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NEAR EAST EVALUATION ABSTRACT

PROJECT TITLE(S) AND NUMBER(S) Agricultural Development Support Poultry Extension and Training Subproject, 279-0052			MISSION/AID/W OFFICE  USAID/Yemen
PROJECT DESCRIPTION  To establish and implement an improved extension and training program within the Live-stock Resource Division at the MOA that will enhance egg and poultry meat production for private producers in the traditional sector and for small-scale commercial pro-ducers.			
AUTHORIZATION DATE AND U.S. LOP FUNDING AMOUNT August 1984	PES NUMBER FY 84 - 04	PES DATE May 1984	PES TYPE <input checked="" type="checkbox"/> Regular <input type="checkbox"/> Other (Specify) <input type="checkbox"/> Special <input type="checkbox"/> Terminal
ABSTRACT PREPARED BY, DATE Abdullah Elsayadi A.E.		ABSTRACT CLEARED BY, DATE AGR, G. T. Atwood J.A. 9/30/84 PROG, D. Fredrick J.S. 10/2/84	
<p><u>Reason for Evaluation:</u></p> <p>To provide the USAID Mission/Sanaa, the Ministry of Agriculture, YARG, and the Consortium for International Development with a set of recommendations for future poultry activities in Yemen. In particular what, if any, changes might be recom-mended for the existing Poultry Extension and Training Project.</p> <p><u>The Status of the Project:</u></p> <p>The ultimate long-term objective of the project is to train and educate a cadre of extension agents in the districts and provinces, and poultry technicians and pro-ject managers in the MAF to assist the poultry industry to develop on a profitable basis. However, institutional development as an objective in a project such as PETS is by necessity long-range and illusive. The institutional development phase of the project is not likely to be successful unless the action phase, i.e. agent training and pullet distribution is successful first, or at least the two proceed simultaneously. At this stage of the project, lasting and significant institutional achievements are not really measurable. The base is there, a good beginning has been made which might be further along had the field work progressed more quickly.</p> <p><u>Key Findings</u></p> <ol style="list-style-type: none"> <li>1) Institutional building objectives would be better served if there is identi-fiable content attributable to the project.</li> <li>2) The project would be better managed if limited objectives are set for a parti-cular time span.</li> <li>3) PETS management is less effective than it could be because of difficulty in ob-taining counterparts at the appropriate level in the Directorate of Animal Resources.</li> <li>4) The project needs to seek other ways of reaching women producers, e.g. through the use of female technician.</li> </ol> <p><u>Lessons Learned</u></p> <ol style="list-style-type: none"> <li>1) If the project can't do all it started out to do it should decide on what it can do.</li> <li>2) To achieve various outputs and purposes a project should not be a slave to its own design.</li> </ol>			

- 3) The evaluation team notes the obvious lesson that experienced managers are needed, and that the University community may not be the best place to look for skilled project managers.

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13. Summary

The evaluation team concluded that, while the basic project design framework remains valid, there is a need for the project to narrow its focus more exclusively on meeting its training objectives, expanding pullet production, both in the short and longer term, and emphasizing distribution of pullets to, and provision of support services for, traditional household flocks and small-scale village flocks. The team felt strongly that although project activities to date have laid a solid foundation for ultimate achievement of output targets and project purposes, the unsynchronized pursuit of individual project outputs, combined with the lack of focus in project team efforts and poor planning and administration of project input delivery, had significantly hampered progress to date, and foreshadowed a need for additional time in achieving project purposes. The evaluation particularly emphasized the need for the project to substantially increase its efforts to reach women in the rural areas who are primarily responsible for management of household flocks and decisions regarding egg consumption. To accomplish these suggested changes in project management, the team recommended: 1) continuation and expansion of training at the Sana'a Poultry Training Center, with particular emphasis on training extension agents; 2) an immediate effort to expand pullet production dramatically, using both external and internal production sources until completion of the project's own pullet production facility at Bir al-Qusain; 3) building upon pullet distribution experience in the wake of the December 1982 earthquake, development of an effective pullet distribution system for household flocks, relying heavily on trained personnel already in place within the extension service; 4) procurement of the services of one or more female poultry specialists, to facilitate the project's outreach to women poultry producers; and 5) development under the Agricultural Development Support Program, but outside the PETS subproject, i.e. under the Core subproject, of a capacity to conduct analyses of primary economic and financial issues facing the poultry subsector in Yemen and to work with the expanding private sector poultry industry.

14. Project Background

From 1975 to 1979 USAID/Sanaa conducted a small (\$1.9 million) Poultry Development Project, under which seven poultry houses were constructed and operated in the Taiz area and four poultry houses, plus a small training center and feed house were built in Sanaa. These facilities were used to produce eggs and layer pullets for sale in the local communities and to train extension workers. The

project was perceived by the YARG as one of the more successful AID activities, and when the ADSP was established the MAF requested that USAID and CID, the ADSP technical assistance contractor, undertake a poultry subproject to pick up where the earlier project had ended.

In retrospect, many of the issues raised during the subproject design process have proven accurate barometers of the difficulties faced by the subproject to date. The original subproject design included assistance in both egg and broiler production, and assistance in establishing a range of flock sizes from the small (10-25 bird) traditional family flock to the medium-scale (over 1000 bird) commercial operation. From the submission of the SPID in June, 1981 to the final authorization of the subproject in August, 1982, there was a continuing dialogue between the Mission, CID and AID/W on how the project might be better focused, and which project elements were paramount. As a result of this dialogue, the SPP upon which the SP was authorized effectively excluded assistance to the broiler industry except on an "as time permits" basis. The approved SPP also contemplated a heavy focus on the traditional sector, considered a more appropriate beneficiary group than the larger-scale commercial sector.

Although pre-project activities (with Core SP funding) were approved relatively shortly after review of the SPID in AID/W, the lengthy design and approval process irritated the MAF, and during this period the MAF removed the al-Rawdah facility from their commitment to the SP and put it into broiler production. Thus, by the time full project implementation was underway, the subproject no longer had access to the site contemplated in the SPP for pullet production. With al-Rawdah converted by the MAF to broiler production, and significant delays in the identification and acquisition of land at Bir al-Qusain, the alternative site for the major planned facility, only the Sana'a Poultry Training Center facility at al-Hasabah was actually ready to produce pullets in fulfillment of project production objectives.

Rather than identifying the shortage of pullet production facilities as a major impediment to achievement of project objectives, and taking immediate steps to rectify this situation, project staff seems to have assumed that this problem would be addressed in time, once the additional facility at Bir al-Qusain was developed. Thus the project team devoted most of its time to training at al-Hasabah, pushing for the identification and development of the facility at Bir al-Qusain, providing advice and assistance to commercial broiler producers and arranging for long-term U.S. academic training in poultry science. The project

made no attempt to locate alternative sources of pullet production, e.g. MAF facilities, private sector.

The project's major experience in conducting the distribution and extension activities central to project objectives was the Dhamar area distribution program which was undertaken in the summer of 1983 in response to the December, 1982 earthquake which caused substantial damage to the Dhamar area. Since the earthquake, approximately 74% of the 7,600 pullets distributed have been in Dhamar, with the balance going to villages outside the earthquake-affected region. Perhaps because the distribution and extension effort has to date been largely concentrated in one area, it has been an unqualified success, and will serve as a basis for expanding these activities over the life of the subproject.

As of this writing the subproject has: trained 18 students in sixteen week courses at the Sana'a Poultry Training Center; identified 12 participants for U.S. academic training, three of which are currently at Oregon State, with the balance still in English language training in Yemen; constructed four satellite demonstration units in various locations around the country, and four brooder houses at the Sana'a Poultry Training Center; provided pullets and training to over 700 farmers; and made significant progress in development of the facility at Bir al-Qusain, for an estimated start-up date early in 1985.

#### 15. Methodology

This evaluation was part of a regularly scheduled evaluation of the of the entire Agricultural Development Support Program (Project 279-0052). The overall external evaluation was conducted by Pragma Corporation between October 14 and November 20, 1983 with their final evaluation draft produced on January 18, 1984. While the Mission accepted the conclusions and recommendations of the Pragma effort with respect to the other 052 sub-projects, it concluded that Pragma's treatment of the PETS sub-project was inadequate in that it reflected a lack of understanding of PETS objectives, activities and implementation problems. Accordingly the Mission, with AID/W concurrence, set aside the conclusions and recommendations of the Pragma evaluation with respect to PETS and developed a new scope of work for a re-evaluation focussed exclusively on PETS. A new evaluation team, comprised of a retired AID agricultural economist, with substantial knowledge of the subprojects' history, and the Chairman of the Carolina State University Poultry Department, was recruited to undertake the new scope of work.

After initial discussions in AID/W and review of project development and other related documents, the evaluation team arrived in Yemen on April 19, 1984. During their two-week stay in Yemen the team conducted extensive interviews with USAID, MAF and CID personnel. In addition, the team made numerous visits to project sites, private poultry (broiler) producers and MAF facilities throughout the country, and interviewed a number of recipients of pullets distributed earlier. The team also assembled an array of price information relating to the costs of broiler and egg production and, using this information, analyzed the effective rates of return for project activities in the traditional sector.

The primary purpose of this evaluation was to assess the progress to date, to determine whether the project remains valid as currently designed and implemented or to identify ways in which either design or implementation require revision in order to accomplish project purposes.

#### 16. External Factors

A major external factor was the MAF's decision to remove al-Rawdah from the subproject and convert the facility to broiler production. As discussed above, this decision has severely delayed the subproject's ability to produce the projected number of pullets for distribution.

Perhaps the most important external factor was the December 1982 earthquake which struck most heavily in the Dhamar area, destroying hundreds of villages. Because much of the livestock in the affected area was also destroyed, USAID, CID and the MAF agreed to provide pullets at subsidized prices to families in the Dhamar area. Funding for this relief effort came entirely from a donation from the Djibla Hospital (Baptist) staff. The evaluation team visited several villages where these pullets had been distributed and found the recipients almost uniformly enthusiastic about the breed of layers they had received. This distribution effort assisted the YARG to provide tangible evidence of the Government's commitment to rehabilitation of the damaged area, as well as provided CID and the MAF with valuable experience in a major distribution effort.

Most recently, substantial increases in broiler production have led to falling prices in the broiler industry, a situation which has caused some of these large commercial producers to seriously consider moving into egg production, where projected returns have never been as great. In recent weeks, however, the government appears to be significantly reducing the flow

of imported frozen poultry into Yemen, and there are some indications that this measure may be in response to pressure from the increasingly powerful broiler industry. If imports continue to be curtailed and broiler prices rise again, the potential shift from broiler to egg production on the part of private sector producers could be slowed for the foreseeable future.

#### 17. Key Project Assumptions

The logframe included in the subproject paper made a number of assumptions crucial to progress under the subproject. The subproject paper assumed that the "cost-return relationship [would] become more favorable for egg production." In the view of the evaluation team, the cost-return relationship for traditional sector egg production is now more favorable than it was at the time the project was developed. The subproject paper assumed a 25-hen traditional model, with feed as a substantial cost component. In the view of the evaluation team, the actual model which exists in the villages, i.e. 4-6 hens subsisting on 1/2 ration of table scraps and 1/2 ration of imported feed, can have similar cost returns to those outlined in the SPP (202 eggs per year), but actual costs will be significantly lower, and returns thus higher.

The question of feed requirements, as well as the availability of pullets was another major assumption of the SPP, where it was anticipated that for outputs to achieve project purposes, both pullets and feed would be available from the rearing and distribution center at Rawdah. As mentioned earlier, the MAF removed Rawdah from the subproject because of the long delay in the project authorization process. Some pullets and feed have been made available from the Sana'a Poultry Training Center at al-Hasabah, but neither have been available in the magnitudes anticipated in the SPP. In the Dhamar area, where the bulk of available pullets were distributed, recipients have had to rely primarily on large commercial broiler producers as sources of feed. When these sources dried up, most of the pullets distributed were shifted to diet of table scraps.

Of perhaps most importance to the institutional development objectives of the SP, the SPP logframe assumed that "YARG can identify and hire persons for training. Housing for trainees becomes available at the Sana'a Poultry Training Center." While the number of trainees to date is 73% of the total goal at this stage of the project, recruitment of students has not been as easy as this assumption would indicate, and the dormitory facilities planned for MAF financing at the SPTC are still under construction. In the meantime, students are housed at the British Veterinary Services Project Hostel.

Similar assumptions were made with respect to identification of academic trainees and counterpart staff. The project is on schedule with 3 of the 10 planned academic trainees enrolled in degree programs in the U.S. and another 9 in language training preparatory to selection of 7 for stateside training. However, identification of counterpart staff has been problematic and in fact the poultry technician is currently without an appropriate counterpart. While individuals have been designated for counterpart positions, they are not of the level or experience which would facilitate smooth functioning of project activities within the Ministry, and the project has often had to relay on the ADSP's Yemeni Co-Manager to perform functions which in other projects would be done by designated counterparts.

