

PROJECT EVALUATION SUMMARY (PES) - PART I

WM=33718

1. PROJECT TITLE DRYLAND AGRICULTURE APPLIED RESEARCH			2. PROJECT NUMBER 608-0136	3. MISSION/AID/W OFFICE USAID/Rabat
4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY) 608-83-9			<input checked="" type="checkbox"/> REGULAR EVALUATION <input type="checkbox"/> SPECIAL EVALUATION	
5. KEY PROJECT IMPLEMENTATION DATES			6. ESTIMATED PROJECT FUNDING	
A. Firm PRO-AG or Equivalent FY <u>78</u>	B. Final Obligation Expected FY <u>84</u>	C. Final Input Delivery FY <u>84</u>	A. Total \$ <u>7,900</u>	7. PERIOD COVERED BY EVALUATION
			B. U.S. \$ <u>4,500</u>	From (month/yr.) <u>June 1978</u>
				To (month/yr.) <u>May 1983</u>
				Date of Evaluation Review <u>June 1983</u>

B. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., program, SPAR, PIQ, which will present detailed request.)	B. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETED
1. Determine INAV criteria for granting degrees to participant trainees and, subsequently, define procedures for degree completion (through INAV or through U.S. institution).	INAV, USAID, MIAC, INRA	July 1983
2. Assure provision of adequate GOM local cost financing to cover INRA recurrent costs and housing and research support facility development costs at both the INRA Aridoculture Center, Settat, and selected satellite INRA stations by PL 480 programming of Title I "Special Account" funds or other assured sources.	USAID, INRA, MOF, MIAC	July 1983
3. Assure provision of adequate GOM staff to serve as counterparts/support personnel to U.S. technical assistance staff.	INRA	July 1983
4. Review and/or redefine administrative relationships of Aridoculture Center to Director of INRA and to regional INRA chiefs.	USAID, INRA, MIAC	August, 1983
5. Obtain TA to advise on detailed specifications for additional project commodity procurement.	MIAC	November 1983
6. Amend existing PP to expand project TA, participant training, commodity procurement, and socioeconomic research component and extend LOP.	USAID, MIAC, INAV, INRA	July 1983

9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS

<input checked="" type="checkbox"/> Project Paper	<input checked="" type="checkbox"/> Implementation Plan e.g., CPI Network	<input type="checkbox"/> Other (Specify) _____
<input checked="" type="checkbox"/> Financial Plan	<input type="checkbox"/> PIO/T	_____
<input checked="" type="checkbox"/> Logical Framework	<input type="checkbox"/> PIO/C	<input type="checkbox"/> Other (Specify) _____
<input checked="" type="checkbox"/> Project Agreement	<input type="checkbox"/> PIO/P	_____

10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT

A.	<input type="checkbox"/> Continue Project Without Change
B.	<input checked="" type="checkbox"/> Change Project Design and/or
	<input checked="" type="checkbox"/> Change Implementation Plan
C.	<input type="checkbox"/> Discontinue Project

11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles)

Doral Watts, Project Manager *Doral Watts*  
 Arlan McSwain, FAO *Arlan McSwain*

12. Mission/AID/W Office Director Approval

Signature: *Robert C. Chase*  
 Typed Name: Robert C. Chase  
 Date: 5/1/83

## NEAR EAST EVALUATION ABSTRACT

MISSISSIPPI A. D. A. OFFICE

Dryland Agriculture Applied Research 608-0136

USAID/Rabat

**PROJECT DESCRIPTION** The stated project purpose is to develop a permanent applied research program aimed at increasing farmer productivity. To achieve this purpose, the project is expected to establish a dryland agronomic research program; develop a program whereby farming equipment is identified for small farmers; and establish a socio-economic research program to provide a better understanding of the behavior of dryland farmers and thus provide a basis for more effective research and extension programs.

<b>AUTHORIZATION DATE AND U.S. LOP FUNDING AMOUNT</b> June 30, 1978: \$4,500,000	<b>PES NUMBER</b> 608-83-9	<b>PES DATE</b> June, 1983	<b>PES TYPE</b> <input checked="" type="checkbox"/> Regular <input type="checkbox"/> Other (Specify)
<b>ABSTRACT PREPARED BY, DATE</b> Ursula Nadolny, June 7, 1983 Health/Evaluation Officer	<b>ABSTRACT CLEARED BY, DATE</b> Robert <i>R. Chase</i> , June 7, 1983 Mission Director		<input type="checkbox"/> Special <input type="checkbox"/> Terminal

The purpose of conducting this project evaluation is to assess the project's implementation progress as defined in the amended PP and ProAg, including contractor performance in the field and at the University campus; assess the initial impact of project activities being implemented under the contract; identify lessons learned; determine the feasibility of expanding project activities as proposed in a draft amendment no. 3 to the PP, including the scope and duration of such expansion and the projected funding required; and analyze obstacles which inhibit progress of implementation and that limit project impact.

Although the project had a slow start because of contracting delays, and failures by both the AID-financed Contractor\* and the Government of Morocco (GOM) to provide the timely implementation anticipated, the project has made substantial progress. The staffing delays and some necessary staff changes by MIAC, and delayed identification of participant trainees and construction of research facilities by the National Agronomic Research Institute (INRA) delayed the anticipated implementation schedule of the project. In spite of this slow start, the project is now progressing rapidly and the future is promising. All but three of the 25 participant trainees (15 PhD and 10 MS) are either in the U.S. or in language training in Morocco prior to departure. The amount of field research established the past two seasons has been substantial, but a three-year drought that is still unbroken has minimized the agronomic research results. In spite of the drought, a number of important changes in current production methods have been identified as promising. These have included proper timing of herbicides to improve weed control, wider row spacing with the use of grain drills at lower seeding rates than the broadcast system used by most farmers, and proper placement of fertilizer. The potential for considerable moisture storage in deeper soils has been demonstrated. A number of new cereal varieties (3 barley, 2 durum wheat and 1 bread wheat) appear promising and are scheduled to be released for seed multiplication in preparation for distribution to farmers. The project has had a significant influence on speeding their release.

The new INRA Aridoculture Center that will house the project in permanent facilities is nearing completion near Settat. Although some auxiliary facilities in the original plans still need to be added, this Center will provide a very suitable facility for the research planned under the project.

Because the project is now making excellent progress under good management and the goal of the project is of increased national importance, a very substantial increase in project funding and extension of the LOP are recommended. The findings of this review would lead to the conclusion that the original project concept was valid, the need was important and is becoming more so, but the original project design seriously underestimated the time and inputs that would be required to make a significant impact. The overall evaluation recommendation is to realign the project activities with a new implementation schedule, and to provide additional financial resources to enable full implementation of activities envisioned in the PP.

Lessons Learned

1. American Contractors, regardless of their qualifications and competence, unless they are long experienced in a particular country, will have a considerable period of learning and adjustment before they become very effective. The Mission must be prepared to give maximum support during this period of adjustment and mobilization, if consequent slippage is to be avoided.
2. The AID system has yet to adequately develop a method to keep both Missions and contractors aware of a rather substantial technical resource base financed by AID through the Bureau of Science and Technology.
3. Related AID-financed projects in other countries in the region should be used as a source of information. This would preclude an unnecessary amount of re-discovering.
4. No matter how carefully multidisciplinary activities may be built into a project design, it is essential that in the implementation stage, all concerned parties -- including the host government institutions and the USAID -- insure that the proposed multidisciplinary integration takes place. Part of the role of the technical assistance team should be to seek ways in which institutional and disciplinary boundaries can be breached where this is an important factor for project success.
5. The programming of participant trainees, and particularly, their integration into project activities on their return, is a complex and time-consuming matter, but one which is ultimately crucial to success in projects of this kind. How the duties of these trainees -- when they are host government officials taken off the job for training -- are to be met in their absence, is a continuing problem in such projects. The suggestion made in this report for ways in which their absence can be compensated for on-the-job by the TA team, should be considered for other, similar projects. The suggestion that this, in turn, be complemented by carefully-designed short-term training programs for those who are left of project-related jobs, also holds good for most similar projects.
6. No matter how competent and well-managed a technical assistance team, if the host government counterpart institution does not have the financial and human resources -- and the political will -- required to implement the project, success will be impossible, or at best, reduced.
7. The use of the TDY approach to assess the qualifications of potential long-term TA project personnel -- as well as to benefit from their expertise during the TDY -- is a very helpful one for team member selection which has worked well in this project.
8. Selection of project equipment that will be appropriate, requires an understanding of local conditions and of the purposes for which the equipment will actually be used in that local setting. Additionally, equipment maintenance, which is often not provided for in AID projects of this kind, can be absolutely crucial to project performance, both of U.S. technical assistants and their host country counterparts.

\*\*for by the use of lesser-trained cadres who are supervised and trained

9. To attract highly-skilled host country personnel, and competent expatriate technical assistants to remote areas, incentives must be provided on the professional and personal levels. This increasingly includes incentives for spouses of host country and expatriate project staffs, both those who are working and those who are not. This also applies to returning participant trainees, whose motivation to work at the project site is important both to the project and to their future utility to their institution and their country.
10. Contractors are not initially aware of the complicated AID procurement regulations, and this poses problems in implementation. Long-term project contractors should be enabled to participate in an orientation course under the auspices of AID/Washington before implementation begins.
11. The current AID requirement to "do more with less" often means that the project officer is unable to exercise competent technical and managerial oversight of his or her project, given increasing workloads. This includes the inability to visit the project field sites, assess the performance of project personnel and counterparts on a continuing basis, and help to solve problems as they arise and before they become serious constraints to project performance.

