

Proj. No 6080134-2
Pr PD-AAA-863-B1

84p.

9/15/75

HIGHER AGRICULTURAL EDUCATION

PROJECT

608-0134

6080134

HIGHER AGRICULTURAL EDUCATION

PROJECT PAPER

Page No.

I. <u>SUMMARY & RECOMMENDATIONS</u>	
A - Face Sheet Data	1
B - Recommendations	2
C - Summary Description of Project	2
D - Summary Findings	2
E - Project Issues	3
II. <u>PROJECT BACKGROUND & DETAILED DESCRIPTION</u>	
A - Project Background	6
1. Setting	6
2. Higher Agricultural Education System	7
3. Current U.S. Assistance	8
4. Special Evaluation	10
5. Continued Critical Shortage of Qualified Manpower	11
B - Detailed Description (Logical Framework Matrix)	14
III. <u>PROJECT ANALYSES</u>	
A - Technical Analysis	19
1. Institutions of Higher Agricultural Education	
2. Administration	19
3. Student Recruitment	20
4. Training Programs	20
5. Faculty	24
6. Graduates	26
7. Manpower Needs & Projections of Graduates	28
8. Assessment of Project Suitability	30
B - Financial Analysis	31
1. Analysis of Hassan II Recurrent Budget and Other Donors' Contributions	31
2. Financial Plan/Budget Tables	33

III. PROJECT ANALYSES (Cont'd)

C - Socio-Economic Analysis	40
1. Setting	40
2. Problems	40
3. Impediment to Resolution of Problems - Manpower Shortage	45

IV. IMPLEMENTATION PLANNING

A - Recipient's & A.I.D.'s Administrative Arrangements	47
B - Implementation Plan (PPT Network)	47
C - Evaluation Strategy	54

V. ANNEXES

1. Student Enrollment 1966-75 and Projections Through 1981	
2. Graduates 1968-1975 and Projections through 1981	
3. Draft Project Description for ProAg	
4. Logical Framework	
5. COM Request for Project	

PART I. SUMMARY & RECOMMENDATIONS

AGENCY FOR INTERNATIONAL DEVELOPMENT
PROJECT PAPER FACESHEET
 TO BE COMPLETED BY ORIGINATING OFFICE

1. TRANSACTION CODE (MARK APPROPRIATE BOX)
 ORIGINAL CHANGE
 ADD DELETE

2. COUNTRY/REGIONAL ENTITY/GRAantee
MOROCCO

3. DOCUMENT REVISION NUMBER
3

4. NUMBER: **608-0134**

5. BUREAU: **NE** P.CODE: **4**

6. ESTIMATED FY OF PROJECT COMPLETION
 FY **8** | **1**

7. PROJECT TITLE - SHORT (STAY WITHIN BRACKETS)
 Higher Agricultural Education

8. ESTIMATED FY OF AUTHORIZATION/OBLIGATION
 A. INITIAL **3** | **76** B. FINAL FY **8** | **0**

9. SECONDARY TECHNICAL CODES (MAXIMUM SIX CODES OF THREE POSITIONS EACH)

091	092	093	094	095	096
-----	-----	-----	-----	-----	-----

10. ESTIMATED TOTAL COST (\$000 OR EQUIVALENT, \$1# _____)

A. PROGRAM FINANCING	FIRST YEAR			ALL YEARS		
	B. FY	C. L/C	D. TOTAL	E. FY	F. L/C	G. TOTAL
1. APPROPRIATED TOTAL	520	100	620	2,715	585	3,300
(GRANT)	(520)	(100)	(620)	(2,715)	(585)	(3,300)
(LOAN)	(-)	(-)	(-)	(-)	(-)	(-)
OTHER 1.	-	-	-	-	-	-
OTHER 2.	-	-	-	-	-	-
HOST GOVERNMENT	-	6,700	6,700	-	38,790	38,790
OTHER HONOR(S)	6,605	445	7,050	39,470	2,440	41,910
TOTALS	7,125	7,245	14,370	42,185	41,815	84,000

11. ESTIMATED COSTS/AID APPROPRIATED FUNDS (\$000)

A. APPROPRIATION SYMBOL	B. TECHNICAL CODE	C. SECONDARY TECH. CODE	FY 76		FY 77		FY 78		ALL YEARS	
			D. GRANT	E. LOAN	F. GRANT	G. LOAN	H. GRANT	I. LOAN	J. GRANT	K. LOAN
FN	101	081	410	-	100	-	715	-	3,300	-
TOTALS			410	-	100	-	715	-	3,300	-
ESTIMATED EXPENDITURES			-	-	100	-	520	-		

12. PROJECT PURPOSE(S) (STAY WITHIN BRACKETS) CHECK IF DIFFERENT FROM PID/PRP

To assist Morocco's Higher Agricultural Education system in: (1) developing an indigenous teaching and research capability geared to training students in soil and plant sciences; and, (2) training needed manpower to increase food production and improve nutrition status of the population.

13. WERE CHANGES MADE IN THE PID/PRP FACESHEET DATA NOT INCLUDED ABOVE? IF YES, ATTACH CHANGED PID AND/OR PRP FACESHEET.
 YES NO

14. ORIGINATING OFFICE CLEARANCE

SIGNATURE: **Mission Director** *Robert P. ...*

DATE SIGNED: **09** | **15** | **75**

15. DATE RECEIVED IN AID/W OR FOR AID/W DOCUMENTS DATE OF DISTRIBUTION
 NO. | DAY | YR.

B. RECOMMENDATIONS

-- Grant	\$3,300,000
-- Waiver for Sole Source Procurement of Contracting Services	
	<u>\$3,300,000</u>

C. DESCRIPTION OF THE PROJECT

1. Through a contract with a U.S. university, A.I.D. will provide to Hassan II National Agronomic and Veterinary Institute: 30 man-years of professional services in soil and plant sciences; 546 man-months of training for pre-doctoral Moroccan faculty, prospective faculty members, and selected other graduate-level students; 20 man-months of consulting services related to research, teaching and curriculum development; three vehicles and some limited scientific equipment.

2. Project activities will be organized and carried out jointly by the Institute and the U.S. contractor.

3. Within a period of five years, research programs designed for graduate student training in soil and plant sciences will be established, and students will be trained in these programs. A full 3rd cycle program in soil and plant sciences (courses and research) will be developed and taught at the Institute in the last two years of the life of the project. Moroccan junior faculty will participate actively in both teaching and research activities under the guidance of the U.S. professors.

4. At the end of the project, third cycle training programs in soil and plant sciences will be offered at Hassan II Institute. Sixteen Moroccan junior faculty trained under this project, in addition to four being trained under the current terminating project, will have been appointed in these fields and will have acquired some experience in teaching and research. They will also have received some training toward their doctorate. Graduates in soil and plant sciences also will be working in the Ministry of Agriculture and contributing to the GOM programs geared to increasing food production and improving the nutrition status of the population.

D. SUMMARY FINDINGS

The GOM has established and is developing a system of higher agricultural education to meet a severe shortage of trained manpower in every field of agricultural science. The GOM intends that the system should be not only a strong one scientifically, but also one that is adapted and relevant to the needs of Moroccan agriculture.

So far, the training programs offered by the system have been modified versions of European programs, and the institutions comprising the system have been staffed largely by foreign - mostly French - personnel provided through bilateral technical assistance programs. The GOM intends to Moroccanize the staff and programs as fast as possible without, however, compromising the quality of training.

Since 1970, U.S. assistance to Hassan II National Agronomic and Veterinary Institute - the major institution in the system of higher agricultural education - has contributed to both objectives of the GOM. Four Moroccans with potential for a successful academic career have been identified and are being groomed for faculty appointments. Moroccan students and academic administrators alike have learned to appreciate the U.S. approach to agricultural training. Thus new ideas have been introduced which can favorably influence the evolution of training programs that are responsive to Moroccan conditions and needs.

Presently, enrollment ceilings are being raised sharply in order to cope with increasing needs for trained agricultural manpower. By the 1979-80 academic year, student enrollment throughout the system of higher agricultural education will have more than doubled the present level. Per force, more Moroccan faculty will have to be trained and appointed if the system is to cope with this increased enrollment.

It is the Mission's firm judgement that continued strong U.S. support of Morocco's higher agricultural education system can contribute significantly to the successful evolution of that system and at the same time to the reduction of Morocco's deficit in trained manpower. In making this judgement, the Mission realizes fully that the 20 Moroccan junior faculty which will have been appointed in the fields of soil and plant sciences, will not have had sufficient training and experience to truly replace the U.S. professors at the end of the project. However, the Mission believes that they will be equipped to successfully carry on the 3rd cycle program of studies in Morocco. Given the progress finally being realized under the terminating project, the magnitude of the manpower gap and the relatively short life of the project, these will be significant accomplishments.

E. PROJECT ISSUES

1. Is Hassan II Institute a viable institution without U.S. assistance?

Yes. The team which conducted an independent evaluation of the current project, concluded that the INAV was viable and would "persevere" without U.S. assistance.

In a developing country whose economy is essentially agricultural and where a serious shortage of agriculturalists exists, could

the government allow such an agricultural training institution to disappear?

The issue is not one of viability or perseverance, but responsiveness to the needs of the country. The young Institute is based on a model, the applicability of which is being questioned. Its graduates will have much influence in the development of Morocco's agricultural sector. Whether Morocco can feed its growing population will be determined in part by the kinds of graduates the INAV and its sister institutions can produce. The significance of U.S. assistance is to be viewed in the above context. In financial terms, that assistance is much less than that of France. Nevertheless, the Moroccans value that assistance highly because it introduces in Morocco a different approach to training which can help them develop a competent and responsive system of agricultural education.

2. Will the Institute's program during the project period lend itself to curriculum development and Moroccanization of staff, as envisaged?

Yes. As noted elsewhere in this Project Paper, the terminating project failed to take into account the small student enrollment which could have been expected at the then brand new Hassan II Institute during the life of the project, 1969-76, and the priority need then existing in the Ministry of Agriculture for the graduates of the Institutes. Over the next five years, 1976-1981, the situation will be vastly different. Student enrollment will be doubled, and, although the Ministry of Agriculture will still need great numbers of graduates, producing these graduates for the Ministry will not be possible unless some of the INAV graduates themselves are prepared to assume faculty appointments.

As far as curriculum development is concerned, Moroccan officials realize that third cycle training must in fact take place in Morocco starting in 1979, to accommodate the increased number of students. They also realize fully that the programs to be offered must be decided upon and prepared before September 1979.

Moreover, they are facing new demands from the employers of the graduates. These employers are no longer asking for generalists to occupy administrative or supervisory positions vacated by departing foreigners. They need professionals who are competent in specific fields. This changing demand will inevitably be reflected in the curriculum, not only in the developing third cycle but also in the second cycle.

3. Shall the present A.I.D. contractor - the University of Minnesota - continue as contractor under the new project?

Yes. The University of Minnesota has performed well under

the current project. It has been able to provide and maintain competent staff in Morocco, and, through this project and other activities, has acquired agricultural expertise in Morocco and North Africa that is probably unmatched in the U.S. land grant system. Moreover, Moroccan officials value highly the excellent working relationship that has developed between their institutions and the University.

Given the time frame of the project and the magnitude of the task to be accomplished, it is essential that these assets be utilized. Changing the contractor, of course, would not be necessarily fatal; but, it would seriously jeopardize the probability of success.

PART II. PROJECT BACKGROUND

G DETAILED DESCRIPTION

PART II. PROJECT BACKGROUND AND DETAILED DESCRIPTION

A. BACKGROUND

1. Setting

When Morocco regained its political independence in 1957 and had to transform the former colonial agricultural service into a national Ministry of Agriculture, very few Moroccans were available who had been trained in agriculture beyond the high school level. Training of higher level agriculturalists was immediately recognized as a priority and, in the near total absence of local higher educational institutions, a number of Moroccan students were sent to study abroad.

By 1964-65, 120 Moroccan students were enrolled in 10 foreign institutions of higher agricultural education located in six different countries: 61 in France, 22 in Spain, 11 in Egypt, 6 in Belgium and one each in Poland and the Soviet Union. All of these students were recipients of scholarships financed by the ONI or by foreign aid agencies and had to spend several years (6-7) abroad to complete their training. Concern developed in the ONI over the cost and inadequacy of the training program in terms of personnel needs, the possible alienation of the students from their changing society, and the possibility of future conflicts among professionals trained at widely different institutions. These concerns led to the following decisions: (i) upgrade the junior college level National School of Agriculture at Meknes, which had been established by the colonial administration to train the sons of European colonists; and (ii) create in Morocco a National Agronomic Institute, which, in the words of King Hassan II, would offer a diploma rigorously equivalent to the European diploma of "Ingénieur-Agronome."

