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ISSUES AND ALTERNATIVE STRATEGIES  
FOR PROJECT 0052

by

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## LIST OF ACRONYMS

CARTO	Central Agricultural Research and Training Organization
CID	Consortium for International Development
FY	Fiscal Year
GDP	Gross Domestic Product
IBRD	International Bank for Reconstruction and Development
LCPP	Livestock Credit and Processing Project
MOA	Ministry of Agriculture
MOE	Ministry of Education
UNDP	United Nations Development Program
USAID	United States Agency for International Development
YARG	Government of the Yemen Arab Republic

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### A SUGGESTED OUTLINE FOR THE BUSY READER

Read pages 1, 2, 17-20, and 48-59. Tables 1 (page 18) and 3-10 (pages 49-56) summarize many of the budget alternatives available to Project 0052.

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## Introduction

It is important to recognize that Yemen is not a typical developing country. By and large, Yemen has been spared the distortions which hamper broad-based development efforts in so many other countries. Urban/rural, centralization/decentralization, employment and income distribution distortions are minimal or, at worst, much less serious in Yemen than in the typical developing country. Because of opportunities for male workers to migrate to high paying jobs in Saudi Arabia, wage rates for unskilled labor are quite high. Because of foreign job opportunities unemployment is not a problem, and income is widely distributed, at least among households with able-bodied males. Central government influence outside the urban centers is weak and, as a result, local communities most often take the initiative in providing services such as water, roads, and schools. Private enterprise is vibrant and operates with little or no government interference or subsidized competition from government enterprises. Because many of the best jobs are located outside Yemen, there has been less pressure to migrate to cities. Much of the Yemeni population is rural with most migrants preferring to use their own villages as bedroom communities rather than move their families to the city.

The absence of many of the typical distortions which accompany development simplifies the task of designing an agricultural development support program. The program is relieved of the difficulties of attempting to alleviate the existing effects of very powerful socio-economic forces. New programs are, of course, not alleviated of the responsibility to avoid creating or contributing to unemployment, income distribution, centralization, and urbanization problems. But this responsibility is much less demanding than the requirement to contribute to the alleviation of deeply imbedded distortions.

Having cleared the air by identifying a series of issues which are less important for Yemen than in most developing economy settings, we are free to turn to a discussion of program issues that are relevant to the Yemen context. These issues are set out in the following sections. Included are alternative goals for an agricultural assistance program, environmental factors, and future constraints to agricultural development. Following a lengthy consideration of these issues, the discussion turns to a brief description of possible program components. Since existing budget limitations make it impossible to implement each possible component, the next step is to identify alternative strategies in the face of limited resources. There follows a summary of the potential, beneficiaries, technical feasibility, required YARG contributions, and possible alternatives for each program component. Another section identifies alternative programs which represent a coherent approach to programming and, in addition, satisfy FY 82 budget constraints. The final section explores the possibility that some program components might be financed by other donors.

#### Alternative Goals for an Agricultural Assistance Program

Development of a strategy for assistance to the Yemen Arab Republic should begin with an examination of goals. There exists a wide range of conceivable goals, and it is unlikely that all can be satisfied with the resources available. One can expect that the different actors, including USAID, the YARG, and recipients of assistance, will apply different priorities to choices among the goals. These issues are identified and discussed below.

One of USAID's goals can be stated as seeking to improve the quality of life of people in developing countries, with special emphasis on the needs of the least fortunate. Quality of life, of course, has several dimensions. Such diverse elements as health, freedom to control one's own destiny, access to

goods and services, and conservation of natural resources contribute to quality of life.

For developing countries, increased production and earned income is a necessary prerequisite to providing the goods and services required to improve the quality of life. Increased production by itself, however, is not sufficient. Increases in production and earned income should occur in a context which does not contribute to distortions such as a bias toward urbanization, centralization, or unemployment. Increases in income should be broadly shared among individuals and regions and, if possible, should help to alleviate existing distortions in income distribution. Increased income should also result in an appropriate allocation between private and public goods. In the case of Yemen this surely means adequate resources for public health, education, and rural roads.

It has been argued in another Design Team report (Implications for Agricultural Assistance of Alternative Economic Development Prospects in the Yemen Arab Republic, pp. 6-8) that nonwelfare assistance programs are unlikely to raise the incomes of the "poorest of the poor" when wages rates are determined by foreign work opportunities. When migration creates abundant job opportunities for unskilled laborers, any remaining cases of very low family income are most likely traceable to problems which are not amendable to increases in production and earned income. Production oriented programs are also unlikely to benefit most unskilled workers who have only their labor to sell. It is unrealistic to expect that production oriented assistance programs could succeed in raising the wages of unskilled labor; this result would occur only if the assistance program were massive enough to overwhelm the effects on the demand for labor of activities in oil rich Arabian Peninsula countries.

The inevitable conclusion of this analysis may be disturbing to some

readers. The conclusion is that programs aimed at increasing production will not materially benefit the poorest of the poor and programs which assist the the poorest of the poor will not increase production. These results necessarily follow when there are abundant employment opportunities for unskilled laborers. Under these conditions program planners are offered a mutually exclusive choice between production and income distribution. It is unlikely that a single program will achieve material amounts of each.

Any serious discussion of the goal of higher income must recognize the familiar tradeoff between present and future income. This issue often affects the choice between programs which yield immediate returns but have little long run effect on the economy and programs which generate few immediate payoffs but eventually result in persistent increases in agricultural production. An example of an activity with quick but fleeting effects would be a plant protection expert who comes to Yemen to deal with a single outbreak of plant disease. Contrast the effects of this activity to that of a plant breeding program which after a ten year effort produces and disseminates a superior sorghum variety. USAID has traditionally emphasized activities such as education, institution building, and agricultural research which yield few immediate results but are capable of bringing considerable change in the long run.

In addition to the goal of increasing production and earned income, USAID must be concerned with visibility. It is important that beneficiaries recognize that USAID is concerned with the quality of life in developing countries and that visible U.S. efforts are underway to improve the quality of life. Thus it is important not only that USAID in fact makes useful contributions to the quality of life but, in addition, that American contributions be visible. This objective is especially relevant for Yemen, where it is vital for American political interests that the Yemeni be aware of American assistance.

In planning assistance efforts it is important to recognize that the YARG also has goals. Many of those goals can be summarized as increasing the quality of life. It is particularly important, however, to identify cases in which YARG goals are different from or perhaps even conflict with those of USAID. Thus we will concentrate on differences rather than on similarities, for differences wherever they exist impose constraints on USAID policy options.

Modern government is a new phenomenon in Yemen. As a consequence the YARG is relatively weak and feels compelled to be concerned with its image among the people. Additional pressure results from the Arab tradition of permitting any commoner to address his petition to high officials, a custom which exerts immense pressure upon officials to solve problems as quickly as possible. For whatever the reason, the MOA is much more impatient for visible results than is USAID, with the result that the YARG challenges USAID proposals for agricultural research and other programs whose benefits are most likely to occur in the distant future (which sometimes seems to include anything beyond two years from the present). It also appears that the MOA is more concerned about the problems of farmers located near the capital than those located further away. One wag has suggested that the MOA's concern for a region's problems is inversely proportional to the driving time from that area to Sana'a.

The MOA measures benefits somewhat differently than is described in AID's Handbook Number Three. The MOA concept of benefits is not unlike what Hubert Humphrey remembered of New Deal Days, "The important thing was that the government was there doing something." This attitude has several implications for evaluation of assistance efforts, including MOA assessment of the benefits of training. Rather than perceiving training as an investment in human capital which yields benefits after some delay, many Yemeni perceive the benefits of training as beginning immediately upon award of the scholarship.

At least some MOA officials put a much higher priority on solving their own administrative problems than seem deserved when measured by a goal such as increasing the quality of life. When asked for needs for assistance, it is not unusual for MOA officials to mention first cash to spend on such things as transportation and photocopying, technicians to solve the administrative and operational problems of a state farm which absorbs the time of that particular official, and for help in defending a particular official's turf. Officials also are greatly concerned with temporary fixes for staffing difficulties such as obtaining supplemental funds to "top off" salaries.

One of the key stated goals of the Yemeni First Five Year Plan was to move toward food self-sufficiency. This, it should be noted, is not the same as the goal of increasing production. Indeed, vigorous pursuit of a policy of import substitution will likely result in less production than will a policy of support for exports and import substitutes based on relative profit opportunities. While it is possible to argue for a policy of food self-sufficiency as insurance against the vicissitudes of international commerce, it must be understood that such a choice invariably has costs in terms of lower production and earned income than would otherwise be possible. It is clear that to some extent the Yemeni have opted for such a policy. The research efforts of CARTO are addressed almost exclusively to the problems of reducing production costs of import substitutes.

#### Environment

In less than 20 years Yemen has changed from a closed society, which the ruling Imam controlled by limiting entry from the outside world, into an open society where hundreds of thousands of Yemeni workers move out of and into the country each year, where a vast array of imported goods are available in village

suks, and where modern western technologies are eagerly embraced and sometimes indiscriminately applied to Yemeni situations. It is difficult to find any aspect of the Yemeni economy that has not been affected by these sweeping changes.

The dominant force driving changes in the Yemeni economy over the last decade has been expanded job opportunities for unskilled labor in oil rich Arabian Peninsula countries. These opportunities have induced approximately one third of the male labor force to migrate. As a result wage rates have risen dramatically, unemployment has virtually disappeared, substantial foreign exchange reserves have been accumulated, and imports of every conceivable good produced anywhere in the world have soared. Despite the undeniable improvements in the standard of living which have occurred, Yemen retains many of the characteristics of the poorest of countries. The labor force is largely unskilled, and the level of public services in the form of health, sanitation, education, and roads have lagged behind the level of private goods and services.

Yemeni agriculture has not been sheltered from these forces. While the agricultural sector remains the largest single source of Gross Domestic Product, the share of agriculture has shrunk from 50% of GDP in 1972-73 to 35% in 1976-77. This decrease in the share of agriculture in domestic output occurred because real output in the agricultural sector has remained essentially unchanged since 1972-73 while output in virtually all other sectors grew rapidly. Over the same period the agricultural labor force has declined, making large productivity increases in agriculture necessary just to maintain constant output.

#### Constraints on Agricultural Development

The 1979 CID Design Team identified a series of broadbased constraints

which restrict the growth of agricultural production. These constraints are identified and discussed in Section 4.3 of the Baseline Field Study Report. It is possible to classify them as:

1. constraints which restrict current agricultural production and income, and
2. conditions which will eventually constrain agricultural production and require long lead times if they are to be eased.

