply water to the coastal communities, however the supply was insufficient to service Malval and Realengal. Also, the water was found to be a very poor quality. Plans to re-establish the supply line from Tumbes to Corrales are still pending and may not be initiated for another 6 months.

The objective of this project was to rehabilitate the water supply to the above three villages by repairing the minor line breaks between San Jacinto and Cristales, and to install a 1,200 meter supply line from

Cristales to Malval, which would provide water from the well in San Jacinto to the villages of Malval and Realengal via Cristales. San Jacinto has an adequate water supply for these additional localities. The execution of this project has resulted in a permanent solution to the water problems in the above communities. Distribution lines in these villages were not damaged and required no maintenance.

The installation of the Ø4" supply line was carried out by SENAPA (the local water authority). Although these villages fall under the auspices of the local Ministry of Health Office in respect to rural water systems; for the sake of efficiency, proper supervision and cooperation, which could not be obtained from the local Health Office, SENAPA agreed to take on this project.

Project Costs:

Materials:	S/.11'569,958.
Installation:	<u>7'440,000.</u>
Total	S/.19'009,958.

Project Specifications:

Materials:

1,200 meters MZ C105 Ø4" Eternit (Asbestos-Cement) Pipe  
Accessories - 2 4" gate valves

Installation:

Under the supervision of SENAPA

Timetable: 15 days after purchase of pipes

Pampas de Hospital & San Jacinto (Pop. 4,000)

Both the water systems in Pampas de Hospital and San Jacinto suffered similar damages to their pumping equipment. Both of these villages are located along the Rio Tumbes, which overflowed its borders and entered into

the pumphouses located along the river in both villages. The pumping equipment was damaged beyond reasonable repair and required replacement. Although both communities had motobombas prior to the floods, it was decided to replace these units with Electrobombas, which were less expensive and more efficient in operation. AID agreed to install this new equipment and accessories, if CORTUMBES and ElectroPerú would carry out the installation of the powerlines from the village center to the pumping station.

The same type of equipment was purchased for both villages and installed by the distributors from whom the equipment was purchased. SENAPA oversaw the installation of this equipment to ensure that it met with their specifications.

There was very little damage to the distribution system, which was repaired by the community with assistance from SENAPA.

Project Costs:

Equipment:	S/.13'305,040.00
Installation:	<u>8'684,346.00</u>
Total	S/.32,989,386.00