In summary, it is apparent that a number of items contained in the SPP assumptions were items which should have been directly addressed in the SP design. This is a lesson which we are beginning to put into practice as we design other ADSP components.

#### 18. Progress Since Last Evaluation

As this was the first evaluation of the PETS subproject, there is no previous evaluation against which progress can be measured. However, since the evaluation report was completed in draft a number of actions have taken place. Specifically, the CID/AID/YARG Joint Annual Field Review which took place in Pomona, California in July, approved the increased focus of the subproject on the traditional sector and agreed to incorporate a new female poultry technician position, currently under recruitment, into the project to address the need for the subproject's distribution, extension and training elements to reach more women who are primarily responsible for household flocks. In addition, subproject management has adopted a number of the suggestions of the evaluation team with respect to the need to increase pullet production quickly in support of distribution and extension efforts. As a result of the evaluation the MAF made two broiler houses at Rawdah available for pullet production. Ten thousand pullets will be available for distribution by December 31, 1984. Also as a result of the evaluation, the MAF assigned a counterpart from their Livestock Resources Directorate to manage the project with the team leader.

#### 19. Inputs

All projected USAID inputs have been provided in a timely fashion except for construction of pullet-rearing facilities at Rawdah. Although the costs of construction at Rawdah are shown in the logframe as an output, this should have more appropriately been an input. In any event, the MAF's removal of Rawdah from the SPP necessitated a search for an alternative facility. Land

was ultimately acquired at Bir al-Qusain, with the construction of poultry houses there planned for completion in January, 1985.

On the YARG side, in addition to the non-completion of the dormitory at al-Hasabah, the YARG has obviously not provided operating costs for Rawdah, but they are committed to covering these costs for Bir al-Qusain. The YARG has not yet undertaken to maintain sufficient quantities of feed to meet producer demand. With respect to other operating costs for the Sana'a Poultry Training Center and other distribution and training efforts, YARG's delivery of operating costs has been spotty, and there have been a number of times when the project has been required to pick up costs which should more appropriately have been covered by the YARG; e.g. topping off per diem for SPTC trainees. The evaluation concluded, however, that the current flexible funding policy should be continued so that substantive achievements are not "subject to the delays inherent in finding relatively small amounts of funds which, for a variety of reasons, were not budgeted or otherwise are unavailable."

## 20. Outputs

The project has accomplished 37% of its training objectives to date (73% of objectives established for this period in the project) for extension agents and positions in the private sector, and with three students at Oregon State in B.S., M.S. and PhD programs, approximately 30% of its long-term academic training objectives. In addition, 14 short courses for poultry producers have been conducted at various locations. Thus the project's training outputs, while slightly behind schedule, are well within the realm of acceptable levels of project accomplishments.

With respect to pullet distribution, however, the lack of available pullet production facilities, coupled with SP management's inability to go outside the project for solutions to this problem, have resulted in an extremely low rate of pullet distribution in comparison with SPP estimates. Whereas the SPP estimated approximately 28,000 pullets would be available in the first year, with around 87,000 available during subsequent years, in fact only 7,624 pullets have been distributed to date. Given the enormous demand for pullets from all sources, and the need of newly trained extension agents for pullets in the conduct of their demonstrations, this pullet production level has been clearly inadequate and has severely hampered the achievement of project objectives.

Given the above cited problems with Rawdah's removal, the movement toward establishment of a facility at Bir al-Qusain and the lack of pullets in the interim, the project has in no way been able to accomplish the specific outputs of establishing a pullet

and distribution center, or establishing flocks in the magnitudes identified in the SPP logframe. With progress in the establishment of Bir al-Qusain, and increased numbers of pullets available from other sources, the SP should however, begin to address these outputs seriously over the next several months. However, given the evaluation team's recommended focus on the traditional sector, it is not anticipated that flocks will be established in the size configuration envisioned in the SPP. We would expect that most, if not all, flocks established would be the household flock of 10 to 25 birds and some small-scale commercial flocks of 50 or more birds, depending upon the demand of the local market for egg production.

The evaluation notes that the four additional laying houses and four brooder houses at the SPTC were completed and are now in full use. Additional laying houses at Sanhan, Saadah and Jahliya were completed as pre-subproject activities but, again, due to delay in project authorization, these three houses were converted to broiler production and, for a number of reasons, have been underutilized, and at times, idle. The team concluded that while it would be useful to return these facilities to full use as egg production training and demonstration sites, they are not now absolutely critical to the success of the program as a whole.

With respect to the institutional objectives outlined in the SPP, the evaluation concluded that it is too early to tell if these goals are being met. Nevertheless, the team concluded that a good beginning had been made, and that substantially more progress can be made if the project is more successful in combining extension agent training with pullet distribution.

The team concluded that although good progress had been made in the conduct of economic, financial and marketing studies on poultry meat production issues, relatively little had been done on egg production. The team recommended that these types of studies be undertaken in the future outside the purview of the PETS subproject; i.d., under CORE, to avoid expanding the narrowed focus of the subproject.

## 21. Project Purpose

The project purpose is "to establish and implement an improved extension and training program within the Livestock Division of the MOA, YARG, that will enhance egg and poultry meat production for private producers in the traditional sector and for small and medium-scale producer."

The evaluation teams recommendations would narrow this project purpose to exclude poultry meat production issues except on an "as time is available" basis. In addition, medium-scale egg producer would be excluded unless and until pullet production and distribution and extension efforts for the traditional and small-scale producers are fully underway. The Mission fully supports this focus and believes that a good beginning has been made in the achievement of the more limited project purpose. With the recommended revisions in project focus and pullet production, and with strengthened efforts to reach women producers, this project purpose can be accomplished by the end of the project. Given the delays to date, however, particularly with respect to pullet production, it may be possible that the project will need to be extended for an additional year or two to ensure that these accomplishments are firmly in place. CID is currently developing a revised implementation plan and budget for this eventuality.

## 22. Project Goal

The Program or Sector Goals and Sub-goals contained in the logframe of the SPP were somewhat redundant and inconsistent. Specifically, the sub-goal was "to increase the output of eggs and poultry meat." The Program or Sector Goals were "to increase egg production in the traditional sector to improve nutrition and increase farm income" and "to, over time, reduce Yemen's dependence on imported eggs." Given the duplication of egg production objectives and the recommendations of the evaluation team and others regarding the elimination of the broiler industry from the project's focus, the Mission believes that the sub-goal should be eliminated. From an objective perspective, it is clear that where the relatively limited numbers of pullets produced under the project have been distributed, the number of eggs produced has been increased. All recipients of the distribution in the Dhamar area report substantially higher numbers of eggs produced by the new type of bird. Unfortunately, not enough pullets have been distributed for there yet to be an appreciable and measureable effect on nutrition or farm income. The evaluation team concluded that because nearly all of the eggs produced in the traditional sector are consumed by farm families, the major impact of the sub-project's focus on the traditional sector will likely be in nutrition. Only if egg production is increased beyond the capacity of farm families to consume them, or if numerous small-scale egg production enterprises are established and functioning, is progress likely to be made under this project in increasing farm income or reducing Yemen's dependence on imported eggs.

## 20. Beneficiaries

The attachment to the SP authorization memorandum, which supplemented information contained in the project paper, stated: "This project is designed to establish and implement an extension and training program to enhance egg production. This incorporates a major, but not sole, focus on developing the traditional farmer's production potential. While traditional farmers are not expected to be allocated the largest number of pullets, they will, however, be the largest group of farmers serviced by the project with the establishment and servicing of some 270+ traditional flocks by year 4."

It is obvious from this statement that in authorizing the project AID/W intended that the traditional sector be the primary focus of distribution and extension efforts. The evaluation team found, however, that "in depth technical, social and economic knowledge on the traditional sector should have been acquired, and that group better served, rather than the seemingly ad hoc advisory services supplied to a number of deserving groups." In support of this finding the team recommended that the project focus on 1) household flocks (maximum of 25 hens) for home production and consumption; and 2) small-scale village flocks (approximately 50 birds) for commercial marketing. The scaling down recommended by the evaluation team of optimum household flock size to something significantly smaller (10-15 birds) than contemplated earlier implies that the spread effect of increased pullet production will ultimately be much broader than the 270+ traditional flocks established as a target. For example, the Dhamar relief effort distributed 2,883 pullets to 988 producers in nine villages.

## 21. Unplanned Effects

There are two effects of the sub-project which were considered only minimally, if at all during the design phase. The first is the potentially sizeable impact on the nutrition of farm families in the traditional sector in view of the evaluation team's finding that families which received pullets in the Dhamar distribution consume all the increased egg production.

The second effect, with which the Mission and CID are only now beginning to come to grips, is a recent request from the Ministry for assistance in developing a plan for more efficient utilization of all MAF poultry facilities. If a plan is developed under the project which is acceptable to the MAF, it could place a much heavier advisory burden on the subproject team. Ultimately, however, this request would appear to be a significant opportunity for USAID to affect the MAF's institutional role in the development

of the poultry industry in Yemen. Combined with the Minister's request for a plan is an offer to return the Rawdah facility to the project, converting it from broiler to layer production. If this were to happen, the project would, with the completion of Bir al-Qusain, have substantially more pullet production resources at its command than were foreseen in the SPP, and might be able to meet project purpose and goals more quickly than the evaluation team anticipated.

## 22. Lessons Learned

The evaluation report cites three lessons learned, with which the Mission fully concurs.

- A. "If a project can't do all it started out to do, it should decide on what it can do."

We note that, although the SP ultimately authorized incorporated a heavy focus on the traditional sector, this focus was lost in early implementation for a number of reasons. Perhaps a corollary to the above lesson is that if a project has a number of worthy objectives it will naturally drift toward those which are easiest to accomplish, i.e. training and providing advice to the more organized commercial sector. It takes strong project management, including considerable foresight, to determine where a project's focus is beginning to shift, and pull it back on track. This problem is particularly exacerbated in a country like Yemen where so many worthy developmental objectives compete for limited assistance resources.

- B. "To achieve various outputs and purposes a project should not be a slave to its own design."

This lesson assumes that the original design outlines a project goal and purpose, and a specific path to their accomplishment through the application of related inputs and outputs. If the goal and purpose remain valid and appear achievable over the life of the project, there should be no hesitation in changing this mix of inputs and outputs to support these objectives. It is obvious now from a re-reading of the SPP that a number of erroneous assumptions were made. Had they been directly identified earlier, specific actions might have been taken to ensure that these assumptions took place, or that the assumptions were changed. A major assumption in project design and initial implementation was that pullet production levels would rise rapidly; once this assumption proved false with the removal of al-Rawdah, project management looked inward for a solution rather than outward at other potential solutions to the problem. We concur

with the assessment of the evaluation team that the SP's major deviation from its own design, the Dhamar distribution effort, was perhaps its greatest success to date.

C. "Experienced managers are needed, and the academic community may not be a good source of development project managers."

In this finding, the evaluation team undoubtedly zeroed in on one of the major flaws in the Title XII approach to project design and implementation. This SP is not the only SP within the agricultural program where we are learning this lesson. Nevertheless, we are caught in a crossfire between a Ministry which has consistently demanded high academic accomplishments for project management staff, a contractor which views Ph.D.'s in technical specialties as minimum requirements for these positions, and our own inability to identify alternative sources of personnel with strong project management experience in addition to a minimal level of technical competency. One possible solution would be to separate the function of team leader/project manager from that of the technical poultry specialist. It was assumed that both functions could be performed by a single individual, but the Universities have not been able to recruit such a talented person from their own ranks, if in fact such a person exists. Rectifying this situation under a Title XII arrangement of the sort we now have will be difficult. We would welcome any suggestions from other Missions which have experienced similar problems.

### 23. Special Comments

To the lessons learned identified by the evaluation team, we would add a fourth, alluded to by the evaluation report but not specifically identified by them as a lesson to be learned. That is, if you identify a beneficiary group such as traditional sector egg producers you should also know what that means in terms of division of labor between the sexes, and have in mind some specific approaches to reaching the target sub-group. The project as designed made a number of heroic assumptions with respect to the possibility of recruiting women for training at the SPTC, establishing or working with existing women's cooperatives, and the provision of extension services to women. The Dhamar distribution effort proved that it is not impossible to reach women in Yemen through demonstrations, but it is also clear that women are not likely to be trainees at SPTC for the near future, and that there is probably something intrinsically wrong with the concept women's poultry cooperatives in Yemen.

What is becoming increasingly clear in this and other projects in Yemen is that for Yemeni women to be project beneficiaries you cannot assume that if you throw enough opportunities at them they will eventually bite. They may, but possibly not for the anticipated reasons. More likely, they will not participate unless the perceived return to their interests is greater than the social pressures working against their participation. To make this equation more loaded in favor of women's participation, it may be useful to reduce social pressures by emphasizing programs where women teach other women. It is on this premise that we have supported the establishment of a female poultry technician position under this SP. We cannot, of course, be sure that this approach will work any better than those employed by the all male project staff to date. We believe, however, that it is an experiment worth making and an investment worth trying if we are to reach the primary beneficiaries of the project.

