EVALUATION OF

PINDAR RIVER AND TWO MEETINGS

INTEGRATED RURAL DEVELOPMENT PROJECT

Prepared for
USAID/Jamaica

by

Ronald V. Curtis, DS/RAD
James B. Lowenthal, DS/RAD
Roberto Castro, LAC/DR/RD

January 10, 1980

This report follows the standard format of the Project Evaluation Summary (PES) for Sections 13 to 23

TABLE OF CONTENTS

13.	Summary	1
14.	Evaluation Methodology	5
15.	External Factors	6
16.	Inputs	8
17.	Outputs	12
18.	Purpose	23
19.	Goal/Subgoal	24
20.	Beneficiaries	25
22.	Lessons Learned	26
23.	Analyses and Recommendations	28
	a. Project Orientation	28
	b. Local Organizations	30
	c. Management Capability	33
	d. Technical Components	37
	(i) Erosion Control	37
	(ii) Research and Extension	41
	(iii) Economic Analysis	44
	e. Financial Resources	57
	f. Replication Points	63

13. SUMMARY

The Project is making notable progress toward achieving the soil conservation goals. This is true despite delays caused by late arrival of equipment, unseasonable rains, and the shakedown period required to put together an implementation team as large as the one used for this Project. The implementation team is especially impressive. The excitement and dedication of the Project Director, Mr. Dudley Reed, permeates the staff.

May 1979, marks the effective starting date of field activities. The accomplishments in this short time -- measured by number of farmers contacted, acreage to be treated, and acreage treated -- speak well for the future. The staff has demonstrated the capability to incorporate the reality of hands-on experience into operations, another indication of the high skill level of the staff. Given sufficient time, and the Project requires more time, there is little doubt that the soil conservation goals of the Project could be achieved. But there are some problems. Beginning in Section 23 of this report, the implementation status of the Project is analyzed and recommendations made to enhance the probability of success.

a. Project Orientation

We strongly recommend a reformulation of the implementation strategy. The Project should address more directly the socio-economic developmental goals of the Project. The concern is that the pressure of the PACD has forced an adoption of an implementation strategy that focuses on the soil conservation aspects of the Project. While the importance of the farmer as the prime mover of development has not been lost, engineering concerns have moved to the forefront, leaving little energy for consideration of longer term developmental goals or even post-Project needs. However, changes should not be initiated until the end of the current dry season.

Recommendation. The implementation strategy should be reformulated to address explicitly the developmental goals of the project. This will require a more measured and deliberate implementation pace as well as additional attention to local organization development.

Recommendation. Extend the PACD of the Project Loan and Grant Agreement to September, 1984.

b. Local Organizations

The stragegy shift recommended above should increase the participation of local organizations in implementation. Jamaica is particularly rich in local organizations and it is argued that more active and stronger, locally controlled organizations will provide the necessary support system for participating farmers so that continued maintenance of land treatments and improved access to credit, markets, and technology will be possible. Without this support, it is feared that Project created benefits will erode when the intensive assistance provided by the Project terminates.

Recommendation. Local organizations should be given a more active implementation role. In this context, the work of Dr. Blustain should be extended.

c. Management Capability

As noted above, management of the Project is clearly effective. Notwithstanding this observation, there are areas where improvement could reduce administrative burdens and increase efficiency. We are recommending that a management audit be conducted to establish lines of authority and fix responsibility. A deputy to the Project Director is clearly warranted. Additionally, the Project is experiencing difficulty with information management. This is most notable in the case of the Farm Plan, a document critical to efficient use of Project resources. Additionally, the present system of data collection and presentation does not provide management with current information for day to day decisions, is not providing feedback to field staff, nor is it providing the data that will clearly document Project achievements to allow a fair assessment for replication.

Recommendation. A management audit should be carried out to ascertain management responsibilities and more efficient lines of authority. At a minimum, a Deputy Director is needed to relieve administrative burdens from the Director and watershed managers.

Recommendation. The management information system should be reformulated with special attention paid to the Farm Plan.

d. Technical Components

The technical components of the Project have fared better than organizational goals. The erosion control program is being implemented with notable success. It is to the credit of Project management that the erosion control component has adapted well to farmer demands for more labor intensive methods of construction and fewer terraces. Costs are higher than anticipated which underscores the need to intensify the search for low cost systems that rely on local materials. Systems for accounting for the costs of different treatment alternatives and the quantification of benefits or erosion control -- especially on the quantity and quality of water -- are lacking.

Reaching thirty per cent of the farms in the Project area is a testimony to the extension component. The message carried by the extension is predominately concerned with soil conservation while the information carried on production techniques appears to be deficient, especially with regard to economic return. The independence of research activities partially explains this weakness.

The agenda of the research component appears to be set independent of extension activities. And the research is a notable lack of information being collected regarding economic variables. Integration of research and extension activities has to be achieved with extension taking the lead role.

The microeconomic analysis was updated within the constraints of data availability. From the private viewpoint it appears that the Project is still offering profitable advise to farmers in the Project area.

Recommendation. Lowering cost of various land treatments should be made an explicit target. Records of individual treatments should be maintained as a basis for documenting the cost implementations of alternatives. Waterways need special focus given their high cost.

Recommendation. A link has to be forced between research and extension. Extension personnel should take the lead to determine research priorities.

e. Financial Resources

With May 1979 as the effective starting date, the Project has not developed a track record on the rate of

expenditures. Technical assistance funds will be exhausted well before the recommended PACD. The kind of foreign advisors required should be determined as part of the reformulation of the implementation strategy. To cover technical needs, more reliance should be placed on Jamaicans. For example, we recommend that an agricultural economist from the MOA be assigned full-time to the Project.

The capitalization of the Soil Conservation Fund in complicated by the degree to which farmers are electing to carry out their own land treatment. While the Fund should not be abandoned, the language in the Loan Agreement should be changed to reflect current conditions.

Recommendation. The mix of technical advisors should be determined as part of the reformulation of implementation strategy discussed above. To partially alleviate the financial constraint, central A.I.D. projects should be investigated.

Recommendation. An Agricultural Economist from MOA should be assigned full-time to the Project.

Recommendation. The Loan Agreement should be amended to stipulate that the Soil Conservation Fund should be capitalized only with repayments of loans made to cover the twenty-five per cent share. When a farmer covers his required share in the labor contributions, no capitalization of the Fund is expected.

f. Replication Points

Finally, the report concludes with ideas on replication of the Project. These are by no means definitive and are meant to identify areas which should be considered in future decisions for projects with large soil conservation components.

14. EVALUATION METHODOLOGY

The Project Paper calls for an objective evaluation after the second full year of project implementation. At the request of USAID/Kingston's Rural Development Officer, Pat Peterson, the Office of Rural Development and Development Administration (DS/RAD) organized a three-person team to conduct this first interim evaluation. The team was headed by Ronald V. Curtis, a Rural Development Officer in DS/RAD. Mr. Curtis was accompanied by Roberto Castro, Agronomist/ Agricultural Economist (LAC/DR/RD) and James B. Lowenthal, Rural Development Management and Organization Specialist (DS/RAD). The Evaluation Team arrived in Jamaica Monday, December 3, 1979, and departed Saturday, December 15. With the exception of discussions with USAID/Kingston personnel Tuesday, December 4, and Friday, December 14, the team spent its entire time in the project area. The majority of this time was devoted to the Two Meetings Watershed, the site of the project headquarters, with short trips to the Pindars River Watershed.

The objective of the Evaluation Team was to document the progress accomplished since the project was approved in December 1977 and to identify issues for increased attention during the final two years of the project. Because of the late arrival of the TA team and project vehicles, USAID/ Kingston stressed particularly the importance of determining, to the extent possible, the impact of these delays on the capability of the project for achieving outputs within the initial time and resource constraints specified in the project paper.

Members of the Evaluation Team interviewed every member of the senior project staff, including the technical assistance advisors (TA team leader Roger Newburn was on leave in the U.S. during the evaluation), soil conservation and extension agents, officials of local farmer organizations and P.C. Banks, farmers, Ministry of Agriculture officials, and Peace Corps Volunteers assigned to the project area. Team members visited meetings of local organizations, farming demonstration sites, farms in various stages of farm development and implementation, and local marketing outlets. In addition to interviews and visits, the Evaluation Team reviewed a wide range of documents available at project headquarters. Frequently, senior project staff and TA Personnel were interviewed by two different team members as a check on the perceptions and conclusions which emerged during the evaluation.

15. EXTERNAL FACTORS

a. Economic Conditions

At the time of design and approval of the Project in 1977, Jamaica was well into a serious economic decline. A tendency for negative balance of payment positions was worsened by increases in oil prices, declines in production of bauxite and alumina, and reduced tourism. At about the same time, high rates of investment in tourist facilities and industrial plant and equipment came to a close as investment programs were largely completed. These factors led to increasing unemployment, exacerbated by increasing numbers of new entrants into the labor force each year. Government policy was also perceived as contrary to private business interests and led to capital flight, reduction in domestic investments, and decreased remittances from abroad. Together, these trends resulted in lower production and higher unemployment.

These trends have not significantly changed since 1977. Production has not recovered and unemployment continues to be a serious economic and political problem. The new problem is inflation.

The GOJ attempted to ameliorate the impact of the economic downturn by increasing government expeditures, devaluation, import restrictions, and stimulation of domestic production, especially foodstuffs.[1] As production lagged, fewer goods were available in the marketplace. Inflation reached 14 percent in 1977, rose to 49 percent for 1978, but fell to 18 percent for the first half of 1979.

This inflation has eroded the purchasing power of the GOJ counterpart. The U.S. dollar contribution, because of devaluations of the Jamaican dollar, has not suffered equally. Section 23e. Financial Resources analyzes the impact of inflation on the Project.

[1] Restrictions on imported foodstuffs have led to higher farm gate prices, a factor which contributes to the respectable financial returns from farming practices promoted by the Project.

b. Validity of Assumptions

(i) Goal.

(a) "High priority to increased agricultural production by GOJ and small farmers." Agriculture continues to receive high priority by GOJ. There is no evidence that small farmers are cutting back production.

(b) "Use of soil conservation measures and improved cropping methods will bring about significant increases in production." No information to validate or invalidate this assumption is yet available.

(ii) Purpose.

(a) "A.M.C. continues to offer guaranteed floor prices to farmers." True.

(b) "Casual labor available for employment on small farmers." True. No significant shortages reported.

(c) "Farmers maintain their treated land." No information available as yet.

(iii) Outputs.

(a) "Farmers' willingness to have land terraced." Farmers are apparently willing: approximately 30 percent of farmers in Project area have farm plans.

(b) "GOJ will develop a program of reforestation of land now in private ownership." A program for the two watersheds has been developed.

(c) "Unemployed manpower available in the area." No significant shortages of labor reported.

(d) "GOJ makes necessary decisions to allow P.C. Banks greater freedom in making loans." P.C. Banks are making loans to Project participants.

16. INPUTS AND PROCUREMENT

The cost and timeliness of Project inputs has varied. This section examines inputs from AID, loan and grant, and the GOJ.

a. Technical Assistance

Technical assistance costs are provided under the grant agreement signed in September, 1977. This agreement also covers the expected cost of training. Allocations were: Technical Assistance, U.S. $1,530,000; training, U.S. $470,000. Table I shows the type, length of service, and expected cost of expatriate technicians considered necessary for the Project.