14

MID-PROJECT EVALUATION REPORT

PROJECT 608-0136

DRYLAND AGRICULTURE APPLIED RESEARCH

JUNE 1983

W.R. Furtick, Team Leader, Agronomist NE/TECH/AD

Leland Voth, Agricultural Development Officer NE/TECH/AD

Alice L. Morton, Senior Consultant, RONCO Consulting Corporation

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## EXECUTIVE SUMMARY

### I. FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

#### A. Findings and Conclusions

Although the project had a slow start because of contracting delays, and failures by both the AID-financed Contractor and the Government of Morocco (GOM) to provide the timely implementation anticipated, the project has made substantial progress. The staffing delays and some necessary staff changes by MIAC, and delayed identification of participant trainees and construction of research facilities by the National Agronomic Research Institute (INRA) delayed the anticipated implementation schedule of the project. In spite of this slow start, the project is now progressing rapidly and the future is promising. All but three of the 25 participant trainees (15 PhD and 10 MS) are either in the U.S. or in language training in Morocco prior to departure. Three of the participants nominated by INRA were not accepted by MIAC and thus replacements are being identified. The amount of field research established the past two seasons has been substantial, but a three-year drought that is still unbroken has minimized the agronomic research results. In spite of the drought, a number of important changes in current production methods have been identified as promising. These have included proper timing of herbicides to improve weed control, wider row spacing with the use of grain drills at lower seeding rates than the broadcast system used by most farmers, and proper placement of fertilizer. The potential for considerable moisture storage in deeper soils has been demonstrated. A number of new cereal varieties (3 barley, 2 durum wheat and 1 bread wheat) appear promising and are scheduled to be released for seed multiplication in preparation for distribution to farmers. The project has had a significant influence on speeding their release.

The new INRA Aridoculture Center that will house the project in permanent facilities is nearing completion near Settat. Although some auxiliary facilities in the original plans still need to be added, this Center will provide a very suitable facility for the research planned under the project.

Because the project is now making excellent progress under good management and the goal of the project is of increased national importance, a very substantial increase in project funding and extension of the LOP are recommended. The findings of this review would lead to the conclusion that the original project concept was valid, the need was important and is becoming more so, but the original project design seriously underestimated the time and inputs that would be required to make a significant impact. The level of increases in participant training that appear needed are less significant than the amount and duration of technical assistance that will be required to establish a self-sustaining research institution and to develop and introduce technology that will result in major increases in national production levels.

## II. RECOMMENDATIONS

### A. Management

Specific improvements in management support by the USAID Mission in Rabat are proposed. Planned increases in the staffing available should make it possible for the Mission to provide more timely leadership in resolving problems relating to interaction with the GOM, keeping abreast of plans by other donors, project monitoring and linking project needs to available resources of S&T centrally-funded activities.

The current management of the MIAC project in Morocco was commended. Recent changes in the overall management of MIAC and of the MIAC/Lincoln support office would also appear to offer the potential for further possible positive improvements by the contractor.

A number of deficiencies on the side of INRA were noted and means of correction proposed. These management deficiencies should be readily resolved as staff with increased levels of experience and training return from the U.S.

### B. Research Facilities

The primary research facilities of the Aridoculture Center nearing completion at Settat require a number of additional auxiliary research support facilities and because of the relatively isolated location in relation to large urban centers, various housing and recreational facilities are recommended for construction with the assistance of PL480-generated local currency funds. In addition, upgrading and additions of facilities at the satellite research stations is also recommended.

### C. Commodities

In general, commodity procurement is up to date and satisfactory. Use of qualified technical input to detail the specifications for some additions of field equipment and for the needs of the new research laboratories at Settat is recommended.

### D. Socio-economic Research Component

This program was implemented by the Hassan II National Agronomic and Veterinary Institute (INAV). It has provided a variety of useful information that can improve the understanding of the farm situation the Agronomic Research program is designed to improve. Major recommendations are for continuation of this component on an expanded basis with emphasis on expansion in the geographic area studied, development of an Agricultural Information Resource Center, increasing the depth of micro-level studies and means to more closely integrate this research component with the Agronomic program.

### E. Special Issues Needing Early Resolution

Several issues of significant importance were identified as needing early resolution and are summarized:

1. A decision must be made soon whether or not the INAV will provide the degrees for participant trainees. The original agreement called for course-work training in the U.S., thesis research in Morocco and the degrees granted by INAV in Morocco. Some of the participant trainees do not meet the requirements of the INAV selection process, especially those in MS training. As a result, INAV has yet to make a firm commitment on whether they will waive these requirements, or in fact grant degrees at all under the provisions included in the project design. If this cannot be resolved, arrangements must be made for the degree work to be completed through the U.S. institutions.

2. The GOM has not been able to provide the timely provision of local currency to cover necessary recurrent costs. This is being compounded by a national financial crisis resulting from the global recession, and three years of severe drought. Use of PL480-generated funds in a "Special Account" or other means of resolution are recommended for early decision.

3. Provision of inadequate GOM staff support is also identified as a constraint on progress of the project and should be resolved as part of the recurrent costs constraints. It is recommended that greater use be made of baccalaureate level staff coming from the higher education institutions to act as interim counterparts. They could act as well-trained support staff once the participant trainees return and form a pool of experienced staff from which future advanced degree candidates could be selected.

4. The administrative relationship of the Aridoculture Center to the Director of INRA is addressed. It currently falls under a Regional INRA Director whose region does not match that of the Center. It is proposed that these two functions be separated and that one of the returning PhD participants be made director of the Center with direct responsibility to the INRA Director.

5. Recommendations are addressed to the future transportation needs as trainees return from the U.S. and suitable project vehicle allocation procedures become more important.

6. The critical need for housing development at the Settat Center is outlined and use of PL480 local currency funds recommended.

7. The level of the GOM per diem rate is a serious handicap to effective operation of a research project covering a large geographic area. Various possible resolutions to the problem are suggested. The most viable over the long term would be construction of adequate guest house facilities at the various research stations.

#### F. Amendment of Project 0136

The recommended increases in technical assistance, use of Peace Corps volunteers, some additions in participant trainees, strengthening the reference library, and additional commodities are all outlined. These relate back to the technical and programmatic recommendations.

## BACKGROUND

In 1978, USAID/Rabat signed a grant agreement with the Government of Morocco for the implementation of an applied agricultural research program in the semi-arid regions of Morocco. The project provides AID-financed inputs totaling \$4.5 million to strengthen applied research in agronomy, varietal selection, farm mechanization, production economics and rural sociology. The project also provides support for professional development and training of Moroccan research personnel. The research focuses on technology development to increase farm productivity and production of major cereals (wheat and barley), edible legumes and grain/forages in regions receiving less than an average of 450 mm of rainfall annually. This region is responsible for an estimated 70% of national barley production and 45% of all wheat production. Increased forage production is a critical variable in the process of increasing cereal production. The form that the increase in forage production takes is a major research problem in the semi-arid region of Morocco. The bilateral grant stipulates that U.S. technical assistance and other inputs will be utilized to develop improved technologies and cultural practices which will be socially acceptable, economically feasible, and financially profitable for adoption by small-scale farmers within this semi-arid region, and to assist in building the institutional base required to maintain a dynamic applied research program. In this regard, this agronomic research was to be closely integrated with socioeconomic research.

The implementing agency for this project is the GOM's Ministry of Agriculture and Agrarian Reform (MARA). However, actual implementation is carried out by two semi-autonomous institutes under the supervision of MARA. The agronomic research program is conducted in cooperation with the National Agronomic Research Institute (INRA). The socioeconomic research program is conducted by Hassan II National Agronomic and Veterinary Institute (INAV), Department of Human Sciences.

The Dryland Agriculture Applied Research Project presently provides for the implementation of a multidisciplinary field research program in agronomy, soil science, crop variety selection, and farm mechanization. There is to be an explicit focus on building linkages between GOM agricultural research and extension personnel through a heavy emphasis on field trials and on-farm demonstrations. Additionally, a significant amount of advanced degree training is provided.

The essential design strategy was to field a resident U.S. technical assistance team of two agronomists and one soil scientist to design and implement a program of field research which is specifically applied to the resolution of agronomic constraints to increased production and productivity in semi-arid areas. During the first years of research design and development, a cadre of 21 GOM personnel were to be enrolled in U.S. university advanced degree programs. This cadre of professionals would then return to overlap with the U.S. TA team for the remaining years of Phase I, and would form the critical mass of personnel required to carry on the research program designed and initiated by the U.S. scientists in collaboration with designated INRA scientists.