As viewed by Moroccan officials, the Institute would produce benefits that would amply justify the heavy financial investment its development would require. More Moroccans would be trained in Agriculture. Moroccan agricultural students would no longer be scattered for several years in various countries, and they would not be handicapped by problems of adjustment to foreign cultures or readjustment to their own society. The programs of the Institute would be adapted to local conditions and would aim at solving the acute problems of Moroccan agriculture. Thus, the problems deriving from training agriculturalists in almost total ignorance of their country's conditions would be avoided and their integration into the life of the society would be facilitated. Moreover, the conflicts which can develop among professionals trained at widely different institutions would be avoided and, through the training of teachers, a solid, coherent and well staffed agricultural education system would evolve.

Finally, the Institute would improve Morocco's agricultural research capacity and this in turn would reinforce the country's development efforts.

2. Higher Agricultural Education System

In April 1968, a royal decree created the Hassan II National Agronomic Institute and defined its role as follows: "... to teach the scientific, economic and social disciplines that are applicable to agriculture, to conduct studies and research, and to train specialized "Ingénieurs-agronomes" to meet the needs of the agricultural sector".

In October of the same year, the Institute physically opened its doors to twelve students selected among 35 who had been recruited in 1966 and enrolled at the nearby national university, Mohammed V, for two years of preparatory studies in mathematics and the natural sciences. Land development and construction work had already begun on the campus site in 1965 with substantial French assistance (5 million dirhams -- over one million dollars -- toward the cost of administrative and academic buildings).

In 1974, the role of the Institute was expanded to include the training of veterinarians and other technicians needed by the Ministry of Agriculture and Agrarian Reform (MARA), and its name was changed to the Hassan II National Agronomic and Veterinary Institute (I.N.A.V.). That same year, authority was granted to the Institute to: (1) award the degree of Doctor of Agronomic Sciences and the diploma of "Ingénieur des Travaux" in Food Technology and Nutrition and in Topography and Rural Works; and, (2) establish a two-year post-secondary program for the training of agricultural technicians.

At the Hassan II Institute, the training program is divided into three cycles of studies, each cycle covering two years. The first cycle is one of preparatory studies, as mentioned above. In the second cycle, the students receive training in general agriculture, and in the third cycle they study a specialized field of agriculture. The diploma of "Ingénieur-Agronome" which is awarded by the Institute thus requires six years of study, and is roughly equivalent to the U.S. master's degree. The diploma qualifies the holder for employment at the civil service rank of "Ingénieur d'Etat". Doctors of Veterinary Medicine are also given the same rank.

Also in 1968, the National School of Forestry Engineers at Salé was established to train "Ingénieurs des Travaux" specialized in Forestry, Range and Watershed Management and Soil Conservation. The National School of Mines was upgraded in 1966 to train "Ingénieurs des Travaux" in general agriculture. This diploma requires four years of studies and qualifies its holder for employment at the civil service rank of "Ingénieur d'Application".

3. Current U.S. Assistance

When the Hassan II Institute began its instructional program in 1968, only 53 Moroccans had completed master-level training in agriculture, 146 had finished bachelor-level studies, and 14 held the degree of Doctor of Veterinary Medicine. All of them had been trained between 1956 and 1968 and most of them had only recently returned from Europe to occupy various positions in the Ministry of Agriculture. In short, no Moroccans were available as teachers for the institutions of higher agricultural education. As a result, the entire teaching faculty was composed of visiting professors who were provided by France and Belgium and assisted mostly by French National Service Volunteers. The same situation obtained at the National School of Agriculture in Meknes, while at the National School of Forestry at Salé, the professors were provided by UNDP/FAO.

Therefore, two years after its opening in October 1968, the Institute had to face the problem of offering graduate level instruction and research training to its students without a resident faculty and with an increasing load of undergraduate teaching. The problem was solved through an arrangement with French and Belgian institutions whereby the Moroccan students would do their third cycle studies at these institutions but receive their diploma from the Hassan II Institute. However, the Institute envisaged that, as it acquired the capability to develop and offer third cycle instructional and research programs, the arrangement would be phased out gradually. It was in this context that, in December 1969, a Project Agreement was signed between the GAF and A.I.D. whereby, over a period of seven years, ending June 30, 1976, the U.S. would provide assistance to the Hassan II Institute to plan the third cycle curriculum, develop third cycle research and teaching capability in soil and plant sciences, and train Moroccan faculty in these fields. Through a contract with the University of Minnesota, four Ph.D. level junior professors, one each in Soil Chemistry, Soil Microbiology, Plant Breeding and Plant Virology, were made available to the Institute. They were supported by two senior professors at the St. Paul-Minneapolis campus, one in Soil Science and the other in Plant Science, who also served as consultants to the Institute.

The four resident professors arrived in Morocco in July 1970, January 1971, July 1971 and December 1961, respectively, and were the only faculty at the Institute concerned directly if not exclusively with third cycle training. However, during the first two years of their presence, the third cycle students (11 in 1970-71 and 18 in 1971-72) were sent to study in France and Belgium, as indicated above. Moreover, none of these 29 students elected to specialize in either Soil Science or Plant Science. With the exception of the Soil Chemistry professor, who was assigned to teach a second cycle course, the U.S. professors had no teaching responsibilities during these two years. As a result, they

devoted most of their time to the establishment and development of research programs which addressed important problems of Moroccan agriculture, and which were designed and organized so as to serve eventually the needs of third cycle students in their respective fields.

In 1973 the Project Agreement was amended to recognize and authorize U.S. assistance in second cycle teaching. That same year, the Mission prepared a revised Project Paper proposing the addition of two professors in Horticulture, the extension of U.S. training to fifth year students, a reduced emphasis on Ph.D. training for Moroccan faculty, and the extension of the life of the project from 1976 through June 1980. While the revision was not formally approved, most of the proposals were accepted and put into practice. The two professors in Horticulture arrived at post, one in November 1974 and the other in March 1975.

Also in 1973, the Institute began to curtail third cycle training abroad by requiring that, whenever feasible, students spend the sixth year in Morocco to prepare their "memoire" or thesis paper. This decision reflected and evidenced the interest of GOI officials to train students in their national setting. It was in effect a significant step toward Moroccanization of the Institute, and it was made possible in some measure by the research programs of the U.S. professors. Since then, students have done their sixth year work in Morocco. The U.S. professors supervised directly 3 of these students and served on advisory committees for 22 others.

Student training in the U.S. began in 1972-73 with one student in Soil Conservation and has increased dramatically. Four students - 2 each in Range Management and Plant Pathology - spent their fifth year in the U.S. in 1973-74; six students, one each in Plant Virology, Plant Breeding and Range Management, and three in various areas of Soil Science, were selected for the 1974-75 academic year and, in the spring of 1975, seventeen applied for U.S. training. Among these, eight were selected and are presently enrolled in U.S. universities.

Faculty training as envisaged in the original Project Agreement has not been possible. As noted, Morocco in 1969 was confronted with an acute shortage of trained manpower in every field of agriculture. The Institute was in the first quarter of its second year of existence and depended completely on visiting professors from abroad even for the 2nd cycle instructional programs. The 2nd cycle student enrollment was 50 and annual maximum increases of 50 students had been planned. Under these circumstances, the Institute could be expected to produce cumulatively a maximum of 152 graduates by June 1976. Yet the project assumed that a valid graduate program could in that time be developed and offered at the Institute and that 10 of the graduates not only would elect to specialize in soil and plant sciences but would also be Ph.D. material and would choose a career in teaching and research.

These were clearly very questionable assumptions. Actually, 103 students have so far graduated from the Institute with the diploma of "Ingénieur-Agronome". Only 19 of these students specialized in the fields represented by the U.S. professors - (3 in Plant Breeding, 8 each in Horticulture and Soil Science) - and 3 of the 19 students completed their studies only in 1975.

Although training of Moroccan Ph.Ds to replace the U.S. professors has not been possible (in fact such training is not even desired by Institute officials, who prefer that the young Moroccan faculty prepare their "Doctorat en Sciences Agronomiques" in Morocco and in the traditional French and Belgian patterns), some progress has been made toward Moroccanization of the faculty at the Institute and the other schools of the higher agricultural education system.

Presently, 12 graduates of the Institute have been given faculty appointment: 7 at the Institute, 4 at the National School of Agriculture at Meknes, and 1 at the Forestry School at Salé. U.S. assistance contributed to the training of 4 of these young Moroccan faculty: one in Range Management, two in Plant Pathology who studied in the U.S., and one in Soil Science who did his 6th year work in Morocco under the supervision of a U.S. professor.

In addition, among the six current sixth year students who studied at U.S. universities in 1974-75, three (one each in Plant Virology, Soil Microbiology and Plant Breeding) are being considered for faculty appointment upon their graduation in July 1976. Thus, potential replacements for three of the original four U.S. professors have been identified. Admittedly, they will need further graduate training, but, under the circumstances, their appointment should be considered a positive accomplishment of the current project.

Special Evaluation

In the spring of 1975, an independent evaluation of the current project was conducted under contract with A.I.D. and with the full cooperation of the Institute. The three-man evaluation team duly noted that the major objectives of the project were based on questionable assumptions and had not been achieved. On the other hand, the team emphasized that the project had (1) produced much research that was significant and useful; (2) strongly influenced students and administrators alike by demonstrating the practical approach to agricultural research; and (3) generated considerable interest in the U.S. approach to agricultural training, as evidenced by the dramatic increase in the number of Institute students requesting U.S. training in the 5th year and by the consideration being given by the administration of the Institute to making the third cycle curriculum more specialized and practical than it had been.

Development of an educational institution, especially one with a graduate program, is a complex and difficult process. It is also a lengthy process that often requires considerable and sustained assistance from outside the institution itself. This is just as true, if not more so, in a developing country (as U.S. experience in India and other countries has demonstrated), as it is in the U.S. Regrettably, the 1969 Project Agreement, in calling for the training of 10 Moroccan Ph.Ds and the development at the Institute of a full third cycle program in Soil and Plant Sciences within a period of six years, did not adequately take into account the foreseeable difficulties in meeting these objectives.

Unfortunately, the report of the evaluation team did not reflect an understanding of the crucial importance of the time factor in the development of the Institute. Nor did the evaluators give appropriate consideration to the circumstances under which the Institute has had to carry out its mandate which, as stated earlier, is not only to train needed agricultural manpower, but to do so in a way that is relevant to the Moroccan setting.

Moroccan academic administrators charged with implementing this mandate had not had any previous experience in this field. They had only one model to go by, the French system in which they had been trained. It was inevitable that they would follow that model. Moreover, the very existence of the Institute and its operation depended essentially on French capital and technical assistance, and this tended to reinforce the acceptance of the model. Yet, GOM officials realized from the beginning that the model was not a satisfactory one. They modified it in novel and important ways by: (1) requiring that students at the Institute each year spend two to four weeks in the rural areas of Morocco, learning first hand the realities of their country, and (2) granting academic credit for these study trips or "Stages". The Moroccan academic administrators realize the need to modify the model even further. As noted by the evaluation report, they have been impressed by the U.S. approach to agricultural training. They value highly U.S. assistance, not so much from the financial standpoint, but because it can make and is making an important contribution to the evolution of a strong and relevant Moroccan system of higher agricultural education.

5. Continued Critical Shortage of Qualified Manpower

As the present project approaches its scheduled end, Morocco of course still faces a critical shortage of qualified manpower. In 1973, at the beginning of the current 1973-77 five-year national development plan, 295 "Ingenieurs d'Etat", including 11 graduates of the Institute, and 576 "Ingenieurs d'Application", were available to MORA against immediate needs of 555 and 236 respectively, and long-term (1978) needs of 1,250 and 2,100, respectively. Training projections for the plan

period were 292 "Ingénieurs d'Etat" and 517 "Ingénieurs d'Application". However, despite the impressive growth of Morocco's higher agricultural education system, actual enrollment figures in the system suggest that, by the end of the plan period, less than these planned numbers will have been produced. Hassan II Institute will have graduated 214 "Ingénieurs d'Etat" (including 31 veterinarians) while 432 "Ingénieurs d'Application" will have received their diplomas. Although they fall short of the projections, these figures provide convincing evidence of the wisdom of the decision to create a higher agricultural education system in Morocco. As the above figures show, within the current Five-Year Plan period, more Moroccans will have received higher agricultural training than in the sixteen preceding years (1956-72)

Given the manpower deficit illustrated above, the agricultural education system, although not yet solid or well staffed by Moroccans, will have to increase its production of graduates if the development needs of the country are to be met. To that end, the ceiling for student admissions to the common preparatory year of the higher agricultural education system was raised in September 1975 from 300 to 600. As a result, student enrollment in the various training programs offered by the system is expected to rise sharply over the next three to four years, reaching 1,605 in 1979-80. This would be more than twice the current total enrollment of 742. Correspondingly, the number of graduates produced by the system is expected to rise from 158 to 460 in 1981. These ambitious projections, probably, will not be achieved by 1981. They constitute, however, a reminder of the severity of the constraint that the shortage of trained manpower represents for Morocco's agricultural development.

