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CITANDUY I - AN ILLUSTRATION OF THE PITFALLS OF WATER AND IRRIGATION PROJECTS IN SOUTHEAST ASIA

AUDIT REPORT NO. 2-497-84-03
March 16, 1984

Southeast Asian water and irrigation development projects have been plagued by a recurring host country support problem -- failure to adequately maintain newly constructed or rehabilitated canals and water control structures. Donors often find themselves developing and implementing projects designed to rehabilitate already existing works which have been allowed to deteriorate through host country neglect. Citanduy I exemplifies such a project which will produce minimal long-term impact and calls into question the wisdom of investing limited AID resources in water projects requiring continuing host country support.

In 1976, AID approved a $12.5 million loan to the Government of Indonesia to construct flood control structures and irrigation canals in Central Java. The structures and canals have been built, but the Project's long-term impact will be negligible without a drastic change in the host government's operation and maintenance policies. In addition, hundreds of thousands of dollars of AID funds were spent to purchase equipment which was rarely or never used.

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GLOSSARY

FAR	Fixed Amount Reimbursement
GAO	U.S. General Accounting Office
GOI	Government of Indonesia
MPW	Ministry of Public Works
O&M	Operations and Maintenance
PROCIT	Ministry of Public Works Citanduy Basin Project Office
W.U.A.	Water Users Association

EXECUTIVE SUMMARY

INTRODUCTION

For the past seven years, AID has been working with the Government of Indonesia in an attempt to improve the living standard of subsistence farmers in Central Java's Citanduy Valley. This river basin, overwhelmingly agricultural, supports almost 3 million people on an area of about 443 thousand hectares (1.1 million acres). Land holdings average .5 hectares in size. This high density, coupled with periodic flooding and drought, has led to severe environmental pressures, land degradation, and a marginal existence for basin farmers.

In 1976, AID and the Government of Indonesia (GOI) signed a $12.5 million loan agreement to fund a project designed to help farmers in the flood and drought plagued lowlands. The Citanduy I Project has focused upon construction and rehabilitation of canals and flood control structures. Local contractors are hired to build or rehabilitate main, secondary and on-farm canals, repair or build levees along the Citanduy River and its tributaries and construct flapgates, drains, and other flood control structures. The Indonesian Ministry of Public Works manages the project through its Citanduy Basin Project Office while a consultant contractor, Engineering Consultants Incorporated, provides technical expertise.

Funding for the project's construction components is provided through Fixed Amount Reimbursement. Under this system as components are completed, AID reimburses the GOI for up to 40% of its construction costs as specified in 1976 engineering estimates. Through June 1983 AID had expended $4,474,000 for construction cost reimbursements. AID also spent about $2 million to finance the procurement of vehicles and machinery to be used both to perform construction work, and to aid in maintenance operations after construction was completed.

The original July 1981 target completion date was extended through December 1984 as the project encountered initial construction delays.

OBJECTIVES, SCOPE AND METHODOLOGY

The GOI places a high priority upon its work in the Citanduy Basin. In fact, the GOI has emphasized that successful project elements will be replicated across Indonesia. We, therefore, focused our audit upon efficiency, economy, program results and prospects for long-term success and replicability of the project.

Our audit covered the period 1976 through June 1983. Our methodology included:

-- interviews with Mission, contractor and GOI personnel as well as participating farmers,

— review and analysis of Mission, consultant and GOI financial records, planning and implementation documents, and

— extensive on-site inspections of both flood control and canal construction.

We performed our examination in accordance with the Comptroller General's "Standards for Audit of Governmental Organizations, Programs, Activities, and Functions", giving due regard to applicable AID regulations.

LACK OF ADEQUATE O&M, AN ENDEMIC, LONG-STANDING PROBLEM WITH INDONESIAN IRRIGATION PROJECTS

Inadequate maintenance is a common problem in Indonesia. Recent AID audits have found that the Indonesian government is underfunding the maintenance components of USAID/Indonesia irrigation projects. U.S. General Accounting Office auditors reported in 1983 that the GOI was inadequately maintaining irrigation canals constructed with AID funds. Without proper maintenance, structures degrade rapidly and long-term impact is lowered. This policy of neglect is long-standing, apparently stemming from the Indonesian propensity to view rehabilitation as delayed maintenance; why spend scarce budget funds to maintain irrigation works when a future donor will rehabilitate them with loan or grant funds? USAID/Indonesia has been searching for solutions to this problem but has not yet been able to shift the GOI's attitude toward maintaining irrigation works. The Citanduy I Project typifies this problem as discussed througout this report.

The Citanduy I Project has succeeded in constructing and rehabilitating canals and flood control structures which could be instrumental in upgrading the quality of life for Basin lowland farmers. However, the project has not achieved its primary objective of providing those farmers with long-term flood protection and a stable water supply. Moreover, the project will never achieve its primary objective without an effective maintenance component.

Without a shift in GOI policy toward allocation of adequate resources to maintain the newly built and rehabilitated canals and structures, those works will rapidly deteriorate necessitating future rehabilitation projects. Consequently, we believe the USAID should re-evaluate its rural development sector strategy and consider the practicality of continued involvement, funding and support of irrigation projects requiring a long-term GOI commitment to operations and maintenance. (See p. 4.)

CITANDUY I PROJECT EXPERIENCING MAJOR DIFFICULTIES

Project Construction Is Virtually Completed But Long-Term Impact Is Jeopardized By Failure To Provide Adequate Maintenance

The project is now three years behind its original construction schedule, due in large part to GOI problems in allocating resources and adjusting

contracting procedures during the project's early years. These problems have now been corrected and most, though not all, anticipated construction will be finished by the December 1984 project termination date. Though construction has proven successful, the GOI's failure to provide adequate resources to maintain new and rehabilitated structures and canals threatens to severely reduce the project's long-term impact on area farmers.

We inspected five separate levee sections along the Citanduy and its tributaries, five major flood control structures (flapgates, drains, and a primary desilting plant) and two on-farm canal systems. FAR payments for this construction totalled about $1.2 million. We found:

- levees cracking and overgrown with vegetation,
- flood control structures exhibiting varying degrees of blockage from industrial effluent and vegetative debris, and
- on-farm canal systems deteriorating for lack of farmer maintenance. (See p. 9.)

These conditions result from the GOI's failure to provide adequate funding or implement workable procedures to keep canals and structures properly maintained.

Although the Indonesian central government oversees project construction, local government agencies are to operate and maintain the canals and structures after completion. Those local agencies are funded both through local taxes and central government budget allotments. Over the last four years, the government has provided only about one half the amount of money for canal maintenance requested by local agencies. Project consultants consider the requests themselves to be far too small and believe local agencies are receiving slightly more than one-third the amount necessary to keep canals in good repair. (See p. 13.)

While the budget for canal maintenance has been inadequate, the budget for maintenance of flood control structures has been non-existent. The central government has not budgeted for such maintenance. The GOI project office, a temporary organization, has been forced to draw funds from other line items in its budget to effect emergency repairs. The GOI project office cannot rationally plan for operations and maintenance or forecast maintenance funding requirements. As a result, no preventive maintenance program has been established for flood control structures. (See p. 14.)

The project has yet to implement procedures to:

- train local government personnel in maintenance procedures, and

-- establish standard maintenance schedules.

As a result, even with increased funding, we believe local government agencies will be unable to adequately maintain project works after project termination. (See p. 15.)

On-Farm Irrigation Systems Are Jeopardized By Inability To Establish Effective Farmer Organizations

Although the GOI constructs the on-farm irrigation systems in the project area, local farmers are to operate and maintain those systems through their Water User Associations. Development of these organizations is the single most important element in successful farm-level project implementation. While 224 organizations existed in the area in 1982, only 9 were active. Project officials acknowledged that the GOI's inability to establish viable farmer organizations seriously threatens the usefulness and life-span of the on-farm canal systems. During our site inspections we found debris, silt and weed blockage in canals and water diversion structures and reluctance on the farmers' part to fully participate in the organizations. (See p. 16.)

Where farmer organizations are not effective, irrigation systems can be vandalized, water wasted or stolen, routine maintenance ignored, and farmers discouraged from cooperating in future development projects. We believe the root cause of the problem lies in the project's inability to foster a sense of farmer ownership over, and thus responsibility for, the on-farm irrigation systems.

At Least $609,000 Of AID Supplied Equipment Is Unused

Through June 1983, AID had expended almost $2,000,000 for the purchase of vehicles and equipment for the project. This equipment, consisting primarily of earth-moving machinery, was to be used for both construction of the canals and flood control structures and maintenance after construction. We inspected the equipment and found virtually all was idle, with machinery valued at over $600,000 having never been used. We attributed this to:

-- inapplicable equipment, either too large, too small, or otherwise inappropriate for the type of construction undertaken by the project, which in turn resulted from poor procurement decisions,

-- failure of the project maintenance shop to reach the repair capability levels envisioned by project planners, a result, in part, of low levels of GOI funding, and

-- inflexible and inadequate procedures, which discourage contractors from utilizing project equipment and do not provide for proper servicing and maintenance of equipment.

In summary, with the project approaching termination, AID has loaned hundreds of thousands of dollars for equipment which has rarely or never been used. (See p. 20.)

Mission Oversight Of Construction Cost Reimbursements Is Compromised By Lack Of Standard Inspection Procedures

USAID/Indonesia has no written procedures for inspecting construction subprojects or reporting the results of USAID engineering inspections to Mission project officers. Consequently, the Mission is certifying subprojects as completed and eligible for fixed amount reimbursement of GOI construction costs without documentation evidencing adequate management oversight. We believe this constitutes a "material weakness" in the Mission's internal control system, as defined in AID Handbook 19.