TABLE I

TECHNICAL ASSISTANCE
TEAM COMPOSITION
PROJECT PAPER

TYPE	DURATION	COST
AID Project Officer	4 years	no cost
Soil Conservation	4 years	240,000
Ag. Extension	4 years	240,000
Horticulturalist	3 years	180,000
Farming Systems	3 years	180,000
Market/Agroindustry	2 years	120,000
Ag. Credit/Farmer Organization	3 years	180,000
Production Economics	2 years	120,000

In addition, 60 person months of short-term technical assistance were suggested at a cost of U.S. $270,000 ($4,500/month).

The cost of the technicians in the PP was seriously under-estimated. In the first place, the AID Project Officer was never assigned to the mission in Kingston. As the USAID mission grew in late 1977 and early 1978, personnel ceilings did not include a provision for this AID project officer. As a result, the administrative arrangements which would have been managed by the Project Officer became part of the RDO's workload. Given the RDO's full slate of duties in Kingston, he was unable to devote the degree of attention required by the Project. To compensate,

responsibility for many of the administrative arrangements was passed to the TA team leader. While this adjustment was very functional from the administrative point of view, it prevented the TA team leader from exercising a full-time technical role, either as the soil conservation or extension advisor, as anticipated in the PP. The absence of an AID Project Officer created a ripple effect in which USAID management responsibilities contemplated in the PP were transferred from the operating budget of the USAID mission to the grant agreement. This shift, combined with the effects of miscalculating the costs of technical assistance described below, placed an immediate strain on the resources available.

The substantial under-estimation in the Project Paper of the unit costs of U.S.-based technicians was another important factor. It is now costing roughly U.S. $100,000 per person-year for long-term technical assistance and U.S. $9,000 per person-month for short-term technical assistance. (These figures are in line with worldwide costs.) The Project Paper allowed for U.S. $60,000 and U.S. $4,500 respectively. Current unit costs are, therefore, running between 66 2/3 and 100 percent over budget. As noted below (23 e. Financial Resources) there was little relief afforded from the contingency allowance.

The result of these two factors -- no full-time AID direct hire to work with GOJ Project management and the under-estimation of unit costs -- is a technical assistance team substantially different from that contemplated. In total volume, little less than 13 person-years of long-term assistance can be provided with the funds budgeted, as contrasted with the 25 years programmed. The actual team composition looks as follows:

-- Team Leader, long-term, arrived September 1978.

-- Soil Conservation Engineer, long-term, arrived September 1978.

-- Agricultural Extensionist, long-term, arrived September 1978.

-- Horticulturalist, long-term, arrived September 1978.

-- Marketing/Agro-Industry Advisor, one-year, arrived September 1979.

-- Agricultural Credit Advisor, short-term, July to September and November to December 1979.

Several important skills have not been available on the team. The lack of a Farming Systems Specialist promotes an undesirable gap between research and extension. Limited services from an agricultural credit advisor raises serious questions about the viability of the credit program. Farmer organization development has been partially and inadequately treated. (The best work available on farmer organizations has been performed by contractors from Cornell University, funded largely from AID/W and attached to the Project).

The lack of a Production Economist is reflected in the paucity of available information on current costs of production, output prices, or expected income flows from approved farm plans. Short-term needs identified during implementation now have to be paid for from outside resources since the budget for this activity has been husbanded to defray the costs of resident advisors. The result is a shortage of critical technical skills for implementation. These shortages are discussed further in Section 23.

b. AID Commodities

A commodity allowance was estimated in the Project Paper at U.S. $1,750,000 to cover the purchase of heavy machinery (U.S. $1,300,000), vehicles (U.S. $250,000) and light equipment and supplies (U.S. $200,000). Procurement experience has been mixed. All of the major items have now arrived with the exception of spare parts and small equipment items.

The loudest complaint from project staff concerns vehicles which did not arrive until May, 1979. Until then project personnel were seriously limited in the work they could perform. Farms could not be visited to establish farm plans. Without farm plans few other activities could be scheduled. Project staff had limited means on which to rely. In some cases, TA personnel used their personal cars. In Pindars watershed, a 1954 Chevy, complete with driver, was hired to transport field crews. We concur with the views of project staff that effective implementation only began when the vehicles arrived.

Most heavy equipment, including the bulldozers, arrived essentially within the timeframe anticipated in the Project Paper. The only exception in this category appears to be the low boy trailer, the truck, and the mobile machine and repair shop. These items didn't arrive until late November 1979. Parenthetically, the mobile machine shop is now being made immobile. It is the experienced opinion of the head of

the repair and maintenance facility that the roads in the Project area do not allow efficient transport of the mobile machine shop and, pulling the shop around the countryside would result in the immediate loss of "the most complete set of tools found in Jamaica today apart from the aluminum companies."

The Summary Financial Plan allowed for the GOJ contribution to make up for the lack of AID-provided machinery in the first year by hiring machinery from private sources. GOJ contribution was set at 50 percent of the AID contribution for the first year, falling to 33 1/3 percent for subsequent years. This apparently was not done to any significant degree. After the arrival of the tractors the GOJ did hire a Low Boy truck and trailer to transport the tractors from one job site to another. Service was reported to be very poor.

The total cost of these commodities is substantially less than those budgeted. Fewer bulldozers were ordered than estimated in the PP. According to a summary procurement report at project headquarderts, the actual cost of heavy equipment and vehicles totals U.S. $1,200,000. Based on the Project Paper allowance of U.S. $1,550,000 approximately U.S. $350,000 remains unspent.

c. <u>GOJ Contribution</u>

As noted above it appears that the GOJ financial contributions were not drawn upon to acquire rental machinery or vehicles when AID provided resources were not available. In the case of vehicles, the most critical shortage, it is doubtful that a sufficient quantity of serviceable vehicles could have been rented in any case. In the case of heavy equipment, the paucity of completed farm plans meant there was little pressing work.

The formation of the GOJ implementation team proved difficult. The original Project Director was the Senior Conservation Officer for the Ministry of Agriculture and the IRDP form constituted only part of his wider portfolio. Senior management of the Ministry of Agriculture would not relieve him of his other tasks nor permit his full-time transfer to the project site. He was finally replaced in April 1979 by a full-time Project Director who has demonstrated effective managerial skills. There has also been some delay in the appointment of the key personnel. Once administrative procedures were established on how to draw down the AID loan, funds have been provided on a timely basis.

17. OUTPUTS

Table II reproduces the EOP's from the Project Paper. The text that follows provides the best available estimate of progress to date. At times, quantification of progress was difficult to establish due to difficiencies in the information system. Relative progress was also hard to establish because of the lack of interim targets.

The section is divided into six sections, following the categories in the PP: (a) erosion control, (b) agricultural extension, (c) farmer organization and services, (d) training, (e) rural infrastructure, and (f) agricultural research. This section is purposely descriptive. In Section 23, we have developed in some analytical detail what we consider to be important issues related to project goal achievement.

TABLE II

OUTPUTS AND EOPS

OUTPUTS	MAGNITUDE EOP
1. Development of Soil Conservation	17,700 acres treated
2. Reforestation	5,000 acres[1]
3. Roads	22 miles
4. Employment	1.1 million person-days
5. Intensified land Use	10,000 acres
6. Advanced training	30 participants
7. Demonstration and Training Centres	5 stations and 50 sub-centres by 78-79
8. Small farmer organizations	33 JAS and 4 PC Banks supported
9. Credit System	$1.6 million in credit distributed
10. Potable water	25,000 persons served by an adequate water supply
11. Electrification	15,000 people served by 96 miles of line
12. Rural housing	235 houses constructed or rehabilitated

[1] Loan agreement incorrectly stipulated 7,000 acres as requiring reforestation (Annex A, B.1.). This should be corrected.

a. Erosion Control

Erosion control has two major components, land treatments and reforestation. Streambed work is also included but is a minor activity.

(i) Land Treatment

The estimate of land requiring treatment is currently thought to be less than that contemplated in the Project Paper. Although not yet definitive, the 17,700 acres of the Project Paper requiring treatment are probably closer to 10,600 acres, covering both forestry development and land treatment.

There is also more consideration of less abusive forms of soil treatments, including more reliance on vegetation and establishment of permanent crops. These trends reflect the importance which participating farmers appear to be placing on less intensive production technologies. Not enough information is available at this time to indicate if these trends will continue throughout Project implementation.

Progress to date is reflected in Table III.

TABLE III

LAND TREATMENTS

	NO.	ACREAGE
Farm Plans Submitted	1212	4951
Farm Plans Approved	833	--
Plans under Implementation	556	2198

As there are no yearly land treatment goals, it is difficult to evaluate these early figures. The project staff considers the current pace to be too slow to complete the watershed in the time alloted. There are three primary reasons cited for the slow pace of implmentation: delays in forming the complete project team, early lack of vehicles for staff to visit farms to prepare the farm plans, and unseasonal rains this past summer. In effect, the project only began implementation this past May with the arrival of vehicles.

(ii) Forestry

Forestry activities include land acquisition for establishment of public forests and a program to encourage forestry development on private lands.

Table IV shows the progress of the forestry subcomponent on private and public lands up to November 30, 1979. The area reforested represents 13.3 per cent of the target for private lands and 2.5 per cent for public lands. On the other hand, counting the areas with approved plans (private) or purchase approval submitted (public) the areas shown represent 46 per cent and 30 per cent respectively of the targets. With this rate of progress, 2000 acres of private land of 3000 acres of public land could be reforested within the current life of the Project.

TABLE IV

FORESTRY

	Private Farms				Public Lands		
	Re-Forested		Plans approved		Re-Forested	Acres	Purchase
	Farms	Acres	Farms	Acres	Area	Purchased	Pending
Two Meetings	89	171	206	504	26	3	251
Pindars	64	96	155	414	50	23	640
TOTAL	153	267	361	918	76	26	891

The Project Agreements require the development of a subsidy scheme for private holdings. This has been done and implementation recently started. For participating farmers, the GOJ covers 60 percent of the cost of establishment and pays for the first three cleanings of bush. An additional bonus payment of J$40.00 per acre year for five years is also paid to the landowner. From limited discussions with farmers and the data presented above, it appears that the scheme has merit.

b. Agricultural Extension

Agricultural extension agents have been placed in almost all of the twenty sub-watersheds (six in Two Meetings and nine in Pindars River). In each watershed, the activities of the extension agents are co-ordinated by a senior agricultural extension officer.

Extension agents have typically received two years of training at the Jamaica School of Agriculture. The agricultural extension agent in a given watershed works in close collaboration with a soil conservation agent and is supported in his or her work by three assistant field agents and a district officer (Peace Corps Volunteer). Because both extension and soil conservation agents assist the farmer in the development of farm plans (and conversely, the soil conservation agents are frequently called on to give advise in areas normally associated with agricultural extension), it is difficult to determine the selective impact of the extension agents. If one considers that farm plans are, on the other hand, the result of the extension program, one can speak more authoritatively. Though October 1979, extension and soil conservation agents made 5207 visits to farmers, primarily to discuss the development and implementation of farm plans.