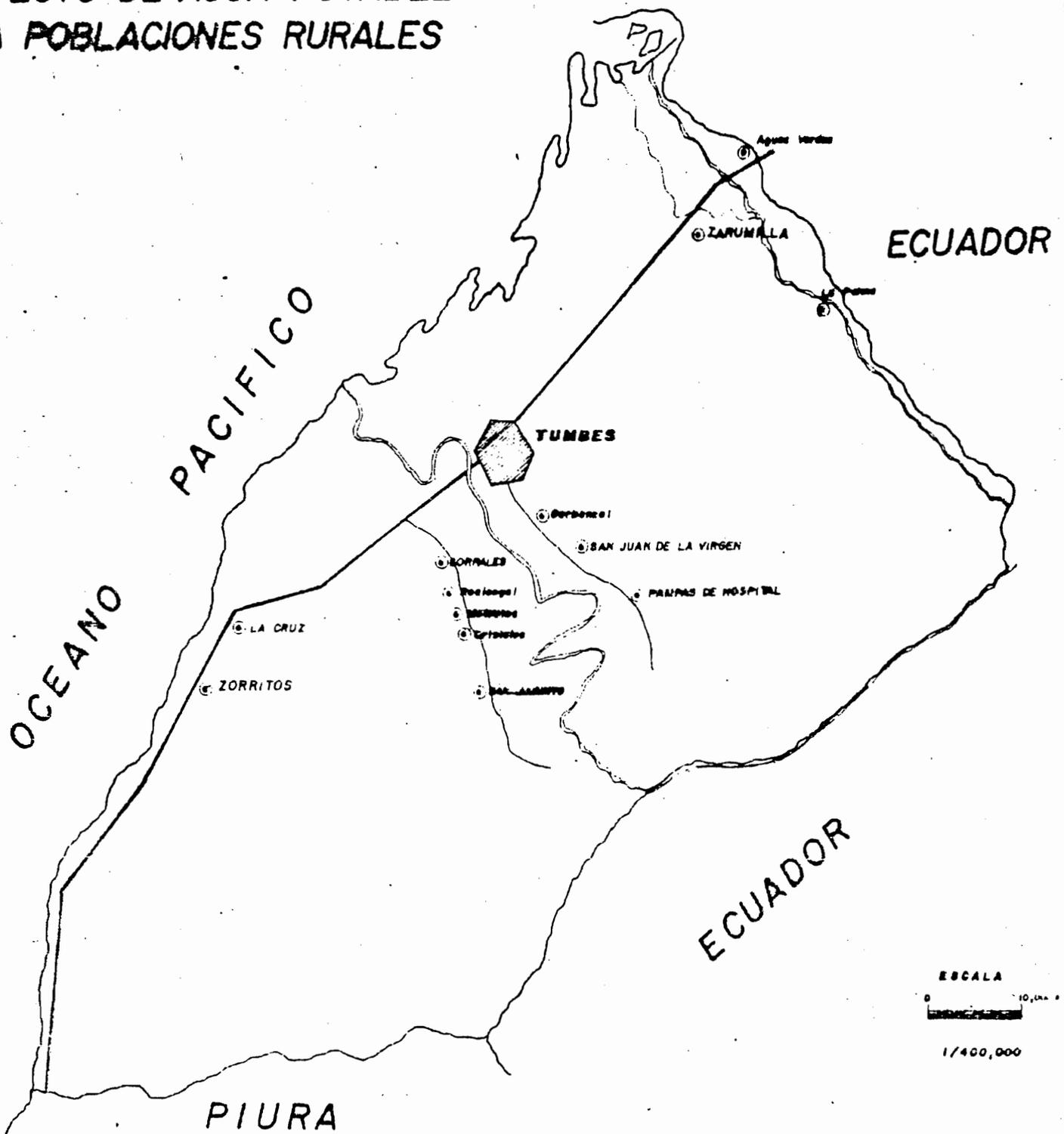
Project Specifications:

Motor and Pump assembly, 18 HP Hidrostal  
Switching Panel for equip equipmtne

Accessories: 2 foot valves  
2 slow closing check valves  
2 gate valves  
- 4" Galvanized Pipe and various fitting

Timetable: 30 days

# PROYECTO DE AGUA POTABLE PARA POBLACIONES RURALES



## AYABACA ROAD RE-OPENING PROJECT

This road is located in the mountainous Province of Ayabaca in the northeastern corner of Piura. Like many other roads in the Sierra, this principal highway leading to the Provincial Capital also suffered severe damage from the heavy rains. One of the more problematic areas was just past the town of Paimas (172 kilometers from Piura) where approximately 8 kilometers of road was buried under a series of landslides. A provisional detour of 10 kilometers was built along the irrigation canal above the slide area, however, this detour became the primary bottleneck for traffic to Ayabaca. It was narrow, precariously situated and continuously became blocked by smaller slides or stuck vehicles.

The only practical remedy available was to carry out the removal of the landslides and rebuild the road for safe vehicular traffic. With the help of Engineers from the Development Corporation (CORPIURA) a visit to the sight was made and a damage assessment made. A project budget was put together, which involved the clearing of landslides between Paimas and Zamba; installing a proper drainage system, which would help prevent further erosion and possible slides, and construct a new roadbed.

The AID Mission felt that the project merited immediate emergency funding as it would help keep the road open to the residents (approximately 75,000 people) living beyond Paimas, as well as, allow them to bring down their agriculture produce, which they were able to salvage, to market. A convenio between AID and CORPIURA was signed on August 1 and a CORPIURA Engineer assigned to work on the project fulltime.

There was an initial delay of three weeks locating available bulldozers to work the Sierras. Three units arrived near the end of August

and were responsible for the bulk of the work, which entailed cutting through the slide. Unfortunately, equipment failure plagued the project until the end, and often times units had to be replaced so that work could continue. After 30 days of battling the slides and equipment breakdown, the road was re-opened. The remaining time was spent on widening the road, building the drainage system and surfacing the road with a layer of bedrock.