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EVALUATION  
POULTRY EXTENSION AND TRAINING SUBPROJECT  
(279-0052)  
AGRICULTURAL DEVELOPMENT SUPPORT PROJECT

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USAID MISSION/SANAA, MINISTRY OF AGRICULTURE, AND  
CONSORTIUM FOR INTERNATIONAL DEVELOPMENT

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## I. SUMMARY AND RECOMMENDATION

### A. Project Status

The Poultry Extension and Training Project (PETS) is one of several agricultural development projects in Yemen being sponsored by AID. The project purpose is to establish and implement an improved extension and training program within the Livestock Division of the Ministry of Agriculture (MOA), Yemen Arab Republic (YARG), that will enhance egg and poultry meat production for private producers in the traditional sector and for small- and medium-scale producers.

The major operational aspects of the project are to establish (1) small layer flocks in the traditional sector, primarily for household consumption, and (2) small- and medium-scale layer flocks for commercial sales. The project also calls for establishing institutional capability in the MOA to support the poultry industry generally and to supply U.S. technical assistance to the industry, to the extent possible, given the primary objectives.

The project was approved in August 1982 as a \$6.185 million grant project. The YARG is to contribute \$5.228 million equivalent in land, staff and facilities. In addition to the project specified items the overall effort has consisted of project items, plus, about 12 person months of technical assistance and the construction of several poultry houses during a pre implementation phase lasting from about February 1981 to August 1982. Thus, the total project activities have been in progress for a little over three years. The project was designed, and technical assistance is being provided by Oregon State University (OSU) through the Consortium for International Development (CID).

### B. Objectives of the Evaluation and Summary of Findings

Along with other projects in the AID-assisted agricultural portfolio, the PETS project was evaluated in the Fall of 1983. That evaluation strongly recommended a redefinition of the project. That evaluation cited major defects in the project, as currently operating, and yet concluding that the project would likely meet its objectives. As a consequence of these ambiguous findings, USAID/Sanaa asked for another review of the project with a call for specific recommendations regarding the need to make major modifications in the project design, if warranted.

The evaluation team found the project design to be appropriate for the development opportunities which exist and for the problems small producers face. The implementation of the project

has, however, been very slow with respect to poultry production. The project is behind schedule and the implementation team of the YARC, and their advisors, have not clearly identified a course of action which would result in accelerating achievement of objectives. The prior evaluation outlined a series of recommendations which have not been acted upon, nor rejected for reason. This evaluation team submits the following conclusions and recommendations.

### C. Conclusions, Specific and General Recommendations

The evaluation team believes the Poultry Extension and Training Project (PETS) has considerable potential to contribute to better nutrition and farm income. Based upon this potential, the project should be continued. However, the primary outputs, up to now, have been the establishment of ground work for the project. Under better management much more could have been achieved. The evaluation team believes a number of alternative ways could have been found to produce and distribute pullets. In-depth technical, social and economic knowledge of the traditional sector would have better helped serve that group rather than the seemingly ad hoc advisory services supplied to a number of deserving groups. Only recently have means been found to adequately cover trainees' per diem costs. The lack of focus is reflected in workplans.

Notwithstanding these serious shortcomings, lost efforts can be made up, and better utilization made of trainees, if the advantages of pullet distribution are understood as a key objective of the project, and as a mechanism for institutional development. The team senses MAF, CID and USAID want to accelerate project activities.

In order to give meaning to this proposition the team submits the following specific recommendations:

A. That current actions and the FY 1985 annual work plan prepared for the Joint Annual Field Review of July 1984 reflect an operational plan for pullet distribution of 15,000 pullets prior to a batch from the Bir Al 'Qhusain farm. This facility plans to have pullets grown out by late fall. The target 15,000 has already been tentatively identified by CID.

B. Expand the 1984 summer training class to 20 persons.

C. Continue the practice of farmer-oriented short courses to accompany pullet distribution, even in the absence of fully trained extension workers being available, to remain in the area of distribution.

D. Develop a plan for bringing the Bir Al Qhusain pullet production facility on-line. The plan should contain a set of contingency methods to brood and manually feed and water or otherwise operate, in the event that all normally supplied utilities function improperly during start-up.

#### General Recommendations

A. The team recommends continuation of the PETS project without redesign, but with major modifications in its implementation.

B. Consultants should be engaged to develop recommendations for delivering extension education programs to women, including information on nutritional aspects of egg consumption.

C. There are a number of possible assistance activities which would accelerate private sector support to the poultry industry. These activities should be specifically identified. The PETS team is fully occupied, therefore, it is recommended that if an identification mission is engaged it should be handled outside the framework of PETS, that is by CORE or by USAID directly.

## II BACKGROUND

### A. General Setting and Problem Statement

Until this decade Yemen poultry production was nearly all traditional. This consisted of small, four or five local "baladi" (native) hens and cocks per village household. These flocks are fed on table scraps, grain screenings, insects and other scratch feed. The keeping of these birds is a low cost, low output, enterprise. Due to low productivity the enterprise has had limited income or nutritional effects for the society at large or apparently, even at the household level which keep these birds. Nutritional levels are a problem in Yemen, generally and particularly in the rural areas.(46).

In the late 1970's and early 1980's very rapid expansion of commercial broiler production took place and is still going on. The expansion has caused broiler prices to recently fall from about 20 Rials (\$4) per 1.5 Kg. broiler to 17 Rials (\$3.4) per broiler. Broilers are widely available.

Local commercial egg production has started, stopped, and recently started again but remains insignificant at the moment. Imported eggs are found in major cities and towns along main roads. These sell for \$1.44/dozen in Sanaa and 12 Rials (\$2.40) per dozen in towns along main roads. They are reportedly of poor quality by the time they reach rural towns. This is no doubt true.

The problem to be addressed, at the substantive, "goal" level, is, therefore, to increase production of eggs and poultry and thereby farm income and nutritional well-being. At the project purpose level the problems to be addressed are those of developing, and applying, institutional resources to achieve production objectives.

### B. Project Background

To address the problems cited above the Yemen Arab Republic Government (YARG) and the United States Agency for International Development (USAID) first carried out a relatively small \$1.9 million Poultry Development Project, 279-0019. The implementation period was from 1975 to mid 1979 and in this relatively short, four year period the project built and operated seven poultry houses in the Taiz area and four poultry houses, plus a small training center and feed house, in the Sanaa area. These facilities were used to produce table eggs and layer pullets for sale in the local community and to train extension workers. Because of its relatively rapid implementation, and action orientation, the project is considered one of the more successful in the YARC/USAID agricultural portfolio. Brown eggs, still available in Sanaa market are readily identified as coming from the Ministry of Agriculture. Notwithstanding the modest

success of the initial project much remained - and still remains - to be done regarding building capacity to affect overall nutrition or farm income objectives. Accordingly, a new project was proposed under the YARC/Consortium for International Development (CID) and USAID agricultural development program. <sup>1</sup> As mentioned above the broiler industry had "taken off". The YARC/AID Poultry Development project built the first modern type poultry houses in Yemen and undoubtedly influenced growth of the industry. However, there was little technical assistance or guidance available, nationwide, and as consequence all types of enterprises - large, medium and small - experienced many inefficiencies in their operations. Egg enterprises, both traditional and the emerging commercial ventures, were also in need of assistance of all sorts. As a consequence the YARC/CID and USAID proposed a poultry project to establish an institutional basis for a self-sustaining poultry industry. The project identification document (PID)<sup>2/</sup> mentioned that the "operational focuses would be on egg and layer production but that obviously much of the assistance and training will be beneficial to the total poultry industry including broiler activities." (13) (underlining provided). AID/W held the formal review of the PID on July 29, 1981 but deferred action on the PID pending answers to a large number of questions which it was believed a design team, which was already in Yemen, could answer. These questions were answered, in part, September 2, 1981 and the project design team continued its work with a project paper being submitted to AID/W, November 24, 1981. The November 1981 project paper (PP) went further than the PID in stating the purpose was to address egg and meat production for traditional, small and medium scale producers. The project was authorized in August, 1982 after a lengthy review process and one in which assistance to the broiler industry was essentially deleted from the project except for U.S. technical assistance on an "as available as time permits" basis. In addition to the activities listed in the project paper, pre-project activities consisting of building poultry demonstration buildings and pullet rearing houses. These houses had been authorized in December of 1980 and built in 1981. In addition, long-term staff arrived in April of 1982. This was authorized under CORE and consist of about 10 person months of service.

1/ under the system of operations in Yemen the U.S. contractor (CID) which provides technical assistance to the YARC, is an equal partner with the YARC and USAID in the development of the U.S. assistance program and in the design of projects.

2/ In the Yemen program projects are designated as sub-projects under the overall agricultural project, Agricultural Development Support Project. This report uses the converted terminology.

The project setting was therefore one in which there is a need for a wide variety of services and a proposed project was submitted to address a broad range of problems. At the same time the approving authority seemed to feel a more narrowly focused project (on egg production) would be more manageable and would likely address a more deserving group of beneficiaries than would dividing a given set of resources between egg and broiler producers.

III DESCRIPTION OF THE PROJECT  
-INCLUDING PRE IMPLEMENTATION ACTIVITIES 1/

A. Project Description 1/

The purpose of this Poultry Extension and Training Subproject (PETS) is to help the YARG strengthen the institutional capacity of the Animal Resources Directorate of the Ministry of Agriculture. This Subproject will implement and improve extension and training programs to increase egg and poultry meat production for private producers in the traditional sector and for small- and medium-scale producers. Emphasis will be placed on the training of extension agents, poultry farm managers, and farmers in the management of egg-laying chickens and the production of eggs.

As a result of this subproject, the Ministry of Agriculture and Fisheries (MAF) should have an institutional capability to improve, promote and support egg production in Yemen. This technical framework will then make it possible for Yemen to increase its domestic egg and poultry meat production and thereby reduce its dependence on imports.

The beneficiaries of the PETS will be the poultry technicians, poultry specialists, poultry extension agents, poultry farm managers, and farmers, including women, who receive training. The traditional sector, which now produces most of Yemen's domestic egg production, will benefit from technical assistance in raising laying chickens. The increase in egg production will provide additional income for the rural sector and will improve nutrition.

This Subproject will concentrate on the following seven major activities:

(1) Provision of up to 16.5 person-years of technical assistance to the Ministry of Agriculture and Fisheries over a five-year period.

(2) Training of Yemeni extension agents, technicians, specialists, private poultry farm managers, YARG/MAF demonstration poultry farm managers and farmers--including women in poultry production and management.

(3) Construction of up to six pullet-rearing houses at Bir Al Qhusain.

1/ This project description is Grant Agreement Amendment No. 13 of February, 1983.

(4) Rearing of 16-week-old pullets and distribution of them to private producers for establishment of egg-laying flocks.

(5) Ministry of Agriculture and Fisheries establishment and operation of a Sanaa Poultry Training Center.

(6) Construction and utilization of demonstration poultry farms.

(7) Conducting detailed economic and financial studies, including feed, poultry and egg marketing, which will result in recommendations for the program.

The USAID, through the CID, will finance the costs of personnel, limited commodities, construction, training and other items, as follows:

#### 1. Personnel - Technical Assistance

(a) Three advisors: one poultry specialist/team leader and two poultry technicians who will work with the Animal Resources Directorate of the Ministry of Agriculture and Fisheries to implement a training program, and the establishment of egg-laying flocks throughout Yemen.

(b) Up to one and a half years of short-term technical assistance, as needed.

(c) Experts to conduct two external evaluations.

(d) Short-term personnel who will assist the YARG and MAF to conduct detailed economic and financial studies of Yemen's poultry sub-sector and of the effects of this subproject.

These studies will include feed, poultry and egg marketing.

#### 2. Construction/Commodities

(a) Construction of up to six pullet-rearing houses to increase the pullet-rearing capacity of the MAF.

(b) Construction of three demonstration egg production units at Sadah, Sandahan and Jahiliyah. (Already completed during pre-subproject phase.)

(c) Construction of 8 poultry houses at the Sanaa Poultry Training Center (SPTC). (Completed during the pre-subproject phase.)

### 3. Training

(a) Training of up to 69 Yemeni extension agents, private poultry farm managers, and government demonstration poultry farm managers in Yemen in an 18-week poultry training course.

(b) Training of up to ten (10) MAF persons as poultry technicians and poultry specialists in the United States at the B.S., M.S. and Ph.D. levels.

The Yemen Arab Republic Government will provide through the Ministry of Agriculture and Fisheries trainees, personnel, construction commodities, land, office space and operational funding, as follows:

#### 1. Personnel

(a) Counterparts to work with the technical advisors.