Since April 1979, and including data through October 1979, the extension program has resulted in:

- o Completion of 1,212 farm plans (30% of the target farm population)
- o Approval of 833 farm plans by project senior management (21%)
- o 556 farm plans in various stages of implementation (14%)

During the past five months, the rate of monthly increases in farm plan development, approval, and implementation has been impressive: an average of 22 per cent monthly increases for plans submitted, 31 per cent for plans approved, and 26 per cent for plans entering various stages of implementation. In terms of acreage, submitted farm plans cover 4951 acres (28% of 17,700), of which 2198 (12%) are under implementation.

Another activity of the extension program includes farm tour/demonstrations and field days. Through October 1979, 25 tours have been conducted for an average of 7 farmers for each tour and 15 field days averaging 11 per field day. No

data has been kept for the number of livestock extension visits, but the livestock extension officer is currently working with 45 farmers on activities initiated by the project. Finally, the two Home Economics extension officers have made 224 home visits, some of which concern home gardening techniques.

c. Farmer Organization and Services

According to the Project Paper, support for farmer organizations would include the provision of training and seed grants designed to strengthen the capability of these organizations. Small farmer organizations specified as the main beneficiaries of this support are local branches of the Jamaica Agricultural Society (JAS), Peoples Cooperative (PC) Banks, and farmer co-operatives.

(i) J.A.S.

The Project area contains 32 local JAS branches, only eight of which were actively functioning as of January 1979. As of November 1979, 23 JAS branches were holding regular monthly meetings, with an average of 15 farmers attending each meeting. The increase in active JAS branches is apparently a result of the efforts of the Project's Assistant Training Officer (referred to as the Small Farmer Organization Training Officer), who requested the officers of inactive branches to call a meeting at which the I.R.D.P. was discussed. Either the Small Farmer Organization Officer or a Soil Conservation/Agricultural Extension agent has attended subsequent meetings in order to continue providing information concerning I.R.D.P. activities and progress.

(ii) P.C. Banks

The Project Paper anticipated that four P.C. Banks would serve the credit needs of farmers in the project area. As of November 1979, four were providing loans to farmers, although three of the banks have accounted for over 90 per cent of the loan activity. (Since the fourth bank is located on the periphery of the project area, its low level of activity does not represent a problem.) Loan advisory committees have approved 125 loans totalling $134,867 (J$238,715), only $42,286 (J$74,847) of which has actually been disbursed. Loans average approximately $1,100 (J$2,000) per farmer with 65% of the loans being disbursed in cash and the remainder in kind. (Here and elsewhere in the PES $US = $J1.77) The project supports the salaries of

three clerks who have been hired at the three most active P.C. Banks to handle project-related loan activity. The clerks have received one-day of formal training (see "Training," part 17d in this section).

(iii) Farmers Co-operatives

The arrival of the Marketing Advisor in September 1979 has stimulated attention on the marketing potential of local organizations. The advisor has made a number of talks to JAS and co-operatives concerning the nature of marketing and marketing strategies. As of November 1979, no grants have been made to local organizations for marketing purposes. On the recommendation of the Project Director, however, the Permanent Secretary of the Ministry of Agriculture approved a loan of $28,000 (J$50,000) to the Christiana Potato Growers Co-operative Association. The loan is designed to augment the association's inventory of farming implements available to small farmers in the project area. No co-operative groups have been formed in the project area as a result of I.R.D.P. initiatives nor has any training been provided for local co-operatives previously active in the area (During the month of November, the project received several requests for assistance in forming collective groups for the purpose of marketing but these groups have not yet materialized.)

(iv) Development Committees

The project has opted for the creation of Development Committees as the primary organizational vehicle for farmer involvement and participation. Initially conceived of as over-lapping with sub-watershed boundaries and as independent of JAS authority, DC's are now being organized as semi-autonomous entities of JAS's and overlap parish boundaries. As of November 1979, six DC's have been organized. DC's are composed of seven farmers (two of whom serve as officers) who are elected at a monthly meeting of the local JAS branch and one or two Project representatives. Membership in the DC's is restricted to farmer participating in the I.R.D.P. The DC's meet once a month (mid-way between JAS meetings) and are usually well attended. The primary activities of DC's apparently have been limited to the identification of community needs for which the committees would like I.R.D.P. assistance. The I.R.D.P. has recieved requests from 15 of the remaining 17 JAS branches to form DC's in their jurisdictions.

Given the Project Paper's focus on farm development and implementation, the issues of farmer organization development have been largely neglected. The Project Paper,

itself, gives no direction as to how capability development is to occur and allocates few specific resources even though this development is considered a principal output. The importance of developing an operational strategy for the development of farmer organizations in the project area cannot be overstated if the project is to accomplish realistically many of its goals. (See section 23c. Local Organizations for further comments on this point.)

d. Training

The Project Paper is both vague and contradictory with regard to the issue of training. In the text, 30 participants are to receive training, without distinction between long and short-term training. Elsewhere, the text specifies 40 person-years of long-term academic training while the total of the subject-person breakout is 41 years of long-term training (Annex 3, p. 8). The long-term training is budgeted for $410,000 which leads credence to the latter figure, calculated at $10,000 per person-year. The absence of clear goals for training makes an assessment of progress impracticable. The scope of training activities to date is summarized in Table V below. These activities are divided into short and long-term participant training (out of country) and short-term in-country training. Three individuals have attended short courses abroad as well.

TABLE V

TRAINING

TITLE	TERM	SUBJECT	DATE
1. Participant Training			
a. Assistant Project Director	24 mos.	Agronomy (B.Sc.)	August 1979
b. Senior Soil Conservation Officer	24 mos.	Agronomy (B.Sc.)	January 1980
c. Senior Soil Conservation Officer	24 mos.	Agronomy (B.Sc.)	January 1980
2. In-Country			
1. Soil Conservation/ Agricultural Extension Agents (20)	4 wks.	Soil conservation	Feb. - Mar. 1979
2. Field Assistants (20 each session)	40 2 wks.	Survey, layout supervision soil conservation	April and June 1979
4. Senior Administrative Staff	36 3 days	Planning and assessment	Aug. 1979
5. Home Economics Extension Agents	32 4 wks.	Home economics extension techniques	Sept. 1979
6. Agricultural Credit Board Officers, P.C. Banks Clerks, Agricultural and Soil Conservation Agents	50 1 day	Agricultural credit	Sept. 1979
7. District Officers (PCV's)	18 2 wks.	Soil Conservation Techniques	Oct. 1979
8. Home Economics Extension Officers (sponsored by MOA)	2 3 days	Home economics	Dec. 1979

The unit-costs estimated in the PP for long-term participant training ($10,000) are insufficient for funding the anticipated number of individuals. The current per year unit-cost utilized in most AID-financed projects is between $15,000 and $18,000. The Ministry of Agriculture is purchasing a building in Christiana which will be converted into a training facility capable of housing 30 participants. This facility will be an important asset as the project increasingly pursues short-term, in-country training strategies.

e. Rural Infrastructure

Three activities comprise the rural infrastructure component: potable water for approximately 25,000 people, rural electricification for an additional 15,000 people, and construction or improvement of 235 houses. In addition, construction or improvement of approximately 22 miles of road, included in the erosion control component, is scheduled. These activities are to be carried out by other GOJ agencies: National Water Authority for potable water, Public Service Company for electrification, the Housing Scheme of the Ministry of Agriculture for housing, and the Ministry of Public Works for road improvement. The extent of progress achieved for these components varies.

(i) Potable Water

In May, 1979, the first allocation of U.S. $84,746 (J$150,000) was made to the National Water Authority to expand the Christiana/Spalding water supply. No data was available on status of the expansion program.

(ii) Rural Electrification

By April, 1979, 54.73 miles of line were reported completed with another 15.99 miles under construction. No data was available on the number of additional customers served.

(iii) Housing

By September, 1979, three applications for improved housing had been approved. Eighty houses are reported to have been constructed in the Crofts Hill area under the Land Lease program.

(iv) Roads

By May, 1979, the implementation plans for roads were complete, the first allocation of U.S. $84,746 (J$150,000) was made to the Ministry of Public Works, and the field survey started. Approximately 16 miles of roads will be ready for construction in January 1980.

f. Agricultural Research

The agricultural research component has established four demonstration centres, two in each watershed, with a fifth scheduled for Pindars watershed. They are located at Rhoden Hall, Kellits School, Coleyville, Butlers Run, and the newest at Morant.

There is no primary focus of research with regard to domestic vs. export, traditional vs. nontraditional. New crops are receiving limited attention (winged bean, vegetables, and peanuts, for example). The research on some crops is clustered to provide more information on intercropping and multiple cropping combinations which would allow more intensive cultivation of the treated land. Yam and bean, coffee and banana, bean and potato and are some combinations under examination while at the newest center at Morant, pine and coffee intercropping will be examined.

Data on costs of inputs and value of output is reportedly being collected but no analysis is available. This has implications for the content and credibility of the extension program. There is little evidence of structured, two-way communication between the extension services and the research component. The demonstration centres are managed by the research unit but the demonstration sub-centres are under the control of the extension service. (Of the latter, only two in Two Meetings have been established with 11 additional identified for Pindars. Fifty were proposed in the Project Paper). There is no evidence of programmed flow of experience from one to the other.

16. **PURPOSE**

a. "Increase hillside agricultural production on small hillside farms in the Pindars River and Two Meetings watersheds." Production increases have not yet been achieved.

b. "Control soil erosion in the watersheds." It is too early to measure the impact of the soil conservation programme on soil erosion. The EOPS condition suggests that soil erosion will be reduced from 53 tons/acre/year to seven tons/acre/year by the end of the project. This estimate is based on extremely limited experience with experimental terracing. More realistic measures of the effects of soil conservation have to be developed.

c. "Strengthen the human resource capacity of the Ministry of Agriculture." Activities are on-going to achieve this project purpose. By early 1980 three participants will have departed for long term training in soil conservation. Other participants will follow. Short-term training courses, some held abroad and others in-country, will reach a wider spectrum of MOA personnel.

The most important means by which skills are acquired in implementation of development programs with a strong soil conservation component will be through the experience of this Project. Lessons learned here by MOA personnel will become the most important font of expertise for future replications.

19. GOAL

Statement: "To improve the standard of living of farmers in Jamaica by increasing income and providing improved roads, housing, electricity, and potable water."

It is too early to determine if incomes have increased as a result of project interventions. It is clear that steps have been taken that will deliver increased public services -- roads, water, electricity, housing -- to the people in the Project area.

Sub-goal: "To establish an agricultural production model that can be replicated on small hillside farms."

The Project has not generated sufficient experience as yet, but several issues have surfaced which bear on replicability potential. The issues are addressed in Section 23 f.

Soil conservation has already been accepted in principle by about 30% of farmers in the project area. Time is necessary to determine if farmers are committed to maintaining lands which have been treated and employing improved production techniques on that land.