There are two broad categories of constraints which restrict current agricultural production and income. The first is the difficulties farmers face in managing the new technological and resource combinations which are becoming available. It is difficult to imagine farmers anywhere facing more changes during the last 15 years than the Yemeni farmer has experienced. Twenty years ago he lived in a subsistence economy which was the result of centuries of adaptation to labor intensive methods of producing a dominant crop, sorghum. The typical Yemeni farmer of 20 years ago did not know that chemical fertilizers and tractors existed. He scarcely considered crops such as wheat, alfalfa, fruits, or vegetables. Within the space of 20 years the Yemeni farmer has been introduced to a whole array of crops and techniques with which he has had little experience. Within the last eight years these farmers have seen real labor costs quadruple while remittances have made possible investments which the farmer of an earlier era did not even know existed, e.g., tractors, tubewells, diesel pumps. At the same time rising incomes have created markets for additional agricultural products. Increases in agricultural output will necessarily be elusive while Yemeni farmers struggle to find the most efficient combination of factors, crops, and agricultural techniques.

The second broad category of constraints which restrict current agricultural production and income can be identified with weaknesses in supporting

institutions, including agricultural education, research, extension, administration, credit, land tenure, and marketing. Supporting public institutions in education, research, extension, and administration are often fledgling or nonexistent. Where they exist, they often are heavily dependent upon expatriate experts not only for policy advice but for day-to-day operating decisions. All too frequently there is little coordination among institutions, narrowly defined specialities, and regions. Contributing to these inadequacies in public institutions and making amelioration more difficult is a lack of trained personnel in all disciplines and at all levels. These weaknesses make it difficult for agricultural institutions to provide Yemeni farmers with the technical assistance required to increase agricultural production.

The fundamental problem underlying credit inadequacies is the continued observance of a prohibition on the payment of interest between Moslems. As long as this religious injunction prevails, private institutions for bringing together willing Moslem borrowers and lenders can never evolve. The next best alternative may be governmental support for credit, but this immediately raises the problem of sources of financing as well as the already mentioned difficulties in staffing and managing public institutions. With tenancy ratios ranging from 15% in the central highlands to 50% in the Tihama, there is the clear possibility that share cropping arrangements provide inadequate incentives for tenants to invest and to assume the higher costs and risks inherent in modernizing agricultural production.

Yemen also lacks a modern processing, distribution, and marketing network for domestically produced agricultural commodities. Nowhere is this problem likely to be so acute as in the emerging domestic and export markets for fruits and vegetables. While the existing elaborate distribution and marketing network for qat demonstrates that indigenous private entrepreneurship is fully

capable of solving these problems when large profit opportunities exist, it is nevertheless true that creation of other distribution networks will be expensive and in the meantime will reduce incentives for the production of fruits and vegetables.

Among the conditions which will eventually constrain agricultural production and require long lead times if they are to be eased is the continually deteriorating resource base, including soils and quantity and quality of groundwater. Recent trends in wage rates and remittance flows threaten to accelerate deterioration of the natural resource base. The high cost of labor has led to land abandonment and to a reduction in terrace maintenance. There is a fear that the breaching of neglected high level terraces will lead to accelerating erosion which will eventually destroy productive terraces at the lower level, erode waterways, and perhaps even irreparably damage the system of spate irrigation in the lower wadi reaches. Lack of financial resources previously prevented widespread exploitation of underground water reserves. Now, however, remittance flows are helping to finance tubewells, with the result that groundwater resources are being rapidly depleted in some areas. In other areas the most evident effect of excessive pumping is deteriorating water quality. The worst case scenario for Yemen over the next two decades is dismal, with the possibility that the deterioration of soil and water will eventually result in large output declines.

Another condition which will eventually constrain agricultural production and requires long lead times if it is to be eased is the lack of basic agricultural research which will result in plants, animals, and technologies adapted to Yemen's soils, climatological conditions, and water resource constraints. In Yemen the most promising opportunities for "biological and/or chemical engineering" appear to lie in the development of crops suited for dryland areas.

Development of improved techniques for producing existing crops and animals in such areas, the use of new crops and animals especially adapted to limited water regimes, and/or the identification of drought tolerant germplasm within conventional crops known for arid land adaptability would allow output increases over a large part of the Yemen Arab Republic.

This section has emphasized the constraints to further agricultural development in Yemen. These constraints are formidable. However, they should not be overemphasized. On the plus side are the relatively equal and wide spread distribution of remittances which provide investment funds, muted equity issues, and dynamic entrepreneurship. With appropriate assistance designed to relax key constraints, the potential exists for substantial increases in agricultural production.

#### Program Components

During 1979 and 1980 CID personnel have logged nearly two person years of time in Yemen in an effort to design a sector wide approach to an Agricultural Development Support Program for the Yemen Arab Republic. Their recommendations are included in the CID Yemen Title XII Program Report No. 1 (dated September 10, 1979) and in draft copies of reports and project papers in preparation during the summer of 1980. This section identifies activities proposed by the CID Design Teams.

1. Support to Yemeni Educational Institutions and Other Training Activities.
  - a. Agricultural Secondary Education. One aspect of the program is a series of projects which will supply expatriate faculty and training for Yemeni faculty counterparts for a group of agricultural secondary schools. The training aspect of the project is designed to make available within eight years of school opening sufficient Yemeni faculty to replace virtually all the professionals supplied by USAID. It is anticipated that this

group of agricultural secondary schools will provide the middle level trained support personnel required for staffing the extension service, research facilities, and the MOA. The first of these agricultural secondary schools, the Ibb Agricultural Training Center, opened in October 1979. During the 1979-80 school year approximately 50 students were enrolled. When fully operational, this school is expected to enroll 270 tenth, eleventh, and twelfth grade students. Other schools include the Surdud Agricultural Secondary School with a capacity for 189 students, scheduled to open in September 1981, and perhaps the Sana'a Livestock School, scheduled to open in September 1982, and the Saadah Agricultural Secondary School, which is still in the planning stage.

b. University Faculty of Agriculture. The YARG has indicated that at a later date a formal request for USAID support in staffing a university faculty of agriculture will be forthcoming. The opening of a university program of agriculture may come as early as September 1984. These university programs will eventually have the capacity to provide most of the bachelor's level agricultural training required for Yemen's future. It is anticipated that Project 0052 assistance will include staffing by a non-Yemeni faculty for a transition period, training for Yemeni faculty counterparts, and perhaps support facilities such as laboratory equipment, computer software, and library materials.

c. In-Service and Out-of-Country Training. Until domestic educational institutions reach capacity, significant amounts of in-service and out-of-country training will be required to provide the trained personnel needed to staff these new educational institutions as well as to upgrade the skills of personnel and fill staffing gaps of existing institutions. The

Core Subproject includes support for in-service training, English language training, and out-of-country training. In addition, each additional subproject is expected to include out-of-country training components for counterparts and other specialists who will be required to staff subproject activities after CID personnel depart.

2. Direct Assistance to Yemeni Farmers. CID Design Teams have concluded that a top 0052 priority is to use extension methods to teach farm management practices directly to Yemeni farmers while simultaneously helping to train Yemeni extension personnel to assist with and eventually to assume responsibility for the activities after CID personnel have left Yemen. The objective is to assist the Yemeni farmer in learning to combine the new technologies and factor availabilities in the most efficient way.

a. Subsistence Farms Development and Management. A Subproject Paper is in preparation which proposes to fund a team of experts to provide a farm systems approach to the problems of farmers with fewer than two hectares. Included on the four person team are a plant breeder who will work mainly at research stations and three extension specialists with skills in water management, agronomy, weed control, and plant protection who will work primarily with cooperator farmers. Most of the efforts of this team will be concentrated in the highlands with some work in the Tihama.

b. On Farm Water Management. The Agricultural Water Resources draft Project Identification Document contains a proposal for extension assistance to farmers who use irrigation water. Most of these farmers are located in the lower wadi reaches of the Tihama, al Jowf, and Mareb. The activity is designed to develop the managerial skills needed to allow

Yemeni farmers to apply those water management and cropping system techniques which have proven effective elsewhere. In the early stages of the activity the three person expatriate teams will concentrate on teaching field leveling techniques, optional timing patterns for field irrigation, and soil probe techniques for determining optimum application of irrigation water. Once Yemeni farmers have accepted these techniques, field teams will assist with advice on fertilizer application and cropping patterns which will further increase the farmers' incomes. Also included in the activity are small amounts of technical assistance on fruit and vegetables harvesting, processing, and marketing and organizational and managerial assistance to farmer cooperatives.

c. Integrated Watershed Management. The demonstration of an integrated system of forest, range, and livestock management is designed to renovate selected rangeland and forest areas in the upper watershed of the wadis, which are steadily deteriorating as a result of continuing livestock grazing overuse and past removal of forest trees for fuel. The strategy is to field a three person team who will work with local communities to offer increased forage and fuel, while accomplishing soil stabilization through planting of grasses, shrubs, and trees, and teaching proper management practices.

3. Institutional Support to the MOA and MOE. CID Design Teams have identified some specific areas in which USAID can directly assist the MOA and MOE in their missions while simultaneously helping to strengthen their capacity to perform these functions by themselves.

a. Water Inventory and Policy. The MOA has indicated that USAID assistance in identifying the status of present and predicted future water

resources and the formulation of policy resulting in optimal use of those resources is a top priority item. An inventory of water resources--a water resource survey, an aquifer modelling effort designed to predict sustainable yields, depletion rates, and deterioration of water quality--is planned to generate those inputs needed for the formulation of alternative water policies. A team of Yemeni and CID personnel will collect available climatological, hydrological, and geological data necessary for modelling the aquifer. After sufficient data are available, it will be incorporated into the aquifer model program. The water policy activity is designed to assist the MOA in the formulation of a viable national water policy.

b. Policy Analysis and Planning. Another area targeted at this time for special institution building efforts is the Planning Directorate of the MOA. The capacity of the MOA to carry out agricultural sector analysis, program planning, and evaluation is limited. The primary reason for this limitation is the shortage of adequately trained personnel. In addition to in-service and out-of-country training, the Core Subproject contains resources for short-term consultants which could be made available to the Planning Directorate whenever the Country Program Director and the MOA conclude that such assistance is appropriate.

c. Agricultural Documentation and Learning Center. The MOA recognizes the need for a Documentation Center to properly maintain and catalogue their own growing numbers of documents, as well as various useful documents from other sources, and to establish an efficient system for retrieving and making available these documents to the persons who need them. Also, at the present time, the MOA does not have suitable facilities for producing the kinds of materials that can be used by radio, television,

and other media for providing information to the public on agricultural research results and government policies and programs. A series of short-term consultancies is planned initially to help develop plans for the center.

d. Technical Backstopping Services to the MOA. The Core staff will review requests for technical services from the MOA. Where the need for limited short-term assistance is justified, the Core will make available directly to the MOA or to a project activity of another donor, the appropriate American expertise.

e. Policy Planning and Other Technical Assistance for Agricultural Education. The MOE faces the task of planning for and opening a large number of schools, including possibly three agricultural secondary schools, over the next few years. CID Design Teams have proposed offering to the MOE a full-time expert to assist with these tasks.