Morocco's development efforts in the agricultural sector are aimed largely at the irrigated and higher rainfall areas. The resulting job opportunities, combined with the kind of training offered in the first and second cycles at the Institute, have made certain fields of specialization much more attractive than others. Of the 108 students who have graduated from IMAV through the academic year 1974-75, 68 (or 63%) specialized in Agricultural Engineering, Forestry, Animal Husbandry and Food Technology, and 40 (or 37%) in all the other fields combined. A survey of the first 66 graduates of the Institute shows that of 54 respondents, 20 (including one office director and 17 department heads) were employed in the Regional Irrigation Offices; 8 and 5, respectively, were Provincial Heads of the Forestry and Livestock Services; 10 (including 4 station directors and 5 department heads) were in the Agricultural Research Division; 7 were teaching; and, 4 occupied administrative positions in the central Ministry.

The Ministry's irrigation development program is now well on its way and is scheduled for completion by the mid-1980s, and the more attractive positions have been filled. Efforts are now being focused on the dryland areas.

As the COM begins to turn its attention to the problems of rainfed agriculture, which occupies most of the land (90%) and accounts for most of the rural population, different kinds of expertise will be needed. Already the job market situation is changing and, in response, increasing numbers of Institute students are fortunately expressing interest in the fields of soil and plant sciences. This was evidenced earlier in 1975 when 17 out of 44 students requested fifth year training in the U.S. in such fields as Plant Breeding, Agronomy, Soil Conservation, Range Management and Horticulture. All of these specialties and others will be required if Morocco is to successfully attack the increasingly acute problems of assuring food and feed production to meet the needs of its growing population.

Without continued external assistance, Morocco's higher agricultural education system is not capable of producing, in adequate numbers, the trained manpower needed. Nor can it hope to acquire alone the capability to do so. Therefore, the Mission is proposing a new project which is designed to assist Morocco in meeting current needs in trained agricultural manpower and in acquiring the capability to continue to meet these needs in the future.

This new project is designed to provide continued U.S. assistance in such a way as to effectively hasten the development of that Moroccan system. As indicated earlier, total enrollment in the system of higher agricultural education is expected to rise sharply over the next four years. Specifically at Hassan II Institute, fifth year enrollment is expected to be about 100 students in 1979, and to remain at that level thereafter. Institute officials clearly realize that the present system of fifth year training abroad for such large numbers will then become impossible to continue. Therefore, starting in the 1979-1980 academic year, the Institute will have to offer in Morocco a full third cycle training program, including both course work and research work. They have estimated that in the fields of soil and plant sciences the minimum needs in faculty will be as follows:

Soil Science	6	Agronomy	6
Forestry & Soil Conservation	4	Fruit Crops	4
Range Management	4	Vegetable Crops	4
Plant Breeding	4	Horticulture	2
Plant Pathology	4		

They expect that the Institute will still be partially dependent on visiting professors from abroad, but they plan to have as many resident faculty as possible and, to accomplish this, give faculty appointment to as many young Moroccans as possible, provided they demonstrate the potential for a successful career in teaching and research in the system of higher agricultural education.

B. DETAILED DESCRIPTION

The project is designed to assist Morocco in meeting current needs for trained agricultural manpower and in acquiring a Moroccan academic capability to continue to meet these needs in the future.

1. Sector

Goal - To improve the capability and quality of Morocco's higher agricultural education system.

Achievement Measures - The establishment in Morocco of university-level training programs in agriculture.

Morocco's higher agricultural education system was established over the past eight years so that, in the short and medium terms, Moroccan agriculturalists could be trained in greater numbers than was possible at foreign institutions. An equally important objective was that, in the long term, the system would offer to Moroccan students, at all levels, training that would equip them to address and solve the problems of the country's agricultural sector. Presently, the system, largely staffed by foreign professors, is not capable of providing in loco, adequate training beyond the bachelor's level. Therefore, graduate-level students must go abroad for their studies at great cost to Morocco and foreign aid donors.

The GOM accepts this only as a transitional alternative. It is committed to the development of a comprehensive agricultural education system that is Moroccan both in orientation and staff. That commitment will be satisfied only when Moroccans have effectively replaced the foreign professors and valid graduate-level training can be effectively offered in Morocco.

2. Project

Purpose - To assist Morocco's higher agricultural education system in:

- (a) developing an indigenous teaching and research capability geared to training students in soil and plant sciences;
- (b) training needed manpower to increase food production and improve nutrition status of the population.

End of Project Status -

- (a) U.S. staff replaced by Moroccans.
- (b) Third cycle programs in soil and plant sciences offered in Morocco by 1979.

(c) Institute graduates employed in food production and nutrition.

Shortages of qualified manpower have been a major constraint to the development of Morocco's agricultural sector. They have particularly affected the programs aimed at the rainfed areas where most of the farmers live and most of the country's food is produced. As the GEM begins to focus more of its resources on the problems of rainfed agriculture, these shortages may well become more severe.

In an effort to reduce these shortages, student enrollment ceilings in the institutions of higher agricultural education will be raised sharply over the next three to four years, so that more graduates can be produced. Two critical requirements must be met if this objective is to be realized: more teachers must be trained and the capability to offer graduate-level training must be acquired.

It is expected that at the end of the project, third cycle studies in soil and plant sciences will be conducted in Morocco based on programs that will have been tested for two years; Moroccans will have been identified, trained, and appointed to faculty positions in the fields of U.S. assistance; and other graduates in these fields will be contributing to the improvement of the food situation in Morocco.

Which will remain to be done to further strengthen the Moroccan faculty and the training programs of the system of higher agricultural education. But, as a result of this project, Morocco will have progressed toward the objective of a competent, indigenous, higher education system capable of training in Morocco all the agricultural manpower the country needs.

5. Planned Outputs

- (a) 28 Moroccan faculty members have received U.S. training.
- (b) 16 Moroccan junior faculty members appointed to IMAV staff.
- (c) 6 research programs in soil and plant sciences.
- (d) 9 graduate-level courses in above fields prepared by 1979.
- (e) 120 graduates in soil and plant sciences.
- (f) 120 theses and publications.

U.S. assistance proposed under this project will enable the system to meet these requirements. Specifically, it will result in the establishment of research programs and third cycle courses that will enable INAV to train, in Morocco, most of its third cycle students in the fields of soil and plant sciences. It will contribute to the training of students specializing in these fields, and among whom junior faculty members will be selected for the system. These young Moroccans will be guided and assisted in the early stages of their careers; they also will be given additional training to strengthen them professionally, thus enabling them to prepare, in time, a doctorate in their respective fields of specialization. In addition, this project will help to alleviate the severity of the manpower shortage in soil and plant sciences, since more graduates specialized in these fields will be available for employment in the MARA.

It is assumed that the GOI will provide INAV and the system of higher agricultural education as a whole with adequate and timely financial support for the establishment of third cycle research and teaching programs. It is also assumed that third cycle training in soil and plant sciences will be offered in Morocco, starting in 1979-80, that students will specialize in these fields, and that qualified Moroccans, as they become available, will be appointed to the faculty of the institutions of higher agricultural education.

The outputs described above can best be obtained through the involvement of a U.S. land grant university.

4. Planned Inputs

- (a) 50 Man-years of U.S. professors in soil and plant sciences.
- (b) 20 Man-months of consultant services related to research, teaching and curriculum development.
- (c) 204 Man-months of participant training for third cycle students.
- (d) 542 Man-months of participant training for faculty members in the higher agricultural system.
- (e) Laboratory equipment and supplies.
- (f) 5 Vehicles.

Through a contract with a U.S. land grant university, preferably the University of Minnesota, 50 man-years of resident U.S. professors will be provided specifically in Soil Chemistry, Plant Breeding, Plant Pathology, Range Management, Watershed Management, and

Horticulture (fruits and vegetable crops). They will complement existing staff at INAV, including French and Belgian visiting and resident professors, as well as Moroccans. Among the latter, one is a former A.I.D. participant who went to study in the U.S. under the 1968-74 cereals project and stayed on to earn a Ph.D. degree in Soil Fertility.

The major responsibilities of these U.S. professors will be to: train third cycle students by guiding and supervising their research work and mémoire; develop, in their respective specialized areas, appropriate third cycle courses to be offered in Morocco in 1975-69; participate in the teaching of these courses in that year, and, in the following one, assist in the selection and training of junior Moroccan faculty; and, as appropriate, participate in second cycle training and curriculum development. Although they will be located at INAV, these professors will be expected to provide assistance to the other institutions of the system, whenever that is feasible and appropriate.

The activities of these professors will be complemented by consulting services of three types. Five man-months of such services in the specific fields of Soil Microbiology, Plant Virology, and Plant Breeding, will be provided to assist graduates trained under the current project and who are expected to join the faculty of INAV in September 1976. Fifteen man-months of consulting services in research, teaching, and curriculum development will also be provided to reinforce the impact of the professors.

To be effective, these inputs must be available on a timely basis. In addition, proficiency of the resident U.S. professors in the French language must be such as to enable them to perform effectively. Under the current project, the contractor has been able to provide and maintain a well qualified staff. It is assumed that it will continue to do so.

INAV will provide adequate facilities for teaching and research, including laboratory and other technical assistants as well as field laborers which may be necessary.

It is assumed that the GOM will provide adequate financial support for INAV and its sister institutions, that competent students specializing in the fields of U.S. assistance will be selected for U.S. training, and junior Moroccan faculty will also be available for training.

During the course of the current project, Moroccan academic administrators, who had not previously been exposed to the U.S. approach to agricultural training, have learned to understand and appreciate this approach. They no longer believe that the broad and largely theoretical training which is characteristic of the "Ingénieur-Agronome" is the only

one that is valid and acceptable. Nor are they certain that it is suited to the needs of their developing agriculture. They have discovered, through the project, that the U.S. approach is not only capable of producing competent agriculturalists, but that its graduates are more action-oriented and more immediately effective as professionals. They are impressed by the flexibility and the problem-orientation of the approach. This new project is designed to reinforce their experience and, in so doing, provide them with ideas and practices that will contribute to the evolution of a more responsive Moroccan system of higher agricultural education. It does not aim at "selling" the American approach.

Among the students who have studied in the U.S. or have completed their thesis work under the supervision of U.S. professors, seven either have been appointed to faculty positions or are expected to receive such appointments by 1976. Their fields of specialization are: Range Management, Plant Pathology, Plant Virology, Plant Breeding and Soil Science. These are fields in which U.S. expertise is unique or unquestionably outstanding. Moreover, these young Moroccans are just beginning their careers and, in time, will have considerable influence on the training orientation and capability of the system of agricultural education. This project proposes to strengthen them professionally, not only through additional U.S. training, but through close association with the resident U.S. professors and short-term consultants.

It avoids the unrealistic objective of training Ph.Ds, and the equally unrealistic objective of developing a comprehensive and fully operational graduate school. It is designed instead to produce limited and discrete third cycle programs, but more importantly to build the foundations that will sustain these programs and strengthen the system of higher agricultural education as a whole. It should not be viewed in the traditional institution building mold - five years is too short a time for that. It should be viewed instead as an attempt to provide significant help to Morocco in its efforts to meet the very serious shortage of manpower which is constraining its agricultural development.

PART III. PROJECT ANALYSES

PART III. PROJECT ANALYSES

1. TECHNICAL ANALYSIS

1. Institutions of Higher Agricultural Education

Higher agricultural education in Morocco is the responsibility of the Ministry of Agriculture and Agrarian Reform (MARA), and is offered at three institutions: the National School of Agriculture (EN) at Meknes, which, prior to independence offered junior college level training to the sons of European colons, but was upgraded to senior college level in 1966; the National School of Forestry Engineers (ENFI) at Sale, which was established in 1966; and the Hassan II National Agronomic and Veterinary Institute (INAV) at Rabat, which was created by royal decree also in 1966. A fourth institution, the National School of Horticulture, is being planned and will be located at Agadir. Its opening date is uncertain at this time. All students admitted to these institutions receive full government scholarships. In return, they are required to accept employment in the MARA (including the institutions of higher agricultural education) or in other government agencies for varying periods of time, from four to eight years. All three of these institutions grant the diploma of "Ingenieur des Travaux" which qualifies the holder for the civil service rank of "Ingenieur d'Application." Hassan II Institute, in addition, grants the diploma of "Ingenieur-Agronome" and the diploma of "Docteur en Médecine Veterinaire" both of which qualify their holders for employment at the rank of "Ingenieur d'Etat."