20. BENEFICIARIES

The direct beneficiaries of this project are the farmers who agree to develop and implement farm plans designed to protect the land and increase productivity. Skilled and unskilled workers employed as a result of Project activities are also important beneficiares. As of October 31, 1979, about 30% of the farmers in the project area had developed farm plans, farmers who will receive (or who have already begun to receive) the benefits of improved agricultural productivity and increased income. Detailed information on these acceptors is not yet available, but a baseline survey has been completed and an analysis of acceptors by the Cornell University Anthropologist is underway.

The Project Paper states that soil conservation and forestry activities will generate approximately 1.1 million days of employment. As of October 1979, these activities had generated 33,746 days of employment. It is interesting to note that the methods for preparing bench terraces, which can be shaped either by machine or by hand, are being cleared by hand at a rate far exceeding PP projections. The shifting emphasis to labor-intensive methods should provide relatively greater benefits in terms of employment generated. On the other hand, reduction in the amount of land to be terraced will reduce employment generation.

Indirect benefits include the improvement of the infrastructural base in the project area. These benefits include 55 miles of electric power lines and the beginning of construction of 16 miles of road by January 1980. Eighty houses have been reportedly constructed in the Crofts Hill area under the Land Lease program and the MOA has approved housing applications from 3 farmers. Data on the expansion of the Christiana Water Authority to serve an additional 25,000 individuals in the project area is incomplete.

Other benefits, as yet unquantifiable, will result from the Home Economics component, which is providing, inter-alia, family planning and nutrition services. A handy craft cooperative and marketing outlet recently refurbished by the home economics component will provide increased employment opportunities to women in the Project area. The Project is currently awaiting approval from the MOA for authorization to hire 10 home economic extension agents.

The most significant, indirect, benefit is the preservation of the patrimony resulting from the soil conservation efforts. Improved quality and quantity of water resources and reduced danger from floods are important benefits to be enjoyed by downstream residents.

22. LESSONS LEARNED

Basically, the lessons learned are derived from the start-up experience of the I.R.D.P. and they are, in a real sense, not new lessons at all. We repeat them here because the regularity with which these lessons are "re-experienced" in A.I.D. projects demonstrates that they have not been learned. These lessons fall into three categories: start-up procurement, project systems development, and social science applied research.

a. Start-up Procurement

The vehicles required for farm plan development and extension did not arrive until 18 months following project approval and six months following the settling in of the advisory team. Effective implementation was delayed almost two years. The first strategic decision facing the project, therefore, was whether to begin lobbying for a project extension before any concrete progress had been accomplished. Certainly the discontinuity in the presence of USAID personnel responsible for project implementation was a factor in this delay. Such discontinuity, however, is common and should be taken into account for its ill-effects on project start-up.

b. Project Systems Development

The importance of the timely collection and transmission of data required for decision-making cannot be overemphasized. USAID/Kingston recognized this fact and acquired short-term consultant services to address this issue. Several months following project approval, an experienced consultant arrived to work with project staff on information system design. Several factors, however, combined to negate the usefulness of the preliminary design. Fist, neither the host country project staff nor the advisory team had been constituted. Second, real implementation did not begin until almost a year later. The unused system had no internal constituency to support its use. Third, actual project implementation proved more complex than the design was capable of dealing with (this is almost always true). The lesson is that significant design efforts must be invested with the actual project staff both prior to project start-up and at regular intervals during implementation. Data requirements, external conditions (e.g., complexity of the task environment), and key actors change, and these changes must be taken into account in system design or system functioning.

c. Social Applied Science Research

Regardless of the nature of the technology being transferred, projects must be implemented in cultural settings with established patterns of belief, tradition, and communication. One cannot assume that the provision of appropriate technical expertise, for example, - soil conservation - is sufficient to assure project success. Technicians rarely have the data available for determining what factors will be associated with adaption of the new technology. The collection of this data should be the responsibility of a full-time project staff member. The subjects for data collection, like the information systems design, should be worked out with project staff before implementation begins and periodically re-thought during the course of implementation. A critical element of this activity is its capability for regularly feeding back data to the project as well as for measuring longer term changes. Applied social science research is in this sense, a valuable adjunct to the Project's information system.

23. ISSUES AND RECOMMENDATIONS

In this analysis section, we hope to place the Project in a context which may not be so obvious from our comments above. Whereas the preceeding sections were organized according to the outline of the Project Evaluation Summary and were largely descriptive, this section focuses on key issues in implementation, analyzes implementation experience, and reaches conclusions about that experience. Recommendations are presented at the conclusion of each section.

a. Project Orientation

Project staff has made significant, even laudable, progress in reaching the target population. As noted elsewhere, about thirty per cent of the farms have made the first step of completing, with extension and soil conservation agents, a farm plan. Farms with completed land treatments fall well short, of course, of this number. But considering that the staff actually received the necessary tools for work only this past May, the achievements to date are to be applauded.

What is not evident, perhaps, in the naked figures but obvious to the visitor's eye is that the farms reached so far clearly belong to A.I.D.'s target population. A majority of the farmers receiving assistance owned less than five acres (approximately 60%). It is also obvious that the staff assembled by the Government of Jamaica is capable of reaching even more farms.

But the success of the Project hinges not on the ability of the staff to treat several thousand acres of land within the time alloted. Success will be determined by what happens after the land is treated. What must be understood, and continually repeated, is that the I.R.D.P. is a development project with a strong soil conservation component, not a soil conservation project with development aspirations. As such, the major unknowns revolve around the farmer's household, not with techniques of land treatment. The erosion control program will be effective only if it continues to be in the private interest of the farmer. The Project staff must understand what the private interest is, how to match that interest with the goals of the Project, and how to establish systems that will support the pro-conservation production techniques coming from the Project. This task, this larger socio-economic task, is, we argue, indispensable for realization of the Project goals. To achieve this larger task, changes are required in implementation of the Project.

In broad strokes, the key element of this strategy is to focus increasingly on strengthening the local organizations in the Project area. The organizations will in turn, assist in the implementation and carry on the support functions once the Project terminates. Of primary interest should be the Peoples Cooperative Banks and the local chapters of the Jamaican Agricultural Society.

By investing time and resources in the local organizations, and Jamaica is rich in local organizations, and using them to implement project activities, Project staff will be laying a strong foundation for post-implementation maintenance in the Project area as well as for replication in other watersheds. Given the experimental nature of the Project, the limited amount of funds available, and the need to learn-by-doing, it should be made clear here that we are not proposing support for the national organizations represented by the chapters or branches in the Project area. While their support is necessary, their needs could well exhaust the resources available under this Project. What is expected, of course, is that the national organizations will have a much more active role to play when it becomes possible to replicate the project in other watersheds.

More time is required for implementation. The pressure felt by the Project staff of the PACD, September, 1982, to achieve the soil conservation component of the Project leaves little energy for consideration of post-project activities. We strongly recommend that the PACD for the Grant and Loan Agreements be extended two years to September, 1984.

Recommendation. The implementation strategy should be reformulated to address specifically the developmental goals of the Project. This will require a more measured and deliberate implementation pace as well as additional attention to local organization development.

Recommendation. Extend the PACD of the Project Loan and Grant Agreement to September, 1984.

What follows is more detailed support for this recommended change in focus with analysis of specific project components. The suggestions presented are done so with the objective of providing Project management with implementation assistance. When all is said and done, it is very much the opinion of the Evaluation Team that the Project has made significant progress and has the potential to realize much more. Following each section, the reader will find recommendations for action to address the points identified.

b. Local Organizations

In various places, the PP refers to the importance of strengthening the capability of small farmer organizations for providing inputs, credit, and marketing services. The following statement summarizes fairly concisely the position vis-a-vis small farmer organizsations which has been frequently articulated in the PP and in I.R.D.P. literature:

> Groups of farmer associations for the purpose of considering their plans and sometimes engaging in unified action represent the best alternative to improve the credit, inputs and marketing services available in the project areas. The project proposes no preconceived "best" structures as group activity and will attempt to assist and develop groups of farmers organized as cooperatives, associations, or societies (PP, p. 34).

In our interviews with a wide range of project staff, we have discovered no dissent in the importance of working with small farmers organizations. The Project, however, has failed to come to grips fully with the resources and strategies required to bring about the active participation of small farmer organizations. This failure has serious implications for the functioning of almost every component of the program, including extension, credit, marketing, social services, research and demonstration, and by necessity, therefore, for the very success of the project.

It was originally proposed that the agricultural credit advisor would also be a farmer organization specialist. He would be responsible for working with branches of the Jamaican Agricultural Society (JAS) for organizing cooperatives (in collaboration with the agro-industry/marketing specialist) as well as for working with credit institutions. It was also presumed that the JAS chapters were actively functioning and would not require any start up organizing:

> The approach will not require the creation of any new organizations or institutions, nor are any planned in the project activity. What will be required are incremental changes in behavior on the part of farmers and managers of institutions to undertake innovations that may initially be perceived as representing higher risk when compared to traditional practices (PP, p. 35).

In reality, only 8 of the 32 JAS branches in the project area were actively functioning as of January 1979. The first issue for the project therefore, was to "revitalize" the JAS's. The Project did not provide however, any one individual to take on that role. A long-term credit advisor

has not yet been hired and short-term assistance only became available in mid-summer. The marketing advisor did not arrive until September, 1979. The project addressed the need to organize inactive JAS's by assigning local organization responsibilities to the Assistant Training Officer (hired in January 1979). This role became defined in practice as contacting officers of inactive JAS branches and requesting them to call a meeting at which I.R.D.P. activities could be discussed. The strategy for dealing with active JAS's has been to provide current information on I.R.D.P. programs and benefits.

An additional resource on which the I.R.D.P. was able to rely was the research provided by two Cornell University Research Associates living in the project area and collecting data. The investigations of Dr. Blustain and Mr. Goldsmith have contributed importantly to the project's current knowledge of local organizations in the project area and to the conceptualization of their role in support of project goals. Mr. Goldsmith returned to Cornell in the fall of 1979 but Dr. Blustain has been extended until summer 1980.

A major departure from the PP was the decision by the project to <u>create</u> Development Committees (DC) in each sub-watershed as the primary organizational vehicle for the participation of small farmers in the implementation of I.R.D.P. activities. The justification for this appears to reside primarily in the Project's concern for control over distribution of benefits and the fear of politicalization of the Project.

During the summer of 1979, Project policy regarding the DC's continued to evolve. The Development Committees are strongly linked to the JAS, both geographically and organizationally. The DC's exist as a sub unit of a JAS chapter and elected officials of the DC's are often the same individuals that are elected officers of the JAS. The most important difference between the two units is that membership in the DC's is limited to active participants in the I.R.D.P. This organizational distinction between the DC's and the JAS is not clearly understood by all farmers or even all Project staff. What does appear to be understood is that the DC's are creatures of the I.R.D.P. To the extent that the I.R.D.P. is known to have a finite life, then one must suppose that the DC's are also perceived as such. When the Project ends, so will the DC's.

The creation of the DC's has contributed an additional organizing task for the I.R.D.P. (six have so far been established with requests from 15 of the remaining 17 active

JAS to form DC's). Organizing constitutes more than the calling of a meeting, the election of officers, and the updating of I.R.D.P. progress. Organizing requires skills for promoting and motivating participation, planning and mobilizing scarce resource, and controlling planned activities within time and resource constraints. Community developers in the United States have painfully discovered that organizing the poor is no easy task.