4. Project Design and Mobilization. Design Team findings and discussions with MOA officials indicated several areas in which the Core Team should proceed to develop subprojects. In addition, continual monitoring by the Core Team of the agricultural sector and consultation with YARG may identify additional program requirements. The Core Subproject contains resources for identifying and developing subprojects and for providing mobilization assistance to additional subprojects as judged necessary.

5. Managerial, Administrative, Technical and Logistic Support for All Subprojects. The Country Program Director will be responsible for overall field coordination of the Program and for providing administrative, technical, and logistical support for each subproject. The Core Subproject has been provided with the resources required to accomplish these tasks.

Program Resources and Costs for Fiscal Year 1982

The preceding section has offered a brief description of 0052 activities which have been recommended by CID Design Teams as priority activities and for which the YARG has indicated substantial interest (formally in some cases, informally in others). This section contains FY 1982 cost estimates for each of these activities as well as indicative funding limits supplied by USAID/Yemen.

The total costs estimated for these activities for optimal operational levels in FY 82 is \$16,635,000. Table 1 contains estimated costs for individual program components. The cost estimates for the Core, Ibb, Surdud and Subsistence Farming Management and Development Subprojects are the result of a detailed review process conducted by CID Design Teams and USAID/Yemen. Cost estimates for the On Farm Management, Integrated Watershed Management, and Water Inventory and Policy activities are, on the other hand, "ballpark estimates" constructed by the author from estimates contained in the draft Agricultural Water Resources Project Identification Document.

Table 1 contains the results of breaking down cost estimates of individual subprojects into functional expenditure categories. Subproject documents contain individual line items for the cost of participant training, making it a simple exercise to tabulate these costs separately. Formal budget documents, do not, however, contain the information required to break down Core Subproject cost estimates into such functional categories as 0052 management, administration, and support; project design and mobilization; and institutional support costs. The estimates presented are based on the author's notes from Design Team discussions of the Core Subproject Paper. The first step was to identify estimates of person years of specialist inputs into the institutional support and project design and mobilization functions. These estimates for FY 82 are two person years for the institutional support function and .5 person

Table 1

Optimal Expenditures by Function for FY 82

<u>Function</u>	<u>Amount (\$000)</u>	<u>Amount as Proportion of Total</u>
Educational Institutions and Other Training Activities	\$ 5,347	.32
Agricultural Secondary Education (without PT*)	3,118	.19
Ibb	1,983	.12
Surdud	1,135	.07
Sana'a	-0-	.00
Saadah	-0-	.00
Faculty of Agriculture	-0-	.00
Participant Training	2,229	.13
Core	872	.05
Ibb	514	.03
Surdud	199	.01
Subsistence Farms	44	.00
On Farm Water	300	.02
Integrated Watershed	100	.01
Water Inventory and Policy	200	.01
Direct Assistance to Yemeni Farmers (without PT)	5,560	.33
Subsistence Farms Subproject	1,390	.08
On Farm Water Subproject	2,780	.17
Integrated Watershed Subproject	1,390	.08
Institutional Support to MOA and MOE	3,028	.18
Water Inventory and Policy	2,000	.12
Policy Analysis and Planning for MOA & MOE	771	.05
Agricultural Documentation & Learning Center	47	.00
Technical Backstopping Services to the MOA	210	.01
Project Design and Mobilization	403	.02
Support for all Subprojects (overhead costs)	<u>2,297</u>	<u>.14</u>
TOTAL	\$16,635	1.00

\* PT = Participant Training

years for the project design and mobilization function. The amounts reported in Table 1 include the direct costs of supporting these personnel together with commodity and miscellaneous costs directly associated with those functions. All remaining Core Subproject costs are reported as 0052 program management and administration costs. (The reader should be aware that no concerted effort has been made to determine whether this level of management and administration costs is appropriate to support all the activities included in Table 1. The author's guess is that the \$2,297,000 level is somewhat inadequate.)

It should be noted that the cost estimates reported in Table 1 are program operating costs. They contain little or no provision for start up costs for individual activities such as unusual amounts of commodities or construction. It should also be noted that resources for FY 82 operation of continued activities in horticulture are not included.

USAID allocations to Project 0052 for FY 82 are scheduled for an "optimum" level of \$8,621,000 and a "most likely" level of \$6,157,000. These programmed expenditure levels stand in stark contrast to optimal expenditures of \$16,635,000 for the entire Agricultural Development Support Program. It is obvious that program managers face some very difficult choices among activities described above even if the costs of most of them are sharply pared down. The next sections address these problems of choice.

#### Analysis of Individual Activities

Difficult choices among proposed 0052 activities seem inevitable. The objective of this section is to assist the process of making choices by providing a detailed analysis of each activity. The first step is to identify as carefully as possible for each activity its potential, intended beneficiaries, technical feasibility, support required from YARG for its success, and its dependency

on specific future economic scenarios for its success. Also identified is the author's estimate of whether the activity can stand alone or whether it requires other 0052 activities to achieve maximum effectiveness. Finally, alternatives for accomplishing the same objectives are considered. The emphasis will be upon identifying less expensive alternatives. Each reader can judge for himself/herself whether the less expensive alternative results in a lower quality activity or whether, on the other hand, it simply eliminates unnecessary "gold-plating."

1. Provision of Interim Faculty and Training for Yemeni Faculty Counterparts for Agricultural Secondary Schools

Potential. The objective of this activity is to provide the middle level technicians required to staff the extension service, research facilities, and MOA administrative units. It is anticipated that the best of these students will receive university educations and eventually rise to top level administrative positions within Yemeni agricultural institutions. Thus, the objective of this activity is to begin meeting within three years the great need of agricultural institutions for intermediate level technicians and, in the long run, perhaps 20 years, to provide the cadre of top level administrators and technical specialists for agricultural education, research, and extension activities in Yemen. It can be fairly said that these schools offer the single best alternatives for ensuring that the leadership of Yemeni agricultural institutions remains in the hands of persons with legitimate experience in agriculture. If this outcome is reasonable, then it would surely be a significant American achievement to be associated from the beginning with such an influential group of institutions.

Beneficiaries. The direct beneficiaries of the activity are the secondary

school students who attend and the Yemeni faculty counterparts who receive additional formal education and on-the-job training. The activity will indirectly benefit those who receive improved services provided by the better trained middle and top level administrators, extension, and research specialists. It should go without saying that the size of the latter benefits are difficult to forecast and, later, to measure objectively.

Technical Analysis. It is surely feasible to design an agricultural school program, recruit and orient expatriate faculty, administer the academic program, provide out-of-country and on-the-job training to Yemeni counterpart faculty, and provide students with an excellent education. While there clearly exist potential difficulties in offering vocational agricultural courses to boys from Ibb and Taiz cities and in maintaining an appropriate balance between vocational and college preparatory curricula, these problems are not insoluble given the administrative and teaching talent and resources currently available to the Ibb Subproject. It should also be possible to design enrichment programs for students and eventually alumni--including counseling with students during their summer practical experiences, sponsoring refresher and extension conferences for alumni, and periodic faculty visits to alumni in their own job locations--which will assist them to become excellent practitioners. These extras will surely also help to reinforce school loyalties which, in turn, can make an important contribution to improved agricultural services throughout Yemen. Many of the benefits, including graduates who function effectively in responsible positions and viable all-Yemeni educational institutions, will occur only after the passage of considerable time.

Required YARG Contributions. The success of the activity in reaching both its short-run goal of graduating qualified students and its long-run goal of all-Yemeni staffing, administration, and financing requires substantial YARG

contributions. The YARG must recruit qualified students, recruit competent and interested faculty counterparts, compensate faculty sufficiently to keep them on the job, and refrain from transferring them to other government positions where their contributions could be substantial. Long run success also requires YARG budget support for supplies, repairs, and other necessary costs of operating schools. It is also necessary that the YARG succeed in recruiting and retaining a large share of graduates into government service if the quality of agricultural support services is to be improved. Long run success also requires sufficient MOE administrative flexibility to permit sufficient curricular and procedural flexibility to operate a quality institution. The MOE bureaucracy has sent disconcerting signals about their intention to determine minute details of school curricular and operational procedures. While the extremely able expatriate faculty will probably succeed in maintaining an excellent educational program despite such bureaucratic barriers, it is less obvious that younger Yemeni faculty members with less independence, experience, and self-confidence will be equally successful.

Activity's Dependence on Particular Socio-Economic Conditions for Success.

Success of this activity is highly dependent upon the assumption that agriculture will remain an important sector in Yemen. The entire rationale for specialized training is that it can be applied to increase agricultural productivity. If Yemen is expected to become a predominantly urban society producing nonagricultural goods and services and/or if increasing numbers of Yemeni find employment in neighboring countries, this activity would constitute a misallocation of resources. Societies which offer mostly job opportunities of the kind mentioned above would be best served by education programs which emphasize the basics and/or offer nonagricultural vocational skills.

Dependence on Other 0052 Activities. This activity, provided that it receives sufficient administrative and logistic support as well as adequate communication and collaboration with the YARG, can succeed in the absence of other 0052 activities in Yemen. Appropriate institutional support to the MOA would make it possible for graduates to make an even greater contribution, but such institutional support is not a prerequisite to making a substantial contribution to improved MOA services in the long run.