2. Administration

The two national schools, EN and ENFI, are under the control and supervision of the Direction of Agricultural Education and Professional Training (DE'FP) of MARA, while INAV is administered by a special board presided over by the Minister of Agriculture. Other members of the INAV board include the Minister of Finance, the Minister in-charge-of Higher Education, and the heads of the central Directions of the MARA. The Director of the Institute is appointed by royal decree, attends the meetings of the board, and serves as its secretary.

In spite of this dual administration, the three institutions are in fact operated as a unified multi-campus system, under the leadership of the Director of INAV. Since 1971, he has also held the position of Director of Agricultural Education in the MARA and, more importantly, he has encouraged the INAV to absorb the DE'FP both structurally and functionally.

3. Student Recruitment

Holders of the secondary school diploma (baccalaureat) in the science-mathematics track are recruited as students for the system as a whole rather than for the individual schools. After a common year of orientation and preparatory studies in science and mathematics, they are divided into two groups: the higher ranking ones are selected to become "Ingenieurs d'Etat" and are assigned to Hassan II Institute, either in the agronomy or in the veterinary curriculum; the remainder, to become "Ingenieurs d'Application," are assigned to any one of the three schools on the basis of their aptitudes and preference. Among those who fail the first year, only a very few are permitted to repeat. The other failed students are guided into agricultural technical schools that train "adjoints techniques."

Students from the Faculty of Sciences of the Mohammed V University and graduates of the agricultural technical schools, may secure admission into the system through a special examination, if they have completed studies equivalent to the preparatory year. In addition, "Ingenieurs d'Application" who have had three years of work experience may be admitted, through special examination, to the third cycle program of study at INAV, and thus qualify for advancement to the rank of "Ingenieur d'Etat."

4. Training Programs

Three types of programs are offered by Morocco's institutions of higher agricultural education.

One basic program leads to the diploma of "Ingenieur des Travaux." It consists of the common preparatory year, a second year of study in science and mathematics, and two years of concentrated study in one of the 5 following fields:

- Forestry and Soil Conservation offered at EUPF, Sale;
- Agriculture (Agronomy, Horticulture, and Animal Husbandry) offered at EN, Meknes;
- Topography, Agricultural Engineering, and Food Technology, offered at INAV, Rabat.

The program of study in veterinary medicine requires six years, the first two in the natural sciences and mathematics. It leads to the diploma of Doctor of Veterinary Medicine.

The program of study leading to the diploma of "Ingenieur-Agronome" similarly requires six years, and is divided into three cycles of two years each. The first cycle comprises the preparatory year that is common to all students in the system of higher agricultural education, and a second year of study in science and mathematics that is essentially the same as for veterinary students. The second cycle comprises a wide range of courses in soil and plant sciences, animal science, agricultural engineering, social sciences, basic sciences and mathematics. This cycle leads to a certificate in "general agronomy."

The third cycle covers the fifth and sixth years of study, and is one of specialization. It is conducted only in part at the Institute. In the fifth year, all students are granted scholarships to study at foreign universities, in France, Belgium and the United States. As a rule, students who elect to specialize in Agricultural Engineering remain abroad until they complete graduation requirements. Other students are permitted to extend their stay as necessary to complete their specialized course work. All other students return to Morocco at the end of the fifth year. In the sixth year, each student is required to prepare a thesis paper or "memoire" which he must present publicly before a faculty jury. The "memoire" may be largely bibliographic, or it may report findings of research conducted by the student under faculty supervision.

Due mainly to the presence and influence of the AID-supported professors at the Institute, the "memoires" are increasingly based on independent research activities.

Upon completion of all third cycle requirements, the student receives a certificate in "specialized agronomy" which, together with the "general agronomy" certificate entitles him to the diploma of "Ingenieur-Agronome." "Ingenieurs d'application" who may have secured admission to the third cycle receive only the certificate in "specialized agronomy."

TABLE 1. FIRST CYCLE CURRICULUM

SUBJECT	Class Hours		Total	Σ Total
	Year 1	Year 2		
Mathematics	180	130	310	15.2
Physical Sciences	345	415	760	37.2
Biological Sciences	186	217	403	22.8
Social Sciences	65	110	175	8.6
Drawing	60	-	60	3.0
Field Trips & Evaluation	180	152	332	16.3
Total	1,016	1,024	2,040	

TABLE 2. SECOND CYCLE CURRICULUM

SUBJECT	Number of Courses	Hours	Σ Total
Mathematics & Basic Sciences	8	252	10.4
Environmental Sciences	6	217	9.0
Animal Production Sciences	6	244	10.1
Agricultural Engineering	6	275	11.4
Plant Production Sciences	7	245	10.2
Social Sciences	7	240	10.0
English	2	120	5.0
Field Trips & Evaluation	-	815	33.9
		2,400	

Tables 1 and 2 present the summarized curriculum for the first and second cycles, respectively. The curriculum is adapted from those offered by similar French and Belgian institutions with one important modification, namely the field trips. Two of these trips are required in each year and cover three to four weeks each. They are highly organized and structured around specific themes, such as: the Discovery of Nature, the Rural Environment, the Agricultural Enterprises, and Agricultural Development.

Specific work assignments are given to individual students or to groups of 4 to 5 students for the duration of each trip. In both instances, a detailed trip report is required. The faculty participates actively not only in the trip activities, but also in their planning and their subsequent evaluation.

Considerable importance is attached to these trips by INAV officials, as evidenced by the time and resources devoted to them. In the view of these officials, the trips serve a fundamental purpose of confronting the students with the physical, biological, and socio-economic realities of their agricultural society. In a very real sense, the trips play a key roll in Moroccanizing the institutions of higher agricultural education which are otherwise still strongly European in orientation.

The curriculum of the first two cycles, as already noted, is adapted from European models. It reflects the same general "scientific" (meaning theoretical) approach to agricultural training. As the tables indicate, the student spends a considerable portion of his time studying mathematics and natural sciences (1,725 hours out of 4,448) or discovering the agricultural sector through field trips (1,147 hours). His training in agricultural sciences covers 1,396 hours, or 31.4% of the total, and that time is divided, almost evenly, among some 32 courses in five major fields. This distribution of time reflects a conscious decision to provide a balance among the major fields; hence, there is no intention at this stage to train working agriculturalists. This is accomplished in the third cycle where the student receives professional training in a specialized field.

One may question the validity, the economy, and the relevance of this approach, especially in a country that is so critically short of trained agricultural manpower. But one should also take into account the historical circumstances of the INAV. It is only in its eighth year of existence; its founders had essentially no model, other than the traditional French one, to guide them; and, its very existence has been and still is largely dependent on French assistance.

INAV officials are deeply concerned by the implications and consequences of the current approach to training for Morocco's agricultural development. They contend that this approach was a valid one in the beginning when Moroccans were urgently needed to take over administrative and other leadership positions from departing foreigners. They also realize that the priority needs are no longer the same and that INAV must further modify its curriculum in order to meet these needs. In short, they see the necessity for a less general and theoretical and more specialized and practical approach to training.

In this respect, the current project of U.S. assistance to Morocco's higher agricultural education has been producing a significant impact. It has introduced INAV students, faculty, and administrators alike to another model, and has demonstrated locally, although on a modest scale so far, that this model can produce agriculturalists who are not only competent but also responsive to the changing needs of Moroccan agriculture.

That, in the view of INAV and other high GOM officials, has rendered the U.S. assistance successful and invaluable.

Changes in approach are, in fact, being considered and presently discussed at the Institute. But in such matters as educational philosophy and strategy, they are not easily made, because, to be effective, they must necessarily have the support of administrators and faculty alike. In the case of INAV, an added difficulty arises from the fact that the majority of the faculty not only is provided by foreign assistance, but has been trained under the very system that is to be changed.

5. Faculty

When the Institute began operations in 1968, it had no resident faculty. The relatively few Moroccans who had received higher agricultural training abroad had only recently returned to Morocco to occupy key positions in the Ministry of Agriculture and were not available for teaching. As a result, practically all courses at the Institute were taught by visiting professors from France and Belgium who were assisted by resident junior teachers and technicians from these two countries. In time, locally available professionals (Moroccan and foreign) were also recruited as lecturers and, in 1970-71, four U.S. professors were added to the faculty. Although the number of visiting professors from France and Belgium has been stable, the composition of the junior staff, made up largely of "cooperants" (young Frenchmen who have opted to serve in civilian capacities overseas as an alternative to military service) has changed almost every two years.

The latest published annual report of the Institute for 1973-74 shows that 52 professors and assistants participated in second cycle instruction. They included:

- 12 visiting professors from France (9) and Belgium (3)
- 8 local lecturers and professors from the National University Mohammed V and the Ministry of Agriculture
- 16 resident French professors and assistants
- 1 resident Belgian professor
- 4 resident American professors
- 11 resident Moroccan professors and assistants.

Although the 1974-75 annual report has not yet been published to show an exact distribution of the teaching staff, the situation for that year remained essentially the same as for 1973-74 with the exception of the addition of two American professors.

Internal reports of the Institute also show that, in addition to the above 2nd cycle faculty, 83 visiting professors and consultants, and 62 resident foreign professors and assistants, participated in the overall instructional programs of the INAV.

The composition and status of this faculty is without question a critical weakness of the Institute and the entire system of higher agricultural education. Given the circumstances under which both INAV and the system came into being, the present situation was perhaps unavoidable. Both the INAV and the system were created, as indicated earlier, to enable Morocco to more effectively satisfy its considerable agricultural manpower needs. To successfully carry out that mandate, a strong, stable, and indigenous faculty was and still is an essential requirement. Thus, from the very beginning, INAV has been confronted with competing, even conflicting priorities. To the extent that its graduates were available to meet the demand of the MINA, they could not be trained as faculty members. Foreign assistance so far has somewhat attenuated the severity of the conflict, but that conflict remains. In fact, it may be argued that the magnitude of foreign assistance which made possible the establishment of INAV in 1968, could become a constraint to the development of a Moroccan faculty.

INAV and other GOM academic administrators are keenly aware of these problems and their crucial importance for the future of higher agricultural education in Morocco. They are also attempting to resolve them. Since 1972, the number of Moroccans appointed to the faculty at INAV and the other institutions has been rising steadily, although slowly. Of the first 66 "Ingenieur Agronomes" who graduated from INAV through 1973-74, 7 or 11% have been teaching in the system - 5 at INAV and one each at EIA and EFTI. Moreover, in September 1975, 6 of the 42 who graduated were given faculty appointments: 3 at INAV and 3 at EIA. In addition, several of the students now in their last year at INAV are expected to opt for an academic career.

The recent decision of the GOM to double student enrollment in higher agricultural education will accelerate the pace of Moroccan faculty development. As a result, the present enrollment of 742 is expected to rise to 1,200 students in 1977-78 and 1,600 in 1979-80. For more details, see Annex 1. At the INAV itself, enrollment in the AID-assisted agronomy division is expected to

increase from 221 in 1975-76 to 450 in 1979-80 and 500 thereafter. This is going to require substantial additions to the present faculty for second and third cycle instruction. However, the critical year will be 1979-80. The students beginning their fifth year of study will then number 100. Most, if not all, of them will have to remain in Morocco to complete the third cycle, for it is highly improbable that foreign assistance will provide 100 scholarships to support these students for at least one year of study abroad.

INAV administrators have begun planning for the organization of the third cycle program in Morocco. They have estimated that a minimum resident faculty of 90 will be needed as compared to the present 55. In the two broad fields of soil and plant sciences, on which increases in food production and improvement of nutrition status depend, the estimates are 14 and 24, respectively. These targets cannot be reached unless the Institute makes a determined effort to encourage and train young Moroccans for academic careers. And that is not possible without the support of a well directed foreign assistance effort.

6. Graduates

The first class of 12 students admitted to INAV in 1968 was reduced to 11 by 1970. Eight of these students went to France and three to Belgium to fully complete their third cycle of study. They returned to Morocco in 1972 to receive their diplomas of "Ingénieur-agronome." Since then 97 additional students have graduated from the Institute.

Table 3 presents the countries in which these 108 graduates and the current graduating class either completely or partially did their third cycle studies. Table 4 presents the areas in which they specialized. 92% of the students received third cycle training in Europe -- France (69%) and Belgium (23%) -- and 8% in the U.S.