A review of I.R.D.P. resource deployments demonstrates that the project has not adequately confronted the resource intensive demands of the organizing tasks. In fact, the assistant training officer is being reassigned to full-time marketing duties as of the beginning of the year.

One might raise the question at this point as to why the I.R.D.P. should devote substantial resources into strengthening JAS, DS's and other cooperative associations. The answer is that over twenty years of experience in rural development demonstrates the absolute necessity of activating farmers to take more responsibility for demanding and participating in the delivery of the services provided by a government agency. The I.R.D.P. is now in the process of developing a package of technical solutions to the agricultural problems confronting farmers in the project area. In practice however, making this information available by itself will do little more than support the individual farmer for as long as the technical assistance is in place. Upon the completion of this intensive phase, new practices could well be abandoned unless low cost systems are in place to continue necessary educational and logistical support. Collective action by the farmers themselves appears to be the only long term, cost effective solution. Collective action also implies organization, and organizations require socio-managerial skills.

The ability of the project to learn how to transfer effectively these skills to farmers in the Project area could be the most important contribution to the replicibility potential of the project. By investing local organizations with effective organizational skills, the cost of future replications can be greatly reduced. The organizational solutions, as much or more than the technical solutions, are critical in making the cost of rural development bearable in Jamaica.

Two other critical functions, financing and marketing, are provided by local organizations. Through some JAS branches and the marketing boards, small farmers of Jamaica, including those in the project area, are better served by markets than most small farmers in Latin America. The road

network is impressive in comparison to other developing nations. Farm gate food prices are, for the most part, high by international standards. Probably unique in Latin America, except for coffee, is the access of small farmers to export markets through the marketing boards.

The marketing of staple food crops, however, is problematic. The Agricultural Marketing Corporation and higglers are the primary buyers. Food crop marketing is not as efficient as the marketing system for export crops but this is an experience shared around the world. The basic problem is that food staples are highly perishable. Processing to extend shelf life is limited and expensive. The higher weight per unit of value limits the distance one can profitably transport items such as yams and potatoes. There is little quality differentiation by consumers, and thus higher prices for quality producers.

c. Management Capability

The task environment of the I.R.D.P., complex initially, is becoming even more so. As described in the PP, the task demands for co-ordination and control include both production (research, extension, marketing and credit) and infrastructure (roads, rural electrification, potable water, and housing). The effective management of such a portfolio is no mean feat. In addition, new types of tasks may be added to the project's management burden. The A.I.D. office of Women in Development has designed a Home Economics Extension Unit -- 30 more staff when fully geared up and a range of services. Finally, A.I.D.'s Office of Education is funding radio transmissions into the project area. Exploiting this communications technology will increase the demands on the extension services. While the management resources have responded well enough so far to provide sufficient control, they have been stretched extremely thin.

The combination of additional services and the increasing rhythm of the original components poses a serious problem for I.R.D.P. management. This problem of management overload will also be felt at lower levels of the project where agriculture extension officers will be the focus of conflicting demands. Role conflict and role ambiguity at this level could produce disorganization and a severely reduced capability for service delivery.

The rapidly evolving nature of the project's task environment suggests that an assessment or audit of its management strategy is appropriate. Such an audit will have

implications for the allocation of responsibilitites both within and outside the project. Within the project, management must develop roles which can absorb routine activities, thus freeing key staff for dealing with novel situations. For example, it is apparent that the director spends far too much time with visitors, logistics, procurement, information dissemination, and some representational activities. The addition of a capable deputy director for administration could relieve much of this routine load from the director. Assignment of public relations and information management as the sole responsibilities of different staff would also help.

Another response to the management overload is to externalize, whenever possible, management responsibilities for discrete tasks or activities. The case in point relates to several of the infrastructure components. The lack of low cost procedures for periodic reporting and quality control of externally managed activities has resulted in heavy demands on the Project Director's time.

The management of the Project clearly recognized these factors and initiated a process of dialogue to confront changing conditions. In late August 1979, the Project Director conducted a three day weekend retreat at which staff examined the impact of current implementation experience on initial Project assumptions. The press of implementation, however, threatens a full exploitation of this event. The retreat initiative should not be lost.

Management training could also be profitable for all levels of Project staff. This training would take the form of management development with training tailored to the level in the organization. Management training workshops could also provide occasions for generating creative solutions to problems which the organization is confronting.

The I.R.D.P. has given more attention to the data requirements of decisions than many organizations confronted with less complex task environments. It is precisely the complexity of its task environment, however, which makes more important the timely provision of data to decision makers in a form that is readily useful. In addition to the needs for data as input into decisions, the project must simultaneously consider the direction of data flows. Substantial benefits are being foregone by neglecting the use of data as a stimulus for the operational staff.

In the beginning of the Project, an attempt was made on a component by component basis to determine the information needs and the systems (procedures, forms, roles) for

collecting the required data. During the project, ad hoc systems have developed as new needs for information have been identified. The result is that much data is not collected in an orderly manner, important areas are being neglected altogether, and other data is collected but not utilized.

Within the Project, there is no central place responsible for making available periodic summaries of data or generating special reports from data already on hand. The only periodic summary is the monthly report, much of which is either difficult to interpret or too out of date to be very helpful.

A primary example of how an "ideal" element of information system has proved far less useful than the original design is the Farm Plan. The Farm Plan document is the keystone of the management system for the Project. It is the instrument that transmits direction from the individual farms to Project management. Land treatment activities are defined here. Extension work has to be shaped to coincide with the new cropping paterns. Credit needs are identified and justified. Since timing of farm off-take can determine the product price and thus farm income, marketing implications are inherent in the information contained in the Plan. If nutritional goals are more actively pursued, then data on family consumption patterns could create additional requirements.

The format is not up to all these demands. Everyone in the Project is unhappy with the document as a planning tool, usually for some particular reason related to individual operational tasks. Some have already redesigned certain components. But isolated attempts to reshape the document will not solve the problem. The solution may not necessarily reside in one document although a single document seems most efficient. In any event, project staff must, as a whole, examine the document, and determine its content and role. It will probably take a few more iterations before a satisfactory, not perfect, format is created.

Another area in which data seems to be sorely lacking is the cost of agricultural production. There is little attempt to collect this data despite the fact that the estimated benefits of this project are based on representative farm productoin models which have not been well validated in the project area.

What seems to be required, then, is both an information system audit and the development of creative ways to use information. Such an audit would have to take into account

the resource constraints which make the development of burdensome systems impractical. The audit will require project staff to invest some energy into an analysis of their component's decisions and the data required for these decisions. While it is usually helpful for this analysis to be catalyzed by the presence of an outside consultant, no system designed ex machina will be of any sustained help.

Recommendation. A management audit should be carried out to ascertain management responsibilities and more efficient lines of authority. At a minimum, a Deputy Director is needed to relieve administrative burdens from the director and watershed managers.

Recommendation. The management information system should be reformulated with special attention paid to the Farm Plan.

d. Technical Components

(i) Erosion Control

Erosion control in the Project has two main parts: soil conservation and reforestation. The first gives emphasis to terracing, ditching, waterways and pasture land. The PP proposed performing terracing and ditching using machine-intensive practices in an attempt to speed-up soil treatment and lower costs.

Progress to date appears to be lower than that implied in the PP. There are several reasons for these short-falls. First, the vehicles to transport crews did not arrive until May 1979. Second, the planned rental of heavy equipment to begin work before the arrival of loan financed equipment did not take place. Third, unseasonal rains in 1979 halted all soil conservation work. Fourth, the 12-hour day proved to be unacceptable to work crews. Fifth, farmers have tended to choose hand-built terraces (with the farmer contracting for the work) over machine-built terraces, making efficient sceduling of machine time more difficult.

The cost of land treatments and reforestion has increased over estimates in the Project Paper with the costs of machine built terraces increasing more than hand built terraces. This is partially due to the fact that farmers are choosing to establish terraces by hand. Taking the construction contract themselves, they have been able, it is reported, to cover the required 25 percent contribution through a combination of their own labour and negotiation of lower payments for the labour contracted. The farmer, in effect, is earning a contractor's fee for managing the construction of terraces on his property.

By reducing the number of terraces built by machine the cost per terrace must rise. Longer distances between farms results in more downtime. Additionally, the expectation in the PP that machines and crew would work 12-hour days, six-day weeks proved unfounded. Eight-hour days and five day weeks are the rule. Current cost estimates, exclusive of waterways, are shown in Table VIII.

TABLE VIII

LAND TREATMENT COSTS

	J$/acre	Percentage Change
Terraces: Machine built	1,390	+ 84
Terraces: Hand built	1,835	+ 47
Orchard Terraces	735	+ 22.3
Basins, pasture and Hillside ditches	230	- 51.5
Forestry Development	325	+ 33.2

Another important change is the amount of production time farmers would lose. After terracing, the PP estimated that at least one green crop to increase soil fertility would be necessary, especially if the new benches were composed of sub-soil material. Farmers are instead going immediately into production, increasing soil fertility with animal manure, with no apparent loss of productivity. This means that the opportunity cost of the terraces, measured here in terms of lost production, is zero. It is too early to tell if this experience will be continued throughout the Project Area.

Systems to collect and move water off treated land to common streambeds are built as part of land treatment. When a waterway serves more than one farmer, the GOJ pays. For those waterways that are an integral part of a farmer's land treatment package, the cost is included and the farmer pays 25 percent.

The cost of waterways is higher in practice than estimates in the Project Paper and is of increasing concern to the Soil Conservation Unit. PP estimates consistently fell below J$ 350 - 400 per acre of treated land while current estimates average around J$900.

The technology for constructing waterways requires prefabricated sections of concrete and wire built near project headquarters. These sections are transported to the field where a waterway crew is responsible for installation. Installation has been done by Project crews, special contract teams, and the farmers. The quality of installa-

tion has been mixed but sufficiently poor to cause concern. Some waterways will require extensive repair. Additionally, an excessive number of check dams appears to have been built.

Efforts are underway to find lower cost alternatives. Spillways partially constructed from live bamboo plants are used at one farm visited. While considerably cheaper, constant vigilance and maintenance are required. Lighter weight and longer prefabs constructed from asbestos and concrete are also being tested. Although transport costs are reduced (lighter weight), the initial cost is higher.

Forestry appears to be an alternative that is increasing in importance even for even small farmers. As a soil conservation tool, forestry is particularly apt for many of the steep slopes found in the Project area. The serious drawback has been economic. Can forestry produce an economic rate of return that competes with alternative uses of the land? More importantly, can forestry provide an income stream that meets the financial needs of small farmers? The answer is a tentative yes.

The subsidy scheme for forestry planting, even on small farms, appears to be attractive. Research on coffee and pine intercropping shows some promise and could smooth out the income cycle. The forestry component has established a credible existence that meshes well with the Project.

Given the delays and the rapidly approaching completion date, all energies have focused on establishing the land treatment, with very little effort addressed to maintenance. Management is very aware of this but has not had the time to focus on this critical component of the project. Without proper maintenance the resources invested in land treatment will be for nought.