Alternatives to the Level of Support Represented in Table 1. Among the cost reducing alternatives to be considered are (a) no USAID support; (b) provide scholarships to agricultural secondary schools elsewhere in the Arab world; (c) reduce annual expenditures at each school; and (d) accelerate the schedule for transition to an all Yemeni faculty.

a. No USAID Support. This option is presumably applicable only to the Surdud, Sana'a, and Saadah schools since USAID has a contractual agreement with MOE to staff the Ibb school and to train Yemeni faculty counterparts. While USAID has made no formal commitments on the Surdud school, it has apparently delivered informal expressions of interest for the Surdud and perhaps also the Sana'a schools to the IBRD and MOE. These informal expressions of interest could not be costlessly withdrawn, but the author is unable to assess precisely the nature of those costs. If USAID assistance is not forthcoming, both the Surdud and Sana'a schools, where construction is already underway, would most likely open on or near schedule with financial support from the YARG and perhaps with limited assistance from the IBRD or one of the Arab development funds. The most likely staffing patterns would consist of recent Egyptian college graduates with little or no teaching or agricultural work experience. A decision not to support the Surdud and Sana'a schools would likely close off for USAID the opportunity

to provide leadership in agricultural secondary education. USAID would be relegated to the role of a donor supporting a single regional institution.

b. Provide Scholarships to Agricultural Secondary Schools in Other Arab Countries. The cost of educating students using expatriate faculty is very high. For example, the USAID portion of the projected Ibb FY 82 budget, excluding participant training, totals \$1,981,000. Table 2 gives the USAID costs per student based on different numbers of students. These USAID costs, which do not include capital costs or operating and Yemeni staffing costs borne by the YARG, are significantly larger than the full costs of sending Yemeni students to agricultural secondary schools outside Yemen. These costs should be compared with total academic year costs of \$2,500 (including travel, tuition, books, living allowances) to send Yemeni students to Egypt for university agricultural education.

Sending Yemeni students out of the country has several disadvantages. Their experience with practical agriculture would be less applicable to the special problems of agriculture in Yemen. There could be sizeable social costs associated with separating 14 to 17-year-old boys from their families for an entire year. Finally, such an arrangement would not provide the intended institution building efforts. Even though USAID could continue to provide training to prospective Yemeni faculty, there would not be available the developed curriculum, the traditions, and the opportunities for practice teaching which result from USAID assistance in providing an experienced expatriate faculty for a number of years. Despite these advantages, USAID support for out-of-country education should not be ignored as a viable alternative.

Table 2

Total FY 82 USAID Ibb School Costs per Student

<u>Total Number of Students</u>	<u>Cost Per Student</u>
270	\$ 7,337
250	7,672
200	9,905
150	13,206

c. Reduce Annual Expenditures for Each School. Using the Ibb FY 82 proposed budget as an example, total USAID expenditures are \$2,497,000, with \$514,000 allocated to participant training and \$1,983,000 allocated to cover operations at Ibb. The three largest budget items are \$1,155,000 for expatriate payroll, travel, and transportation, \$514,000 for participant training, and \$387,000 for on-campus payroll and support. Participant training alternatives will be discussed in the next section. Of the remaining largest items, expatriate payroll, travel, and transportation represents 46% of total expenditures and on-campus payroll and support costs represents 15% of the total.

On-campus costs seem unusually high. They are one-third larger than Core Subproject on-campus costs, prima facie evidence that they could be cut substantially without damaging the program.

The largest single target for cost cutting measures are expatriate staff costs. Two possible options exist, reducing the number of faculty and hiring faculty willing to work for lower salaries. Average cost per expatriate faculty member is \$128,000 in FY 82 dollars. After adjusting for the Team Leader's salary and benefits which are substantially higher than that of other faculty, the cost savings of reducing the faculty by one person is about \$115,000. It may be possible to reduce the size of the expatriate faculty by one or even two persons without substantial damage to the curriculum, particularly since faculty members with the training and experience represented by the Ibb faculty are fully capable of teaching in more than one area. This alternative should be considered for FY 82, when curriculum development will have been largely accomplished thus freeing faculty for more student contact hours. A second option would be to hire faculty willing to work for lower salaries. Cost savings from salary

reductions are, because of benefits and overhead, equal to 176% of the reduction in base pay. A salary reduction of \$10,000 will reduce total costs by \$17,600. The implication of these cost data seems to be that reducing numbers of faculty is a much more likely source of cost savings than reducing salary levels for individual positions. It is likely that one can maintain a higher quality program by employing a smaller number of highly qualified individuals than by using a larger number of less well-qualified persons.

d. Accelerate Training and Shorten the Period in Which Expatriate Faculty are Utilized. Substantial savings are possible over the life of the project if Yemeni faculty could assume full teaching responsibilities at an earlier date. Each person year of acceleration of complete teaching responsibilities by Yemeni faculty reduces USAID costs by about \$128,000 in FY 82 dollars. This section identifies alternatives for accelerating this process which minimize the impact on program quality.

While the Ibb Subproject Paper is not explicit about the time required for selection, training, and supervised teaching for prospective Yemeni faculty, it seems reasonable to assume that approximately five and one-half years are required for each faculty member. This estimated time period includes approximately one year for selection and orientation to the Ibb school philosophy, one year to acquire English language proficiency, two and one-half years for M.S. training in the United States, and a final year of supervised teaching under the tutelage of an experienced faculty member. (After nine months of operation at Ibb none of the Yemeni faculty counterparts have begun English language training.) If program managers could succeed in shortening this process by one year for each of nine

Yemeni teachers, total program cost savings would approach \$1,200,000 in FY 82 dollars, i.e., the entire payroll, travel, and transportation budget for one year.

Let us consider options for accelerating the process of turning over full teaching responsibilities to Yemeni faculty counterparts. These options can be classified as reducing selection and orientation time, reducing the time required for English language training, reducing the time required to acquire appropriate skills and credentials, and reducing the time required for supervised teaching experiences.

Large cost savings will accrue to efforts to shorten the selection and orientation period, particularly if Project 0052 assists with institution building in the Surdud, Sana'a, and Saadah schools. It is important that the process be initiated immediately for all Yemeni faculty for each school. While it may be difficult to accelerate the turnover schedule for the Ibb school by shortening the time required for selection and orientation, it would not be necessary to program such lengthy turnover schedules for the additional schools if selection and orientation for the other schools begins now. Such an approach would require the complete cooperation and considerable effort on the part of the MOE. The number of Yemeni with B.S. degrees and an interest in agriculture is not large, and locating and inducing them to participate in the agricultural secondary schools program will not be easy. One possibility is for Ibb expatriate teachers and MOE officials to tour Arab universities in search of Yemeni in B.S. programs who can be persuaded to request assignment to agricultural secondary schools upon their return to Yemen. Another approach would be to attempt to obtain draft exemptions for secondary school teachers. While no one believes that success in these efforts would be easy or assured,

the payoffs are quite large, more than \$100,000 in FY 82 dollars per person year of accelerated turnover. USAID may be in a position to exert considerable leverage on the MOE to accomplish these objectives. If the MOE can be made to understand that USAID assistance with the Surdud, Sana'a, and Saadah schools is conditional upon their willingness to help reduce USAID costs, they may decide that it is in their interest to assist. If necessary, formal pressure could be applied in the form of strong conditions precedent or memoranda of understanding for the Surdud Subproject. Even better, informal discussions with the MOE about the most acceptable ways to accelerate turnover could begin immediately.

Another significant delay is encountered in English language training. It would be useful to rethink whether proficiency in English is absolutely necessary for each Yemeni faculty counterpart. In addition, the possibility of special incentives for faculty counterparts to pass their English qualifying exams in a short period of time should be explored.

The most lengthy delays in turnover arise from the projected two and one-half years required to obtain an M.S. degree plus one year of practice teaching. Serious consideration should be given to relaxing these requirements for each and every faculty counterpart. It is conceivable that some combination of short-term, out-of-country training plus on-the-job training would result in virtually the same level of proficiency as that produced by existing plans. Serious thought should be given to finding creative ways of developing the same or nearly the same level of proficiency in a shorter period of time. Yet another possibility is to offer special incentives to Yemeni counterparts who complete their M.S. requirements more quickly. Personal observation has convinced the author that many foreign students take a long time to complete their requirements because their

standard of living as students exceeds the standard they expect to achieve when they return home. In such cases financial incentives for early completion could be very cost effective.

The effect of these possible program changes have ambiguous effects on total costs of participant training. Some of the possibilities would raise participant training costs and others would lower them. The proposal to recruit and train as soon as possible all faculty counterparts for the Surdud, Sana'a, and Saadah schools would move forward in time participant training costs without affecting life-of-subproject costs (when inflation is ignored). While increased participant training costs cannot be ignored, the possible savings are so large that they are likely to exceed almost any conceivable increase in training costs.

Yet another approach to accelerating turnover is to use financial incentives to attract qualified Yemeni who have migrated or who are employed elsewhere in Yemen. Such people apparently exist. While it is currently fashionable to argue that "topping off" salaries is unwise, the policy deserves rethinking in this particular case. If a \$10,000 subsidy per year is successful in attracting to agricultural secondary teaching qualified Yemeni not otherwise available, the \$100,000 plus savings per year will allow many years of subsidized salary for the person. Refusal to "top off" because it does not contribute to sustainable institution building makes institution building objectives very expensive.

Finally, it should be noted that accelerated turnover does not necessarily imply a cutoff in total assistance as soon as possible. It is conceivable that the optimal program consists of eight expatriates in the first year which are reduced to three by the fourth year and then maintained at that or a slightly reduced level for another five years. These

matters surely deserve more careful thought than can be supplied by this issues paper. The principal objective here is to raise the issues for the overall evaluation which surely must take place.

2. Participant Training, Including English Language, Short and Long-Term Out-of-Country and In-Service Training

Potential. The objective of this activity is to provide the skilled personnel required for increasing the capacity of Yemeni agricultural institutions to provide better services to their clients. Training programs present one of the few opportunities for direct donor action to relax one of the most pervasive and severe constraints inhibiting Yemeni agricultural development. U.S. based and English language training programs also offer a rare opportunity for Yemeni to become intimately acquainted with American institutions and values. The MOA has emphasized that English language training is also needed to give their personnel access to the technical information, correspondence, and verbal skills required to carry out their daily tasks.

Beneficiaries. The direct beneficiaries of the activity are the Yemeni selected for training opportunities. Indirect beneficiaries are the clients of agricultural institutions who receive improved services as a result of better trained personnel.