Some of the constraints to increased on-farm productivity and production identified in the semi-arid zone in Morocco are susceptible to change over time through research, validation and extension of results. Constraints such as rainfall patterns and shallow soils are not susceptible to human intervention; however, crops and production systems can be adapted to the soil-climate com-

plex. The economic and cultural environment in which Moroccan semi-arid farmers operate is complex, but must be understood in relation to its impact on eventual adoption of improved technology. The major objective of the establishment of a national aridoculture applied research program and institutional capacity is the continuing generation of applied research and/or development of improved techniques which are judged to be profitable to the farmer and are adopted overtime through subsequent extension outreach efforts.

Original USAID plans called for project implementation to begin in FY 1979. The implementation plan required that a U.S. scientific team be fielded to begin development of a multidisciplinary applied research program and that a cadre of Moroccan personnel be simultaneously enrolled in advanced degree programs in the U.S. during the initial year of the project. This time phasing was critical to enable the achievement of the project objectives within the project time frame. However, implementation was seriously disrupted by slow performance of all parties. In February, 1980 an AID direct contract (NE-C-1666) was signed with the MidAmerica International Agriculture Consortium (MIAC) to implement the project. The U.S. technical assistance contractor failed to field an appropriately qualified team of French-speaking scientists until recently; GOM-funded construction of facilities at the central research station has experienced extremely slow progress and only now appears to be nearing completion; the selection of Moroccan personnel to be enrolled in advanced degree programs was seriously delayed by institutional reorganization within the Ministry of Agriculture (MARA) and during the first two years of field work (1981-83), severely distorted climatic conditions resulted in limited data from the research experiments which were established.

Currently, the U.S. technical assistance field team consists of an agronomist, a soils scientist, and a water management specialist. During the first year of residency of the field team the additional locally-hired services of a U.S. variety selection specialist and an agricultural equipment specialist were contracted. They are assisted by two INRA agronomists and a technician, as well as the INRA station directors and support staff of the four research stations cooperating as locations for Project work. Administrative support is received from the Settat Regional Director, also appointed as Director of the National Aridoculture Program, and the INRA Director in Rabat.

After implementation delays spanning four years, the Project activities are accelerating.

The agronomic research program has concluded two years of field research. Field research operations are limited by rainfall and temperature to the period November through mid-June in most years. During this "rainy" season, the precipitation may not be timely, regular or consistent.

During the two years of field experimental work, the U.S TA teams focused primarily on plant nutrient relationships, establishing alternative crop rotations, levels of seedbed preparation and on-farm research trials of traditional vs. improved practices. Typically, for semi-arid zone research, the rains were late and not temporally evenly distributed, which impeded normal plant growth and development. This resulted in extremely low yields and data which were neither susceptible to analysis nor useful to evaluate yield potentials.

Research experiments were located on three different stations with considerable geographic spread in relation to the central Settat Region. On-farm research trials were conducted on farmers' fields distributed throughout the region. Although limited data were collected, the team gained valuable experience on machinery calibration and operations, planting methods and crop culture, and a better general understanding of the constraints involved in working in the region. There were also some useful leads on the value of specific practices tested. Additionally, the field experience has pointed to certain operational bottlenecks, such as insufficient transportation, shortages of appropriate field equipment and the need for a wider diversity of U.S. scientific expertise to enable the conceptual approach of multidisciplinary problem identification and analysis to be successful.

Of the twenty-five Moroccan participants scheduled to go to the U.S. for graduate work three departed in 1980, two additional in 1982 and the rest were placed in language training for departure in 1983. Three of those have since been rejected by MIAC and will need to be replaced. Upon return, they will conduct their research for the thesis/dissertation under the guidance of the appropriate U.S. field team member and an advisor from the faculty of INAV, which will grant the degree. The previously-authorized participants included 15 at the PhD level and 10 at the MS level.

In general, the failure to implement activities on schedule compounded by an underdesigned, overly-ambitious and underfunded project and the impact of inflation has caused the erosion of grant resources available for implementation. Many problems of low production and productivity in the region have not been solved since the original 1978 Dryland Agriculture Project design. The strategy presented in the original Project Paper for problem resolution and achievement of project technological and institutional objectives is still the most viable and should be pursued more vigorously.

#### GOAL

The stated project goal is "To increase basic food production in order to meet the needs of Morocco's fast growing population, and improve income of traditional small dryland farmers."

Status: To date, no progress is evident toward reaching the goal due to drought and other difficulties, but research so far has provided evidence that significant progress is possible once weather patterns return to normal.

Other Contributory Projects: This was examined by the review mission to the extent possible. The only directly relevant donor program is in forage crops under German (GTZ) assistance. There appears to have been adequate coordination to date. Coordination between this project and the Plant Materials Center under project 0145 has recently increased.

There is evidence, however, of insufficient donor interaction in general in Morocco and of an inadequate effort by the mission to overcome this problem by frequent and thorough contact with other primary donors with programs in agriculture.

## PURPOSE

The stated project purpose is "To develop a permanent applied research program aimed at increasing farmer productivity." The project is expected to: establish a dryland agronomic research program; develop a program whereby suitable farming equipment is identified for small farmers; and establish a socioeconomic research program to provide a better understanding of the behavior of dryland farmers and thus provide a basis for more effective research and extension programs.

Progress toward end of project status (EOPS) in the accomplishment of the project purposes is accelerating, but will fall short of original anticipation due to the following factors:

1. Slow implementation by AID, GOM and MIAC.
2. Three years of drought that have reduced research output and caused GOM financial strains.
3. GOM resource reductions forced by the world economic recession.
4. Inadequacies in the original design that underestimated resource requirements and time frame.
5. Inadequacy of original Project Authorization to fully-fund the contract.
6. Administrative inadequacies.

It is the judgement of the evaluation team that the administrative causes of implementation delay have been ameliorated and that the Project activities are now proceeding with reasonable dispatch. The technological and institutional objectives, as well, remain valid. The evaluation recommendations are to realign the project activities with a new implementation schedule, and to provide additional financial resources to enable full implementation of activities envisioned in the original Project Paper.

## EVALUATION METHODOLOGY

The purpose of conducting this project evaluation is to assess the project's implementation progress as defined in the amended Project Paper and ProAg, including contractor performance in the field and at the university campus; assess the initial impact of project activities being implemented under contract NE-C-1666; identify lessons learned; determine the feasibility of expanding project activities as proposed in a draft Amendment No. 3 to the Project Paper, including the scope and duration of such expansion and the projected funding required; analyze obstacles which inhibit progress of implementation and that limit project impact including policy context if applicable, institutional coordination and adequacy of host country support vis-a-vis Grant Agreement commitments. The evaluation scope of work is contained in Attachment A.

The evaluation was conducted in April/May 1983 and involved a review of project documents and interviews with key project personnel. Site visits to research stations and villages in the project area were also conducted. Attachment B contains a listing of personnel contacted during this evaluation.

#### EXTERNAL FACTORS

Possibly the most serious external factor affecting not only the project but all of Morocco has been the severely distorted climatic conditions. For the past three years, there has been a very serious drought and an increased disparity of geographic rainfall patterns resulting in very limited data (in some cases zero results) from the research experiments which were established.

MIAC indicated that during the initial search period for contract staff the US internal revenue laws had changed, which nullified the financial incentive to work overseas. This situation increased the difficulty of finding suitable staff. Fortunately, in 1981 the IRS laws again changed and now provide financial incentives to MIAC staff to work outside the U.S. for extended periods of time.

One of the underlying assumptions in the project design is that INRA can expeditiously provide an adequate number of participant trainees for both PhD and MS level programs with course work and some research training conducted in the U.S. The thesis research and granting of the appropriate degree would occur in Morocco. The INAV is to provide thesis advisors who would oversee the research jointly planned with the assistance of MIAC team staff and the students' U.S. academic advisors. The degrees upon satisfactory completion would be granted by INAV. To date INRA has not been able to identify on a timely basis the projected number of MS and PhD candidates that meet both U.S. and INAV requirements. The majority of MS and some PhD candidates accepted by U.S. universities have not met the requirements of INAV. It is still unresolved whether some, none or all the participant trainees will receive their degrees through INAV. A decision on this is needed urgently as it has a major impact on how those abroad will be handled. The first participant has already returned and an increasing number will follow.

#### INPUTS

Currently, the U.S. technical assistance field team consists of an agronomist, a soils scientist, and a water management specialist. In CY 1982, additional locally-hired services of a U.S. plant breeder and an agricultural equipment specialist were contracted by the USAID under PSC's. These are presently additions to the MIAC team. They are assisted by two INRA agronomists and a technician, as well as the INRA station directors and support staff of cooperating research stations. Administrative support is received from the Settat Regional Stations Director, also currently serving as Director of the National Aridoculture Center, and the INRA Director in Rabat.

MIAC has used the expertise of some faculty members, and some personnel from other universities, in winter rainfall dryland agriculture. The first team leader, for example, was from Washington State University. However, where possible through choice of expertise for TDYs or for long-term field positions, MIAC should be encouraged to continue to seek out such expertise wherever it can be found.

In some cases, participant trainees may be better served by being placed in non-MIAC institutions if more relevant training is available in these institutions in their respective fields. This has already been taken into account in the case of one trainee who is at Washington State University. MIAC should be commended for having taken the lead in this effort, and should be encouraged to continue this approach where it is desirable.