A note of concern for future programs is that no efforts are being made to measure the extent of reduced erosion and improved supply and quality of water as a result of the land treatments. No baseline data has been collected nor has a system been proposed to collect such data.

<u>Recommendation.</u> Lowering costs of various land treatment should be made an explicit target. Records of individual treatments should be maintained as a basis for documenting the cost implications of alternatives. Waterways need special focus given their high cost.

The following tables present the best estimates available to date on costs of land treatments.

TABLE IX

COST COMPARISON BY LAND TREATMENT
(J$/Acre)

TREATMENT	PROJECT PAPER	CURRENT	PERCENTAGE CHANGE
1. Bench Terraces			
a. Machine built	754.50	1,390.00	84
b. Hand built	1,249.00	1,835.00	47
2. Orchard Terraces	600.00	735.00	22.5
3. Hillside Ditches, basins and pasture	473.30	230.00	- 51.5

TABLE X

AREAS PROPOSED BY TREATMENT
(Acres)

TREATMENT	PROJECT PAPER	CURRENT	% CHANGE
1. Bench Terraces			
a. Machine built	3,995	1,380	- 66
b. Hand built	605	1,380	+128
2. Orchard Terrace	1,005	600	- 40
3. Hillside Ditches and basins	10,763	-	-
4. Pasture and Hillside Ditches[1]	1,350	-	-
5. Hillside Ditches	-	6,460	-
6. Basins	-	3,230	-
7. Pasture	-	810	-

[1]The current approach is to treat separately Hillside Ditches from basins and pasture. Emphasis is on minimum soil movement.

TABLE XI

COST COMPARISON BY WATERWAY TYPES

TYPE OF WATERWAY	PROJECT PAPER J$/Acre	CURRENT J$/Chain	CURRENT J$/Acre	PERCENTAGE CHANGE
1. Grassed	85.00	40.00	475	438
2. Ballasted	-	187.00	340	-
3. Prefabricated	220.00	207.00	870	295
4. Asbestos	-	345.00	1,348	-
5. Stepped	350.00	-	1,817	419

Note. 1 chain = 66 feet.

(ii) Agricultural Research and Extention

Experimentation with different crops and demonstration of the results to Project farmers takes place at three different levels. First, agricultural research beyond the confines of Project boundaries takes place at Allsides, a Government of Jamaica facility partially supported by I.I.C.A. Part of the wider MOA research network, this station focuses on traditional crops such as yellow yam, red beans, and ginger.

The second level is the demonstration center, under the management of the research component of the Project. A wider spectrum of crops is under investigation, including vegetables for home consumption and domestic markets.

The third level is the sub-demonstration centers. Located in the sub-watersheds, these centers are under the management of the extension wing of the Project.

The primary function of the demonstration centres and sub-centres is to show farmers the benefits of new cropping patterns on terraces. To do so, requires agricultural research directed towards increasing the productivity and production of the treated farms. Research should emphasize multiple cropping and inter-cropping systems and conduct adaptive research on crops, including non-traditional crops. In addition, testing different modes of appropriate tech-

nology, such as the use of small tractors or roto tillers and solar powered systems for drying products, was proposed in the Project Paper. The emphasis has to be on production systems immediately applicable to Project farmer's needs.

This three tiered system is not fully operational. Only a few sub-demonstration centers, under the management of the extension wing, have been established. The demonstration centers, two in each watershed, are being operated by research technicians and a third is proposed. The difficulty lies not in what has or has not been achieved. Rather it is the separateness of the two activities, research and extension, which became apparent during the evaluation. Research technicians are developing their own agenda while extension activities proceed apart. The schism between the two is illustrated by the following incident.

One member of the evaluation team visited a farm accompanied by a soil conservation agent. This was one of the first farms to receive services under the Project including a loan to finance production activities after the land treatment. Later in the same day the same farm was visited by another evaluation team member, accompanied by technicians from the research unit. The farm was presented as one of the sub-demonstration centers used by the extension service and an example of how the research results were being used in the field. It was later confirmed that the farm was not a sub-demonstration center.

The incident demonstrates more than a momentary lapse in communications within the Project. It is symptomatic of a system where research activities are pursued independently of the client. With little communication between extension and research, one has to wonder about the message carried by the agent to the farmer.

The role of agricultural extension, as described in the Project Paper, was that once farmers had their lands treated, the extension service would see that farmers received adequate instruction in improved farming systems. In conjunction with this, the necessary inputs and credit would also be made available to participating farmers, possibly through local branches of the JAS or other cooperative groups. It was further contemplated that these orgazations would also assist in the marketing of farmers' produce and close linkages would be developed among the activities of purchasing agricultural inputs and the provision of agricultural credit and extension services.

The activities in which the extension system is actually involved do not fit this model. While there is close

linkage between soil conservation and extension activities, the relationship of extension with research, credit and marketing is poor. Although the experiment station at Allsides has some research results suitable for transmittal to farmers, extension service agents do not appear aware of them. Information on costs and yields of the recommended inter-cropping systems on the newly treated lands, necessary for credit determination, are not normally provided. There is a strong consensus in the Project that the extension officers should not have responsibility for credit repayment. Consequently, loan repayment depends on the good will of the borrower since the credit institution, the People's Co-operative Bank, has no facility for active loan recuperation.

In the same vein, marketing information, prices and forecast production levels, are not part of the information base carried by agents. Without this information, recommendations made by extension officers could prove detrimental to the farmer's interest. This is especially true in the case of thin markets for some vegetable crops. Excessive production by even a few farmers can flood a relatively small market and cause unwelcome price decreases.

The few farms visited suggested possible defficiencies in the research and extension services. Weed and pest infestations indicate that farmers are not receiving the necessary information for dealing with these common maladies. Field assistants, who usually have a high school background, often lack the training required for providing reliable information to farmers concerning the range of technical factors inherent in complex inter-cropping systems. This could be partially remedied by giving field assistants more intensive training in a limited number of crops. By narrowing his scope of expertise, greater quality control could be exerted. Moreover, the source of that expertise should be the research unit. The setting of the research agenda should flow from problems ecountered by farmers. The extension arm is the link between farmers and researchers. Research pursued independently of a clear effort to discern farmers' needs is a luxury the Project cannot afford.

In the long run, extension services should focus on farmer organizations and farmer leaders as transmission vehicles for new technologies as they are developed and refined. As the Project moves to completion and the intensity of extension necessarily is reduced, the local organization must fill the gap. The roles of both the soil conservation and extension personnel should also be reexamined. As more and more land becomes treated, the soil

conservation personnel should acquire more of the present extension function. This would free extension personnel to support other aspects of the Project. For example, extension agents could be trained to collect information on the credit limits which a farmer could reasonably expect to bear. They might also work with farmers in understanding repayment schemes.

Finally, the addition of the Home Economics Component to the Project adds a new dimension to extension. Household decisions on consumption, as well as production, have to be accounted for. While it is clear that this very important element should proceed, it is also clear that lessons from the comparison extension efforts should be learned, namely, the how of extension and the content of the message.

Recommendation. A link has to be forged between research and extension. Extension personnel should take the lead to determine research priorities.

(iii) Economic Analysis

Forestry

The PP estimates an expected gross income of J$3,080 per acre from land devoted to timber production. The total cost for reforestation is estimated at J$441, J$244 for establishment costs and J$197 for maintenance. If overhead and management costs are not taken into consideration, the average annual income is J$137 per acre.

The following analysis (based on the accompanying Tables XII to XV) is intended to re-calculate these estimates using current prices and costs. Table XII shows the changes in current costs of production, land acquisition, and subsidies in relation to PP estimates. Total costs for reforestation have increased by more than 50 per cent, basically as a result of higher labor costs. Land values show a very strong increase of 400 per cent, reflecting, it is believed, expectations from services and future benefits derived from I.R.D.P. implementation.

The subsidy system for reforestation has also changed. The PP suggested that a 40 per cent subsidy of establishement costs and a cash incentive amounting to 5 per cent of those costs would be implemented. Currently the subsidy is 60 per cent of the establishment and maintenance costs and a cash bonus of J$200/acre over 5 years. Though these subsidies seem quite large (J$526/acre), compared to the cost of land terracing they represent only 50 per cent of the subsidy for machine built terraces (J$1,042), 38 per

cent for hand built terraces (J$1,376), and 95 per cent for orchard terraces (J$551). Furthermore, those land treatments require waterways with costs ranging from J$340 (ballasted) to J$1,817 (stepped) per acre, which are fully subsidized in most cases.

The current costs for reforestation by activity are given in Table XIII. The establishment costs amount to J$325/acre and maintenance costs J$276. The distribution of those costs among farmers (private) and the GOJ (social) under the present subsidy scheme is given in Table XIV. Farmers' net cost reflects the difference between their share in production costs and the cash bonus.

Table XV reflects the expected costs and returns derived from pure pine stand compared with coffee-plantain and pine-coffee associations. These figures, expressed in terms of present values at a 10 per cent rate of discount, indicate that the average annual expected income from pure pine stand will be J$274/acre if all of the income goes to the farmer. (There is some thought being given to the GOJ and the private producers sharing income as well as costs.)

The association of pine and coffee has special relevance. At present coffee is the most important cash crop, enjoying attractive prices and absence of serious pests such as "broca" and "rust". These maladies have seriously reduced the coffee supply from Central and South America. If Jamaica can manage to keep their coffee plantations free of disease, coffee seems to be very promising for the coming years. The forestry department of the MOA has conducted experiments, with favorable results, of the coffee-pine association. Though some soil acidity problems might be expected, so far the results do not show a significant decline of coffee productivity. If this association is agronomically feasible, economically it is highly desireable. First, coffee provides income from the 3rd year to the 25th when pine should be harvested. This provides income for farmers in the medium term as opposed to long-run returns from pure pine stands. Second, the forest harvests reduce the risk of coffee which comes from variations in world supply and disease. If the main coffee producing countries overcome the current phytosanitary problems and their weather conditions improve, the world supply could increase significantly with a subsequent depressing effect on prices. Finally, under present conditions, the expected average annual net income of the coffee-pine association (Table XV) is J$705/acre during a 25 year period, as compared with pure pine stand of J$274 or the traditional pure coffee stand of J$550.

In summary, due mainly to inflation and expectatic costs of reforestation have increased more than 50 per cent, land value for forestry purposes raised by 400 per cent, and subsidies more than 400 per cent over PP estimates. Although the increase in subsidies is quite large in percentage terms, in nominal values and compared with subsidies for soil conservation treatments, it is not.

TABLE XII

ESTIMATED CURRENT COSTS FOR REFORESTATION
(J$/Acre)

ACTIVITIES	PROJECT PAPER	CURRENT	PERCENTAGE CHANGE
a. Establishment	244.00	325.00[1]	33.2
b. Maintenance for lumber	197.00	349.00[2]	77.2
c. Total cost for lumber	441.00	674.00	53.0
d. Land acquisition	100.00	500.00	400.0
e. Subsidy cost of production	97.60[3]	326.40[4]	224.4
f. Subsidy in Cash (Bonus)	12.20[5]	200.00	1,539.0

1. Overall current estimates: J$300 - 350/Acre
2. Weeding during 1 - 3 years, estimated in J$219/Acre
3. Based on 40% subsidy of establishment costs
4. Based on 60% subsidy of establishment and maintenance during 1st 3 years J$544/Acre.
5. Based on 5% of establishment costs.