TABLE 3 **COUNTRIES PROVIDING TRAINING**
FOR THIRD CYCLE STUDENTS

	70-71	71-72	72-73	73-74	74-75	Total	%
FRANCE	8	12	31	28	29	108	69
BELGIUM	3	6	5	10	12	36	23
DENMARK	-	-	-	1	-	1	-
U.S.A.	-	-	1	4	6	11	8
Total	11	18	37	43	47	156	

TABLE 4 **FIELDS OF SPECIALIZATION SELECTED**
BY THIRD CYCLE STUDENTS

	70-71	71-72	72-73	73-74	74-75	Total	%
AGR. ENGINEERING	3	5	7	7	9	31	20
FORESTRY	2	4	6	6	6	24	15
ANIMAL HUSBANDRY	1	3	7	8	7	26	17
FOOD TECHNOLOGY	2	2	3	2	3	12	8
SOILS	-	1	4	3	2	10	6
AGRONOMY	-	-	3	6	6	15	10
PLANT BREEDING	-	-	3	-	1	4	4
HORTICULTURE	1	-	2	5	5	13	8
PLANT PATHOLOGY	-	-	-	3	3	6	4
ECON & SOCIOLOGY	2	-	2	1	2	7	4
OTHERS	-	3	-	1	3	7	4
Total	11	18	37	43	47	156	

Four fields, namely: Agricultural Engineering, Animal Husbandry, Forestry, and Food Technology attracted 93 (60%) of the students, Soil and Plant Sciences 40 (31%), Economics and Sociology 7 (4%), and other fields 7 (4%).

The greater attraction of these four fields of specialization was apparently due to two major factors. Starting in 1968, the GOM development plans placed priority on the construction of dams and irrigation systems. As a result, the demand for agricultural engineers increased rapidly and students responded to this demand. Also during the period 1968-1973, the pace of Moroccanization of the MARA and the agricultural sector as a whole increased sharply. A number of attractive jobs were thus created and again the students responded to the demand. A survey of the first 66 "Ingenieurs-Agronomes" who graduated from INAV through 1974, shows that, of the 54 respondents: 20 were employed in the regional irrigation development offices, all occupying top positions; 13 were heads of either provincial or district agricultural Livestock and Forestry Services; 4 were working in central MARA offices; 10 including two station directors and several central division heads, were engaged in the Agronomic Research Service; and, 7 were teaching in the higher agricultural education institutions.

As the number of third cycle students increased, more of them have elected to specialize in fields that were previously ignored, such as: Agronomy, Horticulture, Plant Pathology. Again this trend is not only a function of class size but also a response to demand. Continuing food deficits have caused the GOM to establish agricultural production programs which call for these specialties, thus creating new attractive jobs.

Over the next four to five years, enrollment at INAV is expected to increase sharply. This will generate a greater number of third cycle students which, undoubtedly, will further change the pattern of specialization that has so far characterized the graduating classes. Moreover, one can expect greater interest in the fields of soil and plant sciences, as the GOM begins to focus its resources on the development of rainfed areas.

7. Manpower Needs and Projections of Graduates

As implementation of the current development plan was beginning in 1973, Morocco's long-term (1980) needs in college-trained agricultural manpower were estimated at 1,250 "Ingenieurs d'Etat," veterinarians included, and 2,100 "Ingenieurs d'Application." Against these needs, 203 and 346 were available respectively. During the plan period 1973-1977, the higher agricultural education system will produce 101 "Ingenieurs-Agronomes," 31 Veterinarians, and 432 "Ingenieurs

have been largely in irrigated areas. As the GOM begins to focus on the more difficult development problems of the rainfed areas, particularly the less privileged areas where farmers are more traditional, foreign technical assistance must opt for an indirect approach if it is to be effective. GOM officials believe the best and most practicable way to reach this diffuse and largely uneducated target population is not through direct foreign activity but rather through implementation of externally assisted training and support programs looking toward improved GOM rural outreach services manned by Moroccan staff. They feel, perhaps wisely, that given the cultural context of Morocco, only Moroccans are most likely to be effective in these areas. Hence their ambitious training projections.

In these circumstances, assistance to the higher agricultural education system may well be the most significant contribution possible toward the development of the agricultural sector, especially toward the eventual improvement of life in the less favored areas.

3. Assessment of Project Suitability

It is the judgement of the Mission that Morocco's system of higher agricultural education has benefited from the current U.S. AID project of assistance to Hassan II Institute. It is also the judgement of the Mission that continued U.S. assistance will significantly help Morocco in reducing its severe shortage of qualified agricultural manpower, and in developing a system of higher agricultural education that is Moroccan, both in orientation and staff.

It will be noted that the project does not concern itself with the first cycle program. In the judgement of both the GOM and the Mission, the first cycle, being one of preparation and orientation, and being generally adequately staffed, does not require outside assistance beyond that which is already available. Therefore, the project is focused on the agricultural segment of the total curriculum where again, in the judgement of Moroccan officials and the Mission, U.S. inputs are needed and can be most effectively utilized.

It should also be emphasized that the project will involve Moroccans of both sexes on a completely equal basis. Women are admitted as students in all three institutions of higher agricultural education and are subsequently employed at the same rank and salaries as their male colleagues. One female student who studied in the U.S. and is now preparing her memoire is scheduled for faculty appointment at the INAV upon graduation in 1976.

The project described elsewhere in this paper reflects closely the purposes of Title III of the Foreign Assistance Act of

1975. It will help to strengthen the institutional capacity and human resource skills of an agriculturally developing country. It will also provide an opportunity for long-term collaboration between a U.S. land grant university and a developing foreign agricultural institution in teaching and research addressing problems related to food production and nutrition.

The U.S. contribution, including allowances for inflation and contingencies, is estimated at 3.3 million dollars. In the judgement of the Mission, this is a reasonable level not only in terms of the planned outputs but also in terms of the future benefits to Morocco and its people.

B. FINANCIAL ANALYSIS

1. Analysis of Hassan II Recurrent Budget and Other Donors' Contributions

In 1975, the Annual Recurrent Budget of the Hassan II National Agronomic and Veterinary Institute is \$6.7 million - \$3.7 for the operating budget and \$3.0 million for the investment budget. Given the present economic situation in Morocco, this is an important item of expenditure in the country's agricultural sector budget, accounting for 3% of that budget in 1975. The size of this allocation is the best indication of the degree of importance that the Government of Morocco attaches to development of the higher agricultural education system in general and the INAV in particular.

Annual assistance provided by France, Belgium and Canada to the Institute is considerable. In FY 1975 France is contributing \$185,000 to the investment budget; \$70,000 to the operational budget; 50 resident faculty; 37 visiting faculty and consultants; and, 45 scholarships annually. Belgium's assistance includes \$90,000 for the investment budget; \$50,000 for the operational budget; 22 resident faculty; 5 consultants; and, 17 scholarships. Canada is assisting with \$25,000 each for the investment and operational budgets; 7 resident faculty; 3 consultants; and, 5 scholarships.

Canadian assistance to INAV is scheduled for a five year period terminating in 1977 and the total amount of assistance is pre-determined. It is assumed that this assistance will be extended through the life of the project. French and Belgian assistance is subject to annual review but GOM officials expect it to remain stable at the present levels.

The following tables incorporate all the financial inputs into the Nassan II Institute, first for the initial year of the proposed project and then for the life of the project. Actual figures for all of the various budget categories were not available. Using available information, the amounts presented for in-kind contributions were calculated on the basis of U.S. standards, namely: \$11,000 for 12 man-months of participant training including transport costs; \$70,000 per man-year for the resident faculty; and, \$3,500 per man-month of consultant or visiting professor.

TABLE 6 GOM AID VARIOUS DONORS
CONTRIBUTIONS FOR 1975/76

	Canada (\$000)	Belgium (\$000)	France (\$000)	U.S. (\$000)	Morocco (\$000)	TOTAL (\$000)
Investment Budget	25	90	185	51*	3,000	3,351
Operation Budget	25	50	70	-	3,700**	3,845
Resident Faculty	490	1,540	3,500	375	-	5,905
Visiting & Consultant	10	20	305	57	-	392
Training	55	190	495	137	-	877
TOTAL	605	1,890	4,555	620	6,700	14,370

* Equipment

** Includes GOM contributions for foreign faculty support and partial salary payments to students studying abroad.

TABLE 7 TOTAL COM & DONORS' CONTRIBUTIONS
BY YEAR

	Canada (\$000)	Belgium (\$000)	France (\$000)	U.S. (\$000)	Morocco (\$000)	TOTAL (\$000)
Year 1	605	1,890	4,555	620	6,700	14,370
Year 2	630	1,970	4,745	605	6,085	14,835
Year 3	655	2,050	4,945	625	7,000	15,355
Year 4	635	2,135	5,155	545	7,285	15,805
Year 5	710	2,225	5,375	605	7,500	16,415
Sub-Total	3,285	10,270	24,775	3,000	35,450	76,780
0% Inflation	263	322	1,982	240	2,836	6,143
Contingency	52	168	293	60	504	1,077
TOTAL	3,600	11,260	27,050	3,300	38,790	84,000
	(4%)	(14%)	(32%)	(4%)	(46%)	

2. Financial Plan/Budget Tables

Under the current Assistance to Higher Agricultural Education Project 608-0000, actual contract expenditures by the University of Minnesota for the period June 1, 1970 - June 30, 1975, direct USAID dollar and Trust Fund expenditures for the period May 1, 1971 - October 15, 1975 with projections through August 31, 1976, and projected contract expenditures through the scheduled August 31, 1976, project termination date will total \$1.7 million broken down as follows:

	Actual Contract Expenditures 6/1/70-6/30/75	Direct USAID & Trust Fund Expenditures 5/1/71-10/15/75	Projected Contract Expenditures 7/1/75-8/31/76	TOTAL
Project 600-0080				
1. Salaries	509,232	-	170,100	679,332
2. Allowances	16,700	-	12,800	29,500
3. Travel & Transportation	137,093	20,000	20,888	185,981
4. Other Direct Costs	130,990	150,000 ^{a/}	52,200	333,190
5. Indirect Costs	148,868	-	46,400	195,268
6. Equipment	50,983	-	10,000	60,983
7. Participant Costs	87,746	-	128,000	215,746
	<u>1,081,612</u>	<u>170,000</u>	<u>448,388</u>	<u>1,700,000</u>

^{a/} of which \$40,000 estimated TF expenditures 10/15/75-8/31/76.

Under the proposed Higher Agricultural Education Project 600-0134, projected costs are estimated at \$3.0 million plus \$240,000 for 2% inflation factor and \$60,000 for contingency. The basic costs are broken down as follows:

	Year I 9/76-8/77	Year II 9/77-8/78	Year III 9/78-8/79	Year IV 9/79-8/80	Year V 9/80-8/81	TOTAL
Project 600-0134						
1. Salaries	184,600	178,700	195,900	205,400	215,700	980,300
2. Allowances	21,100	23,300	27,000	30,600	33,400	135,600
3. Travel & Transportation	42,000	48,000	23,000	31,000	59,000	203,000
4. Other Direct Costs	157,900	133,700	153,200	157,100	164,200	766,100
5. Indirect Costs	52,400	51,300	55,900	58,700	61,700	280,000
6. Equipment	25,000	10,000	10,000	10,000	10,000	65,000
7. Participant Costs	137,000	160,000	160,000	52,000	61,000	570,000
	<u>620,000</u>	<u>605,000</u>	<u>625,000</u>	<u>545,000</u>	<u>605,000</u>	<u>3,000,000</u>

In addition to the required Summary Cost Estimate and Financial Plan and Costing of Project Output/Inputs Tables, additional clarifying data are hereby provided in order to indicate the basis for the cost estimates and permit an evaluation of the reliability of the data.