#### GOM/INRA

Inadequate travel capability of the INRA staff in Rabat and limited INRA staff so far in place at Settât have made it very difficult to develop close working relationships between MIAC and INRA. This has inhibited continued development of a long-range dryland agriculture research plan and limits joint development of annual work plans. The area of greatest interaction and mutual dependence between the Rabat staff of INRA and the MIAC/INRA project in Settât is in cereal breeding and variety testing. It is therefore recommended that a senior cereal breeder be added to project 0136 and stationed at INRA headquarters in Rabat. This senior scientist would act as an advisor to the Director of INRA on cereal improvement and form a day-to-day link between the MIAC/INRA project in Settât and the INRA Director.

1. Aridoculture Center, Settât. Initial project documents indicate that the research under the project will be based at the INRA station at Sidi El Aidi. However, a multi-lateral decision was later made to develop a more ambitious new facility just south of Settât, to be designated the INRA National Aridoculture Center, Settât. This Center has been partially constructed on a tract of about 25 hectares of rolling terrain with soils seriously lacking in uniformity, about five km southwest of Settât. Project documentation has been amended to describe the role of Sidi El Aidi as a satellite research station and the Aridoculture Center as the headquarters for the project. The site of the Center presents a series of problems which raise fundamental questions about its long-term viability as a major headquarters for research on low-rainfall agriculture in Morocco.

The Center is located on a site which is too small and lacks soil uniformity for applied field research purposes. Surveys of soils in the vicinity indicate lack of potential sites suitable for research purposes that are sufficiently nearby. Thus, it is likely that the Center can best be used as a laboratory, conference, and housing complex. The city of Settât lacks the amenities of hotels, restaurants, entertainment, social, cultural and educational facilities necessary to attract and retain the type of staff being trained as participants under the project.

2. Satellite Stations. As of the evaluation team's visit, decisions about the choice of suitable satellite research stations to be used for applied agronomic research under the project were still pending. Whichever stations are eventually chosen should have, or be provided with, appropriate facilities, including research facilities and living accommodation. They should all have at least limited irrigation facilities to ensure seed increase potential. The GOM, through INRA, is a key actor in making and implementing these decisions, and funds are one of several constraints. The high altitude station at Anaseur is, for example, currently inoperative, and is essential to activities under the proposed Project 0170.

3. Rain Simulation Facility. MIAC and the GOM are aware that, given local weather conditions in the project area, and especially the last three years of severe drought, it is necessary to include, under the project, provision for a rain simulation facility. This was also recommended in the report of a recent MIAC TDY expert. To date, irrigation pipe has been purchased for installation at Sidi El Aidi Station, and the intention is to install a sprinkler irrigation system. It may eventually also be decided to include as one of the satellite stations under the project the station at Tassaout, near Marrakesh, which has ample irrigation facilities.

#### COMMODITIES

1. Field Equipment. Procurement of field equipment appropriate to the needs of dryland research has been slow, and much of that originally procured by the USAID could have been better from a selection standpoint. Most of this equipment was more appropriate for commercial farming than for research. In the future, equipment delivery should be expedited, and greater care exercised to investigate the types of equipment to be procured to make sure that they have been tested and proved under dryland research conditions. MIAC has already sent team members on TDY to Lincoln to help in elaborating specifications for equipment to be purchased, to complement expertise available at MIAC/Lincoln.

2. Laboratory Equipment. The situation with regard to laboratory equipment has recently improved. The arrival of the soil scientist, who has considerable expertise in this area, has facilitated progress under the project. Where resident competence has not been available in Settat or through MIAC/Lincoln, TDY assistance has been sought by MIAC to provide such expertise when needed.

#### RECOMMENDATIONS

##### A. Agronomic Research Component

1. INRA Recurrent Budget. The AID-financed contractor has been placed under pressure by counterpart INRA staff to provide or loan operating funds to permit vehicle operation, per diem expenditures for in-country project travel, etc. This has created problems covered in the audit report, but the basic, underlying difficulty has not yet been resolved. If the project is to function, counterpart requirements must be met by the GOM.

In the project paper under D. Budget Plan and Analysis, item 3, the following statement is found: "DRA (now INRA) has also pointed out that funds allocated to project activities are sometimes not available when

needed due to a complex set of disbursement requirements. We therefore plan to negotiate a provision, also to be included in the Project Agreement, by which the GOM guarantees that operating funds will be made available when needed, preferably via the creation of a 'Special Account!.' The GOM did guarantee this as a CP for the first three years of the project. However, this is again a problem, and should be addressed by the Mission as soon as possible.

2. Host Country Counterparts. The inability of host country governments to identify adequate numbers of participant trainees on a timely basis is a common problem in donor-supported research projects in developing countries. This leads to situations in which the TA team operates without counterparts during most of their stay in-country, which in turn minimizes their effectiveness as trainers. The project design for this project intended to minimize this problem by having trainees carry out their thesis/dissertation work in Morocco, thus minimizing the duration of their stays in the U.S. The level of slippage in GOM adhering to this plan is such that there will still be some problems in spite of the design.

In other countries, considerable success in partially overcoming this problem has been achieved in similar projects by having the host government assign at least two carefully-selected young graduates of either two- or four-year post-secondary agricultural schools for each TA team member. With direct supervision from the TA team member, they often become very competent professional research assistants. They can provide high-quality support over the long term once the participant trainees return. They also form a pool of potential future participant trainees. It is recommended that this be tried as a means of increasing the efficiency of this project and reducing the impact of GOM slippage in the selection and nomination of participant trainees.

3. Short-term Training. Some short-term training has been offered to GOM counterparts under this project to date. Appropriate U.S. and third-country short-term training opportunities are not in short supply, and in some cases, may be as useful in the short-term as the suggestion made above (2) or as a complement to it. It is recommended that the MIAC team and the relevant INRA staff, with the USAID, more clearly define a plan for short-term training under this project.

4. Intra-INRA Relationships and Management. The present Aridoculture Center Director is also the INRA Regional Director. His responsibilities cover a variety of INRA research stations and activities outside the purview of the Center. This puts the Center on an administrative par with a variety of other INRA activities in the region, whether this is the intention or not. It would appear that the level of effort involved in running the Aridoculture Center justifies the establishment of a separate position of Director for the Center, directly responsible to the INRA Director. This would prevent the Center's activities from being constrained geographically to the area under the Regional Director, and prevent them from being given inadequate or variable administrative attention on a day-to-day basis, while assuring adequate access to national-level management.

It is thus recommended that a separate position of Director, Aridoculture Center be established, and filled by the first available returning PhD-level participant trainee.

5. Allocation of Project Vehicles. Adequate transport for both equipment and personnel is vital to the success of an agricultural research program. Since the needs of various scientific staff tend to peak at the same time, and timeliness is essential to research usefulness, the level and diversity of vehicle needs must be adequately accommodated, or large amounts of time and money will be wasted. It is recommended that the needs projected to accommodate the staff increases which are proposed below be carefully planned, and the allocation of procurement between AID and the GOM be decided. Early procurement should be initiated to forestall shortages. The current vehicle pool has major deficiencies that need urgent resolution. The system for motor pool management on the part of the GOM and the contractor should be reviewed at the earliest possible date.

6. Documentation and Library. In some respects, the technical performance of the project has been hampered by lack of access to appropriate documentation. Early attention is needed to acquire adequate documentation to overcome this handicap. Many pertinent publications are available through AID/S&T/DIU, FAO and the International Research Centers. The documentation most pertinent to winter rainfall dryland agriculture has been developed into a retrieval system under an AID grant to Oregon State University. It is recommended that MIAC/Lincoln use these sources and access the various data bases such as CRIS, CARIS, BEMIS, et., to build a priority acquisition list in consultation with the MIAC team in Settat. The amount budgeted for this purpose would appear to be inadequate, and should be reviewed.

7. Satellite Stations. Once a decision has been finalized among the contractor, the GOM and the USAID as to the selection of satellite stations, these should be provided with necessary power, telephone, implement storage, repair shop facilities, chemical, seed, fertilizer and small supply storage, threshing, cleaning and drying facilities, and an adequate guest house. They should have appropriate irrigation facilities.

One satellite station which should be included under the project is the high altitude research station at Anaseur. This is the only such station in North Africa, and is presently inoperative due to lack of operating funds and funds for repair of a key well. In order that seed multiplication for new varieties of barley and wheat can be accelerated, this station is of quintessential importance. In turn, such acceleration is of prime importance in the context of the extension/production activities proposed under the new Rainfed Agriculture Project (608-0170), which is designed to complement agronomic and socioeconomic research activities under this project. Required funds for the renovation of this station, as well as for upgrading facilities at other chosen satellite stations should be provided from local currency generations from the sale of PL480 grain if at all possible, and construction/renovation should take place as soon as possible.

8. Attractiveness of Center to Moroccan Researchers and Expatriate Contract Personnel. Given the discussion above of the inadequacy of the site of the Center south of Settat as a field research station, but its adequacy for laboratories, conferences, and offices, it is recommended that the remaining buildings be completed with this in mind, and additional buildings be constructed to complement those already planned. It is further recommended that the whole issue of providing facilities and amenities such that Moroccan INRA staff and expatriate staff--and their families-- will be attracted to come to, and remain at, the Center, be explored with the GOM, and agreement reached to invest substantial additional funds. These would cover the establishment of adequate quality housing, hostels, and facilities for sports, recreation, entertainment, nursery facilities for small children of working mothers, commissary, and/or transport facilities to the city. This would produce a research community similar to the International Centers or some of the major national centers in other countries that provide an attractive environment for research staff and their families.