(b) Extension agents and technicians to be trained.

(c) Full staff-managers, technicians, laborers for the Pullet Rearing and Distribution Center at Bir Al-Qhusain and the Sanaa Poultry Training Center.

(c) Staff to operate the dormitory at the Sanaa Poultry Training Center.

(e) Managers for demonstration poultry farms.

(f) Technicians to work with project advisors to conduct detailed economic and financial studies of this subproject and Yemen's poultry subsector, including feed, poultry and egg marketing.

#### 2. Commodities and Land

(a) Sale of sixteen-week-old pullets and feed, including transportation to Yemeni producers at cost.

(b) Provision of land for construction of pullet-rearing houses at Bir Al-Qhusain.

(c) Provision of pullet and layer feed for resale to producers assisted by this subproject either by importation or local production.

#### 3. Construction and Facilities

(a) Construction of fence, access roads, and provision of adequate water at the Pullet-Rearing Center in Bir Al-Qhusain.

(b) Establishment of a Sanaa Poultry Training Center at the MAF Hasaba Poultry Farm.

(c) Construction of a dormitory with classrooms at the Sanaa Poultry Training Center.

(d) Obtain adequate housing for trainees until the dormitory is constructed.

(e) Office space for the CID Team Leader in the Ministry of Agriculture and Fisheries facilities.

#### 4. Operational Funding

(a) Budget for operation of the Sanaa Poultry Training Center.

(b) Food and lodging costs for YARG-employed trainees at the Sanaa Poultry Training Center.

(c) Budget for operation of the pullet-rearing facilities at Bir Al-Qhusain.

#### B. Changes In The Project During The Authorization and Implementation Process

(1) The project paper called for the YARG to make available existing poultry production facilities at the Sanaa Poultry Training Center, and the Rawadah Farm for pullet production and the satellite demonstration farm at Saadah for use in egg production demonstrations. The Sanaa Center has been used for limited pullet production but the other facilities, as well as other government owned facilities, have not been used for pullet production.

As mentioned in the section on the project setting there was a long period of time between the initial pre-implementation activities - early 1981 - and the project authorization - August 1982. During this pre-implementation, design and review period the MOAF designated the Rawada farm as a broiler operation as they did not think the "pre-project" was sufficiently well organized to raise and distribute pullets. Accordingly, the Rawada farm is not specified as a project facility in the grant agreement.

While AID/W no doubt had its own good and sufficient reason for the lengthy design and review process the loss of the Rawadah house has plagued the project, perhaps unnecessarily.

The solution to the loss of the Rawadah farm was a long search for a site on which to build another government farm, when, in hindsight, alternatives in the private sector and greater

use of the Sanaa training center may have partially solved the pullet production problem and established a better identity for the project.

(2) Agreement was reached for USAID to finance four, rather than six, new pullet rearing houses at Bir Al 'Qhusain but the floor space is roughly the same as originally planned.

(3) USAID/CID have agreed to support a minor portion of the funding of trainee costs at the SPTC, i.e. topping up of per diem based on increased cost of living off site.

The evaluation team notes the grant agreement is thorough in its identification of contributions to be made by both parties. The only item which seems to have been overlooked is funding for field demonstration costs for extension agents, i.e. small co-ops, feed preparation, watering devices, etc. As a local cost item this is an implicit responsibility to the YARC. There is, nevertheless, a lack of funds for this critical item and ways will need to be found to resolve the problem. No "production" level farm buildings are suggested.

#### IV ACHIEVEMENTS OF THE PROJECT

##### A. Training Program

One of the main objectives of the PETS Project was to develop a training program to prepare students for roles as extension agents in the districts and provinces and for positions in the private industry. The Sanaa Poultry Training Center was expanded in the pre-implementation phase of the project to handle the training. Four new breeder houses and four new layer houses were constructed to support the training program. These houses, along with the existing facilities constructed under Project 279-0019, provided adequate space for handling the initial training program. The first students started in February 1983 and the fourth class is scheduled to be completed on May 15, 1984. With this fourth class of 8 students a total of 22 students will have completed the Poultry training. The previous fourteen students are now working in the following jobs:

Provisional Extension Agents	4
Private Poultry firms	2
British Vet. Services Project	3
Other (overseas, one death, SPTC center)	<u>5</u>
Total	14

It has been estimated that 6 of the present students will assume extension duties. A classroom dormitory to house students for the training program is scheduled to be constructed by the MAF as soon as pre-construction procedures are complete. In the meantime, students are housed at the British Veterinary Services Project Hostel. The training program is set up as a combined formal classroom and practical experience program with about 1 1/2 hours of classroom and 3 1/2 hours field or farm experience each day for an 18 week period.

The project set a goal of 69 student trainees during the five-year period with a total of nine for the first year, 14 during the second, third and fourth years and 18 during the last year. They are currently one half through the third year and a total of 22 students have completed the training course, whereas the goal to date would be 30 students. This represents 73% of the total goal to date. There have been no female students and the prospects look very dim for that goal.

In addition to the poultry training courses the project is designed to train up to 10 MAF poultry technicians in the U.S. at the M.S. and Ph.D. levels. At the present time 2 B.S.,

I.M.S., and 1 Ph.D., are in residence at Oregon State University. An additional nine students are receiving language training as preparation for degree programs.

Fourteen short courses for poultry producers have also been conducted in cooperation with MOA, CID, Ibb School, and British Veterinary Services personnel during the two years of the project.

#### B. Pullet Production and Distribution

A second major objective of the project is to develop laying pullet production capability and a program to distribute the pullets at cost to farmers with a preference given to traditional or small-flock operators.

The production of pullets is basically a mechanism to enable the project and MAF to establish and upgrade the village traditional flocks, increase egg consumption for promoting better planes of nutrition, particularly for the village families and children. Operationally, the pullet production program should be carried out at the same time as extension agents are being trained and assigned to the district extension offices. This would combine their training and their responsibilities for developing the traditional and small-scale egg-production enterprises. The recipients of started pullets would become the first clientele of the poultry extension agents.

Initially, plans were made to produce and distribute rather large numbers of pullets during the course of the project. The planned distribution was to start at about 27,900 during the first year and work up to a capacity of around 87,000 during subsequent years of the project. These goals have not been met as the production capacity at existing facilities, such as at Rawadah has not been available for pullet production and the new construction has been shifted to a new farm (Bir al Qhusain). Alternatives were not, apparently, aggressively sought.

The project however, has had limited experience with the pullet distribution. There is a "walk in" trade at the training center and in 1982 a limited number of pullets were distributed without any record of numbers. In 1983 one flock totalling 3,241 went out with 500 going to various villages and 2,741 to the Dhamar earthquake area. In 1984 a total of 4,383 have been distributed with 1,500 to villages and 2,883 to the earthquake areas.

The evaluation team, accompanied by project and AID personnel, visited a number of the flocks and found a generally enthusiastic response among the traditional flock owners for

the program. The project personnel reported that the recipients literally were ready to fight over receiving the pullets. We visited the homes of a few traditional flocks in the Mabar area and the women and men both were extremely well pleased with the pullets and were particularly impressed with their laying ability as compared to their native chickens. In all cases where we visited, the pullets were running free with native birds rather than being confined as the project training had advocated. The birds were housed at night, or placed in boxes within a part of the residence or compound. The common reason offered for lack of continuous confinement was the unavailability of a prepared laying ration. Some households had feed on hand, others did not, but they all reported that they fed their birds primarily on table scraps.

The initial distribution of pullets to the Dhamar Earthquake area was made at a cost to the recipients of YR 15 each. This price was arrived at in conference with AID, CID and the MAF in order to provide some relief to the earthquake victims. Pullets distributed in other areas were sold at the agreed price of YR25. We asked many producers what they felt the pullets were worth and in all cases the reply indicated that the pullets were worth at least YR25-30. In fact, one housewife indicated that she had purchased her pullets at YR30 from a third party. This appears to be close to, or a little over, the costs of production, so the issue of subsidizer may be moot.

The evaluation team also visited the site of a 50 bird small-flock Women's Cooperative that was established in a remote village in cooperation with the Dutch Development program operating in Radaa. No birds were on hand and a number of reasons were offered for their demise. These included disease outbreak, some were eaten, lack of feed and two village men who had assumed responsibility for the birds were killed in a disagreement with a neighboring village. The house that had been constructed was still there and in good condition.

In summary, only 7,624 pullets have been distributed which represent 7.5% of the number projected in the Project Paper. In the face of demand articulated by trained extension personnel and housewives this is not an acceptable achievement record.

### C. Infrastructure and Use

During the pre-implementation phase of the project starting in April 1981, \$300,000 was made available to CID to complete the Sanaa Poultry Training Center and the poultry houses at the three demonstration farms that were located in Saadah, Sandahan, and Jahiliyah. This building program added four laying houses and four brooder houses at SPTC; two laying

houses at Saadah; one laying house at Sandahan and Jahiliyah. These later two locations were on private property, as planned.

In addition to the facilities built during pre-implementation, the project has under construction four large pullet breeding-growing houses at Bir Al Qhusain. These are scheduled to be completed during the early fall of 1984 and are assigned to support the project. The MAF also has a number of additional farms that are currently being operated as commercial units that may have some space available on a cooperative basis to support the pullet phase of the project. These locations include: Rawadah, Taiz Research Farm, and the Marib Poultry Farm, which is a government private sector jointly owned facility. In addition, the MAF has on the drawing board a classroom and dormitory for the SPTC that has been let on contract, but has not been started to date due to a number of delays.

The evaluation team believes that adequate facilities are in place or under contract for construction to more than adequately support the project.

Again, due to the time gap between building the poultry demonstration houses at Saadah, Jahiliyah and Sandahan in 1981 and the project grant agreement signing in August 1982, the houses were put to use raising broilers instead of the intended use as egg production demonstration farms. Due to poor returns to broiler production and disorganization of one of the private farms and lack of follow-through at the government station at Saadah, the houses have been underutilized and at times idle. The team visited the Sandahan farm. A flock of broilers are being produced. This farm now is being used for hands-on training of SPTC students as well as intended private sector production. The station at Saadah is under repair and scheduled to receive pullets from the batch now being grown out at the SPTC.

The target date for getting the Jahiliyah farm back into production is August, 1984.

While obviously it would be useful and proper to have these farms in production and available as training and demonstration sites, they are not absolutely critical to the program as a whole.

#### D. Institutional Development

The ultimate long-term objective of the project is to train and educate a cadre of extension agents in the districts and provinces, and Poultry Technicians and Project Managers in the MAF to assist the poultry industry to grow and develop on a

profitable basis. The function of this trained Yemeni staff would ultimately be to assist the poultry industry at the household (traditional), small, medium and large commercial flocks to provide an increased supply of egg and meat for consumers. The achievement of institutional and production goals would be improved nutrition, particularly for lower income families. In the short run this may be the main contribution of the project.

Achievements toward the institutional development objective to date are 22 extension type students trained at the SPTC, of which 10 are currently working in extension or staff roles in the MAF. Two B.S. candidates, 1 M.S. and 1 Ph.D. candidate are currently enrolled at Oregon State University for Poultry Science Training.

Institutional development as an objective in a project such as PETS is, by necessity, long-range and illusive. Much time is required to successfully complete training of students, particularly at the degree levels. The training program for extension agents is fairly short-term and should give the institutional development objective a fast start as will development cadres at the district and provincial levels. As the project gains success in pullet distribution and training extension agents, this will create a strong demand for back up from the MAF. The institutional development phase of the project is not likely to be successful unless the action phase, i.e. agent training and pullet distribution is successful first, or at least the actions are parallel with each other.

At this stage of the project, lasting, significant and solid institutional achievements are not really measurable. A good beginning has been made. The project would clearly be further along had the field work been also further along.

#### E. Women

A major objective of the project was to develop educational methods for training women to properly care for and manage the village flocks. The small household flocks tend to become the responsibility of the housewife. Two women's cooperative village flocks were established in cooperation with a Dutch Development Project in the Radaa area. Poultry project personnel worked with the Dutch women who, in turn, worked directly with the Women's Cooperatives. Unfortunately, both of these flocks only survived for a short period of time. In addition, the Ibb School Project also has a direct interest in trying to develop programs for women. In a series of four short courses held in October 1983 on "Care of the Small Laying Flock," 25 women attended in one village and separate training was held in a second village for women and men. A count of those attending was not taken in this latter case.

The major involvement of women in training occurred during the distribution of pullets during the earthquake in Dhamar. Training sessions were held to teach the basic principles of care and management of laying hens. About 500 people attended these short courses and of the 500 about 200 were women. These short courses were highly successful as indicated by the response and enthusiasm reported from the women.

#### F. Economic, Financial and Marketing Studies

The project paper and grant agreement called for the project to carry out a series of studies to determine the continuing or changing economics and financial viability of the production, input supply and marketing enterprises. Results of such studies would obviously be useful to help chart the course of project efforts, to the training program, to the extension service, to the private sector, and most importantly to the various entrepreneurs engaged in production and marketing.