Sources:

1. Interview Mr. R. Watson - Assistant Director Supervisor - Forestry I.R.D.P. and Project working documents.

TABLE XIII

PRODUCTION COSTS FOR REFORESTATION
(J$/Acre)

YEAR	ACTIVITIES		COST
1. 1st Year:			398.00[1]
	a) land preparation	100.00	
	b) digging holes and planting	120.00	
	c) Planting material	30.00	
	d) transportation	75.00	
	e) weeding (1)	73.00	
2. 2nd Year:			146.00
	Weeding (2)	146.00	
3. 8th Year:			130.00
	a) Pruning	30.00	
	b) Thinning	100.00	

[1] Establishment cost: J$325.00/Acre

TABLE XIV

PRIVATE AND SOCIAL COSTS
(J$/acre)

	PRIVATE			SOCIAL		
YEAR	Cost[1]	Bonus	Net Cost	Cost[1]	Cash Subsidy	Net Cost
First	159	(40)	119	319	40	279
Second	58	(40)	18	168	40	128
Third	-	(40)	(40)	40	40	40
Fourth	-	(40)	(40)	40	40	40
Fifth	-	(40)	(40)	40	40	40
Eighth	130	-	130	-	-	-

[1] Costs of establishment and maintenance up to the 3rd year are distributed as follows: 60% project and 40% farmers.

TABLE XV

COSTS AND RETURNS FROM PINES, COFFEE-PLANTAINS, AND PINE-COFFEE

(in J$/Acre as Nov. 30, 1979)

	PINE[1]		COFFEE/PLANTAIN		PINE/COFFEE[2]	
Year	Costs	Benefits	Costs	Benefits	Cost	Benefits
First	437	40	832	-	770	-
Second	166	40	253	240	251	-
Third	40	40	910	1700	870	1200
Fourth	40	40	1193	1940	1080	1600
Fifth	40	40	1385	2650	1330	2400
Sixth			1875	4000	1830	4000
Eighth		3400	2125	4800	1830	7400
Ninth - Forteenth			2125	4800	1830	4000
Fifteenth		7000	2124	4800	1830	11000
Sixteenth-Twentieth			1875	4000	1580	3200
Twenty-first-Twenty-fourth			1385	3200	1330	2400
Twenty-fifth		40000	1385	3200	1330	42400

[1] Assumes 60 per cent subsidy in costs and J$200/acre bonus. The bonus is counted as a benefit as well.

[2] Production of coffee is 17 per cent less than pure coffee stand.

Farm Model

The PP indicates that the representative farm in the Pindar area will have an increase in income of 140 per cent. Farm income in Two Meetings is expected to increase by about 173 per cent. This will result from soil conservation treatments accompanied by production systems based on yam, red pea, banana, coffe, sugar cane, and potatoe. The purpose of this section is to re-examine the PP analysis in light of current conditions.

Between the PP model and current practice, several differences are noted: less area to receive soil conservation treatments, higher costs per acre treated, and somewhat better ideas about suitable crop combinations. It must be noted that data on costs of production and yields were found with great difficulty. The quality of the data is suspect.

The representative farm models under traditional land use and practices and with 1979 costs and prices provide a net income of J$630 in the Pindars River watershed and J$875 in the Two Meetings area (Table XVI). The basis for these estimates is given in Table XIX which summarizes results from experimental work in the Allsides experimental station for the yam and red pea combination as well as adjustments from coffee yields.

The area of land which will be under soil conservation treatment and the uses are indicated in Table XVII. Currently, it is thought that less land will be treated (1.34 acres) for the representative farm than considered in the PP (1.8 acres). This implies that the forestry component should be increased from 0.5 to 1.8 acres as a means to reduce soil erosion and allow production activities to be carried out within the family labor constraint. In addition, there is economic justification in favor of this shift; current and expected prices for forestry products suggest an attractive return with less risk.

The expected income derived from modern agricultural practices are shown in Table XX. It must be pointed out that these incomes will be realized only if a complete technological package is transferred to the farmer. Soil consevation is only one component of this package and by itself will not have a significant impact on increasing farmer income unless other components are available. Agricultural research, extension, credit, and marketing, are among other factors called to play an important role to induce technological change.

The private costs of land treatment and watersheds (Table XXI) indicate relative low cost to the farmer, based

on the subsidy scheme currently applied. This table also suggests that farmers could pay a larger share of the costs if the transfer of the technological package is successful. In fact, Table XVIII indicates that farm net income could be increased by more than 100 per cent for Two Meetings watershed and more than 200 per cent for Pindars River area.

These income gains are based on representative farms, it must be remembered, with bench terraces, where intensive cultivation will take place, which constitute less than 10 per cent of the total area. A larger area is assumed to be planted in permanent crops such as coffee, citrus, and pine. Not included in this analysis is the promising research on interplanting coffee and pine. It appears that farm income could be substantially increased over the long term by such a combination.

In summary, given the current scheme of subsidies and services provided by the Project, farmers will benefit. The benefit will be realized in the long-run and only if a complete technological package is available.

TABLE XVI

FARM MODEL EXPECTED INCOME WITH TRADITIONAL PRACTICES (1979 J$)

	PINDAR RIVER		TWO MEETINGS	
LAND USE	ACRES	INCOME	ACRES	INCOME
Intensive (Yams & Peas)	0.6	520	0.85	740
Coffee	0.6	90	-	-
Coffee & Plantain	-	-	0.85	135
Sugar Cane	0.5	20	-	-
Fallow	0.8	-	0.8	-
Other	0.4	-	0.4	-
TOTAL	2.9	630	2.9	875

TABLE XVII

CURRENT EXPECTED INCOME FOR A MODEL FARM
(1979J$)

	Land	Crop	Acres	Net Income
1.	Bench terraces[1]	Yams & Red Peas and Onions	0.28	1,026.00
2.	Orchard[1] Terraces:	Oranges	0.06	20.00
3.	Hillside Ditches and Basins	Coffee & Plantains	0.98	725.00
4.	Forestry[2]	Pine	1.18	323.00
5.	Other land	-	0.40	-
		TOTAL	2.90	2,094.00

[1] Areas under different soil conservation treatments have been re-estimated in the Retreat Report. The soil conservation targets have been significantly reduced as compared with the PP figures.

[2] According to forestry targets, the area to be reforestered should be 0.5 acre. The Retreat Report suggests a pasture area of 0.08 acres. With no significant livestock production an appropriate use of this land is forest.

TABLE XVIII

INCREASE IN FARM INCOME DUE TO THE PROJECT

Watershed	Net Income Before Project	Amortization soil cons. cost [1]	Net Income after project	Percent Change
1. Two Meetings	875	43.00	2,097	134
2. Pindars River	630	43.00	1,885[2]	192
Weighted average (1/3 farms in Two Meetings: and 2/3 in Pindars)				173

[1] Annual amortization of soil conservation treatments under current subsidy scheme, at 8% rate of interest and 5 years for repayment.

[2] Assuming that costs of transportation for the Pindars area are higher.

TABLE XIX

COSTS AND RETURN OF TRADITIONAL CROPS
(J$/acre)

CROP	COSTS	GROSS INCOME	NET INCOME
1. Yam & Red Peas[1]	-	-	870
2. Coffee & Plantains[2]	570	730	160
3. Sugar Cane[2]	410	450	40

[1] Based on Allsides estimates, 40% of figures obtained from experimental results.

[2] Current value of PP figures, discounted of 10% rate of interest rate.

TABLE XX

EXPECTED PER ACRE INCOME FROM IMPROVED PRACTICES
(J$/acre)

CROP	NET INCOME
1. Yams & Red Peas & Onions[1]	3,665.00
2. Oranges[2]	337.00
3. Coffee & Plantains[2]	740.00
4. Pines[2]	274.00

[1] Based on 60% of results obtained at Allsides station.

[2] Estimated annualized values for 1979 prices, based on costs and returns for the economical life of each crop and discounted at 10%.

TABLE XXI

PRIVATE COSTS OF SOIL CONSERVATION TREATMENTS FOR A REPRESENTATIVE FARM

	LAND TREATMENT	UNIT COST (J$/acre)	AREA ACRE	TOTAL COST	FARMERS COST[1]
1.	Bench Terraces				
	a) machine built	1,390	0.14	195	49.00
	b) hand built	1,835	0.14	257	64.00
2.	Orchard Terraces	735	0.06	81	11.00
3.	Hillside Ditches and Basins	230	0.98	225	56.00
4.	Waterways				
	a) stepped	1,817	0.28	509	0
	b) prefabricated	870	1.04	905	0
	TOTAL			1,414	180.00

[1] Under the 75% subsidy scheme for (1) (2) and (3) and 100% for (4).

e. Financial Resources

(i) Expenditures

There is incomplete information at the Project site on the rate of expenditures. Reports for GOJ expeditures appear to be credible but the financial officer was not available for confirmation.

It is reported that by the close of GOJ FY 79 (April 1979) the GOJ had spent J$541,600. An additional J$1,105,500 was expended during the period May to October, 1979. Project expenditures increased in May, 1979 with the arrival of the vehicles. This figure should increase substantially when agricultural credit flows increase.

Loan and grant contributions reported in the monthly reports are clearly not related to rates of expenditures. The same figure is reported for both April and October. These figures most likely represent amounts presented on AID documents. Table VI presents the data.

TABLE VI

CUMULATIVE PROJECT EXPEDITURES

	GOJ (J$000)	AID (US$000)	GOJ (J$00)	AID (US$000)
Soil Conservation	109.3	-0-	278.5	-0-
Forestry	27.0	-0-	72.2	-0-
Engineering Works	0.8	-0-	29.9	-0-
Demonstration and Training Centres	46.0	0.7	62.7	0.7
Small Farmer Services	4.4	-0-	30.1	-0-
Agricultural Credit	-0-	-0-	61.9	-0-
Comodities:				
Heavy equipment	-0-	720.0	10.3	720.0
Vehicles	-0-	366.6	-0-	366.6
Other	0.7	29.4	-0-	29.4
MOA Operating Exp.	314.8	-0-	150.3	-0-
Water System	-0-	-0-	1.5	-0-
MOA Personnel	-0-	-0-	380.4	-0-
Electrification	-0-	-0-	-0-	-0-
Housing	-0-	-0-	-0-	-0-
Evaluation	-0-	-0-	-0-	-0-
Technical Assistance	21.4	574.0	-0-	574.0
Training	-0-	5.0	18.9	5.0
Contingency	17.1	-0-	-0-	-0-
TOTAL	541.6	1,695.8	1,105.5	1,695.8

Of special concern is the rate of draw down of grant funds for technical assistance. As noted above, technical assistance costs for the Project were substantially underestimated. Because of this, the number of resident advisors (and short-term advisors) have been kept to a minimum: four resident advisors were joined recently by a marketing advisor for a one year assignment. Assuming this team is kept in place until September 1980 (it is inadequate for the range of tasks outlined above), approximately nine years of technical assistance will have been used, leaving four years for the remainder of the Project. (Short-term assistance funds, also underestimated for the number of person months proposed, are not included in this analysis.)