Technical Analysis. There are few risks associated with sponsoring long-term out-of-country training. Reputable American universities are skilled at evaluating student credentials and at providing education to those found qualified. There is virtually no risk that these trainees will be unable to return to useful occupations in Yemen; Yemen's absorptive capacity for skilled personnel is so large that any conceivable number of graduates will be utilized in either the public or private sector. There is considerable risk that returnees

will opt for private employment in Yemen or elsewhere on the Arabian Peninsula rather than return to public institutions. (The determinants of the ability of government to compete for graduates is discussed below.) There is some uncertainty about how many Yemeni possess the educational background required for out-of-country degree programs, but this does not necessarily imply that programs should initially be restricted in size. One approach which has much to recommend it is to launch a large scale recruiting program in order to identify and offer training to all qualified students. If insufficient numbers of qualified students are found or if institutions are unwilling to release existing qualified employees for out-of-country training, unspent funds can be allocated to other, lower priority activities.

If insufficient numbers of qualified students are available for degree programs and/or if specialized nondegree training is considered more cost efficient, short-term nondegree programs should be considered. The success of such programs is more likely to depend on the project's ability to evaluate the needs and the abilities of candidates and to direct candidates to appropriate courses. For degree programs the universities can be relied upon to evaluate students' credentials and to offer appropriate training. In the case of nondegree programs, it is much more important that the capacity to perform these functions be built directly into the Core Subproject. It should be recognized that the cost savings associated with short-term programs are less substantial if students require English language capability before participating. Since developing English language capability is relatively expensive and time consuming, it may turn out that after making such an investment, it would be best to send the student for long-term training.

A necessary prerequisite for successful in-service training is a careful assessment of training needs and intensive monitoring of in-service training

efforts to ensure that training objectives are being accomplished. If these conditions are met, in-service training can be an extremely cost effective way to solve specific personnel requirements that inhibit the effectiveness of institutions.

Required YARG Contributions. The success of this activity requires substantial support from the YARG. The YARG must participate in identifying students for training and, if they are currently employed by the government, be willing to release them from their existing responsibilities while continuing to compensate them. It appears that the YARG is willing to meet these requirements, at least within rather broad limits, for the YARG certainly understands the acute need for trained personnel. If institution building efforts are to be successful, the YARG must find a way to create sufficient financial incentives to induce returning trainees to accept positions with public institutions. It is also necessary that the existing bureaucracy be sufficiently flexible that skilled personnel are allowed to function effectively. It is not certain that the YARG will be able to compete for the services of returning trainees. While substantial progress has been made recently to raise government salaries, the YARG still finds it necessary to insist that returnees from YARG sanctioned training programs are obligated to accept public service employment. It is inevitable that such policies will result in lowered morale and in high turnover as returnees eventually find a way to evade these requirements.

Activity's Dependence on Particular Socio-Economic Conditions for Success. Many of the skills learned in training programs are applicable to a wide set of socio-economic conditions and employment opportunities. Indeed, certain types of training are among the most flexible of capital "investments". Skills made available to trainees often increase the trainee's productivity in a wide set of environments and even increase the person's ability to respond effectively

to environmental changes. Thus it can be argued that general purpose training represents the best possible response to uncertainty about future conditions.

Training efforts which seek to increase agricultural skills, on the other hand, are heavily dependent for their success on the assumption that agriculture will remain a viable industry. And the more specific the agricultural skills learned, the more likely that those skills will be rendered less valuable by different economic conditions which demand different technologies.

In summary, the value of training is not necessarily dependent upon a particular set of socio-economic conditions. Whether existing training is made obsolete by changed conditions depends very much on the nature of that training.

Dependence on Other 0052 Activities. Of all the activities listed in Table 1, long-term out-of-country training is least dependent for its success upon the complementary effects of other 0052 efforts. If the project is willing to rely heavily upon U.S. universities for admission standards and for training content, very little support is needed. The activity could be supervised by a part-time training officer whose principal functions would be to obtain from the YARG lists of nominees and to assist the nominees with the process of gaining admission to a university and solving the logistics problems of embarking for the United States. While the effectiveness of returning trainees might be increased marginally by the existence of USAID institution building efforts in Yemen, it is arguable that the most cost effective way to solve problems of reentry is to provide training which will allow the returnees to solve these problems for themselves.

Since it is less likely that selection for short-term out-of-country training can be successfully delegated to university admission offices, more inputs from the training officer are required to ensure success. The information needed to identify YARG personnel for short-term training and to determine the

most suitable type of training would naturally be available to expatriates assisting with institution building efforts. This would also be true for the information needed to carry out successful in-service training efforts. Thus short-term out-of-country and in-service training efforts have the best chance for success if they are managed by personnel engaged in institutional support efforts.

It is unknown at this time whether the English language training activity requires the support of other 0052 activities. It is possible that little effort is required to recruit students and that a reliable contractor can be found to assume complete responsibility for implementation. If, on the other hand, a qualified contractor is unavailable at reasonable cost, it would be necessary for the 0052 support function to mount a major effort to organize, staff, and administer English language training courses.

Alternatives to the Level of Support Represented in Table 1. Cost reducing alternatives to be considered include (a) reduced program size; (b) substitution of short-term out-of-country training, in-service training, conferences, and seminars for long-term out-of-country training; (c) utilization of Arab language training institutions rather than English language institutions; and (d) special incentives to trainees for early completion.

a. Reduced Program Size. It is feasible to operate training programs at different levels. The size of the program could be reduced by limiting participation to any particular number of participants, including zero. Since candidates who are best able to benefit from training are likely to be the first to be included, large scale training programs experience diminishing returns in comparison to smaller training programs.

As USAID assistance changes, other donors could be expected to partly offset USAID efforts. For example, IBRD funds currently finance short and

long-term out-of-country training for MOA personnel. An increase in USAID assistance to the levels reflected in Table 1 will surely result in a reduction or reallocation of IBRD resources in Yemen. Several Arab countries have determined they can make a contribution to Yemen's development by allocating Bachelor of Science training positions in their own universities for Yemeni students. In the absence of USAID assistance for B.S. trainees, it is not inconceivable that sufficient Arab scholarships would be available to finance the education of almost every qualified Yemeni student. It is less obvious that Arab scholarships could substitute for planned USAID assistance for M.S. study, especially when effectiveness is measured by quality as well as quantity.

b. Substitution of Short-Term Out-of-Country Training, In-Service Training, Conferences, and Seminars for Long-Term Out-of-Country Training. A carefully designed and well managed program of short-term out-of-country and in-service training supplemented occasionally with in-country conferences and seminars could be an effective substitute for much of the planned long-term out-of-country training. While trainees would not receive the credentials which accompany B.S. and M.S. training, a series of shorter training experiences might result in nearly the same improvement in job performance. Another advantage of this approach is that potential MOA personnel would spend less time out-of-country and thus would be available for longer periods of duty in Yemen institutions.

c. Utilization of Arab Language Training Institutions Rather than English Language Institutions. The need for English language competency as a prerequisite for out-of-country training imposes considerable costs and results in substantial delays in completion of training. Building sufficient

English language capability can easily absorb one year of time and sufficient resources to finance an entire year of out-of-country training. Tuition and maintenance costs also differ by several orders of magnitude with approximately \$3,000 required per annum for an Egyptian agricultural university and \$11,000 required for a B.S. program in the United States. Whether these substantial differences in costs can be justified depends on one's assessment of quality differences in educational programs and of the value to the United States of Yemeni with a command of the English language and an opportunity for firsthand exposure to America.

d. Special Incentives to Trainees for Early Completion. The possibility of financial incentives for early completion of training programs for agricultural secondary school Yemeni faculty were discussed on page 29. Such a possibility is equally relevant (or irrelevant) to all out-of-country training programs.

3. Direct Assistance to Yemeni Farmers

Potential. This category of assistance is the only one from Table 1 which directly benefits lower income persons and the only one except for participant training whose benefits accrue directly to Yemeni individuals. This report has previously identified the problems Yemeni farmers face in using their resources efficiently to increase agricultural production and earned income. Given the dynamic entrepreneurship and the openness to new approaches which is characteristic of many Yemeni farmers and the many known opportunities for increasing productivity, teams of CID specialists from the On Farm Water Management and Subsistence Farms activities could, within two or three years, have a major impact on the production and profits of cooperator farmers. In addition, longer term efforts to train Yemeni extension agents and to assist MOA officials

could succeed in institutionalizing within the Yemeni extension system the capability of providing similar assistance to large numbers of farmers throughout Yemen. The Integrated Watershed Management activity aims at nothing less than demonstration in the long run of an incentive compatible approach to halting soil erosion, reforesting cut over areas, and restoring the productivity of the land.

Beneficiaries. Directly benefiting from these activities will be farmers who volunteer to accept assistance from team field specialists and those who attend demonstrations. Possible indirect beneficiaries are farmers who learn of superior agricultural techniques from their neighbors and the extension trainees who receive personal satisfaction and/or financial rewards from association with the activity. In the longer run a great many Yemeni farmers may benefit from the improved agricultural practices being demonstrated by the Yemeni extension system. The primary beneficiaries of the Integrated Watershed Management activity are likely to be rural dwellers in the next generation.

Technical Analysis. Included in this effort is assistance to farmers who use groundwater for irrigation, to farmers in rainfed areas, and to villagers who need assistance in providing firewood and forage and in controlling soil erosion. Because of differences among these activities each will be discussed separately. Common issues will be raised in the final paragraphs.

The On Farm Water Management activity is scheduled to emphasize in the beginning techniques for field leveling, optimal timing patterns for field irrigation, and use of soil probes for determining optimum application of irrigation water. Design Team members generally agree that this activity offers greater prospects for immediate increases in agricultural production than any other possible activity. Team specialists should succeed within two or three years in assisting cooperator farmers to make major progress in water use. Since these techniques are scale neutral and require at most a few more hours

of farmers' time and simple equipment, every category of farmer (large, small, owner-operator, tenant) can benefit from these techniques. Once these techniques have been accepted and applied, team personnel will turn to more complicated farming systems issues including cropping patterns, fertilizer use, and changes in field size. Without special attention to credit availability, landholding patterns, and marketing problems, some farmers may not be able to benefit from these assistance efforts. It is also probable that additional results at this stage will be more difficult to achieve and more sensitive to activity design and skill of team members. Reduced certainty about effectiveness also applies to team success in training Yemeni extension service counterparts.

The proposed Subsistence Farms Development and Management Subproject will apply a farming systems approach to the problems of small (less than two hectares) farms, an activity which will devote most of its attention to rainfed agriculture. The subproject will first offer assistance to producers of sorghum and then eventually move toward a more comprehensive farming systems approach. As with the On Farm Water Management activities, initial gains are more certain than those anticipated for later stages of the activity.