In relation to general economic advice to the MAF, as well as PETS per se, a very good start has been made in preparation of papers on:

- (1) Poultry meat production, consumption and industry capacity,
- (2) Policy issues of the poultry meat industry.
- (3) Representative costs and return budgets for poultry meat production by small growers, and
- (4) Cost of pullets production.

Unfortunately, there is still little data available on egg production, either to test original project assumptions or to serve the project clientele. Perhaps the lack of empirical data is all the more reason to provide a range of likely financial outcomes based on key assumptions.

In any event, the team finds it unusual that this clearly-identified project output has not been more thoroughly addressed. See Annex A for the team's own economic reasoning for recommending small-scale and household egg production efforts.

#### G. Project Expenditures

The project has been operational for about three years, including the pre-implementation activities. The costs consist of direct costs authorized for the project and support costs authorized in the CORE Subproject.

	<u>Direct Project Costs</u>	
	Dollars	Dollars for Riyals (as of 31 March 84)
Actual through February 1984	603,404	
Mar./Apr. Estimated	<u>111,900</u> <u>715,104</u>	<u>368,703</u>
	Total \$1,083,807	

The CID accounting system does not break out logistic administrative and management support costs by projects. These costs are standard for AID contractors. The evaluation team notes costs of doing business in Yemen are high for everyone and in this sense there is pressure to fulfill objectives.

There have been no fundamental problems with regards to inputs but there have been major delays in implementing construction of the new poultry rearing house and a management failure to look for an alternative interim input system to meet project objectives.

#### H. Summary Statement Regarding Achievements

As might be expected, the evaluation team finds the achievement record mixed. The nature of the mix is, however, somewhat different than expected. The training program, usually very difficult in Yemen, is relatively on schedule. The infrastructure activities are very mixed, some, as it turned out, were too far ahead (or project approval too far behind) and others are only started. The pullet production program, which is technologically relatively simple, is far behind schedule. As a result, training has preceeded pullet distributions, and some infrastructure remains underutilized.

While it is not expected that all activities will match perfectly, the existing achievements do not contribute as much to either substantive objectives or institutional goals as were projected in the project paper, for this stage of the project.

In the judgment of the evaluation team the project has not been very good at identification of its near term objectives, in planning, and at problem solving, and hence, in achievement of either short or long-term objectives.

Fortunately, for this can be a very good project, the evaluation team believes the defects are not fundamental problems; the problems can be overcome. Meeting end-of-project objectives are possible, given a probable need for a year's extension of the project.

## V PROJECT OPPORTUNITIES

### A. Traditional Household Flocks

The majority of poultry and eggs consumed by the Yemen citizens are produced in the traditional village flocks that seem to be an integral part of most households. It is estimated that 75% (YARC - Agricultural Sector Assessment USAID, 1982) of all the people in Yemen live in the rural areas. Thus, the majority have an opportunity to keep a few hens to help supply eggs and meat for the family. The commercial industry, particularly broilers, is growing rapidly, but the majority of eggs still originate from the village flocks.

Improvement of the village flock offers a great opportunity to enhance the diet of the average Yemen citizens. The Poultry Extension and Training Projects (PETS) has, as one of its main objectives, to aid the development of this traditional sector of the poultry industry. The PETS training program for extension agents and the pullet production and distribution program are aimed heavily at this segment of the industry and, as is included in our recommendations under section V.1 below, we are suggesting that the project give high priority and most of their effort to this activity.

Currently, household flocks in the rural areas are made up of "baladi" chickens of mixed descriptions that have survived primarily by natural selection for the survival of the fittest. They are mostly small (similar to bantams), lay both brown and white eggs (suggesting a mixture of Asian and Mediterranean breeds), and lay just enough eggs in the spring to replenish the flock. There has been no formal comparison of the "baladi" versus the "golden comet," but the enthusiasm of the women for the latter speaks for itself.

The pullet replacement phase of the PETS project is producing a brown egg layer, originating in the U.S., that has been selected for high egg production and tends to adapt well to sub-optimum management and feeding usually experienced with village flocks. The project personnel have had experience in producing these pullets in the facilities described above in Section IV. E. and have distributed a little over 7,500 of the pullets to village flocks and the Dhamar earthquake area producers. This distribution, over three periods, has given the Center some experience in producing quality pullets and in effectively distributing them to the rural traditional producers. The evaluation team visited a number of these flocks and found an overwhelming acceptance of the pullets.

In the opinion of the evaluation team, and as detailed in the recommendations below, it is recommended that the Project zero in

on training extension agents, producing started pullets to distribute to traditional flock owners in the areas primarily served by the extension agents. The adoption of this, as an immediate main objective for the project, will help improve local diets, improve the quality of life of the village people and help develop a high "identity" for both the USAID/CID project and the MAF. Extension programs should be developed concurrently with the posting of the extension agent trainees and the distribution of the pullets to teach and promote good housing and management for the pullets. Various feeding programs should be tried. These would include full feeding of laying rations. Supplements added to table scraps, grains etc. should be tried along with feeding broiler rations if they are free of improper medications. It is also suggested that the principal extension system provide funds to build some small coops near the district extension offices to demonstrate good management and feeding practices. It may be of particular importance to demonstrate the cutting of broiler feed, widely avoidable to supplement the table scrap ration and to try protein supplement/vitamin/mineral premix as an addition to table scraps.

Another virtue of the very small household flock - in addition to it's ability to enhance nutrition and income - is that it can subsist with much less imported feed than any other scale enterprise. In the aggregate this can be significant.

#### B. Small Scale Commercial Producers

The owners of all of the traditional flocks that we had an opportunity to visit reported that all of their eggs were consumed in the home and none were sold. Some housewives with large families reported that they purchased imported eggs at the village market to supplement their household flock production. This demand for additional eggs in the villages gives the opportunity for the development of some small scale commercial producers to supply the local demand. These flocks consisting of 50 or more birds, depending upon the size of the market, become a logical second step in supplying local demand for eggs. Consumers prefer local fresh eggs and consistently reported that imported eggs were frequently spoiled.

The development of these small commercial producers will be a challenge for the extension phase of the project to assist them with housing, management, feeding regimes, egg care and quality maintenance, health, marketing and culling. As experience is gained with the traditional flocks this phase will be a natural second area for project expansion. Pullets for this phase of the program should be carefully controlled to prevent over-production and should probably be second in priority for receiving pullets. The establishment of these flocks should be carefully planned by the extension personnel in cooperation with the prospective

grower to insure that adequate inputs such as feed, are available to permit the operation to succeed. They are more dependent upon outside feed sources than are the very small household flock.

### C. Large Scale Commercial Producers

Large scale production units are currently being built throughout the country by corporate or investment firms. One such operation visited is planning 45,000 layers in highly mechanized four tier cage housing with mechanical egg collectors connected to an "in-line" processing plant on the farm. Large scale highly mechanized broiler farms are also in existence. This type of industry is highly desired but in most cases employ their own veterinarians and professional management personnel to handle and manage the operations. In general, they do not require MAF or project assistance for successful operations.

The Project personnel should respond to these firms when they have expertise that would be helpful but due to personnel limitations should place their main thrust on developing the traditional sector, next would be work with small-scale commercial growers and finally the large growers.

### D. Public Sector

For various reasons the MAF now has a number of poultry production facilities which are being operated as production facilities. These include the very large MARID broiler, egg and feed complex, the medium size Rawadah farm and the relatively small poultry facility in Taiz.

All of these facilities could benefit from AID-sponsored training and technical assistance. Presently, they do not have a public service function other than their contribution to aggregate production of poultry products. Nevertheless, their efficiency, as production units, could be increased and they therefore represent a target of opportunity for the project, as do other types of and scales of enterprises.

### E. Institutional Development - Private and Public

Establishment of an effective extension and training program for poultry producers remains a needed service from the Government. It is not likely that the private sector can find it now profitable to carry out widespread and very small-scale poultry production demonstrations. Neither does it appear that they can carry out - for profit - the type of training being carried out in the project. The basic rationale set forth in the project paper for general institutional development appears valid now, as it was when the project was authorized.

Beyond the government institutions there are other types of institutions which will emerge in due course. Their development could likely be accelerated if the overall Agricultural Development Support Project designed a new component and added an additional set of resources to the Poultry Subproject.

These institutions are the strictly private agro-business service firms which supply baby chicks, hatching eggs, feeds and feed ingredients, veterinary services and the array of marketing services. These firms might benefit from technical advice, market analysis and financial management services.

The second set of institutions which might emerge is the "not for profit" user service agencies sometimes financed by grower associations. In the case of the poultry industry this might be a central feed analysis laboratory, disease diagnostic laboratories, or a marketing information service unit which might assist in world-wide searches for feed ingredients and perhaps even product markets.

## VI SPECIFIC QUESTIONS CITED IN THE SCOPE OF WORK FOR THE EVALUATION

The following questions are paraphrased from the scope of work and answered in a summary fashion. The answers are, hopefully, substantiated from the entire report.

A. What has been the project's present contribution toward goal level objectives of (1) the traditional sector's improvement in nutrition and income, (2) reduction of dependence on imported eggs and (3) aggregate increase in egg and poultry meat production?

The evaluation team does not believe there has been any significant contribution yet toward goal objectives. The team believes groundwork has been established whereby the project can indeed contribute significantly to the goals. The team believes the goals are valid, important and worthy of pursuing.

B. Will the project purpose be achieved by September 1987?

Based upon progress in the first three years of operation, it does not appear likely that institutional development objectives will be achieved in the next two and a half years or three years. (See achievements, Section IV). It is likely that some of the key project activities - such as pullet distribution targets - will be achieved if given due attention. However, achievement of longer term objectives should be given at least an additional year of project life. Any follow-up on type of poultry development project would be dependent upon the vitality of the private sector, and the achievements of the PETS project. The option should be reviewed about May 1986, or earlier, if additional project type assistance appears needed.

C. Is the project still economically and financially viable? The evaluation team believes the project and farm enterprises are financially VIABLE (see annex A attached).

D. What is the private sector potential to provide feed, chicks, pullets and technical assistance to all levels of the poultry sector?

The team believes the long-term potential of the private sector to provide feed, chicks, pullets is very high. But even for the long-term there would appear to remain a public service function for technical assistance to the very small scale producer, as it is difficult to generate enough new business among very small producers to recoup marginal costs of providing advice on a wide spread basis.

For the near term - say next decade or two - the situation seems to call for public support to the industry for the following reasons:

(1) The present firms capable of, and actually supplying feed - and soon to be capable of supplying chicks and perhaps pullets - carry out these services as an adjunct to their own production operations and could curtail sales when it is in conflict with their own share of the poultry market.

It will take time for specialized farms to emerge, which depend entirely on servicing all types of clientele.

In the near term there appears to be a role for the public sector to encourage further development of the private input suppliers and to assist small producers in identification of competitive input suppliers.

(2) The project, in its development of a higher level of technology at the household level, will perform a market identification and market development functions for the private sector.

(3) As mentioned above, profitable sale of information requiring costly hands on demonstration to unlettered small scale producers is generally not practiced by private firms. Hence the need, in both the short, and long term, for some public institutional capability to adjust to the needs of those not being adequately served by the private sector.

E. Does the MAF have the institutional and budgetary capacity to support all levels of the poultry subsector?

Clearly, MAF does not have this capacity, nor should it try to develop such capacity - hence our suggestion that private and producer association capability be allowed to develop, if not actively fostered.

The MAF should reconfirm its identification of a portion of the industry to first help. The teams' recommendations on this role are contained in the general recommendations.

F. What are the roles of the traditional sector, justification for assistance, and roles of private sector and MAF relative to the traditional sector? (See section on opportunities and requirements for the traditional sector).

G. What have been PETS accomplishments? (See section IV)

VII AREAS OF CONCERN

A. Clarification of Project Objectives

As indicated in section II B regarding the design and approval phase of the project, there was considerable pulling and tugging within AID on the content of the project. The result is a project paper and grant agreement which speaks mainly to developing capability to support traditional, small and medium scale egg producers but clearly allows work to be done in the broiler sector. As a practical, short-term matter, technical advice can hardly be refused for the large scale commercial producers. Other development opportunities, such as private sector development of specialized service firms are cropping up. There has been some expression that the institutional development objectives are primary and pullet distribution is (only) a secondary objective.