TABLE 8

SUMMARY COST ESTIMATE AND FINANCIAL PLAN
(US \$ 000)

SOURCE USE	AID		Host Country		Other(s)		TOTAL
	FX	LC	FX	LC	FX	LC	
A. A.I.D.							
30 Man-Years of U.S. Professors	1,750	390					2,140
20 Man-Months of Consultancies	72	-					72
30 Long-Term Participants	400	-					400
12 Short-Term Participants	170	-					170
3 Vehicles	18	60					78
Lab. Equipment & Supplies	65	75					140
8% Inflation Factor	198	42					240
Contingency	42	18					60
B. GOM							
Operational Budget				20,450			20,450
Investment Budget				15,000			15,000
8% Inflation Factor				2,836			2,836
Contingency				504			504
C. Other Donors							
Operational Budget						725	725
Investment Budget						1,500	1,500
395 Man-Years of Resident Faculty					30,550		30,550
475 Man-Months of Consultancies					1,855		1,855
335 Long-Term Participants					3,700		3,700
8% Inflation Factor					2,889	178	3,067
Contingency					476	37	513
	2,715	585		38,790	39,470	2,440	84,000
	(4%)			(46%)		(50%)	

TABLE 9**PROJECT OUTPUTS/INPUTS IN %**

INPUTS	OUTPUTS					100%
	6 Research Programs	9 Graduate Courses	20 Faculty Trainees	120 Graduates in Soil & Plant Sciences	120 Student Theses	
	01	02	03	04	05	100%
30 Man-Years/Professors	10	30	20	20	20	100
20 Man-Months/Consultants	20	40	40	-	-	100
30 Long-Term Participants	34	22	-	22	22	100
12 Short-Term Participants	50	25	25	-	-	100
3 Vehicles	-	00	-	-	20	100
Laboratory Equipment and Materials	-	70	-	20	10	100

TABLE 10

**COSTING OF PROJECT OUTPUTS/INPUTS
(\$000)**

X New
Rev #

Project # 608-0134

Title: Higher Agricultural Education

Project Inputs	Project Outputs					TOTAL
	#1	#2	#3	#4	#5	
AID Appropriated						
30 Man-Years of U.S. Professors	214	642	428	426	428	2,140
20 Man-Months of Consultancies	16	28	28	-	-	72
30 Long-Term Participants	136	88	-	88	88	400
12 Short-Term Participants	36	42	42	-	-	170
3 Vehicles	-	62	-	-	16	78
- Laboratory Equipment & Supplies	-	98	-	20	14	140
	452 (15%)	960 (32%)	498 (17%)	544 (18%)	546 (18%)	3,000 (100%)
Other U.S.	-	-	-	-	-	-
Host Country*						
Other Donors*						
<u>TOTAL</u>	452	960	498	544	546	3,000

* CCA and Other Donors' contributions to the IIAV valued at approximately \$31 million is not attributable to specific project outputs.

TABLE 11

**PROPOSED HIGHER AGRICULTURAL
EDUCATION BUDGET**

608-0134

	Year I 9/76-8/77	Year II 9/77-8/78	Year III 9/78-8/79	Year IV 9/79-8/80	Year V 9/80-8/81
<u>Salaries</u>					
a) Faculty					
Soil Chemist	25,000	27,000	-	-	-
Plant Breeder	23,700	-	-	-	-
Hort./Fruits	20,400	29,800	31,300	32,800	34,500
Hort./Veg.	21,700	22,800	24,000	25,200	26,500
Soils/Watersheed Mgmt.	25,000	26,300	27,600	29,000	30,500
Range Mgmt.	25,000	26,300	27,600	29,000	30,500
Plant Breeder	-	6,300	26,300	27,600	29,000
Plant Pathologist	-	6,300	26,300	27,600	29,000
	<u>149,600</u>	<u>144,800</u>	<u>163,100</u>	<u>171,200</u>	<u>180,000</u>
b) Consultants					
Long-Term (5ann)	5,000	2,500	-	-	-
Short-Term (3ann/pa)	<u>5,000</u>	<u>5,000</u>	<u>5,000</u>	<u>5,000</u>	<u>5,000</u>
c) Staff					
Director (6ann)	15,000	15,800	16,600	17,400	18,300
Secretary (6ann)	5,000	5,300	5,600	5,900	6,200
Account Clerk (6ann)	<u>5,000</u>	<u>5,300</u>	<u>5,600</u>	<u>5,900</u>	<u>6,200</u>
	<u>25,000</u>	<u>26,400</u>	<u>27,800</u>	<u>29,200</u>	<u>30,700</u>
Sub-Total	184,600	178,700	195,900	205,400	215,700
<u>Allowances</u>					
Educational	21,100	23,300	27,000	30,600	33,400
<u>Travel & Transportation</u>					
U.S. Travel	2,500	2,500	2,500	2,500	2,500
International Travel & Per Diem	20,500	29,500	15,500	23,500	31,500
Inspection Visits (2)	(1,500)	(1,500)	(1,500)	(1,500)	(1,500)
Arrival Travel	(11,000)	(4,000)	(-)	(-)	(-)
Departure Travel	(2,000)	(2,000)	(-)	(-)	(24,000)
Home Leave Travel	(-)	(16,000)	(0,000)	(16,000)	(-)
Consultant Travel	(5,000)	(5,000)	(5,000)	(5,000)	(5,000)
Conferences	(1,000)	(1,000)	(1,000)	(1,000)	(1,000)
Shipping Household Effects	11,000	11,000	-	-	20,000
Storage Household Effects	2,000	2,000	2,000	2,000	2,000
Shipping, Project Supplies & Equipment	<u>6,000</u>	<u>3,000</u>	<u>3,000</u>	<u>3,000</u>	<u>3,000</u>
	<u>42,000</u>	<u>48,000</u>	<u>23,000</u>	<u>31,000</u>	<u>59,000</u>

	Year I 9/76-8/77	Year II 9/77-8/78	Year III 9/78-8/79	Year IV 9/79-8/80	Year V 9/80-8/81
<u>Other Direct Costs</u>					
Fringe Benefits (20%)	36,900	35,700	39,200	41,100	43,200
Preparatory Costs	1,000	1,000	1,000	1,000	1,000
Lab. Oper. Costs/ Student Research	10,000	10,000	10,000	10,000	10,000
In-Country Supplies & Expense	5,000	5,000	5,000	5,000	5,000
On Campus Supplies & Expense	5,000	5,000	5,000	5,000	5,000
In-Country Travel & Per Diem	10,000	15,000	15,000	10,000	10,000
Housing & Utilities	75,000	62,000	70,000	85,000	90,000
Language Training	15,000	-	-	-	-
	<u>157,900</u>	<u>133,700</u>	<u>153,200</u>	<u>157,100</u>	<u>164,200</u>
<u>Indirect Costs</u>					
On Campus (50%)	12,500	13,200	13,900	14,600	15,400
Off Campus (25%)	<u>39,900</u>	<u>38,100</u>	<u>42,000</u>	<u>44,100</u>	<u>46,300</u>
	52,400	51,300	55,900	58,700	61,700
<u>Equipment</u>					
Special Equipment	10,000	10,000	10,000	10,000	10,000
Vehicles (3)	<u>15,000</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
	25,000	10,000	10,000	10,000	10,000
<u>Participants</u>					
Long-Term:					
New	100,000	100,000	100,000	-	-
Continuing	-	20,000	20,000	25,000	-
Short-Term (2 pa/9mm ea.)	25,000	25,000	25,000	25,000	55,000
Travel	<u>12,000</u>	<u>15,000</u>	<u>15,000</u>	<u>2,000</u>	<u>6,000</u>
	<u>137,000</u>	<u>160,000</u>	<u>160,000</u>	<u>52,000</u>	<u>61,000</u>
TOTAL	620,000	605,000	625,000	545,000	605,000
		1,225,000	1,850,000	2,395,000	3,000,000
0% Inflation Factor					240,000
Contingency Factor					<u>60,000</u>
					<u>3,300,000</u>

C. SOCIO-ECONOMIC ANALYSIS

1. Setting

Agriculture is the mainstay of Morocco's economy. About 70% of the active population is directly engaged in farming, livestock and forestry, and 75% of the total population is dependent on agriculture. The sector contributes over 40% of all exports and about 30% of the gross domestic product.

Morocco's agricultural land area covers some 23 million hectares which comprise: 5 million ha. of forest land, 2 million ha. of Alfa or Esparto grass, 8 million ha. of grazing land, and 8 million ha. of arable land. About three-fourths of the arable land is cultivated, the remainder lying fallow. An estimated 1 million ha. is irrigable, of which less than 500,000 ha. are currently under irrigation.

The main crops are: cereals and pulses which occupy over 80% of the cultivated area and constitute the staple diet; a variety of vegetables and fruits - citrus in particular - which are produced mostly for export; olives and sunflower, which are the main sources of edible oil; and, cotton and sugarbeets.

Sheep and goats are the principal type of livestock raised and the main source of meat and milk. Cattle are raised more for their milk than for their meat. The livestock population includes an estimated 18 million sheep, 8 million goats, 3.7 million cattle, and 1.5 million donkeys, mules, horses and camels. Livestock production accounts for an estimated 30 to 40 percent of agricultural income and constitutes the only source of income for some 100,000 nomadic and semi-nomadic families.

2. Problems

Water Deficiency

Moroccan agriculture is confronted with a number of problems. Predominant among them is the increasingly generalized deficiency of water, as one moves from northwest to southeast. Rainfall ranges from over 1,200 mm in the Rif mountains in the north to less than 200 mm in the southern regions. The problem is further aggravated by wide variations in both the amount and the distribution of rainfall during the growing season, causing often considerable reduction in yield through either physiological damage to crops or outbreaks of disease, especially on cereals. In 1965-66, for example, due to limited rainfall, only some 3.4 million ha. were planted in cereals, producing about 1.9 million metric tons of grain, compared to 4.8 million ha. and 6.9 million metric tons in 1967-68, a record year.

In 1973-74, untimely late rains brought about a severe outbreak of diseases which despite estimates for a record harvest forced the GOM to import about one million MT. Late rains which started only in mid-January 1975 and thus delayed crop planting by more than two months have seriously reduced this year's harvest. Although official production statistics have not been published, press releases from the Ministry of Agriculture estimate the 1975 cereal harvest at less than 2.5 million tons.

Unequal Distribution of Growth Benefits

Two types of agriculture are practiced more or less side by side in Morocco: traditional or subsistence and modern or commercial. The traditional sector is characterized by small plots of poor, rainfed land, primitive agricultural implements and methods of cultivation, almost continuous monoculture, low yields, poor quality seed, a lack of understanding of the use of fertilizers and pesticides, and the absence of the means to acquire these inputs. Most traditional farmers raise some livestock - mainly goats and sheep - which often represents their primary if not sole source of cash income. Traditional farmers produce mostly cereals and pulses which constitute the staple diet of the country and consume the greater part of the crop-harvests.

By contrast, modern agriculture, which was introduced by the colonial administration, is practiced on large or medium sized farms, utilizing machinery, improved seed and cultural practices, as well as fertilizers and pesticides. The modern sector occupies only about 15% of the country's arable land, but the more fertile land as it is located in the areas of more abundant rainfall or in irrigated perimeters. It produces mainly fruits and vegetables for export, cotton, sugarbeets, and rice, and it accounts for over 85% of commercialized production, including bread wheat. Since independence, the modern sector has been favored by government investment and policy as it was in the colonial period. This stemmed from the government's preoccupation to increase agricultural output and to keep food prices low, and from the necessity to increase hard currency earnings, thereby creating an effective hedge against food shortages resulting from population growth and recurrent drought. One illustration of the success of such emphasis are citrus exports which increased by 80,000 metric tons, from 552,000 MT in 1966 to 607,000 MT in 1972.

Unequal Land Distribution

Uneven distribution of land ownership and complex tenure patterns characterize Moroccan agriculture. Of the 8 million ha. of arable land, there are close to 6 million hectares of farmland in the

traditional sector and around 1.5 million in the modern sector. The remaining 0.5 million ha. represent the margin of fallow. Approximately 1.1 million of the estimated total 2.1 million rural families own two hectares or less of land while another 441,000 families own none at all. Side by side, about 7% of all farmers possess 50% of all privately held land - usually in the better farming areas. Stated another way, 21% are landless; 48% own less than 2 ha.; 15% own between 2 and 4 ha.; 12% own between 4 and 10 ha.; 3% own between 10 and 20 ha.; and 1% own more than 20 ha.

According to Ministry of Agriculture estimates, farming units outside the irrigated areas must range in size from 10 to 25 ha., depending on rainfall and soil type, in order to be economically viable. On that basis, and considering that most of the rural population does not live in irrigated areas, the overwhelming majority of Moroccan farmers are either non-viable or marginal producers.

Traditionally, four broad categories of landholdings are recognized in Morocco, namely: government land, religious land, collective land and private land. Prior to the colonial period, private or melk land, by definition and usage, had to be worked; otherwise it could not be considered private. Moreover, although some land registration procedure existed, it was not compulsory. Nor was it adequate to the needs of the colonial administration which introduced a new system that made registration compulsory in cases where ownership involved non-Moroccans. Through purchases and through various types of land grants by the colonial government, Europeans acquired clear, registered titles to some 900,000 ha. of the most fertile agricultural land. A few Moroccans also obtained duly registered titles to large tracts of land. At the same time, traditional Moslem inheritance laws continued to foster land fragmentation among heirs, who often failed to properly register their titles.