Under the Fixed Amount Reimbursement strategy used to fund project construction, AID reimburses the GOI for up to 40% of the construction cost estimates upon completion of individual subprojects. USAID/Indonesia engineers are not required to submit written reports on subproject status to the Mission Project Officer before the Mission approves reimbursement. Though we found no instance of erroneous reimbursements during our audit, procedures requiring that written engineering evaluations be submitted to the Mission prior to reimbursement would both diminish the possibility of reimbursement for unqualified construction, thus strengthening internal controls and reducing an area of vulnerability, and help present and future project managers to discharge their oversight functions. (See p. 27.)

PROJECT FUNDS SHOULD BE DEOBLIGATED OR REPROGRAMMED FOR MAINTENANCE

The project's reimbursable construction costs were based upon 1976/7 engineering estimates. Because of periodic devaluations of the rupiah, the Indonesian currency's value vis-a-vis the dollar has fallen by over 50% since project inception. As the project progressed, a given number of rupiah could be purchased for an ever declining number of dollars. Therefore, over $1,000,000 in surplus loan funds remain uncommitted. Since the project plans no further major committments, these funds should be deobligated or reprogrammed to improve the project's maintenance component. (See p. 29.)

CONCLUSION AND RECOMMENDATIONS

Although the Citanduy I project has experienced extended implementation delays, most, though not all, of the planned flood control and canal construction has been or will be completed by the project's 1984 close-out date. However, the Project's long-term success is extremely doubtful due to:

-- failure by project planners to fully address long-term maintenance needs, compounded by GOI failure to provide funds and procedures to adequately operate and maintain the newly constructed or rehabilitated flood control structures and canals, and

-- inability of the Project Office to utilize equipment purchased for the project.

We also found that Mission oversight procedures were inadequate to assure that AID payments were properly disbursed under the FAR mechanism. A valid vulnerability assessment would show this an area of internal control weakness that should be addressed in view of OMB and statutory requirements.

We traced the funding and utilization problems to faulty or incomplete design and the consistent failure of the GOI to provide adequate funding to operate and maintain its irrigation projects. Therefore, the project, as presently structured, cannot achieve its primary goal of providing lowland farmers with long-term relief from periodic floods and droughts.

Of greater import, we believe that the inadequate maintenance plaguing the Citanduy I project as illustrated throughout this report is a problem endemic to AID Indonesian irrigation and water projects. Indeed, it is a characteristic of such projects throughout Asia. It is in the best interests of USAID/Indonesia and the GOI in this important development sector to make the difficult decision of either exploring new ways of attacking this problem or directing future development efforts into areas promising a greater long-term impact.

We believe that USAID/Indonesia should consider re-evaluating its rural strategy and also take a more active role in developing solutions for the project's problems. Accordingly we recommend that USAID/Indonesia:

-- re-evaluate its rural irrigation strategy (See p. 7),

-- work with the GOI to rationalize the present O&M funding situation and establish procedures to provide for adequate O&M after the project ends (See p. 16),

-- seek alternative solutions to the problems of on-farm O&M (See p. 20),

-- relocate project equipment to acceptable sites, or seek to recoup the cost of un-and underutilized equipment, if such sites are unavailable (See p. 27),

-- improve oversight procedures under the FAR funding mechanism (See p. 28), and

-- deobligate approximately $1,000,000 in excess funds, if those funds cannot be used to upgrade the project's O&M capabilities (See p. 29).

MANAGEMENT COMMENTS

USAID/Indonesia agreed with our report's basic arguments and conclusions, but took exception to several recommendations, as noted in the report.

BACKGROUND

The Citanduy River Basin is located on the southern coast of the island of Java, about 300 kilometers southeast of Jakarta. Flowing southward into the Indian Ocean, the Citanduy, its tributaries and several smaller rivers in the immediate vicinity, drain about 446,000 hectares (1.1 million acres), much of it excellent farmland. Overwhelmingly agricultural, the Basin supports about 2.8 million people, resulting in an extremely high population density of over 630 people per square kilometer. This high density, coupled with periodic flooding and drought in the lower basin, has resulted in severe environmental pressures, land degradation, and a marginal existence for basin farmers. Subsistence farming predominates. The average land holding is less than .5 hectares and is often fragmented, with a farmer owning small plots in several locations. Even with such small average land holdings, over half the agriculture work force is composed of landless tenants, sharecroppers and laborers. In this regard, most farmers lack the capability or incentive to invest in agricultural development.

Topographically, the Basin can be divided into three parts with distinct but interrelated problems:

-- The upper watershed, 290,000 hectares of mountains and hills, has experienced accelerating erosion as population pressures force farmers to cultivate crops on the upper slopes.

-- The alluvial planes and valley bottom paddy areas, 124,000 hectares, are subject to both frequent flooding and droughts. Existing irrigation systems have deteriorated with inadequate operations and maintenance, a problem exacerbated by the heavy silt flow from the uplands.

-- The mangrove forests and lagoon (Segara Anakan), 32,000 hectares, are rapidly being destroyed by silt build-up.

AID has undertaken a phased approach in its efforts to help the Indonesian Government solve these problems. In 1976, the two parties signed Loan Agreement 497-H-039, providing $12.5 million to help alleviate the problems of the alluvial planes and valley bottom paddy areas. The resulting Citanduy I project consisted of:

-- construction of levees on the Citanduy and neighboring Ciseel Rivers and their tributaries,

-- rehabilitation of seven existing irrigation systems in the Basin,

-- construction of one new irrigation system,

-- rehabilitation and construction of primary and secondary drains,

-- design of the terminal portion of the eight irrigation systems to be rehabilitated or constructed and construction of the difficult structures of these terminal portions,

-- consulting engineering services for the supervision of construction, operations and maintenance of the flood control and irrigation systems,

-- equipment for construction and operations,

-- feasibility studies and designs for additional projects in the Citanduy Basin, and

-- in-country and overseas training.

Slightly more than 50 percent of the loan funds ($6.8 million) were to be disbursed through a Fixed Amount Reimbursement (FAR) arrangement. Under this plan, AID would reimburse the GOI for 33 percent (later raised to 40 percent) of the estimated costs of building or rehabilitating individual flood control structures (such as levees and flapgates), and sections of canal. Payments would be made only after the GOI certified that the structure or canal section had been completed. The remaining loan money would be used to fund equipment purchases, training, and a host country contract for consultant services. Through June 1983 AID had expended $4,474,000 for construction cost reimbursements and about $2,000,000 to procure construction machinery and vehicles. The GOI would, through its implementing agency, the Ministry of Public Works (MPW), contribute $12.874 million, primarily for construction costs. The October 1981 terminal disbursement date was extended through December 1984 as the project suffered construction delays.

The AID Area Auditor General East Asia audited the Citanduy I project in 1979. The resulting report (Number 2-497-79-12, dated July 23, 1979) noted that the project was one year behind schedule and experiencing problems utilizing vehicles and equipment purchased with AID funds. At that time, the project had disbursed only $1.819 million, the entire amount being spent for equipment purchases and consultant services.

OBJECTIVES, SCOPE AND METHODOLOGY

The GOI places a high priority upon its work in the Citanduy Basin. Successful project elements will be replicated across Indonesia. We, therefore, focused our attention upon efficiency, economy, program results and prospects for long-term success and replicability of the project. We also reviewed USAID/Indonesia management oversight activity, tested a sample of consultant and GOI financial records to verify that loan fund expenditures were properly documented and that the Fixed Amount Reimbursement mechanism was operating properly. Our methodology included interviews with Mission project and financial managers, contractor consultants both in Jakarta and in the Citanduy Basin and GOI managers, engineers and financial analysts. Mission, consultant and GOI planning and implementation documents were reviewed and

analyzed. Finally, we inspected construction sites throughout the project area, including canals, levees, flapgates and other flood control structures and interviewed farmers who are to be the project's primary beneficiaries.

Our audit covered the period 1976 through June 1983 and was performed in accordance with the Comptroller General's "Standards for Audit of Governmental Organizations, Programs, Activities, and Functions", giving due regard to applicable AID regulations.

A second project (Citanduy II) was launched in September 1980. This integrated rural development project was designed primarily to address the problems of Basin upland farmers. We also audited the Citanduy II Project in 1983, the results of which can be found in Audit Report No. 2-497-84-04.

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

LACK OF ADEQUATE O&M, AN ENDEMIC, LONG-STANDING PROBLEM WITH INDONESIAN IRRIGATION PROJECTS

Inadequate O&M is a common problem in Indonesia, and indeed throughout the developing world. As the U.S. General Accounting Office pointed out in a recent report on AID Irrigation Projects throughout South Asia "Overall estimates indicate that irrigation systems in most developing countries are less than 50 percent efficient, resulting in reduced acreage coverage and yields and in social tensions among farmers. In many instances, irrigation systems have been so neglected that donors have been forced to spend millions of dollars for early rehabilitation."1/

In Indonesia, the GAO found that the GOI had failed to perform any routine maintenance at the $18 million Luwu Irrigation Project located on the island of Sulawesi. The GAO noted that the canal banks inspected were heavily eroded. In addition, water management was poor, the system was not being operated as it was designed, and the supply of water to the fields was unreliable.2/

Problems have arisen in virtually all of USAID/Indonesia's present irrigation projects. The AID Area Auditor General for East Asia reported in 1980 that the GOI had not provided adequate O&M funds for systems then completed under the $36 million Sederhana (small scale) Irrigation Project3/. Our discussions with the present USAID/Indonesia Sederhana Project Manager revealed that the GOI has continued to underfund that project's O&M component. Indonesian project officials told the GAO that farmers often broke water control structures and made unauthorized cuts in canal banks to get more water. AID field trip reports cited "...damage from water buffalo walking in the canals, lack of water user associations, unreliable water sources, weirs about to collapse because small damage was not repaired in time, and canals needing major repairs, that could have been prevented with better routine maintenance".