Within the Ministry of Agriculture there is, understandably, considerable interest in pullet production and distribution and subsequent egg production. Yet the MAF's various poultry production facilities have not been mobilized for the project. In fact, some are not being used at all, i.e. the large 15x140 meter house at Rawdah, and others are used as either egg or broilers production units which would have more effect on production if they were used as pullet rearing facilities. That is - a given floor space could produce at least five cycles of layer pullets in two years while the same space can serve only as production space for about one cycle of layers. If a lot of good work is being done and issues of the projects' primary or secondary objectives, or broilers vs egg production opportunities, and concerns of which scale of enterprise to serve, might be considered hair splitting, were it not that dispersion of effort might result in less total product than would a more focused program of work. The evaluation team feels this is, to some degree, the case. We feel (1) the training program would be more effective if there were pullets to be distributed at "graduation"; (2) that the institutional building objectives would be better served if there is more identifiable content attributable to the project, i.e. limited United States technical assistance to a wide variety of enterprises may result in improved output of a particular farm but improvements may not be attributable to the project, nor result in Yemeni institutional capability, and (3) the project may be more manageable if more limited objectives are set for a particular time span.

B. Resource Allocation

As mentioned in Section III relative to the grant agreement, an excellent job has been done in identifying responsibilities for

inputs from key sectors. The exception appears to be costs of carrying out field demonstrations at the household and at the extension office level. Organization of this work, its staffing and financing, is an area needing attention. From an interview with a provincial agricultural chief, the evaluation team's understanding is that a fairly substantial group of extension workers can be mobilized for both distribution and demonstration work - depending upon the time of year when they may be asked to take on additional duties. The project has used, and should continue to stress, mobilization of resources outside of its own budget and staff.

A more general issue related to the above example is the question of budget and operational flexibility when one or the other of the two governments may not be able to fulfill its responsibilities in a timely manner. There are reportedly numerous instances where gasoline, feed, transportation and similar costs need to be met from the AID/CID budget when, accordingly to the letter of the grant agreement, they are YARG responsibility. While the evaluation team believes in the concept of comparative advantage wherein the United States finances primarily United States technical assistance and training and the YARG finances local cost items, there are undoubtedly times when either party with resources should cover unforeseen shortfalls.

An acceptance of the recommendation regarding the next couple of years activity will require replanning the balance of this years' work plan budgets and the next year as well. Hence, the issue of local cost financing will need to be addressed.

#### C. YARG Project Management

It is the team's understanding that the General Co-Manager of the entire Agricultural Development Support Project (ADS) is designated as the MAF Project Director for PETS and that the Director of the Sanaa Training Center is responsible for PETS day to day operation. The team believes PETS management is less effective than it could be. This is because the ADS Co-Manager is not within the Directorate of Animal Resources and is effectively and fully occupied with other duties, including facilitating PETS progress. Similarly, the well managed Sanaa Training Center does not have poultry industry development responsibilities among Provincial Agricultural Chiefs nor liaison duties with the private sector. Other management options need to be considered.

#### D. Pullet Distribution

The major problem hindering progress on the project during the first two years has been the lack of adequate pullet production

and the associated loss of identifiable programs in the field. Since the pullets were not available in adequate numbers, the extension production demonstration programs would not be conducted, organizational structure for distribution could not be established, economic and financial enterprise analysis was not done and extension educational programs were not organized in the rural areas. The total project has been set back by this delay. Not getting pullets out in adequate numbers has resulted in a major loss of experience in this early phase of the project which is crucial to all future work. The major pullet production facility at Bir Al 'Qhusain should become available by late 1984, however, much work needs to be done to set up procedures for pullet placement and distribution. These procedures based, in part, on actual fieldwork, need to be worked out with the MAF and Provisional and District Extension offices. Every effort needs to be made to produce small lots of pullets (3000-6000) between now and the effective start up of Bir al 'Qhusain to gain the needed experience and set up a functional distribution scheme. Suggestions for possible implementation are included in the recommendations section of this evaluation report.

The lack of immediate action on the pullet production and distribution has resulted in some criticism from all concerned agencies regarding the effectiveness of the project in accomplishing one of the primary objectives.

## VIII RECOMMENDATIONS

### A. The Evaluation Team's Central Task Was To Make Recommendations To USAID/Sanaa Regarding The PETS Subproject

The team recommends continuation of the PETS project, without redesigning the project, but with major modification to be made in workplans and for implementation in the next two years. (See below for the nature of the work recommended).

The team's reasoning is as follows:

The original design and long-run objectives of building institutional capability to serve the industry in a variety of ways still appears valid in light of opportunities. Some of these opportunities, beyond the narrower scope recommended for the immediate future, may be reachable in the latter years of the project. This will be when some trainees return and the private sector will take over some of the currently operational aspects of the project, i.e. pullet production and sales.

Therefore, the options for various work should be left open. To the extent our judgment is correct in suggesting the current lack of focus has hampered progress, it is apparent the project will need to be better managed to prevent a reoccurrence, if the project has license to do several major activities. The team believes better management can be accomplished through the work plan, preparation and approval process.

In the teams' judgment the project design does not need modification, but implementation does.

B. Emphasis in the PETS subproject during the period from 1984-1987 should be focused on the traditional village flock.

(1) Household flocks up to about 25 hens for home production and consumption.

(2) Village flocks of small-scale, usually around 50 or a few more birds for commercial marketing.

This emphasis should contribute to developing this phase of the industry and result in improved nutritional levels of rural families. This emphasis would require a high priority on the following specific items in the workplan.

#### 1. Pullet Production and Distribution

Pullet production should be increased immediately to get

effective members into the provinces and to develop experience in distribution, placement, and production. This production should give immediate identity to the project and fill in the gap until pullet production is possible at the new Bir Al Chusain farm. Suggestions for immediate expansion of pullet production are:

(a) Arrange with the MAF to temporarily assign one house at Rawadah Farm for pullet production.

(b) Contract for a batch of pullets with a private farmer.

(c) Distribute present production of 6,000 pullets being produced at SPTC to one province at the completion of the 16-week growing period. Present laying birds at SPTC could be recycled for a second laying period to maintain egg production.

(d) Pullet production should be initiated at the demonstration farms at Sandahan to produce 3,000 pullets for distribution in the northern areas.

(e) Develop an agreement with the MAF and the SURDP Center in Taiz to grow from 3,000 to 6,000 pullets at the research center for distribution in the southern provinces.

(f) Contract with private owner of the demonstration farm at Sandahan to produce one flock of 1,500 pullets. Arrange with the owner to retain 500 to stock his laying flock and distribute the 1,000 in the district or province. A similar arrangement may be possible at Jahiliyah.

(g) Arrange with the poultry-livestock program at Ibb School to grow a group of pullets for distribution in the Ibb area. The poultry facilities are used at the school for instruction purposes and pullets would be ideal. Also, this flock could offer an educational approach for the women's program proposed by Ibb School.

## 2. Poultry Training

(a) The poultry extension training program of 18 weeks is well established and has produced 22 graduates.

(b) Training program should be expanded by recruiting qualified applicants through the MAF, provisional agriculture extension directors and industry. At least two classes of 20 students each should be the goal per year (2 x 20 = 40 per year).

(c) The classroom, dormitory or "training center" building is very important to permit the expansion (beyond 20) of the

class size at the training center. Dormitory or hostel arrangements can always be arranged on an interim basis but classroom and laboratory facilities are necessary for expanding the future size of classes to meet the project goals.

(d) Emphasis should be given to accepting students with aspirations to work in extension programs.

In addition to the educational programs, it is suggested that project personnel assist extension agents in redesigning and constructing small demonstration houses, under the care of the extension agent, to help promote good management. Estimates of the costs and returns to small scale enterprises should be prepared for use in the education and extension programs.

### 3. District Extension Programs

District and provincial extension programs should be developed in areas that have poultry/livestock extension agents and where pullets are distributed. The assignment of new extension agents as graduates from SPTC may be tied to subsequent distribution of pullets to permit the agent to develop a rapport with his clientele and aid the recipients in successful management of their laying birds. The extension educational programs are outlined in the Project Paper and should be designed to help the flock owners gain competency in the following:

1. Care and management of laying flocks
2. Feeds and feeding
3. Disease control
4. Equipment, construction and care
5. Maintaining egg quality
6. Culling

C. The involvement of Yemeni women in formal training programs is very difficult due to the religious and social customs, however, women play the significant role in caring for the home poultry flock.

It is recommended that women consultants, or a team of experts which have poultry production, nutrition education, and rural backgrounds, and speak Arabic and have familiarity with the Yemen culture be engaged to evaluate (1) the role of women in poultry production and (2) to make recommendations to the project management regarding the educational approaches and

methods to effectively develop a training program for the women. With emphasis on very small household flocks the project's ultimate nutritional impact might be its greatest achievement. Information is scarce how more eggs might best be used. Any planned nutritional studies or assessments might provide advice on improved utilization of more eggs.

The team was asked to consider the role of the private sector in relation to project objectives and how the development of the private sector might be accelerated.

The team feels there are a number of ways in which private sector development might contribute significantly towards project goals. (see Section V) The 1984-85 Workplan contained a tentative proposal suggesting the project hire a long-term advisor whose responsibilities would be, in part, to strengthen liaison between the private sector poultry producers and the MAF. The team recommends an alternative approach. We feel the industry opportunities for the private sector may be more in the service business than among individual producers who now have demands for some feeds and other inputs which are not being met.

Hence, we suggest a private sector survey as to what precisely might be done. A specific action proposal might then be developed and funded if a definite proposition can be identified. We believe these activities should be carried out under the CORE project, as program development is its responsibility, and generally we are recommending PETS consolidate its activities rather than develop more.

#### E. YARG Management Appointments

The team believes a senior MAF official at the level of the Director of Animal Resources, be appointed as project director. This is in keeping with the long-range objective of broad institutional development. It is also felt that the project can benefit in the short-run from attention by a senior official whose job spans the management of the array of MAF poultry interests. Coordination must also be achieved with Provincial Agricultural Chiefs who will play a key role in an action program.

#### F. Resource Allocation

The team notes that the project management team, MAF/CID/AID, has taken a reasonably flexible approach to local cost financing when the need so dictates. The team recommends a continuation of the policy. We feel substantive achievements

should not be subject to the delays inherent in finding relatively small amounts of funds which, for a variety of reasons, were not budgeted or are otherwise unavailable.

With respect to staff, the work plan drafted for FY 1985 has a new position for a United States Ph.D. poultry extension specialist to work, in part, with the commercial sector. If the recommendation for the near term to concentrate on pullet production and household production is accepted, then the staffing pattern may call for a different type of person. Conceptually, a Yemeni female poultry expert, sensitive to the village household situation and nutritional well-being might be the ideal; second best alternatives would be acceptable. Holding to the Ph.D. requirement might really deny the project the most qualified person for a village production program.

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ANNEX A

Review Of Financial And Economic Viability Of Farm Enterprise And The PETS Subproject

As mentioned in the text of the foregoing report, there is little or no empirical data on egg production in Yemen. The exception is a CID calculation of pullet production costs. This is a minor item in the enterprise budget. For the traditional sector this annex will, therefore, simply (1) review price and cost changes which have occurred since preparation of the Project Paper (PP); (2) assess the profitability of even smaller scale farm enterprise than those shown in the PP and (3) present conclusions regarding economic and financial viability of the farm enterprises.

For the significant cost items--feed, labor, interest costs, and chicks--there are very little subsidies or taxes in the small scale poultry sector. Thus, economic and financial analysis at the enterprise level are roughly the same.

In egg enterprises, more than any other farm enterprise, there is one critical cost item on the input side. Feed makes up 60%-70% of all costs or production. The other fixed and variable cost item are spread throughout the enterprise. Unless the technological relationship changes, which they have not, or drastic changes occur in costs of non-feed inputs, which has not happened, reviewing feed costs, and of course, product prices, serve as a reasonable basis for comparing the favorable project paper costs and return analysis to the current situation.

Assuming the costs other than those listed above have not changed much, then it is apparent that the traditional sector egg production is more favorable than it was at the time the project originated.

The evaluation team found the ability of the household to care for 4-6 hen units impressive. Particularly in light of limited effective extension advice. The housewife's reportedly good, but unqualified, rates of production from feeding table scraps alone. It is estimated that these household units could achieve the same 202 egg/year production levels cited in the Project Paper on a ration of table scraps and a one-half level commercial layer ration. If this proves to be the case in reality, as indications show, small scale household enterprises should be even more profitable than the 25 hen, traditional, but seldom existing, model cited in the project paper.

# DRAFT

Assuming a lower laying rate, a death factor and a lower salvage value for spent hens than those in the PP estimation, the enterprise still looks profitable - see TABLE 2, below.

Since the time of the project paper submission, the key cost/price movements have been favorable for egg enterprises, at least from the limited observations made by the evaluation team. The estimates are presented below in TABLE No. 1.

TABLE No. 1 - Price/Costs Estimates

	<u>Project</u>	<u>Current Prices</u>	
	Paper	Range	Average
Feed	2.5 Riyals/KG.	1.6-2.25	1.91/
Pullets	31.4 Riyals/each		25.42/
Eggs	.67 - .75 each		
Local, Sanaa			
somewhat fresh			.73
Imported, Sanaa,			
stale			.60
Imported, village,			
stale			1.00
Not observed, but			
fair market village			
value fresh, at least			1.00 plus

1/ This price represented actual broiler feed costs (22%N) adjusted downward to normal layer feed (16%N) with the normal 15% less costs.