9. Housing Availability in Settat. The long-term problem has been discussed under recommendation (2) above. In the short term, however, there is a lack of satisfactory housing available in Settat to accommodate potential project expansion and/or returning participants. A solution to this problem both in the short term and the long term is required. It is recommended that the Contractor, GOM and USAID meet as soon as possible to resolve this problem.

10. Inadequate GOM Per Diem Allowances. The GOM per diem allowance for food and lodging is currently 50 Dirhams per day. This is inadequate to permit the participant trainees and INRA counterpart staff to accompany Contract team personnel on field visits, including to satellite stations on anything approaching an equal basis. In addition, even this per diem is often forthcoming only after severe delays. Even where it is a question of Moroccan staff traveling without expatriate staff, the present per diem rates are not high enough to allow for appropriate food and lodging given the locations to which this travel is usually required. It is recommended that the following solutions be considered and discussed by the parties concerned: a) get a special per diem agreement for INRA project staff; b) provide guest house and meals for satellite station locations or allocate a per diem allowance as part of the participants' training programs until their theses/dissertations are accepted. This latter solution would still not resolve the problem encountered in this regard by non-participants INRA staff. It might serve as an interim solution until guest house facilities could be established, however.

## B. Socioeconomic Research Component

1. Extension of Studies in Haute Chaouia. Results obtained from the 51-Farm Study and the Souk Price Study in the Haute Chaouia area have been sufficiently significant that it is recommended that these studies be extended. Unfortunately, funding constraints and delays in the data analysis phase have precluded the continuation of these studies during the 1982-83 agricultural cycle, although some impressionistic data have been collected in the course of analysis. It is recommended that, as of September, 1984, these two studies be continued, under the supervision of full-time and contract researchers at INAV's Development Directorate (INAV/DD).

2. Development of an Agriculture Information Resource Center.

INAV has proposed to the USAID for over a year, the creation of an Agriculture Information Resource Center in Settat. This center would, in the first phase, gather micro-climatological data, price data, data on availability and prices of inputs, and other key information of use to extension/production personnel of the GOM in the area, and to farmers. These data would be summarized and released in the form of an agriculture information bulletin on a bi-weekly or bi-monthly basis. During this phase, the bulletin would be made available to the contract team and INRA staff, and to staffs of the DPA and CTs.

Under a second phase, the bulletin would be modified, and, together with radio spots and other extension media, make available to farmers in the project zone, up-to-date information on these topics to assist them in making timely management decisions at key points during the cropping cycle. Funding for the creation and operation of this center would include salaries for 3 contract Moroccan researchers, some commodities, including construction of a small building, and some travel allowances for interviewers and researchers. These researchers would also supervise the continuation of the 51-Farm and Souk Price Studies in the area.

3. Further Micro-Level Studies. At present, items 1 and 2 above appear likely to provide sufficient cross-sectional baseline data to meet the immediate needs of the agronomic research team, and also their needs in the medium term if the project is extended to include other socio-ecological areas. If this project is expanded geographically to include a much different zone--i.e., the favorable rainfed region-- then further baseline data of this kind will be needed.

4. Thesis Research and Special Studies. For both the purposes of institution building and provision of appropriate sub-regional level data for agronomic research priority formulation--as well as for baseline data for Project 0170 extension/production activities-- it is desirable to continue to fund some M.S. thesis research and thesis preparation, as well as particular special studies. Care, however, should be taken to ensure that timeliness requirements for research planning and extension design purposes are respected in allocating topics between thesis research and special studies which will be carried out by senior researchers. There remain a variety of social and institutional questions which need to be answered about small and medium farmers and farm communities in the project area, both for the planning of agronomic research and as background to the proposed extension/production activities under Project 0170. It is anticipated that further topics will emerge as these two processes continue to develop over the life of the project. To date, an illustrative list of topics includes:

- The farm household decision-making process and the role of various household members in it (e.g., production, consumption, savings, and investment decisions);

- The woman's role in farm production and other income generating activities, as well as in household decision-making;

- Informal/formal credit systems as related to production and investment credit (e.g., sources, rates of interest by source, access to various sources, consumer preferences, transaction costs, rates of repayment by source);

- Input distribution/utilization and access channels (e.g., by farm type, and by land tenure situation);

- Changes in food consumption patterns and composition of farm diets by size of farm and income group (this would amplify the results of a study already completed);

- Farmer interaction with the formal extension service and other means of exposure to innovative information, i.e., whom do small-scale farmers emulate, and under what conditions;

- Impact of formal education on farm family size, farm production decisions by farm size, land tenure arrangements;

- The role of local/regional "notables" as a conduit/constraint to information dissemination, land brokerage, credit brokerage and access to means of production.

Given the importance of the socioeconomic work in terms of making a significant impact on the potential success on the overall project, and of its linkage to activities under Project 0170, it is recommended that INAV/DHS and/or Direction de Developpement would benefit greatly from carefully-structured U.S. technical assistance under this project. The role of the proposed U.S. rural sociologist would include provision of such assistance to the Institute, as well as activities in the field at the project site.

5. Student Stages. The stage system is an integral part of the training of all students at INAV, and is now run by a separate Department. These stages provide a wealth of data on the basis of which it is possible to design special studies to be carried out later by more senior students, contract researchers, and INAV faculty. The main constraint to date has been the lack of financial resources at INAV to carry out sufficient and timely analysis of these data. It is recommended, therefore, that under the expansion of the socioeconomic studies component of this project, funding be provided for non-salary costs of stages for one year in a mutually agreed-upon area of the project zone, and for subsequent data analysis to be carried out by contract researchers.

### C. Overall Recommendation

1. It is recommended that this project be extended by amending the existing Project Paper. Specific recommendations for inclusion in such an amendment are provided in the Special Comments/Remarks Section below.

## OUTPUTS

### A. Planned Outputs

1. Improved Technology
2. Trained Moroccan scientists and technicians
3. Relevant baseline data from the socioeconomic research
4. Analytical report on dryland mechanization

### B. Actual Outputs

#### 1. Agronomic Research

a. Crop Year 1981-82: The project conducted a rather extensive set of both on and off station trails during the 1981-82 crop season. These involved tests of varieties, fertilizer interaction, seeding methods, tillage and rotation trials and weed control. Unfortunately, data obtained were of limited usefulness due to crop failure throughout the zone following severe drought. Some valuable observations were possible, however, from the limited research results as assessed by the MIAC Team and by TDY consultants. These are summarized as follows:

(1) Control of weeds gave one of the most notable improvements in crop response.

(2) There was limited response to fertilizer, but evidence of improved growth from phosphorous.

(3) Events that had increased soil moisture storage during the prior year (leaks in irrigation pipe crossing the plot area) resulted in significant crop development that indicates the soils of this zone can store significant amounts of moisture that is then utilized by the succeeding crop.

(4) Disease problems are of major importance.

(5) Birds are a serious limiting factor in obtaining reliable yield results in small-scale trials.

(6) Research station management must be improved in order to reduce error factors and upgrade the reliability of data generated in on-station trials.

b. Crop Year 1982-83: The project reduced the number of locations used on experiment stations and for on-farm trials to provide greater attention to detail and quality of research. Although research data from yields are yet to be completed, observations would indicated severe drought has again severely curtailed measurable results. In most locations any yield data will be meaningless due to these climatic conditions. This would be obviated in subsequent years by the establishment of the rain simulation facility.

Some additional observations provide guidance for future follow up research. These are summarized:

(1) Wider row spacing reduced the impact of drought on yield reduction.

(2) Variety trials of vetches and peas for fodder sown both alone and with the various cereals indicated wide differences in drought tolerance.

(3) The addition of small measured increments of moisture prior to seeding gave large increases in crop growth. This gives further indication of moisture storage capacity of soils in this zone. It also gives a demonstration of the need for a rain simulation facility.

(4) Rotation trials indicated enough moisture storage under plow-type fallow to increase yield. This further indicates that research on various types of summer fallow justifies considerable efforts.

(5) Although fertility trials did not give evidence of significant differences in grain yields under the drought conditions, improved fertility was an important factor in plants overcoming damage from diseases and at least surviving. This could be of considerable importance where moisture is adequate for the improved plant survival to be translated in grain yield.

(6) There was indication that phosphorous placed in the seed zone is more effective than when broadcast as practiced by the farmers.

(7) Hessian fly can be a major insect pest in the project zone.

## 2. Socioeconomic Research

The Ministry of Agriculture, in keeping with standard practices, utilized its semi-autonomous relationships with INAV/DHS to implement the socioeconomic studies under the Project. Although U.S. TA was contemplated in the original Project Paper none was initially provided, partially due to the perceived competence of INAV/DHS to conduct agriculture-related socioeconomic research. Once the funds were made available to INAV/DHS from MARA, the program of work was initiated. The grant agreement stipulates that the geographic location(s) and type(s) of research conducted will be selected and developed on the basis of compatibility with work conducted under the agronomic research program of INRA to maximize the utility of the information flowing from this research.