1/ "Irrigation Assistance To Developing Countries Should Require Stronger Committments to Operation and Maintenance" (GAO/NSIAD-83-31; August 29, 1983)

2/ It should be noted that the GAO, in the course of its three nation inspection tour, found these conditions were not unique to Indonesian projects. Irrigation projects in Thailand and Sri Lanka evidenced similar O&M problems. Nor are they unique to AID projects. The World Bank found that O&M problems plagued its "Indonesian Irrigation Rehabilitation O&M Project" (Impact Evaluation Report No. 4575 of June 22, 1983).

3/ "Sederhana Irrigation and Land Development I & II", Report No. 2-497-80-11 of May 28, 1980.

The current difficulties Indonesia is experiencing in the O&M of its irrigation systems can be traced, in part, to events during the past 30 years. Following the Second World War, changes began to occur in Indonesian land tenure and cropping patterns, with large estate holdings giving way to smallholder rice farms. This change had a profound impact on irrigation in that fewer resources were available for O&M, the organizational advantages of estate agriculture were lost, and farmers moved into upper watersheds with a resulting decrease in water availability and increase in siltation problems.

With the government spending minimal amounts of money for O&M, by the mid-1960s many of the larger irrigation systems were almost inoperable. In the late 1960s, the government launched a major program to rehabilitate existing systems. While emphasizing construction, it continued to neglect maintenance. The quality and adequacy of the manpower and equipment available to the provincial government for O&M deteriorated. O&M staffs are not highly motivated since their jobs are considered less glamorous and prestigious than those in design and construction. Project personnel told us that reputations and high salaries come through employment with the Ministry of Public Works, i.e., construction, not through provincial public works, i.e., O&M.

Funding agencies have traditionally preferred investing in the highly visible hardware of irrigation (dams, canals) rather than in people and management systems. For instance, the Citanduy I loan agreement provides for little in the maintenance area beyond submission of an O&M plan as a condition precedent and a general warranty by the GOI that it would "...cause the Project when completed to be operated, maintained, and repaired in conformity with acceptable engineering, financial and administrative practices, in such manner as to insure the continuing and successful achievement of the purposes of the Project, and in accordance with the approved operations and maintenance plans." 1/

USAID/Indonesia has been searching for solutions to the O&M problem, including closer coordination between local public works agencies, which are ultimately responsible for O&M of flood control structures as well as primary and secondary canals, and central agencies tasked with actual construction and rehabilitation. Working under the assumption that at least part of the O&M problem of the Citanduy I project lies in its failure to involve local public works in its early construction phase, the Mission designed the irrigation construction component of the subsequent Citanduy II project to provide for greater local government participation in design and construction. Hopefully, this would lead to increased willingness on the part

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1/ We here refer only to O&M of the Main System and flood control structures. The loan agreement and the USAID expended considerably more effort in attempting to provide for on-farm O&M, see p. 16 below. Equipment which was supposedly purchased for O&M activity is discussed at p. 20 below.

of local government to maintain the completed structures. However, this plan does not address the problem of O&M at the "on-farm" (Water User Association) level. Unfortunately, for reasons discussed in Audit Report No. 2-497-84-04, the new Citnaduy II project has not yet been able to test this hypothesis.

The Mission's Rural Development staff has identified four factors which, it believes, have a direct impact on the successful operation and maintenance of irrigation systems: appropriate design and construction, financial resources, participation of water users, and water management practices. The Mission is developing a small scale irrigation O&M project to address these factors. Though the project description appeared in the Annual Budget Submission (ABS) for FY 1985, it is still in its formative stage and the Mission acknowledges that a substantial amount of evaluation and analysis remain to be done before the project can be seriously considered for implementation.

While the Mission has recently made laudable efforts to address the O&M problem, we believe a satisfactory solution is unlikely if not impossible without a substantial change in the GOI's basic attitude and policy toward O&M. The GOI appears to view rehabilitation as deferred maintenance. This attitude has been exacerbated by donor policies which, in the past, stressed capital development over recurring costs. As AID has pointed out in its policy statement on recurring costs:

> "For many poor countries, the funds available for new capital projects, because they come largely from concessional assistance, are more plentiful than the funds available for financing the recurrent costs of existing projects, which come largely from domestic resources."1/

Under these conditions, it may in fact be more cost effective, from the GOI's perspective, to rely upon periodic donor largesse to rehabilitate deteriorated structures than to institute a program of continuous maintenance. Nevertheless, it is obviously not the most cost effective method of utilizing limited resources from the donor's point of view.

An A.I.D. policy paper of May 1982 on Recurrent Cost Problems in Less Developed Countries supports direct funding of recurrent costs under narrowly defined conditions. These include:

- an assurance that recurrent cost support has higher development impact than new investments,
- an inability of the host country to undertake recurrent cost financing, and

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1/ "Recurrent Costs Problems in Less Developed Countries", A.I.D. Policy Paper, May 1982.

— existence of a carefully phased plan for shifting the entire burden to the host government.

The policy paper also notes that when recurrent cost problems result, not from the host country's inability to undertake such financing, but from policy choices based upon other considerations, Missions should:

— attempt to persuade governments to make necessary reforms,

— enlist the support of the donor community for policy reform, and

— provide technical assistance in the form of expertise and training to support reforms, including such areas as fiscal policies and tax administration.

Conclusion and Recommendation

In the past, the Mission has certified that the GOI had the capability to effectively operate and maintain AID-financed irrigation and flood control systems. Experience has shown that the GOI has not met these responsibilities. Consequently, we believe that the Mission should give greater consideration to the GOI's commitment and willingness to operate and maintain AID-financed irrigation and flood control systems. If the GOI is not financially capable of providing for O&M, some form of AID support may be justified for continued operation of existing systems. If, in fact, the GOI does have available financial resources for O&M, the Mission should attempt to alter GOI policy as outlined in AID's policy paper of May 1982. If the GOI refuses to take sufficient action to reform its O&M policy, the Mission should seriously consider reducing its level of assistance to the irrigation and flood control sector in Indonesia and channeling available funds into development sectors promising greater long-term impact. Accordingly, we recommend that:

Recommendation No. 1

USAID/Indonesia:

(a) determine whether the GOI is financially or otherwise capable of providing adequate project O&M, and

(b) if appropriate, provide direct funding in conformance with AID policy if the GOI is incapable of operating and maintaining AID financed irrigation and construction projects, or

(c) justify retention of on-going projects and inclusion of new projects requiring O&M in the AID portfolio if the GOI is capable of, but unwilling to, provide adequate O&M.

MANAGEMENT COMMENTS

"We consider that evidence to date shows GOI incapable of providing adequate O&M. Mission considers GOI budgetary situation is one factor which warrants AID direct funding intervention for O&M. Over last three years, total GOI budget has been either constant or declining in real terms. IBRD and IMF agree prospects over next five year period are for severe budgetary constraint since 70 percent of Indonesia's revenues have been dependent on oil sector. We agree that donors throughout Asia have not focused adequately on O&M issue. Emphasis has been on new construction with O&M a tangential concern. However, O&M is increasingly becoming a Mission area of emphasis."

The Mission went on to state that it is currently developing a project to address the O&M issue and is continually reassessing its irrigation strategy. The Mission has thus satisfied sections (a) and (c) of the above recommendation.

PROJECT IS THREE YEARS BEHIND ITS IMPLEMENTATION SCHEDULE BUT SHOULD ACHIEVE MOST OF ITS CONSTRUCTION TARGETS BY REVISED TERMINATION DATE.

The project has experienced extended implementation delays. The original target completion date of July 1981 was twice extended. The present project termination date is December 31, 1984. The delays were caused by:

-- the GOI's inability to provide trained counterpart staff personnel,

-- difficulty in satisfying the loan's conditions precedent,

-- the GOI's refusal, during the project's early years, to let multi-year construction contracts,

-- changes in contract specifications, and

-- an initially inadequate GOI construction budget.

Both consultants and Mission project managers believe that all construction, save the new irrigation canals, will be completed by December 1984. As shown in Appendix D, 90.7 percent of project construction had been completed by August 1983. However, delays in signing contracts for that canal system make it highly unlikely, in their opinion, that the construction can be completed by the project's close. Nevertheless, the Mission believes, and we concur, that the construction phase of Project Citanduy I should be considered a success. But, in the absence of a drastic restructuring of its operations and maintenance component, the project will not succeed in its primary objective of providing long-term flood protection and a stable water supply to area farmers.

FLOOD CONTROL STRUCTURES AND IRRIGATION CANAL SYSTEMS ARE DETERIORATING BECAUSE OF INADEQUATE MAINTENANCE

The project is one year from completion, yet our field inspections revealed that flood control structures and canals were already exhibiting evidence of structural decay and the effects of inadequate maintenance. Most of the construction work we inspected exhibited deterioration because of inadequate O&M.[1/] We found:

- -- levees cracking and overgrown with vegetation,
- -- flapgates and drains (flood control structures) exhibiting varying degrees of blockage from industrial effluent and vegetative debris, and
- -- on-farm (tertiary and quarternary) canal systems deteriorating for lack of farmer maintenance.