2/ CID costs and return data from the training center operations.

# DRAFT

The team's conclusion, based upon original project paper budgets and recent price movements, is that the project should be continued based upon expected financial returns to the enterprise. Much needs to be done in observing and experimenting with various sized enterprises and under different feeding and management practices to verify the above estimates.

Table 2, below compares the PP cost and return estimates with representative prices of April, 1984. An estimate is shown for a household flock. The key assumptions are:

## For the April 1984 column:

1. Depreciation and maintenance costs have increased by 12% since August 1982.
2. A half Riyal transportation charge has been added to the cost of pullets.
3. Economical and financial layer feed costs are 1.9 YR/Kg.
4. Economic and financial value of fresh eggs are 1 YR/each.

## For The Household Enterprise

1. There are little or no fixed or investment costs.
2. Seven pullets are purchased, only five survived for production.
3. Laying rates are 180 eggs per year vs 202 in the other model, (M1) commercial feed is one-half that used in M1.
4. Value of spent hens is 15 YR vs 30 in M1. No litter value is assigned.
5. The baladi enterprise is abandoned, freeing feed for the new enterprise. The value of the baladi enterprise is unknown. Given the conservative estimates for laying rates, survival rates and salvage value of spent hens it is assumed the opportunity costs of the baladi operation is "accounted for" through these low estimates.

35

# DRAFT

Table: Average Cost and Return for Three Producer Models

Item	Traditional Sector August 1982, Project Paper	Apr. 1984	Household Flock Estimates Apr. 1984
Flock size (no. of birds)	25	25	5
Age of birds at distribution	16 wks.	16 wks.	16 wks.
<u>Investment (YR):</u>			
Buildings (15 yrs.)	500	500	
Equipment (7 yrs.)	250	250	
<u>Fixed Costs (YR):</u>			
Depreciation	69	77	
Interest	167	167	
Maintenance	7	8	
Total fixed	243	252	
<u>Variable Costs (YR)</u>			
Pullets (31.4 YR/bird)	785	648	183
Feed (2.5 YR/kg)	2,597	1,974	197
Water	—		
Electricity	—		
Litter	—		
Miscellaneous	31	31	6
Total Variable	3,428	2,653	386
<u>Income (YR)</u>			
Egg - .67 YR/egg	3,384	5,050	900
- .75 YR/egg	3,790		
Spent hens	770	770	75
Litter	188	188	
Total (.67 YR)	4,342	6,008	975
(.75 YR)	4,748		
<u>Return to owner's land, labor and management (YR)</u>			
.67 YR/egg			
Total (per year)	671	3,103	589
Per bird (per year)	26.8	124	118
.75 YR/egg			
Total (per year)	1,077		
Per bird (per year)	43.1		

## ANNEX B

### Lessons Learned

The lessons from the review of this project are perhaps self-evident; they may bear repeating anyway, and they may have application elsewhere in managing development projects.

1. If a project can not do all it is set out to do, it should decide on what it can do: a lot of AID projects, like PETS have several objectives. This may be for reasons such as avoiding appearing trivial, or for boosting up the rates of return, or to satisfy various special interest groups. And if the project is then being implemented in a country with an ever shifting human, land, and financial base then trouble can, but need not always follow. This is because almost any AID project has at least three "managers" controlling various resources. <sup>1/</sup> These "managers" are the host government, the technical assistance contractor and AID. Thus, it can turn out that a project faces a situation of:

three agencies times X number of objectives  
times a Y factor of shifting resources.

In instances such as this, while the basic design may be sound, there is an absolute need to agree upon a phased implementation of critical activities.

2. To achieve various outputs and purposes a project should not be a slave to its own design: As AID projects are usually implemented two or three years after the project is designed, it should be apparent that the inputs, and even outputs, should not be cast in concrete. Alternatives to those inputs, or outputs, stated in the project documentation might often be found to achieve objectives. In the PETS project, pullet production is a very critical output and they were to be produced from project-sponsored, newly constructed government farms (an input). The construction is only now underway.

It is well known that finding land and carrying out construction in Yemen is a very time-consuming process. Yet alternatives to the project-designed solution for producing pullets was not successfully found. For the pullets, it seems the project looked continually inward to its original design rather than outside its own design for solutions.

<sup>1/</sup> This may be particularly so for collaborative assistance type projects.

On a positive note, the opposite approach was taken for the only major pullet distribution which was an emergency motivated operation.

The project design, strictly speaking, would not call for the underplanned distribution and with the less than ideal prior training of householders. Hence, a successful activity was carried on outside of the project design.

It is interesting to note that sticking to the design has caused serious delays, while overriding the design helped a successful activity. This is not to say the basic design was wrong - it was only inappropriate at a given time.

3. The evaluation team notes the obvious lesson that experienced managers are needed: Managers must be able to plan and to replan when the unexpected happens, to clarify objectives in keeping with other key actors on the crowded scene and to generally show exceptional innovative capabilities; to juggle a bundle of resources to achieve an objective. While these, gods walking, are scarce, the evaluation suggests that while the academic community is one of the very best sources of objective technical expertise, it may not necessarily be that good a source of supply for development project managers. The reasons are:

A. The fundamental and necessary concept of academic freedom critical to the U.S. education system may not be too useful if carried over into a relatively rigid output-oriented development project situation, i.e., the overseas staff are all volunteers, a professor with good management skills can not be ordered to take a post in a developing nation, and while working on projects the choice to do something one is professionally interested in is less available than doing what the project is designed to do.

B. Universities and their staff do not normally manage development projects of the AID or IBRD type. Hence, it should come as no surprise that professors learn on-the-job if it is their first, second or even third overseas assignment.

C. Advancement (and hence work experiencing) in the university community is based partly upon teaching and research achievement. Even for those in managerial positions the management is within a well established institutional framework, not the rough and tumble, ever changing situation which exists with development projects, with their construction activities, lack of operational funds, foreign language and cultural differences, etc.

The above "lesson" is not to say that AID and the host governments do not also have their share of problems in staffing projects with managers who have all the desirable experience and qualifications. However, their advantage is that the staff are career developmental officers and are familiar with the situations in emerging nations.

In due course, the university community may develop a career staff with similar experience of that in AID and the host governments. In the interim, it will take close cooperation between all of the involved agencies to "manage" complex, or even simple projects.

## ANNEX C

### BIBLIOGRAPHY

1. Agricultural Sector Assessment. Yemen Arab Republic. USAID/MOAF Sanaa, Yemen Arab Republic. Revised July 1982.
2. Annual Work Plan (Draft) PETS Subproject. 1 October 1984 - 30 September 1985.
3. CID Cost Reporting Data, March 31, 1984. Tucson, Arizona
4. Evaluation Report Agricultural Development Support Project. USAID/CID Yemen. March 1984. Wash. DC
5. Final Report, Team Leader/Poultry Specialist PETS, D.W. Francis April 28, 1982 - May 16, 1984
6. First Annual Work Plan for PETS, 1 Sept. 1982 to 30 Sept. 1982
7. Fourteenth Amendment to the Project Grant Agreement. USAID Project No. 279-0052. Feb. 13, 1983
8. Monthly, quarterly, annual reports from project leaders, CID, etc.
9. Policy Issues in the Poultry Meat Industry. Yemen Arab Republic. Milton M. Snodgrass, Agriculture Planning Advisor, USAID/CID, Yemen
10. Poultry Extension and Training. Revised Subproject Paper. USAID/ Yemen, Sanaa, Yemen Arab Republic. Revised July 1982.
11. Poultry Meat Production, Consumption and Industry Capacity in the Yemen Arab Republic. Jan. 1983. Milton M. Snodgrass, Agriculture Planning Advisor, USAID/CID, Yemen.
12. Program Strategy Statement of the Yemen Title XII Agricultural Development Support Program, Project 270-0052. May 4, 1983.
13. Project Identification Document. Poultry Extension/Training Subproject. USAID/Yemen. June 30, 1981
14. Representative Cost and Return Budgets for Poultry Meat Production by Small Growers in the Yemen Arab Republic. Milton M. Snodgrass, Agricultural Planning Advisor, USAID/CID, Yemen

15. Study of the Possibility of Substituting the Imported Agricultural Food Stuffs by Domestic Productions in the Yemen Arab Republic. Dr. Mustafa M. al-Muhaser.

16. Summary: Yemen Arab Republic National Nutrition Survey. 1979 US Dept. of Health and Human Services, PHS. Center for Disease Control, Atlanta, GA.

17. Thirteenth Amendment to the Project Grant Agreement, USAID Project No. 279-0052. Aug. 26, 1982

## ANNEX D

### Evaluation Methodology, Unexpected Factors and Review of Key Assumptions

#### A. Evaluation Methodology

The evaluation was carried out by a relatively small team of two persons and in a short period of twelve work days. The team consisted of an agricultural economist familiar with the AID project process and a poultry specialist, the Head of the North Carolina State University Poultry Department. In a sense, the effort might more appropriately be called a review rather than a formal evaluation, with a set methodology, complete with sample surveys. Nevertheless, the procedure, or methodology, consisted of the following:

1. Pre field work consisting of a review of relevant documentation in the U.S. - PIDs, PP, reporting cables, prior evaluation material and cable exchanges on that evaluation.
2. Telephone interviews with U.S. based contractor personnel.
3. Review, in Yemen, of project documentation, work plans, training curriculum and trip reports and end-of-tour reports.
4. Interviews with project personnel, large-scale private commercial poultry producers, other donor staff, household producers and small-scale commercial producers. The list of persons contacted is attached.
5. Field observation of production facilities - see attached map of areas visited,
6. Assessment of materials, formulation of tentative conclusions and recommendations,
7. Oral presentation of conclusions and recommendations to USAID and contract staff,
8. Preparation of draft report,
9. Presentation of conclusions and recommendation to the YARG, USAID and contract staff.

Given the excellent and open cooperation of the YARG, CID and USAID staff, and the abundant material available on the

project, the evaluation team feels their findings are reasonably well substantiated. In those instances where firm evidence is hard to come by - such, as for determining whether end-of-product objectives are obtainable - the team was asked to make qualitative judgements - and we did this.

#### B. External Factors and Unplanned Effects

There appears to have been some shift of host government priorities away from interest in small-scale egg production to a continuation to use YARG facilities for broiler production. The interest in very small-scale egg production may have been a stronger AID priority than a YARG priority.

However, due to the external factor of the 1982 earthquake and the subsequent distribution of pullets in 5 to 6 bird lots, as well as a couple of 50 bird lots, there is now a strong demand for pullets being expressed by housewives and the extension services. An unplanned effect was the failure of the women's cooperative effort with the 50 bird units which has caused the project to rethink its tactics with respect to the most effective scale production unit. The reasonably successful distribution, in light of minimum training with producers, and emerging feeding problems should also cause the project to try a variety of training and follow-up extension options and to experiment with a variety of means to supplement table scrapfeed.

In summary, the earthquake, and events subsequent, may cause the YARG to renew its interest in village egg production. The very small-scale efforts reveal both promise and some problems regarding supplemental feed.

#### C. Review of Key Assumptions

The key assumptions listed in the logical framework contain assumptions outside the control of the project - such as price movement. Also listed as assumptions are items which should be more or less internally controllable by the project - such as obtaining feed. These latter items are really factors necessary for success of the project rather than an assessment of risk and uncertainty under which the project operates, and which could cause the project major problems. (It is noted that the draft AID Handbook on evaluation is not very clear on the AID definition of "assumptions" for projects. The definition given is with respect to uncontrollable factors, yet the examples given for assumptions on outputs and inputs appear to be clearly internal to the example project.)

In any event, the key explicit assumptions with respect to PETS are restated from the logical framework, or paraphrased,

1. Goal and Sub-goal

Assumptions

Increase egg and poultry meat production

Price/cost relationships become more favorable for egg production, new technology will be adopted and put into sustained use.

The economic issues is a key assumption which has proven to come to pass. There has been no extensive testing or adoption of technology. From the limited experience there is no reason to expect that the assumptions will not hold true.

2. Purpose

Assumption

Build (public sector) institutional capacity useful to small- and medium-scale producers.

Government can supply trainees and house them at the SPTC.

This is a factor which should be under the control of the project. Trainees have been supplied but the lack of dormitory space has been a problem which has been resolved.

An implied assumption is that "there will remain a public service need not being met or apt to be met by alternative means - such as the private sector." This is sort of a fundamental assumption for the project.

As mentioned in the body of the report this critical implicit assumption remains valid. Although the need for the government to produce pullets may be (and should be) overtaken by the private sector there will remain a need for public sector information services to very small and small-scale producers.