Table VII demonstrates the relationship between the resident advisors and the Project calendar.

TABLE VII

TECHNICAL ASSISTANCE

	TA PERSON YEARS	CUMULATIVE PERSON YEARS	PP SIGNED	TA TEAM ARRIVED	PACD LOAN	PACD GRANT	PACD PROPOSED
Sept. 1977			XX				
Sept. 1978				XX			
Sept. 1979	4	4					
Sept. 1980	5	9					
Sept. 1981	4	13			XX		
Sept. 1982						XX	
Sept. 1983							
Sept. 1984							XX

Thirteen years of resident technical assistance will have been completed in September, 1981. If this mix of skills were appropriate for Project implementation and if implementation had proceeded as outlined, there would be little need for concern. (Why the PACD of the Loan Agreement is September, 1981 is a mystery. It is assumed that, at a minimum, the PACD of the Loan Agreement will be extended to September, 1982.) Given the high level of skills available in Jamaica, despite recent migration of professionals, Project staff could complete the Project complemented with participants trained abroad.

The problem, however, is that the present TA team does not represent what was proposed in the PP nor what is

needed. Specific identification of skills could not be done as part of this evaluation. But it is clear that advisors with different skills and experience will have to be brought into the Project in order to complement local talent.

To the extent possible, Jamaican skills should be drawn into the Project. An agricultural economist from the Ministry of Agriculture, for example, assigned to the Project, could provide much of the technical input required for specific components of the marketing and credit component, data collection for evaluation, and calcualation of returns from agricultural research findings. Some skills will still have to be drawn from abroad.

Financing for this additional technical assistance will be a problem. AS shown above, funds for resident advisors will be exhausted by September 1981, if not sooner. Several options, not mutually exclusive, can be considered:

a. Request additional grant funds.
b. Request additional loan funds.
c. Transfer training from grant to loan financing, leaving for later the question of sufficient funds for loan funded activities. This would provide approximately four and one-half years of resident advice.
d. Draw on loan funds for the additional TA leaving, as above, the sufficiency question for later.
e. Change the mix of the present TA team to focus on the local organizational tasks as opposed to engineering. There does not appear to be much scope for this.
f. Internalize management of the TA team within the Project staff and have the team leader fulfill a dual role, technical and managerial. The USAID or GOJ Project staff would have to acquire some of the housekeeping functions currently covered by the present team leader.
g. Switch from a resident TA mode to one of programmed short-termed visits by technicians. This can be cheaper and more effective once Project staff has passed the initial hurdles of implementation and acquired technical basics.
h. Expand the draw on other non-Project resources such as being done in the case of Dr. Blustain and was done for the WID component. DS/RAD centrally funded projects are particularly appropriate for this Project and could provide more assistance. The advantage is that these Projects already have a subject matter focus, bringing worldwide experience to bear on specific problems, and carry some of

their financing. By sharing costs Project resources are multiplied. Assistance in agricultural credit from Ohio state, organizational and managerial assistance from Development Alternatives, and continued and possibly intensified assistance from Cornell University, are especially appropriate for the Project at this stage of implementation.

Recommendation. The mix of technical advisors should be determined as part of the reformulation of implementation strategy discussed above. To partially alleviate the financial constraint, central A.I.D. projects should be investigated.

Recommendation. An agricultural economist from MOA should be assigned full-time to the Project.

(ii) The Twenty-Five Percent Solution

The Loan Agreement requires a Soil Conservation Fund to be established and capitalized by the 25 percent contribution coming from participating farmers. (Section 5.2 (a)) These funds are to be used for soil conservation activities in watersheds other than Two Meetings and Pindars, presumably when the lessons learned from the I.R.D.P. are ready for replication. It is not clear that these required deposits are being made. Moreover, it is not clear that it is in the best interests of the Project or Jamaica to make such deposits.

Where farmers elect to take a loan for their 25 percent share, repayments could naturally flow to the Fund. They would be flowing in at about the same time that work in other watersheds began. This is what appears to have been intended. However, the more common case is where a farmer elects to contribute his 25 percent by his own labour and takes a construction contract, covering his share by discounting the contract 25 percent. The share exists only as a book-keeping entry. Strict interpretation of the Loan Agreement would require that the 25 percent be deducted from Project funds at the time of the transaction and deposited in the Fund. Such monies would sit idle until a companion project were mounted in another watershed. These funds are better used now rather than waiting for another opportunity.

Recommendation. The Loan Agreement should be amended to stipulate that the Soil Conservation Fund should be capitalized only with repayments of loans made to cover the twenty-five per cent share. When a farmer covers his required share in the labor contributions, no capitalization of the Fund is expected.

(iii) Inflation

Inflation was not an issue when the Project was prepared. Contingency allowances in the Summary Financial Plan, the closest to an inflation factor, amounted to 2.9 percent over the life of the Project. This is equivalent to an annual inflation rate of six-tenths of one per cent.

Inflation is now a major problem in Jamaica. In 1978, an annual rate of 48 per cent was recorded. This fell to 18 per cent for the first half of 1979 (January to July). The impact of this inflation in the Project is closely related to the recent devaluations of the Jamaican dollar.

In 1977 the U.S. dollar bought 1.25 Jamaican dollars. At present the rate is J$1.77. This represents an increase in value of the U.S. dollar of 41 per cent for the Project. That means the local currency costs of the Project could increase by 41 per cent and still be covered by the residual value of the U.S. dollars in the loan.

The largest component of the Project requiring Jamaican dollars is wages for labour, especially for land treatment. And the primary cost factor is the minimum wage. This has increased over the period 1977 to 1979 from J$5.30 to J$7.30, an increase of 37.7 percent.

The 41 percent increase in value of the loan dollars appears to offset the increase in wages. But salaries of Ministry of Agriculture personnel are not protected by a dollar denominated loan. The amount of inflation induced increases in government salaries was not readily available for this evaluation. Increased GOJ contribution to cover inflation as the Project moves into the latter years of implementation will be required.

U.S. inflation, not Jamaican, is also affecting Project resources, especially technical assistance costs. In addition to a serious under-estimation of technical assistance costs, U.S. inflation was not taken into account to arrive at the expected cost of foreign advisors. While this inflation factor is overshadowed by the original under-estimation, continuing TA costs will be affected by U.S. inflation.

f. REPLICATION POINTS

1. The Project is a socio-economic development effort, not an engineering task. The techniques of soil conservation have to be mastered (and developed to some degree) but the critical variables revolve around decisions made by farmers regarding which lands will be treated, how they will be treated, what the land-use pattern will be for the treated land, what the productivity of the new land will be, and how long the land treatment lasts. If the private decision maker is ignored or treated merely as a labor input, t .e Project will fail. The farmer must be convinced that the Program is in his interests and he must have access to the necessary resources for implementation.

2. There are two sets of costs and benefits in soil conservation: (1) private costs borne by the owner of the land, which must be included in the calculus of potential net benefit, and (2) public costs related to public benefits. In the latter case, the public benefits from having a stable, productive land base and efficient watersheds which can protect downstream residents. One cannot ask the private landholder to bare the public cost nor should the public reward unduly the private landholder. In practice, it is very difficult to find the right formula which apportions costs equitably and efficiently.

In the present case, the evidence suggests that farmers may be willing, to and are financially able, to pay more than the twenty-five per cent now required. First, most farmers are covering their contribution by taking a contract to build the terraces themselves. By a combination of negotiated rates with hired labor and providing some labor themselves, the twenty-five per cent, and maybe more, is covered. No cash outlay is required. Second, the contracts are calculated on a basis of the minimum wage for Jamaica. As soil treatment takes place during the dry season, a natural idle time for farmers, the minimum wage may in fact overstate considerably the market wage. With few alternatives for productive employment, farmers may be willing to pay a larger share -- accept a lower wage. This possibility is enhanced since the work performed is on his own land. Third, farmers are not, as previously thought, required to forego a year of production while soil fertility is re-established. With natural fertility of the soil and treatment with animal manure, farmers are able to plant and reap on schedule. Fourth, although information is still skimpy, there appears to be substantial financial benefits forthcoming from the farming practices proposed by the Project. The complete package, including terracing, is a good investment.

The combination of all these factors suggests that the farmer could pay a larger share. This would reduce considerably the unit cost to the public sectors.

3. Not all land requires treatment to stabilize a watershed. In the case of the Project, is was orginially estimated that 17,700 of the 29,000 acres required treatment of some sort. More intimate knowledge of the Project area has resulted in an estimate of 10,600 acres. Thus the cost of treating the watershed has been reduced significantly. The cost of stabilizing a watershed should not be expressed as a unit cost per acre treated. The appropriate unit cost of stabilizing a watershed is the total cost of treatment divided by the number of acres in the entire watershed. Thus the per acre cost of land treated would be $26,000,000 divided by 10,600 or $2,452.83. The per acre cost of treating the watershed, however, would be $26,000,000 divided by 29,000 acres or $896.55.

4. In the extreme, the cheapest way to stabilize the watersheds would be to abandon all crop production, annual and permanent, and plant trees. Barring this, it is generally true that the more land devoted to permanent crops, the less erosion. Change from intensive cultivation, annual crops, to permanent crops reduces the number of terraces required, the most expensive and radical form of land treatment. To some degree, this appears to be what is happening in the Project Area. Permanent crops are less labor and drudgery intensive, appealing characteristics for farmers advancing in years. Production of food crops would suffer if this trend continued and were magnified, but there are alternatives to hillsides for staple food production.

5. Replication in Jamaica should depend on the degree to which lower cost alternatives are developed during implementation. The Project is experimental. As such, efforts must be made to direct the experiment and document the results. Some important areas for investigation are: (a) gauging the extent to which farmers are able and willing to shoulder the cost of on-farm treatments; (b) cost reductions through the use of local materials such as bamboo for waterways; (c) cost reductions by passing some of the organizational costs from public agencies to participant supported bodies; and (d) experiments with differential levels of field personnel in the watersheds. These are but a few points that should secure attention on the cost side.

Calculation of the benefits has not progressed beyond the exhortations in the Project Paper. Nothing is being done to monitor the changes in water quality and supply as a result of the land treatments. Work on measuring the econo-

mic impact of the Project has started with the collection of baseline data but analytical work on what constitutes "income" and " an improved standard of living" must continue. Otherwise, measurement of the socio-economic benefits will be greatly hampered in the future.

Together, the costs and the benefits, will provide guidance for future decision-makers. Critics who see only the high cost of development of hillside farms must be shown the accompanying benefits.

6. There does not appear to be any particular point when a watershed is treated. From an economic point of view, one could not argue for a perfectly stabilized watershed, especially when people have to co-habitate with plants and animals. But some land treatment is always going to be better than none.

This begs the development question. One does land treatment as part of development package which leads not only to less of the farm washing down the hillside, but a higher standard of living for those individuals whose productive resource base is limited to a small parcel of land perched on a hill. If productive alternatives are available, they should be pursued with vigor.