The starting point for design of the Integrated Watershed Management activity is the assumption that village demands for forage and fuel must be satisfied before soil erosion can be halted and the process of land restoration can begin. Because the Integrated Watershed Management activity deals with problems of soil erosion, rangeland restoration, and reforestation, its time horizon is necessarily long. Three to five years will be required before significant results are visible. Since this activity addresses problems of use of village common areas for forage and fuel, its success requires cooperation of several farmers, perhaps of entire villages. This need for collective effort will surely result in delays and perhaps even in failure. The prospective long run

gains, however, are enormous. The activity attempts nothing less than demonstration of an incentive capable approach to solve the serious problem of deforestation and soil erosion.

Staffing each of these activities will likely prove more difficult than for any other proposed 0052 activities. Since team members must communicate directly with farmers, it is essential that they be able to speak and understand Arabic early in the life of each activity. The remote location of two of the activities, On Farm Water Management and Integrated Watershed Management, are such that team members will likely be unable to maintain their principal places of residence in Sana'a or Taiz. To be located away from either Sana'a or Taiz means that acceptable schools for dependents and elementary health care will not be available nearby. Morale problems are inevitable as team members and their family members will not have ready access to members of the international community in Yemen. The On Farm Water Management team will surely be forced to live in the Tihama where high temperatures, high humidity, and blowing dust result in living conditions which many consider intolerable. These problems will be exacerbated if USAID/Yemen is unable to obtain approval for decent housing (such as large mobile homes) for team members. It seems to be the informal consensus of 1979 and 1980 Design Team members that staffing problems may be so serious as to undermine the viability of the proposed On Farm Water Management activity. In short, it may turn out to be impossible to staff the activity with the greatest potential for quick improvements in agricultural productivity.

Required YARG Contributions. Direct benefits to farmers from contact with team members require only that the YARG grants permission to work with Yemeni farmers. Extensive YARG cooperation, participation, and financial resources are required, on the other hand, if the Yemeni extension system is to acquire

eventually the capacity to provide these services to the farmers without outside assistance. To the extent that CID teams are unable to reach all farmers directly or indirectly through farmer-to-farmer communication channels, extensive YARG participation in institution building is required if the activities are to be successful. It is unknown at this time what the level of YARG participation will be. The MOA has not indicated that it is unwilling to participate. On the other hand, the author cannot recall a single instance in which a Yemeni official has initiated the suggestion that USAID assist the YARG with these problems. While MOA officials sometimes nod enthusiastically when the activities are mentioned, another familiar response is neither agreement nor disagreement. MOA officials on at least one occasion urged CID to consider additional effort in the highlands and to deemphasize the Tihama, a suggestion which conflicts with Design Team assessments of where the greatest opportunities for assistance lie.

Activity's Dependence on Particular Socio-Economic Conditions for Success.

Since these activities concentrate on water use and upon farming systems approach to extension efforts, they are unlikely to be undermined by socio-economic changes. It is unlikely that water will become so abundant that its efficient use becomes unimportant; if anything, water will become more scarce. The essence of a farming systems approach is to assist the farmer in identifying and using the factor proportions, cropping patterns, and agricultural techniques which are most appropriate for prevailing conditions. A farming systems approach will assist farmers in adapting to any environment. Only if conditions make agriculture unprofitable under any circumstances will socio-economic changes undermine the success of these activities.

Dependence on Other 0052 Activities. The direct assistance aspect of the activities will require logistical support from Project 0052. The institution building aspects, on the other hand, will require extensive training efforts,

regular communications, and close coordination with the MOA, and probably also some of the institutional support efforts evaluated below. In brief, these activities, if they are to be institutionalized, require major 0052 efforts on most fronts.

Alternatives to the Level of Support Represented in Table 1. Among the cost reducing alternatives to be considered are (a) reduced staffing and (b) concentration on assistance to the Yemeni extension system.

a. Reduced Staffing. Except for the On Farm Water Management activity where Table 1 expenditure levels presume support for two distinct teams, it is not possible to reduce expenditures significantly without destroying the teams' abilities to provide effective assistance to farmers. Rather than reduce team size, it would seem best to abandon entire activities. It is possible to combine the Subsistence Farms and On Farm Water Management activities to field two teams with one team concentrating on the highlands and the second team located in the Tihama. Two teams, each consisting of two and one-half persons, plus a plant breeder could be fielded for \$2,000,000 in FY 82. Adding or eliminating Subsistence Farm and On Farm Water Management teams is unlikely to provoke offsetting responses on the part of other donors. Direct extension assistance to Yemeni farmers has never been popular among foreign donors and it is unlikely that USAID decisions will affect the activities of other donors. This is not necessarily the case with the Integrated Watershed Management activity. There is a possibility that the Livestock Credit and Processing Project may decide to devote its considerable resources to range management. The approach to intervention now being considered by the Livestock Credit and Processing Project is remarkably similar to that envisaged in the draft Agricultural Water Resources Project Identification Document for the

Integrated Watershed Management activity. Before design of this activity proceeds much further, someone should assess the likely extent of the LCPP effort and offer a judgment on whether additional Project 0052 efforts are warranted.

b. Concentration on Assistance to the Yemeni Extension System. Staffing levels and projected costs for these activities could be reduced considerably if direct assistance to farmers was abandoned and efforts were directed toward equipping the Yemeni extension system to carry out these activities. Using the Yemeni extension system to make direct contact with farmers might allow budgets to be cut by as much as two-thirds. A possible approach to On Farm Management would be to delay implementation until 1985 when the first graduates of the Surdud Agricultural Secondary School would become available to offer simple on farm water management techniques to farmers. It is conceivable that the Yemeni extension system could eventually develop the capacity for teaching farmers simple techniques without direct 0052 assistance to farmers. It is less likely that Yemeni extension personnel will succeed in providing comprehensive assistance in applying optimal farming systems within the next five - eight years. The level of sophistication required for such efforts is clearly beyond the capabilities of existing extension personnel.

4. Institutional Support for the MOA and MOE

Potential. With direct assistance it would be possible to improve the functioning of the MOA and MOE during the interim until sufficient Yemeni are trained and recruited to plan, implement, and manage government services without outside assistance. Effective institution building efforts will also create institutional policies and practices which will allow these new Yemeni

personnel to function effectively. Special areas for assistance include MOE requirements to plan for, open, and manage agricultural secondary schools. The MOA could benefit from assistance in agricultural policy analysis and planning, particularly during preparation of the next five year plan. It is hoped in addition that the Core Team can succeed in helping the MOA to understand that policy analysis, planning, and evaluation is a continuous process and that a permanent capacity to carry out these functions is needed. Perhaps the greatest opportunity for improvement in YARG policy making lies in the area of water policy. It appears that uncontrolled competition for groundwater supplies is depleting nonreplaceable water resources at a rapid rate. The MOA has urgently requested USAID technical assistance in helping it take the leadership in establishing a national water policy for the Yemen Arab Republic. There is a possibility that USAID assistance can play a crucial role in helping to allocate rationally over time the nation's scarce water resources. It is hoped that CID and the MOA will be able to establish a long-term relationship which will endure beyond the 0052 phases sustained by USAID funding. This long-term relationship will give the MOA access at any time to the broad spectrum of expertise and training opportunities which American land grant universities have to offer. In addition to these opportunities to improve the functioning of public institutions in supporting agricultural development, this activity probably represents USAID's best opportunity to establish visibility and maintain a presence at the ministerial level within the YARG.

Beneficiaries. Indirect recipients of benefits are the clients of agricultural institutions who receive improved services as the result of institutional support efforts.

Technical Analysis. Success in providing institutional support will depend in great part upon the judgment and political skills of the Core Team members

charged with responsibility for this activity. The difficult task of earning the trust and confidence of MOA officials is complicated by the presence of an IBRD advisory group in the MOA who appear to be overly jealous of their privileged positions and perhaps uneasy about their own personal futures. It is possible that timely assistance with inventorying Yemen's water resources and advice on the formulation of a national water policy will go a long way toward earning the required trust and confidence of MOA officials.

USAID will have less control over the outputs of their institutional support efforts than is customary for USAID activities. Core Team members involved in institutional support will necessarily serve in an advisory capacity in the MOA. In this position they cannot reasonably expect to control the outputs which result from their technical studies and advice. Core Team members will inevitably become entangled in the day-to-day operating problems of the MOA including bureaucratic struggles with other agencies and details of managing state farms as well as with decisions on national water policy. They cannot expect to remain aloof from the bureaucratic chores while reserving their efforts for preparing their counterparts for epochal policy choices. Neither can they be certain that their inputs will not be used in support of some disastrous policy choice or to the disadvantage of individual Yemeni deserving of assistance.

For better or worse, institutional support for the YARG will necessarily be a force for centralized control. Power and decision making in Yemen is decentralized in part because the YARG lacks the capacity to plan and implement policies, including policies which intervene in and replace private decision making. Successful institutional support will increase the capacity of the YARG to carry out such policies.

The design of this activity presumes that USAID will delegate to the contractor the authority to deal on a day-to-day basis with the YARG without close

USAID supervision. If USAID chooses to participate in all contractor-YARG discussions on a day-to-day basis, it will be necessary for USAID to assign a USAID/Yemen officer who is available to share MOA offices with the Core Team on a six-day-a-week basis. Perhaps it goes without saying that it will be extremely difficult to evaluate ex post success of institutional support efforts. The net contribution of such assistance is virtually impossible to measure from conventional objective data.

Required YARG Contributions. YARG officials must trust Core Team members, admit them into their confidence and decisionmaking circles, and understand what kinds of assistance the Core Team offers.

Activity's Dependence on Particular Socio-Economic Conditions for Success. Assumptions underlying this activity are that agriculture will remain a viable sector and that improved public services can contribute to increases in agricultural productivity. As long as these conditions exist, the Core Team can adapt its assistance so that it is appropriate for prevailing socio-economic conditions.

Dependence on Other 0052 Activities. The success of this activity is highly dependent upon receiving support from other 0052 activities. It is most likely that the 0052 program must achieve success in some other activity such as the Ibb school or On Farm Water Management (or be perceived as instituting greatly desired activities) before its offer of institutional support is accepted. If institutional support is to be phased out, training assistance must be available to develop the trained personnel who will eventually perform the functions with which the Core Team assists.