3. Outputs

Assumptions

Trained persons in both public and private sector

Persons will be found and sent for training as managers, including womens' groups as managers of flocks.

A public sector capacity established for rearing pullets as a base for private flocks.

The government will see to it that feed and rearing houses are not a limiting factor.

The assumption that persons can be found for formal training has held true for men but not for women. Availability of government rearing houses has been a big problem and feed resources a relatively minor problem. As the factors, and problems, are amenable to solution within the project, they can be addressed by the project and are not being simply left dangling as an "assumed" situation. The planned involvement of women will require renewed effort. It has not proven to be a realistic assumption to have women's groups manage flocks. Women's group management of medium-sized flocks may not, in itself, be an important output. Creating a system to provide technological information to the individual households, in a manner relevant to women, is a very important output.

4.        Inputs

Advisors, training,  
trainees, financing  
supplies, equipment,  
and rearing houses

Assumptions

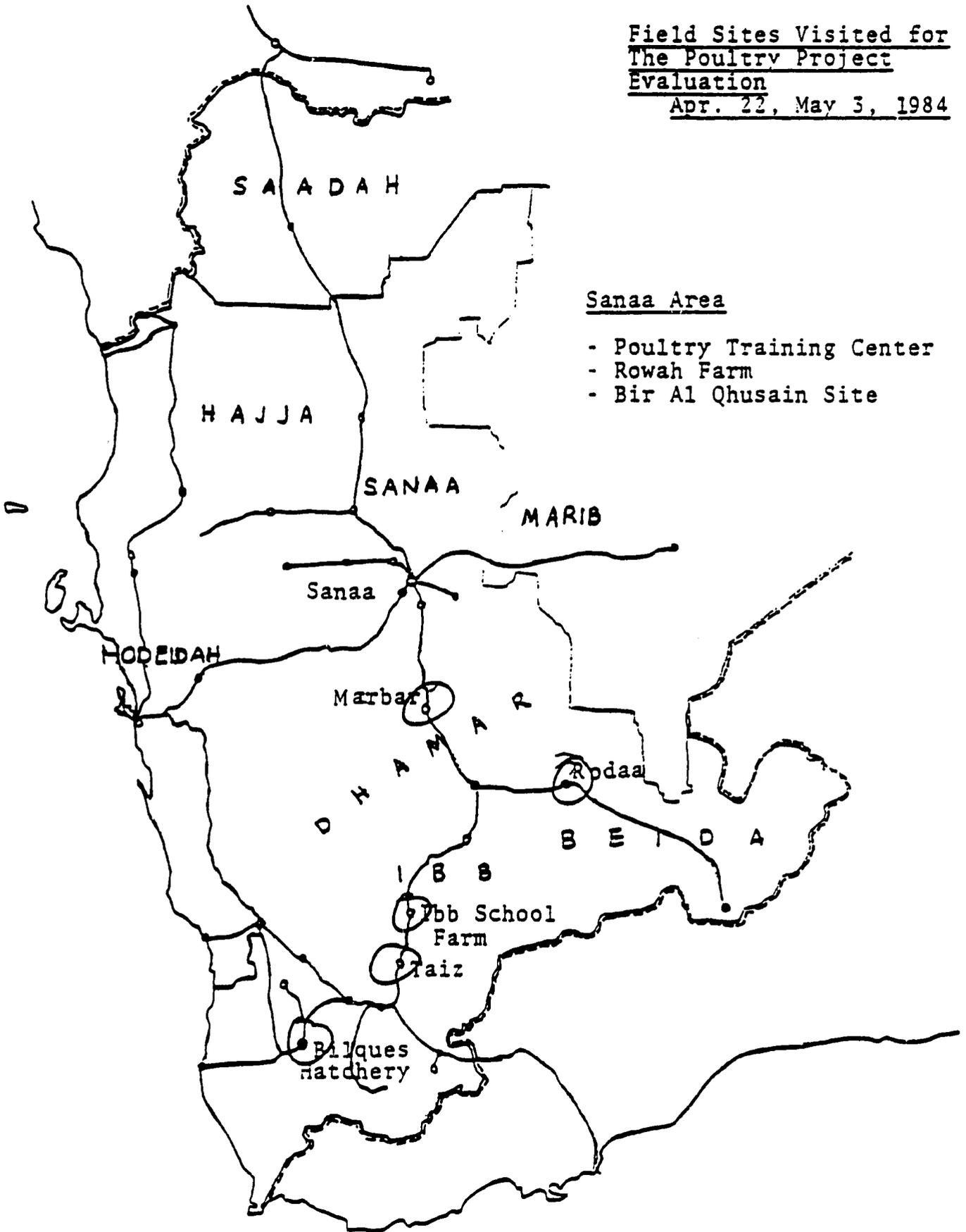
That financing, facilities and  
staff would be available to  
constitute provision of the inputs

By and large, the internally achievable assumption on inputs has been realized with the key exception that the pre-project poultry houses, and those in the SPTC, continue to be used for either egg or broiler production rather than for raising pullets for distribution. This calls into question the underlying implicit assumption of commitment to the project, as designed. This is addressed in the body of the report and in the recommendations.

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YEMEN ARAB REPUBLIC

Field Sites Visited for  
The Poultry Project  
Evaluation  
Apr. 22, May 3, 1984



PERSONS CONTACTED

1. H. E. Dr. Ahmed A. Hamdani - Minister of Agriculture
2. Mr. Charles F. Weden, Jr.  
Director, USAID/Sanaa
3. Mr. Thomas Rose  
Deputy Director, USAID/Sanaa
4. Dr. H. P. Peterson  
ADO - USAID/Sanaa
5. Mr. G. Tracy Atwood  
Asst. ADC - USAID/Sanaa
6. Dr. Royal Brooks  
Director CID-Office/Sanaa
7. Dr. K. Holleman  
Poultry Specialist, Team Leader CID Office/Sanaa
8. Dr. D. W. Francis  
Former Poultry Specialist, Team Leader, CID Office/Sanaa
9. Mr. Paul Heidloff  
Poultry Technician, CID/Sanaa
10. Mr. Carson Coleman  
Poultry Technician, CID Office/Sanaa
11. Dr. Jack Law  
Training Officer, CID/Sanaa
12. Dr. Milt Snodgrass  
Planning Advisor, CID/Sanaa
13. Dr. Amil Badie  
Agriculture Advisor, CID/Sanaa
14. Mr. Mukbil Armed Mukbil  
Deputy Minister of Agriculture
15. Mr. Abdul Hafiz Karhash  
MAF - CID - Co. Manager
16. Mr. Yahya Ismail Shugaa  
Director, Sanaa Province Agriculture Office
17. Mr. Lutf Al-Ansi  
MAF - Planning Officer
18. Mr. Abdul Karim Abutalib  
MAF - Manager, Hasabah Training Center
19. Mr. Addulla Murqim  
MAF - MABAR District Extension Offices
20. Mr. Hani Al-Masri  
MAF - MABAR District Extension Asst. Officer
21. Mr. Ali Mujaher  
Site Manager - Jahran Poultry Farm
22. Mr. Mohamed Mustaka  
Supervisor - Jahran Poultry Farm  
(PETS - Trained student)

23. Miss Gaynor Cumminga  
Veterinarian - JAHRAN Poultry Farm
24. Miss Nadia Saleh Saif  
MAF - Co-Manager - RADAA Development Project
25. Miss Marley Bookman  
Dutch-Volunteer, RADAA Development Project
26. Mr. John Turner  
Consultant - Bilquis Poultry Farm/Taiz
27. Hatchery Specialist  
Bilquis Poultry Farm/Taiz
28. Mr. Mohamed M. Javed  
Manager- Bilquis Poultry Farm/Taiz
29. Mr. Ali Saleh  
Deputy Manager  
Bilquis Poultry Farm/Taiz
30. Mr. Ghazi Alwan  
Chairman and Managing Director  
Bilquis Poultry Farm/Taiz
31. Dr. E. Eddington  
Director - Ibb Secondary Agricultural Institute (ISAI)
32. Dr. Awadalla Y. Hamid  
Teacher, Livestock & Poultry Science ISAI
33. Miss Jerry Donnley  
USAID - Program Office

## ANNEX E

### Scope of Work for the Evaluation

#### I. Objective:

The objective of the services requested in this PIO/T is to provide the USAID Mission/Sanaa, the Ministry of Agriculture, YARG, and the Consortium for International Development with a set of recommendations for future poultry activities in Yemen. In particular, what, if any, changes might be recommended for the existing Poultry Extension and Training Project.

#### II. Background:

A. The purpose of the Poultry Extension and Training Subproject (PETS) is to establish and implement an improved extension and training program within the Ministry of Agriculture and Fisheries that will increase egg and poultry meat production for private producers in the traditional sector and for small- and medium-scale producers.

B. The Project, which was authorized in August 1982, for five years at \$6,185 million, included pre-subproject expenditures of \$300,000 for construction of demonstration poultry houses in villages. The pre-subproject phase began in April 1981, nearly two years after the previous Poultry Production Project (279-0019) was completed. Project 279-0019 constructed two poultry training centers and produced a small number of pullets for sale to villagers. The impact of the project was small because: 1) there were few pullets available for sale/distribution; 2) there was a weak to non-existent extension/technical assistance capacity to support the village-level flocks, and 3) farmers often shifted from egg-layers to broilers, which were more profitable and required less technical knowledge.

C. Large producers rapidly expanded into the broiler industry. Because of the economies of scale inherent in broiler production, these large producers soon supplanted the smaller traditional farmers in the broiler industry. Currently, the broiler capacity is sufficient to absorb domestic demand and prices are beginning to decline. Consequently, some of the large broiler producers are beginning to look at egg-layers as possible alternative uses of current physical capital investment.

D. The Ministry of Agriculture wanted to promote egg production and to support the small and traditional farmer.

The Poultry Extension and Training Subproject was designed to improve the MAF's capacity to support the country's egg production with emphasis given to the traditional and small-scale farmer. The subproject is an institutional development activity which concentrates on improving the MAF technical capability through degree-training, short-term training, and advisory assistance.

E. There is no source of pullets available in Yemen. Thus, as part of the PETS project, the MAF, with assistance from CID, is constructing a pullet-raising facility with an annual capacity of 70-100 thousand pullets. The pullets will be sold at cost to farmers with preference given to small-flock operations, and follow-up assistance provided by the trained extension agents and MAF technicians.

F. The contractor, CID, provided the required staff on time, and the short- and long-term training is nearly on schedule. Construction of the pullet-rearing houses was delayed for more than a year while a site was secured.

G. The YARG is increasingly focusing its priority on short-run production rather than the longer-run institution building. At the same time, the expansion of the private sector in the egg-laying segment of the poultry industry is seriously straining the MAF's capacity to respond to the private sector's need for guidance and technical assistance. In this rapidly evolving environment, a major challenge to the PETS is to maintain its focus on long-run institutional development of the MAF and to be responsive to requirements of the small and traditional farmer while recognizing the YARG's increasing priority on production and the Ministry's need to be able to serve the larger commercial producers of eggs in Yemen.

### III. Specific Scope of Services Required

A. Evaluate the contributions of the Poultry Extension and Training Subproject toward achievement of the following goal objectives.

- 1) Increase egg production in the traditional sector to increase farm income and improve nutrition.
- 2) Reduce Yemen's dependence on imported eggs.
- 3) Increase production of eggs and poultry meat in Yemen.

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B. Evaluate the accomplishments toward achievement of the project purpose and the likelihood the purpose will be attained by September 1987. Examine the assumptions of the PETS, in particular the economic viability of different sized egg-laying flocks, and the role of the private sector, to determine if USAID intervention in the poultry subsector is still justified and if the PETS is the most appropriate intervention.

C. Evaluate the private sector potential to provide feed, chicks, pullets and technical assistance to all levels of Yemen's poultry subsector.

D. Evaluate the MAF institutional and budgetary capacity to support all levels of Yemen's poultry subsector.

E. Examine the traditional sector poultry production and its future potential. If there is justification to continue assistance to the traditional poultry producers then evaluate and compare the capability and capacity of the MAF and the private sector to provide that assistance.

F. Evaluate the progress of the PETS toward accomplishment of the major elements:

- personnel trained - MAF, private, farmers, women
- egg-laying flocks established
- pullets produced
- extension system operating
- poultry and egg-marketing studies being done

Prior to beginning field work, the team will consult with USAID/Sanaa to determine which of the above items are to receive particular emphasis or whether there are additions or deletions to the above items.

#### IV. Nature of Required Reports

A. A draft report will be completed and available for review by USAID/Sanaa prior to the team departure from Yemen.

B. The team's report will provide recommendation and reasoning relative to:

(1) continuation of the PETS project as designed, with no major changes;

(2) phasing out the project;

(3) design of alternative projects, or modification of the PETS project. If this latter recommendation predominates, then proposed elements should be described along with timing, scope and reasons for a redesign effort.