We believe the root causes of this problem lie in the GOI's failure to provide sufficient funding and develop adequate procedures to maintain these structures and systems. Though aware of the problem, the Mission has as yet been unable to motivate the GOI to devote adequate resources to maintain these construction works in reasonable operating condition. As a result, the project, as presently structured, cannot achieve its primary objective of providing area farmers with long-term flood relief and a stable water supply.

We visited five separate sections of levee construction (approximately 35 kilometers) along the Citanduy and its tributaries, five major flood control structures (flapgates, drains, and a primary desilting plant), two tertiary (on-farm) canal systems, and an upland demonstration farm plot. We chose construction sites completed from 1979 through August 1983, plus one site to be completed in early 1984, in an attempt to gauge the effect of low maintenance levels over an extended period of time. FAR payments for this construction totalled approximately $1,249,000. The results of our inspection visits are shown below.

1/ For purposes of this report, operation is the allocation and delivery of water supplies and handling of drainage run-off, and control of flood waters. Maintenance is defined as the upkeep of irrigation, drainage and flood control structures, embankments, and channels and the removal of silt and vegetation from canals and flood control structures. Although we refer to "Operations and Maintenance" (O&M), throughout this section, the reader should be aware that we are generally referring to the maintenance component unless otherwise indicated.

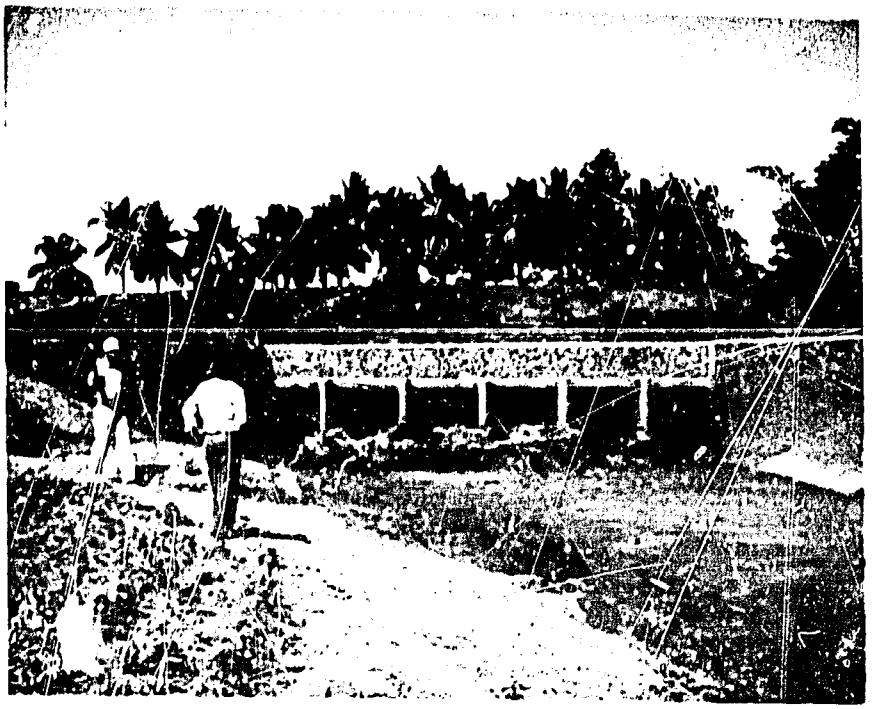
Levees

Two of the five levee sections showed erosion damage ranging from minor fill loss, where farmers had cut roads from the levee top to their villages along the levee sides, to cracks caused by heavy vehicle movement along levee roadways. (A dirt road or pathway runs across the top of each levee. This roadway is designed to accommodate light, preferably foot, traffic). Four of the five stretches of levee exhibited vegetative overgrowth or improper cutting procedures (grass cut too close to ground). Vegetation on a levee is not per se detrimental. It is, in fact, useful in helping to bind the levee soil, preventing erosion. However, without periodic cutting, the grasses proliferate to a point where they impede farmer access to their farm plots. Farmers then resort to burning the grasses where they stand. We saw this occurring along one stretch of earthworks. Since the farmers' grass and thatch homes are often located directly adjacent to the levees and thus in close proximity to the area being burned, they risk destroying their own dwellings when clearing the levee grasses. The consultant contractor admitted that this situation presented a clear and immediate hazard, but knew of no instance of fire spreading to dwellings.

Nevertheless, proper maintenance would include cropping the grasses and other vegetation. Further, such conditions indicate a general lack of concern with preventive maintenance. The GOI had budgeted no funds for any maintenance work along that section of levee which we observed burning. One section of levee was in good condition, showing little or no erosion or lack of repair. Unlike the other levee sections which were completed between June 1979 and February 1982, however, this stretch was being completed at the time of our audit.

Other Flood Control Structures

The drains and flapgates all showed build-up of vegetative or other forms of debris at intakes, though all were still operational. One flapgate inlet was partially blocked by industrial sludge from an upriver cassava processing plant. The effluent had backed up for several hundred meters behind the gate. The desilting plant, completed in March 1983, showed slight debris build-up at the water intakes. GOI project officials told us that the canal leading to the desilting plant had sustained erosion damage for lack of maintenance.



Flapgate Intake Showing Build-up of
Vegetative Debris and Industrial
Effluent

On-Farm Irrigation Systems

The tertiary canal systems, which are to be maintained by local farmer groups (Water User Associations), showed unrepaired damage to, and debris in "turn-outs", structures which divert water from tertiary canals directly onto a farmer's land. We also found some canal areas to be weed-choked.

On-Farm Turn-Out Showing Build-Up
of Vegetative Debris

Of greater concern than the actual present physical condition of these structures and systems is the failure of the GOI to develop any viable procedures or allocate funds to keep them functional. GOI project engineers told us there were no periodic maintenance plans or schedules for repairing these structures. As discussed below, the GOI has neither established procedures for transferring O&M responsibility to the local government agencies ultimately responsible for long-term upkeep, nor provided the Project Office with adequate funds to perform more than stop-gap maintenance.

GOI'S FAILURE TO PROVIDE ADEQUATE FUNDING AND PROCEDURES FOR O&M THREATENS LONG-TERM PROJECT IMPACT

Inadequate O&M of Citanduy I capital structures has lead to a dilution of the project's long-term impact. GOI project officials were virtually unanimous in their belief that inadequate maintenance was the project's most serious long-term problem. Those officials told us that many of the project's most expensive construction subprojects, such as desilting plants and flapgates, had a useful life-expectancy of one to three years without adequate maintenance.

Under Citanduy I, O&M responsibilities are divided among various groups. Responsibility for maintaining the "Main System" of primary and secondary canals, and flood control structures lies initially with the Citanduy Project Office (PROCIT), located in the Basin. This office, an arm of the GOI MPW, is directly responsible for overseeing the studies, designs, and construction called for in the loan. Since it is a temporary organization, it is responsible for O&M only during construction and is to turn over O&M responsibilities to the District Irrigation Section of the Provincial Public Works Services, a local government agency, after completion. The local government, therefore, has primary, long-term responsibility for maintaining these works.

GOI Has Not Provided Adequate Funding For Proper Maintenance Of The Main Canal System And Flood Control Structures

Over 90 percent of the project's main canal system has now been completed and maintenance responsibility turned over from PROCIT to the local government. The local government uses revenue from land development taxes collected from local farmers to pay for this main system maintenance. Since 1974 O&M funds have also been allotted from the central government budget in increasing amounts. O&M funding is calculated in rupiah per hectare of irrigated land. The government has consistently provided fewer rupiah/hectare for O&M than the local public works agencies considered adequate, as shown by the figures for West Java below:

Table 1

Fiscal Year	Funds (Rp/Ha) Requested	Funds (Rp/Ha) Provided	Percent of Request Provided
1980	6800	2721	40
1981	7000	3622	51
1982	Unknown		
1983/4	8000*	5512	69

* Estimated by PROCIT officials.

Project consultants estimated that the local public works agencies would require 15 thousand to 18 thousand Rp/Ha to provide adequate maintenance for the main system canals in their care. Based on these figures, the local agencies are receiving about 37 percent of the funds required to keep the main canal system operating as the project anticipated. As a result, the local public works agencies are unable to adhere to adequate maintenance schedules.

Project officials told us that the debris build-up we observed at a primary desilting plant resulted from the local agency's inability to dredge and repair the primary canal directly above the plant more than once a year (officials believed dredging 2 or 3 times a year would be adequate). Local farmers complained that erosion of the secondary canals leading to their village areas had led to siltation of their tertiary canal systems. In view of the local farmers' reluctance to participate in irrigation projects as discussed below, we believe this condition presents a very real danger of disenchanting and thus alienating the very farmers who are to be the project's primary beneficiaries.

While the budget for main system O&M has been inadequate, the budget for O&M of the project's flood control structures has been non-existent. Though levee construction was 95 percent, and other flood control structure construction 84 percent completed by August 1983, the government has allocated no budget to the district irrigation service for flood control structure O&M. As a result, maintenance of these structures cannot be accomplished under a formal program. Since it was not foreseen that PROCIT would be performing O&M activities after construction completion, its budget contains no O&M line item. PROCIT has performed emergency repair work by drawing funds from other line items in its budget.