The actual clearing of the slide took much less time than originally anticipated and the project came in well under budget. A plan to expand the project to include the rehabilitation of an adjacent section of road was considered, however, it was never followed up by CORPIURA.

This project complimented other rehabilitation work that CORPIURA began a month after the initiation of the above project. The combined efforts of both projects have had a tremendous impact on keeping the road open, plus making less the time it takes to reach Ayabaca by a matter of hours.

In all, 3 bulldozers, one Front Loader, a Grader and two Dumptrucks worked on the project.

Also, a small work gang of 26 persons followed the machinery and were responsible for the installation of the drainage canals along the edge of the road.

The project was well supervised by the resident engineer, who had 4 controllers working with him to watch over the heavy equipment and keep time of the work gang. A foreman also was responsible for supervising the construction of the canals by the work crew.

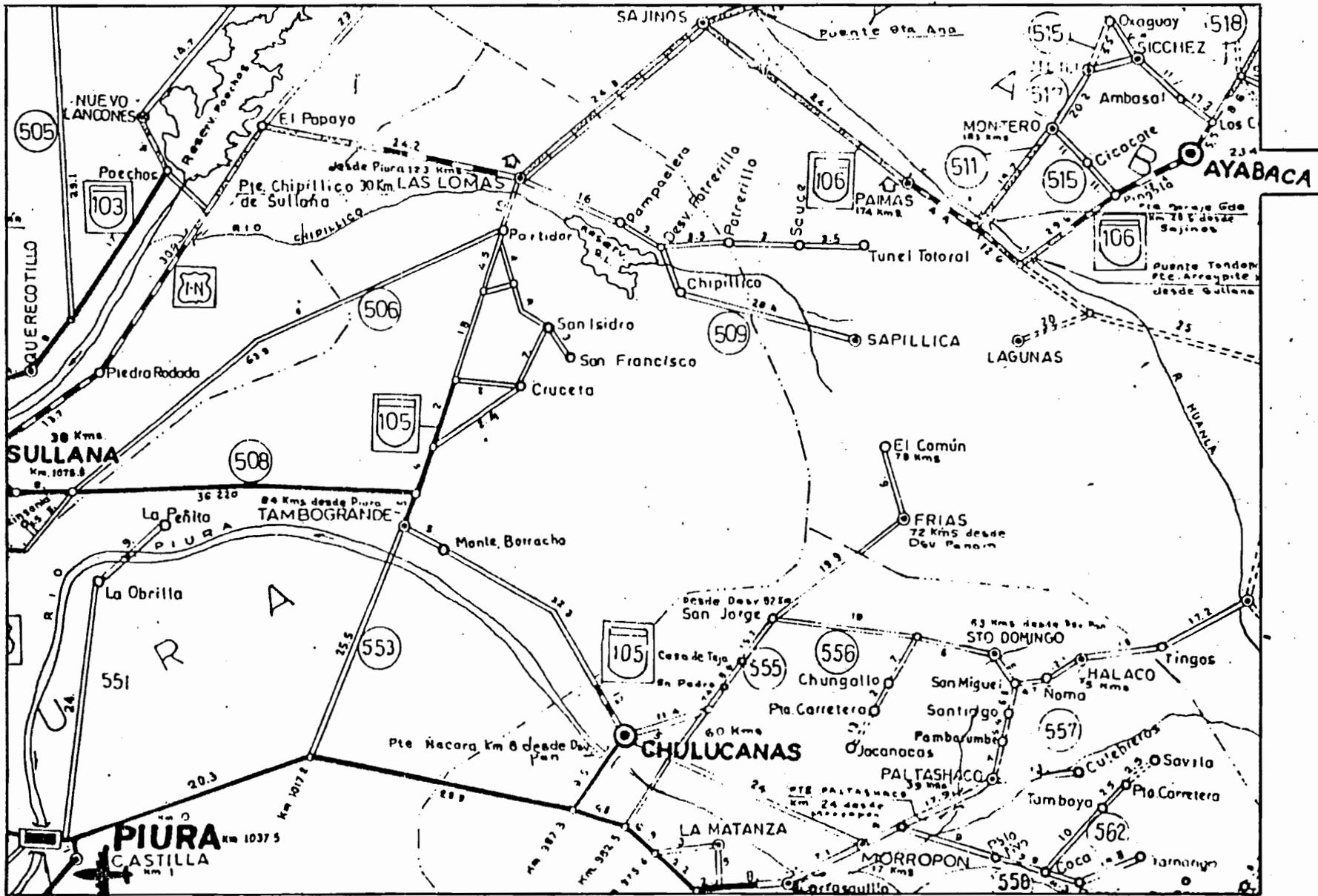
Below is a breakdown of the cost on this project:

Materials:	S/. 5'737,810.00
Equipment:	43'912,850.00
Personnel:	<u>8'767,858.00</u>
Total	S/.58'418,518.00

Timetable:

Project Signed:	August 1, 1983
Project Completed:	November 15, 1983
Project Duration:	107 days

Another project is now in the process of being designed to carry out more protective type work on this road, which will include the installation of culverts and bridges in areas of heavy erosion, and to widen the road to provide better access to the communities in the higher elevations. The project will be presented to INADE in early December for funding consideration.



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AYABACA ROAD RE-OPENING PROJECT

DEPARTMENT OF PIURA DEVELOPMENT CORPORATION (CORPIURA)

The Development Corporation in Piura (CORPIURA) has evolved from what once was the regional development office (ORDENORTE). This institution is quite large and occupies part of the old region development office, which also is the home for a number of other regional institutions such as the Ministry of Energy and Mines, the National Statistics Office, the National Planification Office, and others. They also have another office, one block away which houses the main Administration Unit of CORPIURA: Both are in the Urbanización Del Chipe.

CORPIURA has been charged with the responsibility of the reconstruction and rehabilitation of Piura, except in certain areas which fall under the Ministry of Transportation and SENAPA. The amount of damage suffered by this Department is probably the largest in Peru this year and the responsibility a large one. Under the leadership of Ing. Luis ("Lucho") Zegarra Caminatti, President, CORPIURA has been battling to keep up with the rehabilitation efforts, however, they have not received much support from the Press and are constantly being bombarded by investigating commissions from Lima, who tie up the CORDES personnel and make it difficult at times to get on with the real rehabilitation work. Ing. Zegarra is a very energetic and dynamic individual, and has some very good people working with him. However, as a Government Institution he is losing some of his best Engineers to private contractors who can pay much more than the Government. He is trying to find ways around this dilemma in order to keep his staff.

Below is a list of CORPIURA's key personnel and office titles:

Presidente - Ing. Luis Zegarra Caminatti  
Gerencia de Administración - Alberto Kamahara Takamura  
Sub-Gerente de Contabilidad - Alfonso Gonzales Morante  
Sub-Gerente de Personal - Jose Lombardi Pingo  
Sub-Gerente de Financiera - Jaime Solando Montoya  
Sub-Gerente de Abastecimiento y Serv. Aux. - Oscar  
Lau Leon  
División de Comunicación y RR.PP. - Marcos Peijra Serina  
Gerencia de Legales - Dr. Luis Arunategue de Lellis  
Gerencia de Planeamiento - Hugo Guarnizo  
Gerencia de Infraestructura - Tomas Talledo  
Gerencia de Estudios y As. Tec. - Rafael Garcia de Lellis  
Gerencia de Rehabilitación - Víctor Boyer Oyola  
Sub-Gerente de Supervisión - Luis Morales Córdoba  
Sub-Gerente de Estudios - Arq. Jorge Gonzales Bustamante  
Sub-Gerente de Administración - Antonio Orellana Montenegro  
Ing. Nancy Ortiz Oyola                      Ing. Jorge Colmenares Zapata  
Ing. Juan Villalba Moscoso                  Ing. Carlos Becerra Boggio  
Ing. Luis Arismendiz Morales              Ing. Francisco Morocho Calle  
Ing. Oscar Colmenares Zapata              Ing. Federico Sanchez Vargas

AID's Emergency Relief Projects carried-out with CORPIURA were very successful and had excellent supervision from the Rehabilitation Office under the direction of Ing. Victor Boyer. Engineers were assigned to each of the projects and responsible for its proper execution. Accounting and controls in the field were well maintained throughout the duration of the work.