Alternatives to the Planned Level of Support Represented in Table 1. There are no compelling reasons why any one of the activities listed in Table 1 under institutional support require that the other activities be supported. It should

also be possible to operate any of the activities at any particular level. For example, the Water Inventory and Policy activity could absorb \$2,000,000 per year or it could be limited to a two week TDY visit of a water policy expert.

In the absence of detailed knowledge of YARG requirements and the way in which institutional support assistance will be utilized by the YARG, it is extremely difficult to estimate the marginal productivity of adding additional TDY or full-time personnel to the Core Team. It is likely that only well informed individuals such as the Country Program Director will possess the information needed to make this judgment. There does exist a notion that "sweeteners" such as the Agricultural Documentation Center and technical backstopping services are needed to induce the MOA to accept policy assistance, but this remains an untested hypothesis.

#### 5. Project Design and Mobilization

This activity is so familiar to readers that to discuss it would be to belabor the obvious. Only one point will be made. If available 0052 resources are fully allocated to other activities, it would be a waste of resources to design and mobilize other activities for which financing is unavailable. Given existing budget constraints and design schedules it is likely that project design and mobilization efforts will be needed for FY 81 but not for FY 82.

#### 6. Support for All Subprojects

Insufficient support will surely doom any 0052 activity to failure. Each activity requires representation at the highest levels of the MOA or MOE, regular communication with operating elements of the ministries, periodic monitoring and evaluation, and day-to-day managerial and logistic support. The appropriate levels for such support are managerial problems which are best considered elsewhere. Consideration of these matters will end with the observation that the

requirements for support services are roughly proportional to the number of 0052 personnel in Yemen, and that the \$2,297,000 level reported in Table 1 is probably more than sufficient to support an \$8,600,000 FY 82 program.

#### Choosing Among Activities to Select a Program

The preceding sections offered a discussion of individual activities which was intended to assist the reader in forming judgments about possible payoffs and potential difficulties for each activity. While that discussion is relevant to the problem of choosing a program, it is incomplete. Formulating a total program ultimately requires making choices among activities. It is necessary to compare one activity to another and determine their relative importance. This section offers examples of choices among activities.

Tables 3 - 10 summarize key options for resource allocation which satisfy (approximately) the \$8,600,000 FY 82 "optimum" budget limitation. Among the options are:

- (1) Activities for which approved or draft subproject papers exist (Table 3),
- (2) Maximum direct assistance to Yemeni farmers plus the participant training and institution building efforts needed to create YARG capacity to continue the efforts (Table 4),
- (3) Maximum commitment to participant training and to institution building in agricultural education (Table 5),
- (4) Maximum commitment to institutional support for the MOA accompanied by one highly visible field activity (Table 6),
- (5) Maximum commitment to natural resources conservation and restoration (Table 7),
- (6) YARG's preferred activity set (Table 8),

Table 3

OPTION 1

Activities for which Approved or Draft Subproject Papers Exist

<u>Function</u>	<u>Amount (\$000)</u>	<u>Amount as Proportion of Total</u>
Educational Institutions and Participant Training	\$ 3,413	.40
Agricultural Secondary Education (without PT*)	1,983	.23
Ibb	1,983	.23
Surdud	-0-	.00
Sana'a	-0-	.00
Saadah	-0-	.00
Faculty of Agriculture	-0-	.00
Participant Training	1,430	.17
Core	872	.10
Ibb	514	.06
Surdud	-0-	.00
Subsistence Farming	44	.00
On Farm Water	-0-	.00
Integrated Watershed	-0-	.00
Water Inventory and Policy	-0-	.00
Direct Assistance to Yemeni Farmers (without PT)	1,390	.16
Subsistence Farming	1,390	.16
On Farm Water	-0-	.00
Integrated Watershed	-0-	.00
Institutional Support to MOA and MOE	1,028	.12
Water Inventory and Policy	-0-	.00
Policy Analysis and Planning for MOA & MOE	771	.09
Agricultural Documentation Center	47	.00
Technical Backstopping Services to the MOA	210	.02
Project Design and Mobilization	403	.04
Support for all Subprojects (overhead costs)	<u>2,297</u>	<u>.27</u>
TOTAL	\$ 8,531	1.00

\* PT = Participant Training

Table 4

OPTION 2

Maximum Direct Assistance to Yemeni Farmers Plus the  
Participant Training and Institution Building Efforts Needed  
To Create YARG Capacity to Continue the Efforts

<u>Function</u>	<u>Amount (\$000)</u>	<u>Amount as Proportion of Total</u>
Educational Institutions and Participant Training	\$ 844	.10
Agricultural Secondary Education (without PT*)	-0-	.00
Ibb	-0-	.00
Surdud	-0-	.00
Sana'a	-0-	.00
Saadah	-0-	.00
Faculty of Agriculture	-0-	.00
Participant Training	844	.10
Core	400	.05
Ibb	-0-	.00
Surdud	-0-	.00
Subsistence Farming	44	.00
On Farm Water	300	.03
Integrated Watershed	100	.01
Water Inventory and Policy	-0-	.00
Direct Assistance to Yemeni Farmers (without PT)	5,560	.63
Subsistence Farming	1,390	.16
On Farm Water	2,780	.32
Integrated Watershed	1,390	.16
Institutional Support to MOA and MOE	400	.05
Water Inventory and Policy	-0-	.00
Policy Analysis and Planning for MOA & MOE	-0-	.00
Agricultural Documentation Center	-0-	.00
Technical Backstopping Services to the MOA	200	.02
Extension Administration	200	.02
Project Design and Mobilization	-0-	.00
Support for all Subprojects (overhead costs)	<u>2,000</u>	<u>.23</u>
TOTAL	\$ 8,804	1.00

\* PT = Participant Training

Table 5

OPTION 3

Maximum Commitment to Participant Training  
and to Institution Building in Agricultural Education

<u>Function</u>	<u>Amount (\$000)</u>	<u>Amount as Proportion of Total</u>
Educational Institutions and Participant Training	\$ 4,831	.64
Agricultural Secondary Education (without PT*)	3,118	.41
Ibb	1,983	.26
Surdud	1,135	.15
Sana'a	-0-	.00
Saadah	-0-	.00
Faculty of Agriculture (Design & Mobilization)	200	.03
Participant Training	1,713	.23
Core	1,000	.13
Ibb	514	.07
Surdud	199	.03
Subsistence Farming	-0-	.00
On Farm Water	-0-	.00
Integrated Watershed	-0-	.00
Water Inventory and Policy	-0-	.00
Direct Assistance to Yemeni Farmers (without PT)	-0-	.00
Subsistence Farming	-0-	.00
On Farm Water	-0-	.00
Integrated Watershed	-0-	.00
Institutional Support to MOA and MOE	500	.07
Water Inventory and Policy	-0-	.00
Policy Analysis and Planning for MOA & MOE	-0-	.00
Agricultural Documentation Center	-0-	.00
Technical Backstopping Services to the MOA	-0-	.00
Human Resources Policy, Planning, & Backstopping	500	.07
Project Design and Mobilization	-0-	.00
Support for all Subprojects (overhead costs)	<u>2,000</u>	<u>.27</u>
TOTAL	\$ 7,531	1.00

\* PT = Participant Training

Table 6

OPTION 4

Maximum Commitment to Institutional Support for MOA  
Accompanied by One Highly Visible Field Activity

<u>Function</u>	<u>Amount (\$000)</u>	<u>Amount as Proportion of Total</u>
Educational Institutions and Participant Training		
Agricultural Secondary Education (without PT*)		
Ibb		
Surdud		
Sana'a		
Saadah		
Faculty of Agriculture	-0-	.00
Participant Training	1,372	.16
Core		
Ibb		
Surdud		
Subsistence Farming		
On Farm Water		
Integrated Watershed		
Water Inventory and Policy		
Field Activity	500	.06
Direct Assistance to Yemeni Farmers (without PT).		
Subsistence Farming		
On Farm Water		
Integrated Watershed		
Institutional Support to MOA	3,028	.36
Water Inventory and Policy	2,000	.24
Policy Analysis and Planning for MOA	771	.09
Agricultural Documentation Center	47	.01
Technical Backstopping Services to the MOA	210	.03
Project Design and Mobilization		
Support for all Subprojects (overhead costs)	2,000	.24
One Highly Visible Field Activity (e.g., Ibb or Subsistence Farms--On Farm Water)	<u>2,000</u>	<u>.24</u>
TOTAL	\$ 8,400	1.00

\* PT = Participant Training

Table 7

OPTION 5

Maximum Commitment to Natural Resource Conservation and Restoration

<u>Function</u>	<u>Amount (\$000)</u>	<u>Amount as Proportion of Total</u>
Educational Institutions and Participant Training	\$ 500	.06
Agricultural Secondary Education (without PT*)	-0-	.00
Ibb		
Surdud		
Sana'a		
Saadah		
Faculty of Agriculture		
Participant Training	500	.06
Core		
Ibb		
Surdud		
Subsistence Farming		
On Farm Water		
Integrated Watershed	500	.06
Water Inventory and Policy		
Direct Assistance to Yemeni Farmers (without PT)	4,000	.47
Subsistence Farming	-0-	.00
On Farm Water	-0-	.00
Integrated Watershed	2,000	.24
Pilot Project on Terrace Maintenance	2,000	.24
Institutional Support to MOA and MOE	2,000	.24
Water Inventory and Policy	2,000	.24
Policy Analysis and Planning for MOA & MOE	-0-	.00
Agricultural Documentation Center	-0-	.00
Technical Backstopping Services to the MOA	-0-	.00
Project Design and Mobilization	-0-	.00
Support for all Subprojects (overhead costs)	<u>2,000</u>	<u>.24</u>
TOTAL	\$ 8,500	1.00

\* PT = Participant Training

Table 8

OPTION 6

YARG's Preferred Activity Set

<u>Function</u>	<u>Amount (\$000)</u>	<u>Amount as Proportion of Total</u>
Educational Institutions and Participant Training	\$ 4,118	.47
Agricultural Secondary Education (without PT*)	3,118	.35
Ibb	1,983	.22
Surdud	1,135	.13
Sana'a	-0-	.00
Saadah	-0-	.00
Faculty of Agriculture	-0-	.00
Participant Training	1,000	.12
Core		
Ibb		
Surdud		
Subsistence Farming		
On Farm Water		
Integrated Watershed		
Water Inventory and Policy		
Direct Assistance to Yemeni Farmers (without PT)	-0-	.00
Subsistence Farming		
On Farm Water		
Integrated Watershed		
Institutional Support to MOA and MOE	2,700	.31
Water Inventory and Policy	2,000	.23
Policy Analysis and Planning for MOA & MOE		
Agricultural Documentation Center	100	.01
Technical Backstopping Services to the MOA	400	.05
Contingency Fund for Financial Emergencies	200	.02
Project Design and Mobilization		
Support for all Subprojects (overhead costs)	<u>2,000</u>	<u>.23</u>
TOTAL	\$ 8,818	1.00