An objective of the socioeconomic research component was to develop a more detailed understanding of the technical and economic factors which affect decision-making by farmers under varying perceptions of risk, and the key aspects of the social environment in which these decisions are made. Risk assessment is considered a crucial factor in the farmers' decision to adopt new/improved cultural practices and techniques under semi-arid conditions. This work is being undertaken in an attempt to ensure that the innovations and subsequent recommendations flowing from the agronomic research will be compatible with existing farming systems and non-technical constraints facing the small-scale producer.

A second objective of the program is to increase the capability of INAV/DHS researchers to apply more rigorous quantitative analytical methods to the process of data analysis. Further, this project seeks to strengthen the working relationships between social scientists (INAV/DHS) and those in the biological, agronomic and engineering sciences (INRA) to: further encourage multidisciplinary problem identification, research design, and quantification of production coefficients and constraints. In this way the project seeks to introduce and institutionalize an improved scientific research method within the Institute. It is anticipated that research results will be produced which

more nearly reflect on-farm conditions to assist other scientists, government officials and extension workers in the selection of appropriate technologies for small-scale producers under semi-arid conditions.

Implementation of the socioeconomic studies component of the Project by INAV/DHS began substantially before implementation of the agronomic applied research component. Funding for the socioeconomic component initially came from a prior project (608-0134). The socioeconomic research component was implemented in two phases. In Phase I, a substantial number of Third Cycle M.S. theses was prepared, covering a variety of topics which were identified as providing requisite background information for the subsequent project-specific studies carried out in the next phase. Topics included soil classification, food consumption, wages and employment, evolution of farm size, and the impact of mechanization.

In addition, a number of INAV student stages, during which students gather data about farm-level agricultural variables in the field, were partially funded under this first phase. The resultant stage reports cover a variety of topics, including the evolution of cooperatives in the agrarian reform sector, labor costs by farm type, contributions of various sub-regions to the regional herd.

Under Phase II, work began on a survey of 1079 farm households in the project zone, providing the basis for sample selection of a smaller number of farms of various types which would be the object of a long-term, cross-sectional study of farming systems in the area. The final 51-farm sample then provided the basis for a study carried out over one and one-half years, exploring a number of dimensions of the farming system. Farms included in the sample were representative of 19 farm types drawn from 8 groups. A concomitant study of price fluctuations for key commodities was carried out at six souks (markets) in the project area. Data from these two long-term studies have partially been analyzed, and several reports have been submitted to USAID. Analysis of the remaining data is on-going.

In all, although there have been some questions raised by the USAID as to the methodologies involved in data collection and analysis under the socioeconomic studies component, and although some topics which were originally envisaged have been covered less thoroughly than was anticipated, the outputs of this component have been extremely valuable. Their value, however, will be substantially enhanced if and when the agronomic research team makes more use of them in planning its research.

### 3. Strengthening INRA and INAV Hassan II - Institution Building

It is clear that the implementation of the socioeconomic studies component of this project has had a distinct and beneficial impact on the DHS at INAV, which has been responsible for the design and implementation of the component. Institution building has taken place in the areas of student stage training, report writing, thesis research and thesis preparation, the design and implementation of special studies, and the organization and planning of socioeconomic research.

However, whether this, in turn, has had the desired institution building impact on INRA that was originally foreseen is dubious. The INRA Director has, during the life of the project, taken a decision to depend entirely on the Institute for the design and implementation of socioeconomic research. This has meant that, rather than the anticipated result of integration of socioeconomic and agronomic research being forthcoming, the pre-project separation of these respective research domains has been maintained. This separation has, in turn, been exacerbated by the MIAC contract team's failure to make significant effort to integrate results of the socioeconomic research component into their decision-making and research planning process. The fact that they have probably not been encouraged to do so by the INRA Director is not sufficient extenuation; a key part of technical assistance is the education of host country counterparts as to the state of the art in the country of origin of the technical assistance team. While coordination of agronomic and socioeconomic research in the U.S agricultural community often leaves a great deal to be desired, it is particularly ironic that MIAC, through its original study team, had the foresight to include the basis for such coordination under the project, only to have its implementation team ignore what had been put in place.

The present MIAC team leader, and at least some other members of the team, are demonstrating more interest in the results of the socioeconomic research component, and are likely to utilize these results increasingly as their French language proficiency improves, and as they begin to come more effectively to grips with the joint research planning process which is required with INRA staff counterparts if the project is to achieve its technical assistance goals. It is to be hoped that under the proposed project expansion, further strides will be taken in this direction

On the agronomic side, institution building has been severely hampered to date by the limited INRA staff assigned to Settat and lack of transportation available to the staff of INRA/Rabat. Frequent interaction and institution building has resulted in the cereal breeding area of both INRA and INAV due to the efforts of the project cereal variety testing specialist.

#### 4. Training

a. Long-Term Participant Training: The project as amended provides for U.S. training for 25 participants; 15 at the PhD level and 10 at the MS level. The first three (2 PhD and one MS) departed for the U.S. in 1980, and the first returned in 1983. In addition two at the PhD level departed in 1982. So far six have departed in 1983, five of whom are at PhD level. Eight additional participants are in language training and awaiting acceptance by U.S. institutions. Three of these have been rejected by MIAC, (2 MS and one PhD) and will need to be replaced.

b. Short-Term Training: So far, ten short-term trainees have been sent overseas for six months or less. These included a cereal breeder and a plant pathologist sent to the CIMMYT Wheat Breeding Course in Mexico in 1980. Two were sent for plant protection training in the U.S. in 1979. Two trainees participated in the Kansas State University Grain marketing, Storage and Handling Course in 1982 and one trainee in maize breeding was sent to CIMMYT. During 1983, two trainees were sent for training in soil analysis in the U.S. and one on Research Station Management to CIMMYT.

## 5. Other Outputs

a. Agricultural Equipment Study, February 1983: This report written by Grant Scott covers field studies and interviews conducted during 1982 when he was interim MIAC Team Leader. It evaluates equipment availability, dealerships, service and maintenance facilities, farmer utilization economics. The originally planned depth of the report was lessened by the failure of the GOM to give required permission to interview farmers. Some of this was overcome through discussion of information obtained by the INAV socioeconomic research team.

b. Annual Project Reports and Seminars: The project has summarized its progress in annual report form and implemented an annual Research Seminar including INRA, INAV, etc. The first seminar was held in December 1980, and the second in April, 1983.

### SPECIAL COMMENTS/REMARKS

#### A. Findings

1. The basic goal, and project purpose established in the original project paper is still valid, but some of the important assumptions will need to be reexamined in light of past experience and current conditions.
2. The needs the project is designed to fulfill are of increasing importance because a growing food deficit is causing a steady increase in import requirements at a time when the balance of payment deficits have widened due to the impact of world-wide recession and rapid population increase.
3. The output of this project is an important element for the success of Project 608-0170, Rainfed Agriculture, which is under design as one of the key elements in implementing the AID Agricultural Sector Country Development Strategy.
4. In order for project 608-0136 to overcome past delays and original under-estimation of the magnitude of resources required to accomplish the project purpose, a major amendment of this Project Paper is required.
5. Accepting the validity of the general approach suggested in the original Project Paper and its amendment, current urgencies, past inadequacies and present circumstances make it highly desirable to propose major revisions in the Project Paper so it can adequately support the needs outlined in the design of Project 608-0170. Project 0136 should be contributory to and closely coordinated with the farming system extension / production component being designed under project 608-0170 and to the extent feasible, these two projects should either have common management or intimate coordination. The research and extension element of these two projects should form the basis of a long-term farming systems approach to research and extension which acts as a bridge between the research and extension organizational structures of the Ministry of Agriculture and Agrarian Reform (MARA).

6. A number of the activities of the Range Management Project 608-0145 are directly contributory to both projects 608-0170 and 608-0136. This is especially true for the Plant Materials Center and the testing of forages introduced through this center on the various range perimeters. These should provide both information and a seed source for experimental and future commercial forage seed to support the forage research and follow-up extension activities proposed. The socioeconomic studies and methodology used under projects 0145 and 0136 should be of mutual interest and more exchange of information between the two projects encouraged. The Range Management Project staff are increasingly interested in integration of the dryland agricultural activities and crop residues into a range management system. This indicates that more direct linkage between these projects that fall under different MARA organizational structures should be studied by the mid-project evaluations team scheduled to evaluate project 0145 in late 1983.

7. The experience gained to date and the evidence of improved project management both on site and by MIAC/Lincoln might justify continuation of the same contractor under an amended project paper that greatly increases the funds allocated and the time frame of the project. Since there are still deficiencies in contractor technical performance outlined in this report, close monitoring should be given to insure continued rapid improvement in performance.

8. The current performance by the GOM in providing timely identification of participant trainees, resolution of problems of where degrees of trainees will be granted, provision of adequate support staff, release of recurrent budget allocations and capital funds is inadequate. Assurance of overcoming these deficiencies in a timely manner should be prerequisite to allocation of the increased funding level proposed through revisions in project 0136 and new activities of a related nature proposed under project 0170.