The only difficulty AID had with their projects was with CORPIURA's Financial Office, where AID's disbursing paperwork often got mixed in with the rest of CORPIURA's routine transaction, which created delays in processing. Although all funds were properly accounted for, the Financial Office was not prepared to take on this added work load from the AID Projects. Because of the increased number of project to be carried out in 1984 and 1985, a separate accounting unit will be established to expedite all of

AID's financial transactions.

Collaboration on the AID projects between CORPIURA and AID has been excellent this past year, and should continue through the next few. They still need a little guidance with the submission of new projects and practice using AID's voucher system, but they are ready to cooperate 100% with future projects and support personnel.

DEPARTMENT OF TUMBES DEVELOPMENT CORPORATION (CORTUMBES)

The Development Corporation in Tumbes (CORTUMBES) is fairly young, formed in September 1982, it had only a few months to organize itself before the heavy rains hit that Department. Prior to September, Tumbes was covered out of a Regional Office in Piura.

They have their own office building located on the northern edge of the Capital on the Carretera Panamericana Norte. Below is a list of their key personnel and office titled:

Directorio - (5 members)

Ing. Jorge Espinoza G. - Ing. Fernando Herrera Avalos  
Sr. José Quinta Delgado - Sr. Numa Cabrera Garcia  
Sr. Hernán Olaya Dioses

Presidente - Ing. Jorge Espinoza Granda  
Gerente General - unoccupied  
Oficina de Asesoría Legal - Dr. Alfonso Vidal Diaz  
Dirección General de Planificación - Prof. Víctor Hugo Rodriguez M.  
Dirección General de Administración - CPC Gregorio Cobeñas Iman  
Gerencia de Estudios - Ing. Eduardo Torres Vargas  
Gerencia de Ingeniería - Ing. Fidel Garcia Moreno  
Gerencia de Rehabilitación - Arq. Felipe Sattler Zanatti  
Promotora Social - Socorro Zavaleta de Revilla  
Asistente Técnico - Ing. Jesús Adriaola Razuri

Management - Ing. Jorge Espinoza is a very energetic individual and is interested in proceeding as rapidly as possible with future rehabilitation projects. However, he is currently handcuffed with a staff of Engineers, which lack his enthusiasm and are very reluctant to take charge of projects. The Rehabilitation Office is only a few months old, however, it is led by an individual who spends only 50% of his time in Tumbes. The remaining time at his regular job with ENACI in Lima.

There is very little continuity with respect to the management of rehabilitation projects. The AID Emergency Relief Projects received

absolutely no attention from CORTUMBES except for an interest in the amount of funds which were to pass through the CORDES. CORTUMBES assigned no one to supervise the projects nor initiate the work. Only with the assistance from SENAPA, on an informal basis, were the projects executed at all.

If AID is to continue working with CORTUMBES, a permanent coordinating staff will have to be set up in the Rehabilitation Office with competent personnel who have a desire to see the programs succeed. Working with a part-time Gerente de Rehabilitación, who has more interest in his pet housing projects than anything else, will not work, and hasn't worked in the past. AID is going to have to make stronger demands on the CORDES, or channel their funds through other local institutions. Up to now, only SENAPA has responded favorably to AID's assistance and have assisted in putting together four new projects to be carried out in 1984. CORTUMBES was not interested in the presentation of these new projects, except to sign off on them and ask when the money was going to arrive. There is a lot of work that could be carried out in this Department, but some drastic measures are going to have to be taken with CORTUMBES or AID will receive the same apathetic interest they have received to date.