By "burying" O&M funding in other line items, PROCIT has been able to effect some repairs. Project officials told us they drew down about 21.4 million rupiah ($33,500) between 1981 and July 1983 from the PROCIT "Rehabilitation" line-item to repair levees. Since this money is provided by the GOI through its budgetary process and not through the AID loan we could not determine what effect, if any, this re-allocation of funds had upon the project. PROCIT officials themselves could not tell us precisely how much money they are spending on O&M since funds are drawn off as repair crises arise, but they estimate they are raising about one-third of the funds necessary for adequate maintenance through this procedure. Those officials are reluctant to ask for specific O&M funding in their budget requests since they are not authorized to perform such work in the first place.

GOI Has Not Established Adequate Procedures For Orderly O&M

As stated above, project O&M was to remain the responsibility of PROCIT only until the completion of construction. Once a canal, levee, flapgate or drain was completed, the local government was thereupon to assume maintenance responsibility. Only the completed canals have been turned over to local government control. PROCIT has retained operational control over completed flood control structures since the GOI has not established any formal

procedure for transferring O&M responsibilities to the local government. In the absence of such procedures, PROCIT will not release control. This may, of course, be desirable since the local government has inadequate resources to maintain the structures. Of greater immediate concern is PROCIT's failure to:

-- train local government personnel in maintenance procedures, and

-- establish standard maintenance schedules.

As a result, even with increased funding, we do not feel local government will be able to maintain the project's structures once PROCIT relinquishes control. PROCIT officials acknowledge that their workers are presently far more proficient in maintenance operations than are local government personnel. Yet PROCIT has not and does not plan to set up any formalized training procedures to pass on this knowledge. PROCIT officials told us that, although the local government was presently incapable of maintaining the project structures, they (PROCIT) did not have authority or responsibility for training local government personnel without a formal agreement between the two levels of government. We believe it is a flaw in project design to provide for (or at least anticipate) transfer of the physical structures from the project to local authorities without a similar transfer of the expertise required to keep those structures operating.

The project has not set up standard maintenance or inspection schedules for the flood control structures. This situation could, of course, be expected given PROCIT's "crisis management" maintenance operations. As a result some sections of levee had not been inspected for many months at the time of our site visits, and project officials were unaware of the deteriorated conditions we uncovered.

Conclusion and Recommendations

Maintenance of irrigation and flood control structures is now inadequate. When the GOI's Citanduy Project Office ceases its emergency repair work, it could become non-existent. The deteriorating condition of the project's structures is attributable to the GOI's failure to:

-- provide adequate funding for proper maintenance, and

-- establish maintenance schedules and procedures.

These appear, in turn, to be symptoms of the GOI's long-standing policy of deferring maintenance of irrigation projects until such time as systems require rehabilitation. Such a situation obviously militates against rational O&M planning or forecasting of O&M funding requirements. The effect is inadequate preventive maintenance for the flood control structure. We believe that establishment of and adherence to set maintenance and inspection schedules would both enhance present O&M and facilitate orderly transfer of O&M functions to the local government. Accordingly, we recommend that:

Recommendation No. 2

USAID/Indonesia work with the Ministry of Public Works and PROCIT to:

(a) determine acceptable levels of O&M funding for PROCIT to adequately maintain flood control structures until such time as responsibility can be relinquished to local government units, and

(b) incorporate the O&M line-item into the PROCIT budget.

Recommendation No. 3

USAID/Indonesia work with the Ministry of Public Works, PROCIT and local public works agencies to develop and implement procedures to:

(a) facilitate the orderly transfer of flood control structure O&M responsibility from PROCIT to local agencies,

(b) transfer O&M expertise from PROCIT to local public works agencies, and

(c) establish standard maintenance schedules.

MANAGEMENT COMMENTS

"Mission considers that, unlike irrigation systems, flood control works should probably not be relinquished to local government units. The control of major rivers transcends provincial, let alone district jurisdictional boundaries, and should, properly, be the continuing responsibility of the Directorate of Rivers, either through PROCIT, which is a field office of the Directorate, or some other mechanism. Mission will work with PROCIT as per rec. no. 2(a) to determine acceptable levels of O&M funding required for adequate maintenance of flood control works. Were direct aid funding to be used to implement the O&M program, use of Citanduy I funds would be tightly constrained by the 31 December 84 TDD. Mission will also explore other alternatives including possibility of applying portion of PL-480 Title I proceeds to finance O&M."

We agree with the Mission that responsibility for flood control works should probably be retained by the Indonesian central government. The GOI has given no indication, however, that it is willing to modify its plans to relinquish control.

DIFFICULTIES IN ESTABLISHING VIABLE WATER USER ASSOCIATIONS THREATENS LONG-TERM USEFULNESS OF ON-FARM IRRIGATION SYSTEMS

The farmers themselves, through Water User Associations (W.U.A.), are to maintain tertiary (on-farm) irrigation systems, through both their own labor

and an "in-kind" user's tax paid to the Association. Project planners considered the development of these Associations to be the single most important element in successful farm-level project implementation. While 224 such Associations existed in the project area in 1982, only 9 (4 percent) were active. Project Officials admitted that the Government's inability to establish viable W.U.A.s seriously threatens the usefulness and life-span of the tertiary and quarternary canal systems.

Given the high concentration of very small farms in a relatively small area, it is imperative that farmers cooperate closely and coordinate their activities if on-farm irrigation systems are to succeed. Without close cooperation, farmers at canal heads can receive more water than they need, those farther down the line receive less, and routine maintenance is neglected or shared inequitably. The traditional answer to this problem in Indonesia is Water User Associations. These organizations, if operating as intended, provide the administrative structure needed to ensure that water is equitably distributed and maintenance is regularly performed. For instance, an Association's functions include:

-- removing silt and weeds from canals,

-- repairing cracks and eroded banks,

-- scheduling water deliveries,

-- opening and closing gates, and

-- maintaining discipline among users.

Project planners, recognizing the central role W.U.A.s play in on-farm irrigation, called for establishment of W.U.A.s in all project irrigation areas, but relied upon provincial government agencies to establish and provide inputs for those Associations. Concluding that the project area Associations were far from effective in carrying out their responsibilities, the project, in 1980, became more directly involved in the effort. In that year, the Mission supported the establishment of two water management pilot farms in the project area to "...refine and disseminate the technology for using available water supplies more efficiently from the tertiary turn-out to the farmer's field." The project invested considerable effort in strengthening the W.U.A.s including:

-- assignment of two full-time consultants (an engineer and a sociologist) to this activity,

-- financing of agricultural inputs to stimulate acceptance of more efficient cropping systems,

-- production of an on-farm water management manual which included O&M instructions,

— training of 74 area farmers in O&M methodology and W.U.A. management, and

— providing for participation of 19 farmers and officials in a comparative study tour to observe functioning Water User Associations in other areas of Indonesia.

Despite these efforts, by 1982 only 9 of 224 W.U.A.s in the project area were operational. The remaining were classified as either "developing" (69), meaning that members were aware of the Association's function but were "reluctant" to pay their membership contribution, or "passive" (146), in which case area farmers were not even aware the Association existed.

During our inspections we visited two on-farm systems. Both exhibited the effects of inadequate maintenance. Although both were classified as having "active" W.U.A.s, we saw debris and silt blocking water "turn-outs" (small structures which divert water from the tertiary canal directly onto the farmer's field), and weed blockage. It was difficult to gauge the overall effect of these conditions since our visit did not coincide with the period of maximum canal utilization. Local officials told us the farmers would repair the canals before the next period of peak water need.

Nevertheless, Mission project officials told us most of the area W.U.A.s were not functioning, and on-farm water management was "a failure". They attributed this to:

— application of project resources solely to the two pilot areas,

— high rainfall levels in the Basin, which usually receives adequate rainfall for ten months of the year. (The irrigation systems are designed to guarantee a steady supply of water throughout the year, but the farmers can survive without irrigation. As a result, the farmers feel little pressing need to maintain the canal systems.),

— farmers' inability to devote their full time and effort to their irrigated plots, (Many hold second jobs and/or work additional landholdings in other areas. At one of the systems we inspected, an official of the W.U.A. in that area told us that about 12.5 percent of the members of his association refused to pay the 8 percent tax levied by the organization. Most of these farmers were also cultivating plots outside the W.U.A. area, and had neither the time nor the inclination to participate in or contribute fully toward the Association. This official also told us that coordination between adjacent Associations was so poor that they could not work out a mutually satisfactory water diversion schedule, and that leading officials of the provincial public works agency had never visited the area to discuss the farmer's problems.), and

— high levels of absentee landlordism.

In analyzing the on-farm O&M problem throughout Indonesia, the Mission has identified several additional factors:

-- W.U.A.s are resisted by farmers who have their own, long established local groups and who distrust government intervention.

-- The government itself has been less than energetic in attempting to form these associations.

-- Farmers who own land feel they have already contributed for the payment of O&M costs through payment of local taxes.

-- Farmers, Ministry of Agriculture and local government officials complain that they are asked to provide O&M assistance for what is, in actuality, unsatisfactory construction by provincial public works sections.

-- W.U.A.s sometimes contain too many farmer-members to remain cohesive. (This was the situation at one of the sites we visited, where membership was almost two and one-half times the recommended maximum level).

-- Farmers are not compensated for land taken for canal construction.

-- Agricultural extension workers and local government officials are poorly trained in the organizational skills needed to establish the W.U.A.s.

Despite these drawbacks, W.U.A.s can be successful if the farmers participate in the system's design and construction, thus establishing a sense of farmer ownership. Such organizations are working on the Island of Bali. This was not done in the Citanduy Basin where, according to project officials, the W.U.A.s were imposed upon participating farmers as a prerequisite for inclusion in the project.