## B. Technical, Programmatic and Procedural Recommendations

1. Cereal production agronomy. In the initial work, inadequate attention was paid to the large volume of experience developed in winter rainfall dryland farming from AID projects in Turkey, Jordan and Tunisia and extensive work in the Western United States and Australia. The TA short-term TDY report of Gary Peterson and Don Sanders dated April 5, 1983 does an excellent job of highlighting these deficiencies and gives the necessary specific recommendations to develop a more relevant and better focused program. These should be used as the basis for future planning.

2. Cereal improvement. The project needs in this area are dependent on the cereal breeding programs headquartered in Rabat under both INRA and INAV. These need to have a direct link to Project 0136 which should test advanced breeding lines. This is currently being handled on an ad hoc basis by the variety testing specialist of the project. The quality of the national program is a determining factor as to whether major variety improvement will occur. Recommendation has been made that the project be increased to allow a long-term TA senior cereal breeder/advisor to be stationed with the Director of INRA. The project 0136 variety testing specialist at Settat should concentrate on testing the material from the national program under the simulated rainfall facility recommended and link results into on-farm demonstrations for the material designated for seed increase as a prerequisite to release. With significant

assistance of this project six new cereal varieties developed by INAV and INRA are being released for this purpose (three barley, 2 Duram and 1 bread wheat varieties).

3. Soils and Soil Fertility. First priority should be devoted to getting an operative soils laboratory underway. Second, but high priority should be given to developing response data for crops under different levels of fertility and soil moisture on major soil types. The procedures for this work is adequately outlined in MIAC reports. When the pulse legume and forage/fodder programs become operative, special attention needs to be focused on minor element deficiencies and biological nitrogen fixation. In addition, a comprehensive field research program on subsurface nitrogen application should be initiated. In years of low rainfall, nitrogen applied at seeding time may cause a negative response. The solution used in other areas has been to use a small amount of starter nitrogen at seeding time and then at the latest date at which full response is possible to apply subsurface the amount the crop can utilize based on the amount of soil moisture and residual nitrogen available. Sub surface application equipment has been on site for two years without being used.
4. Pulse Legumes. These are important crops for both crop rotation and as cash crops in the dryland farming system. Assistance and training available through the International Agricultural Research Center Network should be called on for backstopping the pulse program. The resources of AID centrally-funded projects should be used to enhance the nitrogen fixation potential of pulse crops.
5. Forage Crops. This program should be carefully coordinated with the Plant Materials Center developed under the Range Management Project 0145 and the work by this project on various perimeters. It should also request assistance from the previously-referenced, centrally-funded AID resources on biological nitrogen fixation. A close liaison needs to be maintained with the German (GTZ) forage crop assistance project.
6. Equipment/Tillage. This is such an important component it should be supported by adding a long term TA staff position. This will require adequate backstopping with support staff and shop facilities.
7. Weed Control. This has proven to be one of the major limiting factors to crop productivity in dryland winter rainfall areas and is amenable to rapid improvements at the farm level. The weed problems in Morocco are both serious and diverse and will require a continuing major research program. This should be implemented at the earliest time possible. One MS level returnee is already available. The AID mission should encourage and arrange for assistance from S&T Project 931026, Weed Control Utilization since adequately trained TA staff are not available for this purpose.
8. Crop Protection. The pest and disease problems appear to be much greater limiting factors to dryland cropping in Morocco than the level of effort in project 0136 would indicate. It is recommended that a major effort be initiated to develop a pest and disease crop loss assessment program. This will require additional long term TA assistance. The original plan to include a vertebrate pest control program in the participant training component was

dropped. This is deemed a serious mistake and should re-evaluated. Bird and rodent damage also appear to be severe.

9. Agricultural economics. This should be an integral part of the planning and evaluation of all the field programs of the Center. It is therefore strongly recommended that this component be developed by the addition of a long-term TA position.

10. Research procedures. Due to inherent variability of soils, residual effects of previous experimental trials and the long-term nature of tillage/fallow and crop rotation work, U.S. experience gained in experiment station management, research methodology and plot layout should be better utilized. TDY assistance may be desirable to provide help with these problems.

11. Use of AID centrally-funded S&T projects. The USAID has failed to include budget provisions required by, and assist the contractor in access of, experience available under centrally-funded projects. This should be rectified as soon as possible. Projects of significant importance are as follows:

Project Number: 931-026 Weed Control Utilization  
931-0613 Nitrogen Fixation (symbiotic) NIFTAL  
031-0829 Plant and Seed Materials (USDA)  
936-4120 Pre/Post Harvest Rodent and Bird Control  
931-0930 Pest Management/Environmental Protection  
936-4135 Dryland Management Synthesis  
931-1229 Soil Management Support Services  
936-4099 Farming Systems Support

C. Amendment of Project 0136 - Evaluation Team Recommendations

1. Timeframe. The increased need for this project as a basic support element for project 0170 has already been addressed. In reality, the project is only now in a position to move ahead with reasonable assurance of significant accomplishment. It is, therefore, recommended that it be extended until September, 1987, and closely coordinated with the extension/production component of project 0170 to form a farming systems research/extension/production activity. This should be tested as a pilot model to determine its broader applicability as a means of coordination for research and extension at the national level.

2. Allocation of Additional Funding.

a. Long-term TA-Morocco

Senior Cereal Breeder/Advisor to INRA/Rabat  
Equipment Systems Specialist  
Forage Specialist  
Pest Management/Crop Loss Assessment Specialist  
Soil/Water Management Specialist  
Rural Sociologist  
Production Economist (local hire)  
Livestock/Forage/Feed Specialist (local hire)

b. MIAC/Lincoln

Expand administrative and technical backstopping capability

c. Peace Corps

1 Agricultural Data Management Specialist  
4 Equipment Repair Shop Support Staff

d. Funding to INAV for the Socioeconomic Research Component

Estimated 4 year cost is \$600,000

e. Participant Trainees

Increase total to 18 MS and 21 PhD

f. Additional Reference Library Acquisitions

Estimated 5 year cost is \$275,000

g. Commodities

To be detailed in Amendment 3

h. Estimated Total Additions - \$18,100,000

3. Use of PL-480 Title I Local Currency Generations

- a. Completion of research facilities, Settat
- b. Provision of housing, family support facilities, and hostel/conference center, Settat
- c. Research support facilities and hostel at each satellite research station.
- d. Structures to house pilot Agricultural Information Resource Center
- e. Renovation of High Altitude Research Station, Anaseur

D. Other Recommendations/Remarks

1. Management

USAID/Rabat. The Mission is in a much better position than the contractor team leader to deal with performance deficiencies by the GOM. As a result, there needs to be more interaction with the team leader and aggressive follow-up by USAID/Rabat in these areas. A number of rather basic issues detailed in this report have been allowed to develop or go unresolved for an intolerable length of time. The deficiencies of past Mission monitoring of the contractor and aggressive pursuit of remedies are partly responsible for the low level of accomplishment to date under this project. It is, therefore, recommended that the key personnel of the Food and Agriculture Division of the USAID visit the project site more frequently, interact with both the team leader and the project staff, and make more expeditious efforts to resolve problems best handled by the Mission.

The project officer, despite a high work load, should be allowed and encouraged to review his projects on site more often. The Mission should assist the contractor in use of the large, relevant, centrally-funded AID resource base and to interact with nearly identical AID projects in Tunisia, use the experience base developed by past projects in Turkey, and Jordan, and to interact with relevant International Research Centers.

There have been recent changes in the management of MIAC/Lincoln and of the Consortium itself. There is evidence this will bring increasing improvement in MIAC management of this project. Regular telephone communication, only recently possible, has also expedited matters. There are still delays by MIAC/Lincoln apparently due to excessive work load in relation to staffing. There has been minimal technical backstopping, probably as a result of this situation.

## 2. Procurement

In the past, there have been both delays and inadequate effort to insure choice of the most appropriate commodities, and priority on procurement and shipment. There are still evidences of deficiencies, but effort is being made to correct them. At present, the problem is inadequate funding to meet needs. These are largely for future requirements rather than delays hampering current activities, however. Improper separation of commodities and operational expenses in the past has complicated the situation. These accounting problems are being resolved.

## 3. Ordering and Documentation

Inadequate secretarial and support staff in Settat have handicapped expeditious handling. New staff undergoing training should soon correct these problems.

## 4. Customs Clearance

This has been handled satisfactorily in the past, but recent personnel changes may hamper this process, at least temporarily.

## 5. Beneficiaries

The original MIAC Dryland Agriculture Study Team produced an excellent beneficiary analysis, given sources then available, and the time allowed for report preparation. This is partly attributable to the expertise and experience of the senior sociologist on the team, from the University of Missouri. That beneficiary analysis was then incorporated in large part in the Project Paper.

However, although the socioeconomic studies component section of the MIAC Study Report was included in the project design and implementation, a key recommendation was somehow left out. This recommendation was that technical assistance be provided to the DHS, INAV Hassan II, from

a U.S. rural sociologist, who would assist the socioeconomic research team in the elaboration of appropriate methodologies. Such a TA specialist, had he or she been fielded, would probably have been able to ensure that the results of the socioeconomic studies carried out under the project would have been better integrated into the research agenda of the agronomic team members. His or her presence in country would have facilitated the USAID's monitoring the component effectively, and would have precluded the concerns on the part of the Mission which later arose as to the appropriateness of methodologies employed in analysis of research results under this component.