CONTACT LIST FOR THE DEPARTMENT OF PIURA

CORPIURA:

Ing. Luis ('Lucho') ZEGARRA Caminatti 32-5301, 32-3121  
Presidente (home - 32-3041)

Ing. Victor BOYER Oyola 32-2601, 32-8232  
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Ministry of Health:

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Director de I Region de Salud

Ing. Luis A. QUISPE Castañeda 32-3561  
Director de Ingenieria Sanitaria (home - 32-5964)

SENAPA:

Ing. Hugo VELEZ Quiroz 32-8902  
Jefe Regional de SENAPA

Ing. Juan PERALTA Gutierrez 32-3083  
Jefe de Equipos HidroJets (AID)

Prefectura:

Don Julio CONEJO Burgos 32-5751  
Prefecto de Piura 32-4981

Municipalidad de Piura:

Don Luis PAREDES Maceda 32-9205  
Alcalde (assumes office 1/84)

Cooperación Popular:

Ing Luis NAVARETE Gil 32-8918  
Director Departamental de Piura

Ministry of Energy and Mines:

Ing. Wilfredo CASTILLO Castro 32-2523, 32-8501  
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Prelatura de Piura:

Monseñor Oscar CANTUARIAS Pastor 32-7561  
Obispo de Piura

Proyecto Chira-Piura:

Ing. Jaime BURNEO Seminario 32-1651, 32-1261  
Director General

Ministry of Agriculture:

Ing. Victor PIEDRA Magliola 32-6512, 32-4392  
Director

Ministry of Transportation:

Ing. Manuel CACHAY Mayano 32-4141  
Director Regional de M.T.C.

U.S. Consulate:

Ing. Walter CARLSON 32-1842  
Hon. Consul

Red Cross:

Sra. Lily Cucliza de SCHAEFFER 32-5420  
Presidente (home - 32-3914)

CARE:

Sr. Henry ALDERFER (Municipalidad)  
CARE Coordinator 8<sup>a</sup> piso

Comite de Damas:

Sra. Chela de ZEGARRA home - 32-3041  
Sra. Mela de VASSE  
Colegio de Lourdes

Military:

General Romulo ZAPATA, FAP 32-4021  
Coronel Armando LLOSA Alvarez, FAP 32-9145  
Jefe, Estado Mayor del Ala 8

Comandante César PASARA, Naval 32-3121

Dr. Luis ('Lucho') SUAREZ - Def. Civil 32-1945

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Plaza de Armas

Hotel de Sol 32-4461

Ministry of Education:

Prof. Wilfredo RODRIGUEZ Razuri 32-6512, 32-4392

Department of Piura

Catholic Church:

Piura:

Augustinian Fathers

Padre BERNARDINO (Ital.)	32-3021
Senorita Carmela (Ital.)	Piura Radio 'Net'
Hogar San Antonio	

Jesuit Fathers

Padre Vicente SANTUC	32-8634
Padre Paco MUGUIRO (Health Coord.)	32-7330
Sr. Hernan CARRASCO (Emerg. Coord.)	32-8976
CIPCA (Centro de Investigaciones y Promociones del Campesinado)	

Chulucanas:

Augustinian Fathers

Bishop John McNabb (Am.)	46
Padre Joseph LAWLOR (Irish)	Piura Radio 'Net'
Padre Art (Am., posted in Paicapampas)	
Padre Charles (Am. - posted in Chalaco)	
Padre Robert (Am. - posted in Paicapampa)	
Padre William (Am. - posted in Chalaco)	
Padre Richard Appicie	
Madre Juana (Phyllis)	
Prelatura de Chulucanas	
Casa de la Fraternidad	
Chulucanas (Apdo. #483, Piura)	
Bother Tony - Lima Contact of Augustinian Fathers	67-3006 (Lima) Piura Radio 'Net'

CONTACT LIST FOR THE DEPARTMENT OF TUMBES

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    Gerente de Rehabilitacion

Prefectura:

Don Hector LAMA de Lama 2826  
    Prefecto de Tumbes

Ministry of Health:

Dr. Gernaro LAINES 3788, 3789  
    Director de Area Hospitalaria de Tumbes 3790, 2222  
Sr. Ricardo Sanjinez Ricardi  
    Tecnico Sanimiento de Salud

SENAPA:

Ing. Jorge SAMANEZ Valer 3031  
    Jefe de Operaciones Planta - 2135  
    Administrador (a.i.)

Ministry of Agriculture:

Ing. Issac CANALES  
    Director de Region Agraria I

Instituto Nacional de Planificación:

Sr. Hernan HERRERA Aparcana 2643, 2644  
    Director General en Tumbes

Ministry of Transportation:

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