Conclusion and Recommendation

Where W.U.As are not effective, irrigation systems can be vandalized, water wasted or stolen, and routine maintenance ignored. Of equal import, however, may be the psychological effect which failed projects can have on local farmers, discouraging them from participating in government sponsored or organized projects in the future.

With the project approaching termination, we believe it will be difficult, if not impossible, to resuscitate the W.U.A.s. The Mission should, therefore, examine alternative methods of providing on-farm O&M. Accordingly, we recommend that:

Recommendation No. 4

USAID/Indonesia review those areas where W.U.A.s have not been workable, seek alternatives to these W.U.A.s which can be implemented within the remaining lifespan of the project and work with the GOI to implement them.

MANAGEMENT COMMENTS

"Mission is currently reviewing those areas where WUAs have not been working and is seeking alternatives...Alternative Mission is employing to stimulate WUAs in Citanduy I irrigation systems is targeting of WUAs in these systems for subsidized agricultural inputs and special extension attention under model irrigation blocks activity of Citanduy II. Because of extensive area involved, pilot areas within these systems are targeted rather than entire systems. Head and tail ends of the systems, where on-farm water management problems are most apparent are targeted. These are areas where O&M inefficiencies lead to water wastage at the head and limited water supply at the tail...Will provide results when available."

INABILITY TO UTILIZE EQUIPMENT THREATENS LONG-TERM PROJECT IMPACT AND WASTES HUNDREDS OF THOUSANDS OF DOLLARS OF AID FUNDS

Through June 1983, AID had obligated $1,992,088 and expended $1,923,475 for the purchase of vehicles and equipment for the Citanduy I project. This equipment, consisting primarily of compactors, bulldozers, and similar earth-moving machinery, was to be used for both construction of the canals and flood control structures and O&M after construction. Our inspection revealed that virtually all the equipment was idle, much of it having never been used. We attributed this to:

-- inapplicable equipment, either too large, too small, or otherwise inappropriate for the type of construction undertaken by the project,

-- failure of the project maintenance workshop to reach the repair capability levels envisioned by project planners, and

-- inflexible and inadequate procedures.

As a result, the project spent hundreds of thousands of dollars for equipment it would rarely or never use, and the project's long-term O&M capabilities have been compromised.

Project Equipment Is Underutilized

Project planners anticipated extensive use of heavy equipment for both flood control structure and irrigation canal construction, the former because levee compaction was not deemed feasible by hand efforts, the latter due to the lower cost of using equipment and the difficulty in excavating water saturated material by hand. The project thereupon purchased heavy machinery, supplies

and related commodities valued at almost $2 million. Upon inspecting the project motorpool and workshop, we found:

- Virtually all the equipment was available for inspection. Project officials were unable to locate three sump pumps each valued at approximately $1,500 and four pieces of heavy equipment had been moved off-site.

- None of the equipment, save eight vehicles, was being utilized at the time of our inspection. According to GOI officials, twenty-eight pieces of equipment, valued in excess of $609,000 had never been used. 1/

- Of the remaining equipment, most had rarely been used. 2/

- Some equipment listed as "working" by the on-site consultants was, in fact, inoperable. We requested that maintenance shop personnel start the engines of two pieces of equipment, a bulldozer and a forklift. Neither would start. GOI officials claimed the equipment required spare parts.

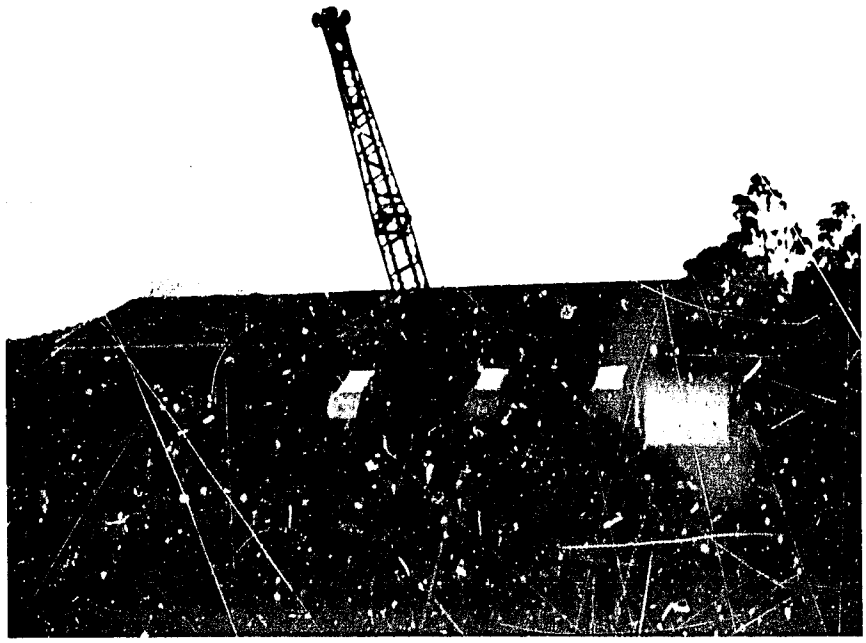
- Maintenance shop equipment, including carpentry tools, drill presses and hydraulic tire tools, valued at more than $21,000 had never been used, and, according to the on-site consultant, would never be used without a substantial upgrading in maintenance shop capabilities. 3/

- Four pieces of heavy equipment had been moved off-site.

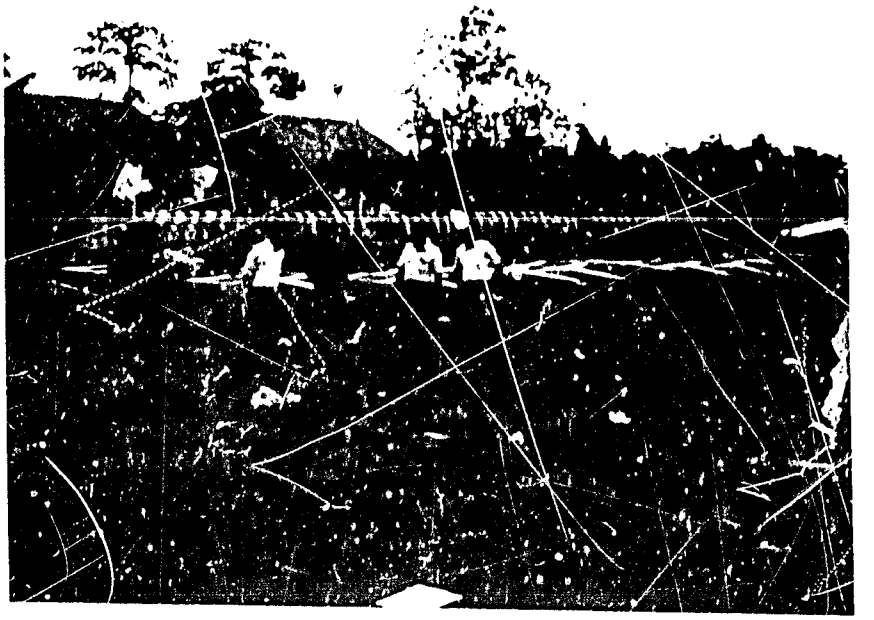
1/ Listing included as Appendix A.

2/ A complete listing of equipment and inspection results included as Appendix B.

3/ A complete listing of unused maintenance shop equipment is included as Appendix C.



Some of the Heavy Equipment Lying Idle
in the Project Maintenance Area



"Sheepsfoot Rollers" Purchased to
Compact Levees but Never Used

In October 1982, GOI officials notified USAID/Indonesia that some equipment at the Project Citanduy site were "unsuitable" under local conditions. Among these were two "Wheel Loaders", each valued at approximately $19,000. The officials asked that USAID/Indonesia approve transfer of the "Wheel Loaders" to other, non-U.S. funded project sites in the Basin. In November of that year, the Mission replied that, although it agreed with the request in principal, it required more information before approving the move. The GOI never supplied the additional information, but proceeded to move the equipment. In addition to the "Wheel Loaders", a forklift and a mobile workshop, valued at approximately $50,000 were moved to a second, non-project

site. We inspected the forklift and workshop, the former being inoperable for lack of spare parts. Although the forklift and workshop had received only limited use at the alternate site, project consultants told us that if the equipment had not been moved, they would never have been used at all.

Poor Procurement Decisions, Inadequate Maintenance And Inadequate Procedures Led To Underutilization Of Project Equipment

Project planners anticipated that the construction equipment purchased by the project would be used directly by project personnel and also be rented to private construction contractors working on the project. With this in mind, the GOI, USAID/Indonesia and the consultant contractor, Engineering Consultants, Inc. (ECI), formed an "Equipment Working Team", in 1976, to determine the equipment requirements for the Citanduy Project. The "team" received technical information from local suppliers in Jakarta, the GOI, and the ECI central offices in the United States. USAID/Indonesia provided information on procurement procedures. It was impossible, seven years after the fact, to determine the input each of the participants had on the final procurement list. What is certain is that the Mission accepted the equipment list in March 1977.

Although we were told by GOI officials that contractors reject project equipment because they believe it is too expensive to operate efficiently and too prone to breakdown for lack of maintenance, GOI, USAID/Indonesia and ECI personnel agreed that the primary reason the equipment was not used was its unsuitability under local conditions. For example:

-- towed-pad type compactors ("Sheepsfoot Rollers"), with a total value in excess of $240,000, procured to compact the earthen levees, were not maneuverable on the narrow levee-tops and were too heavy for transport over local roads;

-- two self-propelled compactors worth approximately $117,000 were also too heavy to be transported to the project sites;

-- front-end loaders valued at over $77,000 could not be used because of muddy ground conditions;

-- a mobile crane valued at over $117,000 sits unused at the project motorpool, deteriorating in storage, because it cannot be transported to work sites; and

-- six sump pumps valued at almost $10,000 were too small for efficient utilization.