Since this was not provided for in the Project Paper, the USAID sought the services of a social scientist consultant from the U.S. to undertake an evaluation and synthesis of the research results generated under this component. This assessment, which took place over a period of four months in the Spring and Summer of 1982, led to a broader socioeconomic literature review, and to the preparation of a revised, and more complete, beneficiary analysis, based largely on the results of the socioeconomic component's work. This beneficiary analysis, A Beneficiary Profile of Haute Chaouia, has been provided to the MIAC contract team, and to the INAV researchers. It should serve as an annex to the proposed project amendment 3 for project 0136, and for the new Project Paper for project 0170.

No amount of pre-project beneficiary analysis, however, substitutes for attention to beneficiary impact during project implementation. It is this aspect which has suffered a certain amount of inattention due to the problems of coordination between the agronomic and socioeconomic research teams already discussed. However, the team varietal selection specialist should be commended in this connection for having designed a study of household consumer preferences for different characteristics of grain varieties, which was carried out by a Peace Corps volunteer in the project area. Given the orientation of the present MIAC team leader, and the proposed farming systems research/extension/production component of project 0170--as well as the proposed addition of a rural sociologist and an agricultural economist to the contract team--it is to be hoped that this situation will soon improve considerably.

#### LESSONS LEARNED

1. An important lesson may be identified as the rediscovery that American contractors, regardless of their qualifications and competence, unless they are long experienced in a particular country, will have a considerable period of learning and adjustment before they become very effective. The Mission must be prepared to give maximum support during this period of adjustment and mobilization, if consequent slippage is to be avoided.

2. In addition, the AID system has yet to adequately develop a method to keep both Missions and contractors aware of a rather substantial technical resource base financed by AID through the Bureau of Science and Technology. These projects have often been inadequately utilized in support of research projects and other science-related activities in the field. This has certainly been a serious failure of the AID system as it relates to this project. A variety of centrally-funded projects and the International Agricultural Research Centers could have provided significant relevant support, but were not utilized, due to lack of awareness by both the Mission and the contractor. This is a basic Mission responsibility.

3. A further related lesson is that AID has financed, and is financing, related projects in other countries in the region. The experience gained and interchange of information on past projects, and with on-going project personnel, is not built into the system and is not occurring. This causes an unnecessary amount of re-discovering that could readily be avoided.

4. No matter how carefully multidisciplinary activities may be built into a project design, it is essential that in the implementation stage, all concerned parties--including the host government institutions and the USAID--insure that the proposed multidisciplinary integration takes place. While activities of this kind are difficult in some U.S. environments, they may be even more difficult in those of many developing countries. However, part of the role of the technical assistance team should be to seek ways in which institutional and disciplinary boundaries can be breached where this is an important factor for project success.

5. The programming of participant trainees, and particularly, their integration into project activities on their return, is a complex and time-consuming matter, but one which is ultimately crucial to success in projects of this kind. How the duties of these trainees--when they are host government officials taken off the job for training--are to be met in their absence, is a continuing problem in such projects. The suggestions made in this report for ways in which their absence can be compensated for by the use of lesser-trained cadres who are supervised and trained on-the-job by the TA team, should be considered for other, similar projects. The suggestion that this, in turn, be complemented by carefully-designed short-term training programs for those who are left on project-related jobs, also holds good for most similar projects.

6. No matter how competent and well-managed a technical assistance team, if the host government counterpart institution does not have the financial and human resources--and the political will--required to implement the project, success will be impossible, or at best, reduced.

7. The use of the TDY approach to assess the qualifications of potential long-term TA project personnel--as well as to benefit from their expertise during the TDY--is a very helpful one for team member selection which has worked well in this project.

8. Selection of project equipment that will be appropriate, requires an understanding of local conditions and of the purposes for which the equipment will actually be used in that local setting. Additionally, equipment maintenance, which is often not provided for in AID projects of this kind, can be absolutely crucial to project performance, both of U.S. technical assistants and their host country counterparts.

9. To attract highly-skilled host country personnel, and competent expatriate technical assistants to remote areas, incentives must be provided on the professional and personal levels. This increasingly includes incentives for spouses of host country and expatriate project staffs, both those who are working and those who are not. This also applies to returning participant trainees, whose motivation to work at the project site is important both to the project and to their future utility to their institution and their country.

10. Contractors are not initially aware of the complicated AID procurement regulations, and this poses problems in implementation. Long-term project contractors should be enabled to participate in an orientation course under the auspices of AID/Washington before implementation begins. This would avoid subsequent wastage of time, effort and funds during project implementation.

11. The current AID requirement to "do more with less" often means that the project officer is unable to exercise competent technical and managerial oversight of his or her project, given increasing workloads. This includes the inability to visit the project field sites, assess the performance of project personnel and counterparts on a continuing basis, and help to solve problems as they arise and before they become serious constraints to project performance.

#### UNPLANNED EFFECTS

It is too early to determine what unplanned effects this project may have. This is a topic suitable for serious consideration in a post-project impact evaluation.

Scope of Work

- A. Determine the effectiveness of project activities toward achievement of project goal, purposes, and objectives as defined in amended Project Paper and ProAg.
- B. Report the degree of timely participation and resource allocation by responsible parties committed to the implementation of this project.
- C. Assess the contractor's compliance with AID Project Implementation and Management Regulations, in both the field and the home office.
- D. Appraise the progress of procurement of appropriate project commodities and evaluate the overall project procurement plan.
- E. Assess the project's participant training program progress, impact and examine linkages with appropriate institutions essential to achievement of project goals and objectives, i.e., INAV linkages to INRA, INRA/Rabat linkages to the Aridoculture Center in Settat, Aridoculture Center linkages with extension outreach institutions, i.e., GOM service centers, etc. Recommend specific action steps to improve working relationships.
- F. Analyze the progress to date of the Socioeconomic Research Component involving INAV. Of particular interest is whether socioeconomic research results and findings are being taken into account in planning and assessing the technical research program and workplans.
- G. Assess the overall capacity and effectiveness of INRA in carrying out rainfed agriculture research and make recommendations for improvement.
- H. Appraise the impact of the interventions by other donors on the achievement of Project Goal, Purpose and Objectives. Are other donor activities complementary? Are there opportunities for cooperation on technical or policy aspects?
- I. In view of the above, evaluate the adequacy of current project, resources, progress and viability; and review options for future of the project, including whether or not the project should be expanded as being proposed in Amendment 3.
- J. Review alternatives of integrating project 608-0136 into USAID's Rainfed Agriculture Cereals Production Program, including measures to establish or strengthen working and management relationships among INRA, and the GOM entities involved in Project 0170.

Persons Contacted During the EvaluationAID/Washington

Richard Cobb, Chief, NE/TECH/AD  
Robert Morrow, Economist, NE/TECH/AD  
Raymond Meyer, S&T  
James Walker, S&T  
Jack Robins, S&T

USAID/Rabat

Robert Chase, Mission Director  
Harry Petrequin, Deputy Director  
Arlan McSwain, Food and Agriculture Officer  
Doral Watts, Project Officer  
John Dorman, Agricultural Economist  
M'hamed Hanafi, Project Specialist  
William Erdahl, Program Officer  
Ursula Nadolny, Evaluation Officer

Other Donors

Khaled M. Abed, FAO, Country Representative  
M. Coloris, FAO, Chief of Party, Extension Project  
K. Jenzen, GTZ, German Technical Assistance  
P. Martini, FAO/MARA Cereal Plan Chief of Party

AID Contractor Staff

Darell Watts, Team Leader, Project 0136  
D.W. Bray, Project 0136  
Willa Finley, Project 0136  
Frederick Trough, Project 0136  
Wallace Swanson, Project 0136  
Mr. and Mrs. Gunar Mallor-McGrath, PCV's  
Roger Banner, Team Leader, Project 0145  
Richard Aro, Project 0145  
Carl Goebel, Project 0145  
Conception del Castillo, Project 0145  
John Harding, Project 0145  
Malcolm Purvis, Project 0160 - Minnesota  
Lyn Gallagher, Project 0160  
Donald Johnson, Project 0160

Government of Morocco

Faraj, H., Director of INRA  
Zouttane, M., Director of Aridoculture Center, Settati  
Rachdi, Y., Chief of Extension, DPA, Settati Province  
Azzouzi, M. Agronomist, DPA, Settati Province  
Nabil, A., Director, Centre de Travaux, Ben-Ahmed  
El Haimer, Director, DPA Settati Province  
Jiluli, M. Che de Station, Jemaa Shaim  
Hamdalah, Che de Station, Tessaout  
Sàsson, Albert, DPV  
Anshoum, M., DPV  
Firdawcy, L., INAV, Secretary General and Director of Instruction  
Bekkali, A., Director, INAV Hassan II  
Pascon, P., INAV Hassan II, Director, Development Direction  
Zagdouni, M. INAV Hassan II, Projet Chaouia  
Benatya, Y., INAV Hassan II, Projet Chaouia