\* PT = Participant Training

Table 9

OPTION 7

Something of Everything

<u>Function</u>	<u>Amount (\$000)</u>	<u>Amount as Proportion of Total</u>
Educational Institutions and Participant Training	\$ 3,500	.41
Agricultural Secondary Education (without PT*)	2,000	.24
Ibb		
Surdud		
Sana'a		
Saadah		
Faculty of Agriculture		
Participant Training	1,500	.18
Core		
Ibb		
Surdud		
Subsistence Farming		
On Farm Water		
Integrated Watershed		
Water Inventory and Policy		
Direct Assistance to Yemeni Farmers (without PT)	2,000	.24
Subsistence Farming		
On Farm Water		
Integrated Watershed		
Institutional Support to MOA and MOE	1,000	.12
Water Inventory and Policy		
Policy Analysis and Planning for MOA & MOE		
Agricultural Documentation Center		
Technical Backstopping Services to the MOA		
Project Design and Mobilization		
Support for all Subprojects (overhead costs)	<u>2,000</u>	<u>.24</u>
TOTAL	\$ 8,500	1.00

\* PT = Participant Training

Table 10

OPTION 8

Lean Funding of Each Activity in FY 82 with Design and  
Mobilization Efforts which will Allow Rapid Program Expansion in FY 83

<u>Function</u>	<u>Amount (\$000)</u>	<u>Amount as Proportion of Total</u>
Educational Institutions and Participant Training	\$ 3,700	.44
Agricultural Secondary Education (without PT*)	1,500	.18
Ibb		
Surdud		
Sana'a		
Saadah		
Faculty of Agriculture		
Participant Training	2,200	.26
Core		
Ibb		
Surdud		
Subsistence Farming		
On Farm Water		
Integrated Watershed		
Water Inventory and Policy		
Direct Assistance to Yemeni Farmers (without PT)	1,500	.18
Subsistence Farming		
On Farm Water		
Integrated Watershed		
Institutional Support to MOA and MOE	500	.06
Water Inventory and Policy		
Policy Analysis and Planning for MOA & MOE		
Agricultural Documentation Center		
Technical Backstopping Services to the MOA		
Project Design and Mobilization	800	.09
Support for all Subprojects (overhead costs)	<u>2,000</u>	<u>.24</u>
TOTAL	\$ 8,500	1.00

\* PT = Participant Training

- (7) Something of everything (Table 9), and
- (8) Lean funding in FY 82 activities with design and mobilization efforts which will allow rapid program expansion in FY 83 (Table 10).

Option One identifies activities for which approved or draft subproject papers exist. This option represents a default position. In the absence of additional initiatives, Option One will most likely be carried out. It should also be understood that the YARG has been apprised of the staffing levels reflected in Option One budget data and may take exception if these activities are eliminated or reduced in scope. For these reasons, Option One has to be considered a likely outcome.

Option Two, Three, Four, and Five budget maximum efforts in activities for direct assistance to farmers, participant training and institution building in agricultural education, institutional support for the MOA, and natural resources conservation and restoration, respectively. In each case the proposed budgets take into account the particular interdependencies of each activity with other 0052 sponsored activities. These interdependencies were identified in an earlier section of the paper. It is assumed that \$2,000,000 is sufficient to provide managerial, administrative, and logistic support in each case.

Option Six represents an effort to quantify YARG preferences for USAID assistance. Such an effort is difficult, for the YARG, of course, does not speak with one voice. For example, neither MOE nor the MOA officials would likely agree on the allocation of resources between agricultural secondary education which is under the supervision of the MOE, and remaining activities, which are targeted on MOA concerns. Option Six reflects the MOA's expressed concern that assistance with water inventory and policy has been assigned the highest priority. It also reflects the author's assessment that the MOA is

little interested in using USAID resources for direct assistance to Yemeni farmers and to institution building in the field, such as in the extension system. The large allocations for the Agricultural Documentation Center, technical backstopping, and contingency fund for financial emergencies reflect expressed concerns of a large number of MOA officials.

Option Seven is an example of spreading resources thinner across different activities in order to include each major activity. (It is revealing to compare Options One and Seven. They are quite similar.) A suboption (not included in Table 9) would be to further spread resources among more projects by using budget allocations for individual activity areas to fund a larger number of sub-activities. For example, the \$2,000,000 allocated to staffing agricultural secondary schools could be stretched to allow expatriate staffing and participant training for both the Ibb and Surdud schools. The \$2,000,000 allocation for direct assistance to Yemeni farmers could be used to finance components of both the Subsistence Farms Development and Management Subproject and the On Farm Water Management Subproject.

Option Eight consists of operation of Option Seven on a skeletal basis for FY 82 with the savings used to lay the foundations for rapid program growth in FY 83. The funds saved by reducing the Option Seven budget are used for the design, mobilization, and preproject participant training required to permit rapid program expansion in FY 83. (The reader may have noted that Options Two through Seven exclude project design and mobilization funds on the assumption that FY 83 total allocations will not provide sufficient resources for program expansion.)

#### The Possibility of More Severe Budget Limitations

Options One through Eight were based on the assumption that about \$8 million

would be available to finance Project 0052 FY 82 activities. In fact, USAID's FY 82 budget submission requests an "optimum" expenditure level of \$8.6 million. The "most likely" budget level for FY 82, however, is only \$6.2 million. Thus there exists a very strong possibility that Project 0052 will be forced to adhere to a much more severe budget limitation than that indicated in Options One through Eight.

It is doubtful whether it is possible to pare down individual activities contained in Options One through Eight to the \$6.2 million level and still maintain a viable program. For example, it is difficult to imagine how it would be possible to reduce each of the activity expenditure levels in Option One by an average of 25% and still have a viable program. Decisionmakers should consider cutting out an entire activity such as participant training or Subsistence Farms Development and Management rather than try to operate each activity at such a low level as to ensure that none can succeed.

#### Possible Contributions of Other Donors in Financing Table 1 Activities

It is apparent that USAID funds sufficient to finance all the activities listed in Table 1 will not be forthcoming. Before concluding that some of these needs will go unmet, it is useful to consider whether other donors might be available to help to finance the activities listed in Table 1. Possible responses of other donors include displacement of existing or contemplated support as well as increased assistance. These responses are discussed below.

It is important to recognize that other donors are already engaged in activities listed in Table 1 and that others have at one time or other considered similar activities. Existing IBRD institution building efforts in the MOA and CARTO provide considerable participant training and institutional support to those organizations. It is possible that the net effect of USAID assistance in

these activities will be to displace IBRD expenditures with little net effect on total expenditures for participant training and institutional support. It is also possible that USAID support for the Integrated Watershed Management activity might result in the diversion of Livestock Credit and Processing Project funds from similar efforts. While only USAID has expressed interest in providing expatriate faculty and participant training for the agricultural secondary schools, it is conceivable that upon withdrawal of USAID support the IBRD or one of the Arab development funds would move to partially replace USAID efforts.

Other potential activities identified in the Baseline Study Field Report where other donors are likely to provide at least limited assistance in the future include credit systems and agricultural database development. The IBRD has long recognized the needs for such assistance and in the absence of efforts by other donors will provide at least partial support for these activities. (The IBRD institutional support team in the MOA apparently understands the displacement principle. They have on numerous occasions suggested that USAID assistance in agricultural database development would be welcome.)

Each of the cases mentioned above involves a sophisticated donor with confidence in its own capacity to identify Yemeni needs and to plan and implement its own assistance programs. Such donors are likely to have many more attractive assistance opportunities than there are funds to finance the opportunities. Under these circumstances USAID efforts are most likely to result in displacement of the efforts of other donors rather than in a significant augmentation of total effort. In particular there is, in the author's opinion, a nonnegligible probability that USAID efforts in Yemen will over the next five years displace IBRD and UNDP contributions. Because rapid income growth in Yemen has lifted per capita income levels above the cutoff points which the UNDP and IBRD use to identify countries with the greatest needs, those aid giving institutions are

reexamining their commitments to Yemen. If, simultaneously, USAID commitments to similar activities are increasing, the IBRD and UNDP will find it easier to redirect their assistance efforts to other countries. While this displacement effect is unlikely to reduce UNDP and IBRD inputs during the life of existing projects, renewal of project commitments is less likely.

There may exist other donors who would be willing to increase their assistance efforts to Table 1 activities as a result of USAID inputs. Donors who lack confidence in their ability to identify opportunities for assistance and to design and implement viable projects might be willing to increase their assistance to Yemen if they were offered the opportunity to participate in activities designed by USAID. Other donors with limited amounts of funds may also prefer to participate in large USAID designed activities rather than carry out their own small assistance programs. A list of such donors would include the Netherlands, Sweden, and several of the Arab development funds.

It is unlikely that CID efforts to identify and design attractive activities will in itself be sufficient to attract the participation of other donors. Specialists in grantsmanship are quick to point out that detailed knowledge of the interests (or, more exactly, whims in many cases) of potential donors is at least as important to success as carefully documented needs and well designed action programs. While CID Design Teams have been quite successful in identifying opportunities for assistance and are well advanced in designing assistance activities, they have acquired precious little knowledge about the interests and whims of the smaller, less sophisticated potential donors. Success in identifying other donors willing to participate in USAID designed programs will surely require much effort, most likely supplied by the Core Team. Two possible approaches to the problem include, first, contacting potential donors directly and, second, convincing the YARG to approach potential donors with specific

suggestions for assistance. Either approach, to be successful, would surely require expansion of the Core Team to staff these efforts.

Participation in any of the activities listed in Table 1 might appear attractive to potential donors. Other activities not included there which are worthy of donor consideration are credit assistance to small farmers, a program for repair and restoration of deteriorating terraces, the test wells and meteorological and stream flow monitoring equipment needed to expand the database required to model aquifers, and the capital and operating costs required to operate research stations. Serious consideration ought to be given to the question of whether Project 0052 should devote resources to the task of identifying potential donors and assisting them to find projects which are suited to their interests and capabilities.