Damaged and otherwise inoperable equipment may sit for months in the project maintenance shop before repairs are completed. Project planners believed the project maintenance and equipment shop would serve major equipment needs throughout the Basin. The facility was designed and equipped for maintenance capability up to and including major heavy equipment overhaul. They

anticipated that the shop would eventually be able to completely rebuild damaged and worn-out equipment. To quote one manufacturer representative, "With all those excellent facilities available...they should be able to run the establishment as a first class service and repair facility in the area and maybe the best in West Java." This has not happened. The equipment consultant at the project site told us the facility could restore and service equipment, but was incapable of overhauling operations. Moreover, repair and service sometimes required weeks or months since the project did not keep adequate numbers of spare parts in stock, and the GOI did not budget sufficient funds to either purchase spare parts as needed or adequately train shop mechanics. Although we found no records for total equipment "downtime", the consultant believed it to be substantial (months in some cases), a belief reinforced by the results of our inspection.

Project procedures and lack of procedures also hindered equipment utilization. For example:

-- GOI Project officials admitted that construction contractors often refuse to use project equipment because GOI procedures mandate that only project employees operate such equipment - contractors refuse the equipment, believing project operators are inadequately trained and motivated;

-- the project has developed no procedures for either providing spare parts for equipment, anticipating their need, or providing systematic, scheduled preventive maintenance;

-- the project has yet to implement any procedures to provide for systematic training to upgrade the capabilities of its mechanics and equipment maintenance staff; and

-- the project never complied with a 1978 USAID/Indonesia recommendation that it establish procedures to ensure that equipment operators were qualified, contractors had incentives to use project equipment, and a "sinking fund" be established to provide money for spare parts from equipment rentals.

Project Equipment Should Be Redeployed Or Purchase Costs Recouped

The Mission has been aware of the equipment utilization problem since at least July 1979. At that time, the AID Area Auditor General East Asia reported that Citanduy Project equipment costing $1,160,961 had not been used. Consequently, the auditors recommended that the Mission work closely with the GOI and the the consultant to initiate an immediate plan for the effective utilization of all loan-funded equipment and that it "...consider invoking the remedial actions available under Article VII (Cancellation and Suspension) of the loan agreement" if the problem was not corrected. The recommendation was closed in February 1980 when the Mission reported that the equipment usage rate had risen to 67 percent. By March 1981, however, the Mission Project Officer was notifying the Director of Rivers of the GOI Directorate General of

Water Resources Development that the project was experiencing serious equipment utilization problems - only 29 percent of the equipment was working at that time, the remainder being either "idle" or "down". The project officer went on to write that "...the continuing deterioration in effective use of equipment, lack of a coherent parts inventory system, and failure to even approach adequate staffing levels (of the maintenance shop) cannot be ignored indefinitely." Further, the Mission felt that such problems were common throughout Indonesia, and, unless corrected, their cost to the GOI would be "staggering".

On May 18, 1981, the AID Regional Inspector General for Audit issued Report No. 2-497-81-13, "Luwu Area and Transmigration Development Project: Irrigation Equipment". This project, located on the island of Sulawesi, Indonesia, procured irrigation equipment valued at $866,148. The auditors found that none of the equipment purchased with AID funds was being used at the time of their inspection. They determined that this was due to (1) a lack of GOI funds to establish and operate workshops and a spare parts management system; (2) a lack of fully trained GOI personnel; (3) a lack of GOI funds to buy spare parts for its equipment and to move AID-financed equipment to the project site; and (4) the lack of an effective equipment leasing program.

The Citanduy I problem went uncorrected. In October 1982 the consultant's in-country representative officially notified the GOI Citanduy I Project Manager that equipment valued at over $554,000 had been sitting idle in the project maintenance shop since their receipt in 1979 and recommended that the equipment be transferred to other development projects where they could be used. As stated above, four pieces have been transferred, but without Mission approval.

During our audit, the Mission again approached the GOI expressing its concern with this problem, and recommending that the government move the equipment to alternate sites. GOI project officials we talked to could not, however, identify suitable alternate locations.

Conclusion and Recommendation

With the project approaching termination it is unlikely that most AID-financed equipment will be utilized at the project site. Although project planners had anticipated that the equipment would be used for O&M after project termination, much of it is obviously unsuited for this role. Alternate sites are apparently not readily available. We agree with the Mission's current efforts to move the equipment to alternate sites with the proviso that the Mission assure itself that the equipment is actually utilized at such sites, and does not "disappear", or sit idle and deteriorating at another location. Failing this, the Mission should act to recoup the cost of unused and underutilized equipment in accordance with the loan terms. Moreover, the Mission should develop and implement procedures to facilitate utilization of equipment which may be purchased for any future projects with irrigation construction components. Accordingly, we recommend that:

Recommendation No. 5

USAID/Indonesia:

(a) determine whether alternative sites are available for transfer of project procured equipment,

(b) establish and implement procedures for transfer of the equipment and assurance that transferred equipment will be properly used, if sites are available, and,

(c) proceed in conformance with Article VII of the loan agreement to recoup the cost of unused and/or underutilized equipment in all cases where alternative sites are unavailable.

MISSION COMMENTS

"Mission intends to find alternative sites for equipment, so that refund remedy would not be necessary. However, we also believe it would be difficult to apply sanction for unsuitable equipment because AID concurred in procurement of this equipment, based on equipment lists drawn up with advice from AID-funded consultants."

LACK OF PROCEDURES FOR INSPECTING AND CERTIFYING SUBPROJECTS IS AN INTERNAL CONTROL WEAKNESS WHICH HINDERS MISSION OVERSIGHT CAPABILITY

The Mission is certifying subprojects as completed and eligible for fixed amount reimbursement without documentation evidencing adequate management oversight.

The project loan agreement stipulates that the GOI "may, from time to time, submit a request to A.I.D. for reimbursement of an agreed upon portion of the predetermined Local Currency Costs for units of work completed..." and further that "Each request for reimbursement shall contain certifications that ... the units of work have been completed according to approved plans, specifications and contracts...".

We found that the GOI was submitting the required documents for each reimbursement. In each instance, the GOI Citanduy Project manager, a representative of the Ministry of Public Works, the Consultant (ECI) Resident Manager and USAID Project Manager certified that construction had been completed as per work plans and specifications. The USAID Citanduy Project Manager did not personally inspect each unit of construction before certifying, but told us that a Mission engineer visited each subproject at the time of completion and reported orally as to its acceptability. We did find one inspection report in the Citanduy I project files. A USAID/Indonesia engineer, in that instance, visited 24 subproject sites, (about 18 percent of the total) recommending that all be certified for reimbursement, but noting several instances of inadequate maintenance which required Mission attention.

Mission staff told us that there are no standard procedures requiring that qualified USAID inspectors visit project sites prior to reimbursement or that inspection reports be submitted in writing to the Project Office. This is left to the prerogative of individual managers. One Project Manager overseeing another irrigation project in Indonesia told us that he required written inspection reports before certifying any reimbursement because that had been his predecessor's procedure.

OMB Circular A-123 established internal control standards and a system of agency responsibilities and requirements to address instances of fraud, waste, and abuse of Government resources and mismanagement of Government programs resulting from weaknesses in internal controls. The Federal Managers' Financial Integrity Act, P.L. 97-255 placed responsibility for insuring adequate internal control on the head of each executive agency.

Though we did not find any instances during our audit of reimbursements based on false or erroneous certifications, we believe the lack of written procedures for inspecting and reporting upon water control and irrigation sub-projects constitutes a "material weakness" in the Mission's internal control system, as defined in AID Handbook 19 Appendix 1D. In addition, good management procedure necessitates that the Mission establish written rules for its Project Officers to guide them in performing their oversight responsibilities.

Conclusion and Recommendation

USAID/Indonesia has no written procedure for inspecting construction subprojects or reporting the results of USAID engineering inspections to Mission project officers. Such rules, requiring that a qualified USAID expert submit a written report on each construction subproject prior to reimbursement would:

-- diminish the possibility of reimbursement for unqualified construction, thus rectifying an internal control weakness in Mission procedures, while satisfying regulatory and statutory requirements,

-- create an institutional memory aiding future project officers, and

-- allow the Mission to more easily compare and analyze information across project lines, pinpointing possible problems and potential remedies for future projects with construction components.

Accordingly, we recommend that:

Recommendation No. 6

USAID/Indonesia establish and implement procedures to assure that qualified Mission engineering personnel inspect construction sites and report their findings to project officers in written form prior to final certification of FAR payments.

MISSION COMMENTS

"Mission agrees that the results of the AID engineering inspection of FAR projects should be in written form and included as a part of the payment documentation. A Mission Order is being finalized to establish this requirement. We request the report note, however, that it is our opinion that inspection procedures followed on this project are not descriptive of inspection procedures for other project FAR construction sub-projects. We thus take issue with the contention that there is a serious material weakness in the Mission's internal control system, as related to all FAR payments."

THE PROJECT SHOULD DEOBLIGATE APPROXIMATELY $1 MILLION IN EXCESS FUNDS

By the Mission's calculations, the Citanduy I Project is overfunded by $1,165,151 due primarily to periodic devaluations of the Indonesian rupiah vis-a-vis the U.S. dollar. Since the project is drawing to a close, and no additional major expenditures are anticipated, the Mission should deobligate these funds.