Since independence, the foreign-owned land either has reverted to Moroccans through private purchases or it has been taken over by the government for redistribution to small farmers. Presently, about 62% of the total agricultural land is owned or controlled by the government and a small number of Moroccans. Croplands belonging to the State amount to about 1.6 million hectares, of which 1.2 million hectares fall in the traditional sector. These traditional lands are generally leased by plot to individuals on an annual basis. Leases, however, may sometimes run as long as three, six or nine years. Some occupants have acquired title to the land through continued and appropriate use over a period of time. Collective croplands are assigned to individual families within a tribal commune. Rights to use of habous (religious) lands are auctioned off, parcel by parcel, by the Ministry of Economic Affairs.

Recovery of foreign held lands and distribution to small

farmers' cooperatives have further complicated tenure patterns and have fueled more disputes over title or tribal rights. Furthermore, land recovery efforts and progressive Moroccanization measures over the years have prompted foreign land-holders to sell their property to private Moroccans before government take-over. This has tended to concentrate further land in the hands of the few. Land tenure changes in the Rharb (Kenitra Province) between 1965 and 1970 serve to illustrate this process: foreign held land in the modern sector during this period declined by 40,000 ha. benefitting only 150 households (an average of 300 ha. per household). Meanwhile, the number of farmers without land increased from 16% to 33% of all Rharb households during the same period.* With the nationalization by the GOM in 1973 of all remaining foreign-held land (some 200,000 ha.) this process presumably has been halted. The rapidly expanding rural population which adds 370,000 people a year to its ranks increases the pressure on the unevenly distributed land resources.

Finally, unequal land holdings contribute to widespread underemployment and subsistence production and encourage absentee ownership and inefficient land utilization, thus imposing severe constraints on expanded agricultural production and increased income for traditional farmers.

Insufficient Food Crop Production

Despite its natural endowment of reasonably good land resources, Morocco currently is a deficit producer of several food staples. In fact, modest improvements in agricultural management and practices could reverse this situation so as to provide surpluses in good crop years. For example, the country in good rainfall years produced enough cereals to satisfy domestic needs and even export some barley and oats. In poor rainfall years cereals had to be imported. However, since 1966, following a succession of poor harvests, Morocco has become a net importer of bread wheat, barley, maize and various other cereal products. In 1973 imports of these commodities were valued as follows: Bread Wheat: DH 483 million; Barley: DH 21 million; Maize: DH 15 million; and, other cereal products: DH 3.5 million. Thus, the total value of cereal imports (DH 522.5 million or about \$130 million) exceeded by far the combined value of imports of sugar, dairy products, meat, and sea foods (DH 323 million or about \$80 million). Grain imports in 1974 are sharply higher.

* Abstracted from: *Revue de Géographie* No. 20, 1971 - "Quelques données élémentaires sur l'évolution des structures agraires dans la plaine du Rharb." M. Boudierhala, pp. 114-124.

About 4.5 million hectares are planted to cereals every year. But yields are low - averaging between 0.9T to 1.3T per ha. - due to low soil fertility, poor seed and poor cultural practices, and generally poor varieties. Yet, given Morocco's endowment, it would not be unreasonable to expect yields of 2-3 tons per ha. During the 1969-72 period, total cereal production ranged from a low of 4.2 million MT in 1970 to 5.3 million MT in 1971 and 5.2 million MT in 1972. Bread wheat production during the same period ranged from 383,000 MT to 869,000 MT.

By contrast, production of pulses has been increasing steadily from 294,000 MT in 1969 to 414,000 MT in 1972. However, this increase does not reflect improved production practices, but simply an increase in the area planted to pulses: from 364,000 ha. to 481,000 ha. Average yield per ha. for all pulses during the period was between 0.8 and 0.9 T.

Sunflower seed and cotton seed are the principal sources of edible oils. (Olive oil is also produced but largely for export - 34,500 MT exported in 1972 out of a production of 55,000 MT.) Although their production has increased from 7,000 MT to 26,000 MT, and from 19,000 MT to 25,000 MT respectively between 1968 and 1972, Morocco still had to import some 91,760 MT of crude edible oils in 1972. Imports of crude edible oils totaled 108,000 MT in 1973 and 82,000 for the first six months of 1974 as compared to 72,000 MT for the same period in 1973.

Inefficient Livestock Production

Livestock production in Morocco accounts for an estimated 34% of all agricultural income and constitutes a major source of income for traditional farmers. Sheep and goats are the main animals raised and are the principal sources of meat and milk. Cattle are raised primarily for milk.

Per capita consumption of milk and milk products in 1969 was as follows:

Fresh Milk Whole	16.5 Kg.	Butter	2.2 Kg.
Canned Milk	3.3 Kg.	Cheese	0.4 Kg.
Skim Milk	13.9 Kg.		

Milk production, estimated at 525,000 MT, meets only 40% of needs. As a result, Morocco imports large quantities of dairy products which were valued at some DH 73 million in 1973, and represent, according to the Livestock Office, the equivalent of some 2 million liters of milk per day. In 1971, the last year for which statistics

are available, per capita meat consumption in urban areas was about 19 Kg, distributed as follows:

Beef	8.64 Kg.	Camel & Goat	0.52 Kg.
Lamb	2.78 Kg.	Horse & Pork	0.72 Kg.
Poultry	3.00 Kg.	Other	3.00 Kg.

Meat production is estimated at 175,000 MT and was, until very recently sufficient to meet demand. In 1974, however, Morocco had to import 120,000 sheep for slaughter, and the Ministry of Plan estimates that by 1977 fresh meat imports will rise to 30,000 MT of which 10,000 MT will be beef.

The country's livestock sector suffers from inefficient range management, disease, poor quality of animals and the traditional system of land tenure. Most of the livestock in Morocco - dairy cattle excepted - is raised on uncontrolled ranges. The livestock population exceeds the existing grazing capacity and little feed is raised and stored. As a result, many animals starve during the dry season, and in years of low rainfall, the livestock population is subject to abrupt diminution. Research results recently published by the Livestock Service show that the carcass weight of animals slaughtered has been steadily decreasing. In the case of sheep in particular, carcass weight has dropped from a high of 14.5 Kg. in 1955 to 12 Kg. in 1965, and 10.5 Kg. in 1973. In the case of cattle, the results show an average carcass weight of 118 Kg. and milk production of only 532 liters per year.

3. Impediment to Resolution of Problems - Manpower Shortage

The development of agriculture in Morocco has been and continues to be primarily the responsibility of the Government, which carries out or controls over 90% of investment and fixes to a large extent the prices of the main agricultural inputs and products.

Government intervention is direct, through the Ministry of Agriculture and Agrarian Reform (MARA), or indirect through large public cooperation such as CNCA - the agricultural credit bank; OCE - the export trade office; OCIC - the cereal trade office; SODEA and SOGETA - companies that manage the farms formerly owned by foreigners; SONACOS - the company recently created to handle the distribution and marketing of improved seed.

As we have seen, Morocco's agricultural sector is experiencing many problems. Government programs directed at them are encountering varying degrees of success. One of the major deficiencies affecting all programs alike concerns manpower shortages.

Agricultural education in Morocco as explained above, is conducted in three types of schools, required to fill the three basic categories of civil service (fonction publique) positions. These schools correspond roughly to high school, junior college and senior college in the U.S. Their graduates are employed as "adjoints techniques," "ingénieurs d'application" and "ingénieurs d'état," respectively. The first category provides the bulk of personnel for the Extension Service. The second and third categories work in research and teaching or occupy supervisory positions in the central ministry and its provincial services or in the public corporations mentioned earlier.

Excluding managerial, administrative, and clerical personnel, the Ministry of Agriculture and the quasi-public corporations presently employ some 203 master's level technicians (ingénieurs d'état and veterinarians), 376 bachelors level "ingénieurs d'application," 2,236 high school level "adjoint techniques," and 2,615 "agents techniques." Estimated needs are nearly double the number presently available. Important numbers of foreign technicians are currently partially filling this gap.

It is planned that between 1973 and 1977, the educational system will have trained 292 ingénieurs d'état, 517 ingénieurs d'application, 1,580 adjoints, and 2,667 agents techniques. These targets are probably obtainable in the last two categories but almost impossible to meet in the first two. The five institutions of higher agricultural education, as they exist presently, cannot produce that many graduates in a five-year period. In addition to expanding their physical plant, they must increase considerably the size of their teaching faculties. Since these institutions are already largely staffed by expatriates (more than 70% are supported by various donors) and the possibility for additional foreign staff is not promising, Morocco must now turn to its own people to meet increased staff requirements.

In the area of manpower development, U.S. assistance resources are critically needed to help increase the number of agriculture engineer graduates required to narrow this manpower gap. By concentrating on the development of an indigenous research and teaching capability geared to training students in soils and plant sciences at INAV and training needed manpower to increase food production and improve the nutrition status of the population, the proposed project will focus on the most important problems facing Moroccan agriculture. Its successes will therefore inevitably greatly improve the quality of life of the rural poor in Morocco.

PART IV. IMPLEMENTATION PLANNING

IV. IMPLEMENTATION ARRANGEMENTS

A. RECIPIENT'S AND A.I.D.'S ADMINISTRATIVE ARRANGEMENTS

1. Recipient

The primary recipient of U.S. assistance under the proposed project will be Morocco's higher agricultural education system and, more specifically, the Hassan II National Agronomic and Veterinary Institute. As previously noted in the technical analysis section of this paper, the system operates under the overall academic and administrative leadership of the Director of INAV. He has been in office since the creation of the Institute, and there is no reason to question the continuity of leadership in the system. The other two schools, ENA and ENFI, are each managed by an autonomous director and both have demonstrated high leadership qualities over the past few years. The capability of these three directors to develop their respective institutions, coordinate programs, implement the King's mandate and introduce new directions into the system of higher agricultural education is proof of their abilities, talents and dedication as administrators/technocrats of modern Morocco.

2. A.I.D.

Monitoring of the project implementation will not necessitate additional A.I.D. staff commitments. The Mission will maintain existing close contacts with both the contractor and the recipient.

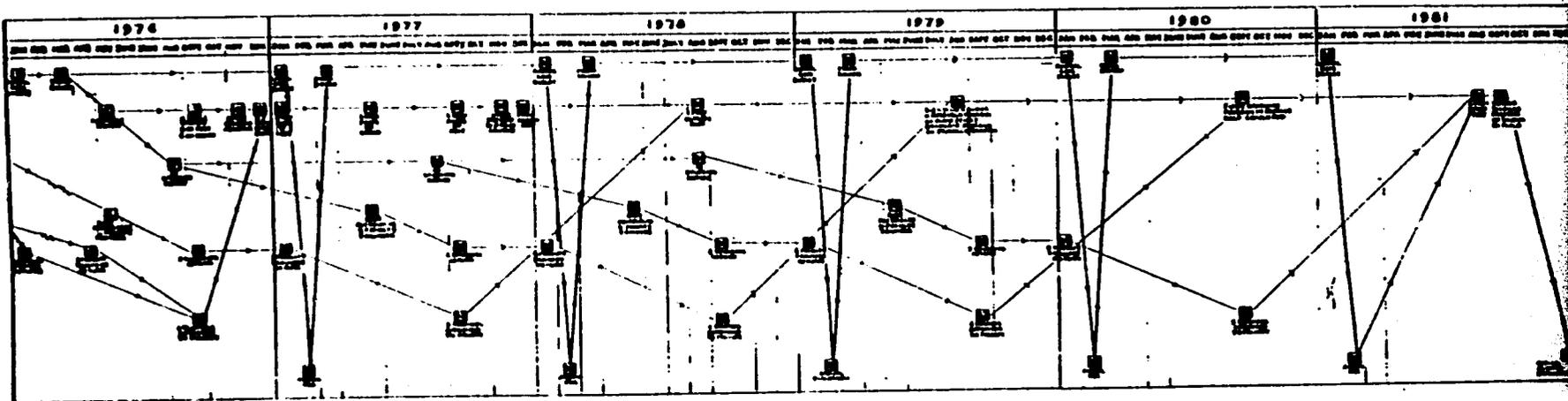
B. IMPLEMENTATION PLAN

One key output that will determine the success of the proposed project will be the number of Moroccans trained to occupy faculty positions in the system of higher agricultural education. Appointment of these young Moroccans is envisaged at the beginning of each academic year, in September. That will be possible only if, as planned, competent students are pre-selected, however tentatively, for training to that end. Hence these two linked events will be of primordial importance in the implementation of the project. They will be key considerations in determining, after the joint review scheduled for each year in February, whether the project will be continued as planned, modified, or terminated.

U.S. assistance is to be implemented through an A.I.D. contract with a U.S. land-grant university. The University of Minnesota is uniquely qualified and experienced in this regard, and a waiver for sole source procurement of contracting services is requested. The contractor has, over the past five years, established

a close working relationship with IAV. Senior professors at the University have served as regular consultants to the Institute, and have acquired considerable knowledge and experience in Morocco's higher agricultural education system. These members of the present contract staff who will be returning to faculty positions at the University will constitute an additional resource and will be available for short-term assignments in Morocco. The sole source of U.S. assistance will ensure continuity of U.S. assistance and, more importantly, avoid a delay in project implementation which could be crucial, given the critical importance of proper timing of the proposed assistance.