At the time USAID/Indonesia approved the engineers' flood control structure, irrigation and drainage construction cost estimates in 1977, the Indonesian kupiah exchanged at a rate of approximately 415 to U.S.$1. By April 1983 the rate had slipped to Rp 970 to U.S.$1, a 111 percent decline as the result of devaluations in 1978 and 1983. Since the fixed amount reimbursement funding mechanism was based upon repayment of a percentage of costs as estimated in 1977 and stated in rupiah, as the project progressed, a set number of rupiah could be purchased for an ever decreasing number of dollars. As a result, more than $1 million will remain unspent by the project's close. USAID/Indonesia project officials told us the Mission plans to decide on a piecemeal basis whether to re-earmark or deobligate these funds.

AID Handbook 19, Chapter 2, mandates that "Funds are deobligated when it is clear that the amounts obligated by the project agreement exceed the amounts required to finance the AID assistance contemplated in the agreement."

Conclusion and Recommendation

In view of the doubtful long-term impact of this project, we believe any re-earmarking of funds, save in the interest of improving long-term O&M, is not justifiable. Accordingly, we recommend that:

Recommendation No. 7

USAID/Indonesia deobligate such remaining uncommitted project funds as cannot be effectively used to upgrade project O&M capabilities.

Equipment Purchased for Citanduy I Project
Never Used

Item		ID No.	Unit Value ($)	No. of Units	Total Value ($)
(01)	Mobile Hydraulic Crane	MC-2	117,763	1	117,763
(02)	Self-Propelled Compactors	HVRS-1 HVRS-2	58,539	2	117,078
(03)	Towed Compactors (Sheepsfoot Rollers)	PR-1-PR-10	24,153	10	241,530
(04)	Tilt-Deck Towing Trailer	TNT-2	11,741	1	11,741
(05)	Combination Lube & Fuel Trailer	LFT-3 LFT-4	19,465	2	38,930
(06)	Sump Pump	233197	1,547	1	1,547
(07)	Outboard Motor	F-5261706 F-262202	1,310	2	2,620
(08)	Concrete Mixers	CM1 - CM4	3,706	4	14,824
(09)	Concrete Vibrators	L431297 0-004698 0-004698 Unknown	722	4	2,888
(10)	Mobile Workshop	B-4790	60,300	1	60,300
			Total Value		609,221

Citanduy I Equipment Status

Item	ID. No.	In Use	*Operational Not in Use	Broken Down or Awaiting Parts	Never Used	Unlocated
Bulldozer (Case 450)	B-10		X			
	B-11		X			
	B-12			X		
	B-13			X		
	B-14			X		
	B-15			X		
Wheel Loader (Case 480C)	WL-1				X	
	WL-2				X	
Forklift	F-1			X		
	F-2		X			
Mobile Hydraulic Crane	MC-2				X	
	MC-1		X			
Self Propelled Compactor	HVRS-1				X	
	HVRS-2				X	
Towed Compactor	PR-1				X	
	PR-2				X	
	PR-3				X	
	PR-4				X	
	PR-5				X	
	PR-6				X	
	PR-7				X	
	PR-8				X	
	PR-9				X	
	PR-10				X	
Truck Tractor and Flat Deck Trailer	TN.T. 1		X			

Item	ID No.	In Use	*Operational Not in Use	Broken Down or Awaiting Parts	Never Used	Unlocated
Tilt Deck Towing Trailer	TNT-1		X			
	TNT-2				X	
Combination Lube and Fuel Trailer	LFT-1		X			
	LFt-2		X			
	LFT-3				X	
	LFT-4				X	
Field Utility Vehicle (Scout II)	D4086	X				
	D4087			X		
	D4088	X				
	D4089	X				
	D4090	X				
	D4091	X				
	D4092	X				
	D4093			X		
Field Utility Vehicle (CJ-6)	D-70	X				
	D-71	X				
Pick Up Truck	D-5S		X			
	D-6S		X			
	D-7S		X			
Boat Hull 17 W. Trailer	Unknown		X			
Boat Hull 17	281		X			
Jet Boat 21 W. Trailer	Unknown		X			

Item	ID No.	In Use	*Operational Not in Use	Broken Down or Awaiting Parts	Never Used	Unlocated
Sump Pump	233199					X
	233197				X	
	2[illegible]203			X		
	2[illegible]200					X
	233202					X
	233204		X			
Outboard Motor	5262809		X			
	5261800		X			
	F5261766	X				
	F5261706				X	
	F5262202				X	
Concrete Mixer	CM1				X	
	CM2				X	
	CM3				X	
	CM4				X	
Concrete Vibrator	L431297				X	
	0-004698				X	
	Unknown				X	
	Unknown				X	
Mobile Workshop	B4790				X	
	B4789		X			
Water Truck	B472 8XY		X			

*GOI Officials stated Equipment Operational, Auditor Observed Equipment Sitting "Idle".

Maintenance Shop Equipment

Purchased for Citanduy I

Project - Never Used

	Item	I.D. NO.
(01)	Hose and Reel Assembly	6H - 008, et al
(02)	Wheel Balancing Apparatus	WB - 59 B, et al
(03)	HD Hydraulic Tire Tools	
(04)	Wheel Alignment Set	2054 D - WASA
(05)	Wash Racks	NC -694, et al
(06)	Drill Press, Radial	MC - 2777H141121
(07)	Sand Blasting Machine	MC 3140 K 12
(08)	Carpenters Shop Equipment	490
(09)	Engine Stands	OTC 1725, 20, 30
(10)	Air Hand Tools	520
(11)	50 Ton Press	548
	Total Estimated Value	$21,130

Citanduy I Construction
Through August 1983

Construction Item	Percentage of Total Anticipated Work	Percent Completed	Total Weighted Percent of Progress
Flood Control Levees	55.3	95.0	52.5
Flood Control Structures	15.1	84.1	12.7
Irrigation Rehabilitation	11.2	94.6	10.6
New Irrigation	1.0	22.0	.2
Drainage	12.1	88.6	10.7
Terminal Systems	5.3	75.1	4.0
Total	100.0		90.7

APPENDIX E

List of Report Recommendations

Recommendation No. 1

USAID/Indonesia:

(a) determine whether the GOI is financially or otherwise capable of providing adequate project O&M, and

(b) if appropriate, provide direct funding in conformance with AID policy if the GOI is incapable of operating and maintaining AID financed irrigation and construction projects, or

(c) justify retention of on-going projects and inclusion of new projects requiring O&M in the AID portfolio if the GOI is capable of, but unwilling to, provide adequate O&M.

Recommendation No. 2

USAID/Indonesia work with the Ministry of Public Works and PROCIT to:

(a) determine acceptable levels of O&M funding for PROCIT to adequately maintain flood control structures until such time as responsibility can be relinquished to local government units, and

(b) incorporate the O&M line-item into the PROCIT budget.

Recommendation No. 3

USAID/Indonesia work with the Ministry of Public Works, PROCIT and local public works agencies to develop and implement procedures to:

(a) facilitate the orderly transfer of flood control structure O&M responsibility from PROCIT to local agencies,

(b) transfer O&M expertise from PROCIT to local public works agencies, and

(c) establish standard maintenance schedules.

Recommendation No. 4

USAID/Indonesia review those areas where W.U.A.s have not been workable, seek alternatives to these W.U.A.s which can be implemented within the remaining lifespan of the project and work with the GOI to implement them.

Recommendation No. 5

USAID/Indonesia:

(a) determine whether alternative sites are available for transfer of project procured equipment,

(b) establish and implement procedures for transfer of the equipment and assurance that transferred equipment will be properly used, if sites are available, and,

(c) proceed in conformance with Article VII of the loan agreement to recoup the cost of unused and/or underutilized equipment in all cases where alternative sites are unavailable.

Recommendation No. 6

USAID/Indonesia establish and implement procedures to assure that qualified Mission engineering personnel inspect construction sites and report their findings to project officers in written form prior to final certification of FAR payments.

Recommendation No. 7

USAID/Indonesia deobligate such remaining uncommitted project funds as cannot be effectively used to upgrade project O&M capabilities.

REPORT RECIPIENTS

USAID/Indonesia	
Director	5
AID/W	
Bureau for Asia:	
Assistant Administrator	1
Deputy Assistant Administrator (Audit Liaison Officer)	2
Office of Indonesia and South Pacific/ ASEAN Affairs (ASIA/ISPA)	1
Bureau for Food for Peace and Voluntary Assistance	
Assistant Administrator	1
Bureau for Science & Technology:	
Office of Development Information & Utilization (S&T/DIU)	2
Bureau for Management:	
Assistant to the Administrator for Management	1
Accounting System Division (M/FM/ASD)	2
Directorate for Program & Management Services: Office of Contract Management (M/SER/CM)	3
Office of the Inspector General:	
Inspector General (IG)	1
Executive Management Staff (IG/EMS)	12
Policy, Plans & Programs (IG/PPP)	1
Office of Legislative Affairs (LEG)	1
Office of the General Counsel (GC)	1
Office of Public Affairs (OPA)	2
OTHERS	
Regional Inspector Generals:	
RIG/A/Washington	1
RIG/A/Nairobi (Africa East)	1
RIG/A/Dakar (West Africa)	1
RIG/A/Cairo (Egypt)	1
RIG/A Karachi (Near East)	1
RIG/A/Latin America	1
RIG/II/Manila	1
AAP/New Delhi	1