The Implementation Plan for this proposed activity is hereby presented.



Country: Morocco	Project No.: 608-0134	Project Title: Higher Agricultural Education	Date ;	/X/ Original / Revision	Approved:
---------------------	--------------------------	---	--------	----------------------------	-----------

CPI NARRATIVE

<u>Date</u>	<u>Responsibility</u>	<u>Date</u>	<u>Responsibility</u>
1. 1/1/76	Annual GOM budgetary allotments made. GOM	7. 8/15/76	Ten 5th year students depart for U.S. training. USAID
2. 1/30/76	One faculty trainee returns from U.S. training. GOM USAID	8. 9/1/76	Five students return from U.S. training for their 6th year at Institute. GOM USAID
3. 3/15/76	Project Agreement signed and other documentations prepared. GOM USAID	9. 9/1/76	Four faculty trainees appointed to faculty (ref. steps 2 & 4 plus one who returned 10/75). GOM
4. 4/30/76	Two faculty trainees return from training. GOM USAID	10. 9/1/76	Eight U.S. professors - four at post: soil chemistry; plant breeding; horticulture/fruits; horticulture/vegetables; and four on board, microbiology (visiting professor); virology (visiting professor), soils - watershed management (language training); range management (language training). USAID
5. 5/31/76	Contract with implementing agency signed. AID/II		
6. 5/31/76	Hassan II Institute pre-selects three faculty trainees from the group (8) presently in U.S. GOM		

Country:	Project No.:	Project Title:	Date:	/X/ Original	Approved:
Morocco	608-0134	Higher Agricultural Education		/ / Revision	
<u>CPI NARRATIVE</u>					
	<u>Date</u>		<u>Responsibility</u>		
11.	11/1/76	Third cycle research program started.	USAID		
12.	12/31/76	Two U.S. professors depart post (microbiology and virology)	USAID		
13.	1/1/77	Annual GOM budgetary allotments made.	GOM		
14.	1/15/77	Two U.S. professors arrive at post (soils watershed and range management).	USAID		
15.	1/31/77	Three faculty trainees return from U.S. training (ref. Step 6).	GOM USAID		
16.	2/15/77	Annual evaluation conducted	GOM USAID		
17.	3/15/77	Project Agreement signed.	GOM USAID		
	<u>Date</u>		<u>Responsibility</u>		
18.	5/1/77	Two U.S. professors on board - plant breeding and plant pathologist (language training).	USAID		
19.	5/31/77	Hassan II Institute pre-selects four faculty trainees from the group (10) presently in U.S.	GOM		
20.	8/15/77	Ten 5th year students depart for U.S. training.	USAID		
21.	9/1/77	Six students return from U.S. training for their 6th year at Institute.	GOM USAID		
22.	9/1/77	Three faculty trainees appointed to faculty (ref. Steps 6 & 15)	GOM		

Country:	Project No.:	Project Title:	Date:	/X/ Original Revision	Approved
Morocco	608-0134	Higher Agricultural Education			
<u>CPI NARRATIVE</u>					
	<u>Date</u>		<u>Responsibility</u>		
23.	9/1/77	Two U.S. professors arrive at post (plant breeding & plant pathologist).	USAID		
24.	11/1/77	Preparation of Third Cycle courses started.	USAID		
25.	12/31/77	One U.S. professor departs post (plant breeding, during Sept./ Dec. 77 functioning as visiting professor.)	USAID		
26.	1/1/78	Annual GOM budgetary allotments made.	GOM		
27.	1/31/78	Four faculty trainees return from U.S. training (ref. Step 19).	GOM USAID		
28.	2/15/78	Annual evaluation conducted.	GOM USAID		
29.	3/15/78	Project Agreement signed.	GOM USAID		
	<u>Date</u>		<u>Responsibility</u>		
30.	5/31/78	Hassan II Institute pre-selects four faculty trainees from the group (10) presently in U.S.	GOM		
31.	8/15/78	Ten 5th year students depart for U.S. training.	USAID		
32.	8/31/78	One U.S. professor departs post (soil chemistry)	USAID		
33.	9/1/78	Four students return from U.S. training for their 6th year at Institute.	GOM USAID		
34.	9/1/78	Four faculty trainees appointed to faculty (ref. Steps 19 & 27)	GOM		
35.	1/1/79	Annual GOM budgetary allotments made.	GOM		
36.	1/31/79	Four faculty trainees return from U.S. training (ref. Step 30)	GOM		

Country: Morocco	Project No.: 608-0134	Project Title: Higher Agricultural Education	Date:	<input checked="" type="checkbox"/> Original <input type="checkbox"/> Revision	Approved
<u>CPI NARRATIVE</u>					
	<u>Date</u>	<u>Responsibility</u>	<u>Date</u>		<u>Responsibility</u>
37.	2/15/79	Special evaluation conducted at project midpoint. GOM USAID/AID/W	43.	1/1/80	Annual GOM budgetary allotments made. GOM
38.	3/15/79	Project Agreement signed. GOM USAID	44.	1/31/80	Five faculty trainees return from U.S. training (ref. Step 39) GOM USAID
39.	5/31/79	Hassan II Institute pre-selects five faculty trainees from the group (10 presently in U.S.) GOM	45.	2/15/80	Annual evaluation conducted. GOM USAID
40.	8/31/79	Third cycle courses & research program in place; first graduate program started in Morocco. GOM USAID	46.	3/15/80	Project Agreement signed. GOM USAID
41.	9/1/79	Five students return from U.S. training for their 6th year at Institute. GOM USAID	47.	9/1/80	First graduate program in Morocco half completed. GOM USAID
42.	9/1/79	Four faculty trainees appointed to faculty (ref. Steps 30 & 36) GOM	48.	9/1/80	Five faculty trainees appointed to faculty (ref. Steps 39 & 44) GOM
			49.	1/1/81	Annual GOM budgetary allotment made. GOM
			50.	2/15/81	Annual evaluation conducted. GOM USAID

52

Country: Morocco	Project No.: 608-0134	Project Title: Higher Agricultural Education	Date:	'X/ Original / / Revision	Approved
<u>CPI NARRATIVE</u>					
		<u>Responsibility</u>	<u>Date</u>		<u>Responsibility</u>
51.	8/31 81	Six U.S. professors depart post.			USAID
52.	9'1. 81	Tested Third Cycle Program of Studies in place.			GOM
53.	12/15'81	Special in-depth evaluation conducted.			GOM USAID AID/W

C. EVALUATION STRATEGY

Given the previous U.S. association with the Hassen II National Agronomic and Veterinary Institute, the special evaluation undertaken of the current project in April 1975 and the many planning sessions carried out jointly by the Institute and USAID staffs in the preparation of the new project proposal, sufficient baseline data is available. The Institute's collaboration in the evaluation process has been close and candid and we see no reason that this will change in the future. Annual evaluations involving Institute, contractor and USAID staffs are scheduled for February each year. A special evaluation involving AID/W staff in addition to the above principals is envisaged at project mid-point while a special in-depth evaluation by an independent contractor is planned six months after the project officially terminates.

PART V. ANNEXES

STUDENT ENROLLMENT 1966-75 AND PROJECTIONS THROUGH 1981

ANNEX 1

	66-67	67-68	68-69	69-70	70-71	71-72	72-73	73-74	74-75	75-76	76-77	77-78	78-79	79-80	80-81
PREP. YEAR	33	48	94	88	110	194	225	249	294	600	600	600	600	600	600
AGRICULTURE		60	53	68	84	90	100	123	165	195	243	270	300	300	300
FORESTRY		11	30	47	58	52	57	52	58	56	69	80	90	90	90
TOPOGRAPHY						17	43	75	102	116	160	200	240	240	240
FOOD TECHNOLOGY								14	30	50	86	120	150	150	150
HORTICULTURE												100	150	150	150
SUB-TOTAL ING. DES TRAVAUX		71	83	115	142	159	200	267	355	417	558	770	930	930	950
ING. AGRICULTURES		12	30	62	109	150	183	208	215	221	279	337	395	450	500
VETERINARIANS						14	31	54	79	104	142	173	200	225	250
SUB-TOTAL ALL ING.		83	113	177	251	323	414	529	649	742	979	1280	1525	1605	1680
TOTAL STUDENTS		121	207	265	361	517	639	879	943	1342	1579	1880	2125	2205	2280

GRADUATES 1968-1975 AND PROJECTIONS THROUGH 1981

ANNEX 2

	66-67	67-68	68-69	69-70	70-71	71-72	72-73	73-74	74-75	75-76	76-77	77-78	78-79	79-80	80-81
AGRICULTURE	16	17	17	19	20	32	28	40	42	73	70	100	100	100	
FORESTRY			11	14	16	18	10	18	16	14	14	20	20	20	
TOPOGRAPHY							16	27	52	36	40	90	90	90	
FOOD TECHNOLOGY									14	16	30	50	50	50	
HORTICULTURE												50	50	50	
SUB-TOTAL															
ING. DES TRAVAUX	16	17	28	33	45	50	54	85	104	159	144	310	310	310	
ING. AGRONOMES				11	18	37	42	42	42	42	42	45	50	100	
VETERINARIANS									12	19	23	25	25	50	
TOTAL	16	17	28	33	56	68	91	127	158	200	209	380	385	460	

U.S. Inputs

Through a contract with the University of Minnesota, the U.S. will provide the following:

- (a) 30 Man-years of resident U.S. professors in Soil Chemistry, Plant Breeding, Plant Pathology, Range Management, Watershed Management, and Horticulture;
- (b) 20 Man-months of consultant services related to teaching, curriculum development, and research;
- (c) 204 Man-months of participant training for third-cycle students;
- (d) 342 Man-months of participant training for faculty members in the higher agricultural education system.
- (e) Laboratory equipment and supplies.
- (f) 3 Vehicles.

The major responsibilities of the U.S. professors will be to: train third cycle students by guiding and supervising their research work and memoire; develop, in their respective specialized areas, appropriate third cycle courses to be offered in Morocco in 1979-80; participate in the teaching of these courses in that year and in the following one; assist in the selection and training of junior Moroccan faculty; and, as appropriate, participate in second cycle training and curriculum development. Although they will be located at INAV, these professors will be expected to provide assistance to the other institutions of the system, whenever that is feasible and appropriate.

GOM Inputs

The GOM will provide:

- (a) Adequate financial support for the institutions of higher agricultural education.
- (b) Adequate facilities for teaching and research, including laboratory and other technical assistants as well as field laborers which may be necessary.
- (c) Students and faculty members to be trained in the fields of soil and plant sciences.

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

ANNEX 4

Life of Project: _____ to FY 82
From FY 78 to FY 82
Total U.S. Funding: \$3,000,000
Date Prepared: November 1978

Project Title & Number: Higher Agricultural Education 608-0134

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS																																
<p>Program or Sector Goal: The broader objective to which this project contributes:</p> <p>To improve the capability and quality of Morocco's higher agricultural education system.</p>	<p>Measures of Goal Achievement:</p> <p>The establishment in Morocco of university-level training programs in agriculture.</p>	<p>GOM records. Institute reports.</p>	<p>Assumptions for achieving goal request:</p> <p>GOM is committed to the development of an indigenous higher agricultural education system.</p>																																
<p>Project Purpose:</p> <p>To assist Morocco's higher agricultural education system in -</p> <ol style="list-style-type: none"> 1) developing an indigenous teaching and research capability geared to training students in soil and plant sciences; 2) training needed manpower to increase food production and improve nutrition status of the population. 	<p>Conditions that will indicate purpose has been achieved: End of project status.</p> <ul style="list-style-type: none"> - U.S. staff replaced by Moroccans. - 3rd cycle programs in soil and plant sciences offered in Morocco by 1979. - Institute graduates employed in food production and nutrition programs. 	<p>Institute records and publications. In-depth evaluation.</p>	<p>Assumptions for achieving purpose:</p> <ul style="list-style-type: none"> - GOM committed to the development of a Moroccan teaching and research faculty for its higher agricultural education system. - GOM will provide adequate budgetary and administrative support for the system. 																																
<p>Outputs:</p> <ul style="list-style-type: none"> - Faculty trained. - Research programs and facilities supportive of training functions. - Graduate level courses in above fields. - Graduates in soil & plant sciences. - Students' theses & publications. 	<p>Magnitude of Outputs:</p> <ul style="list-style-type: none"> - 28 Moroccan faculty members have received U.S. training. - 16 Moroccan junior faculty members appointed. - 6 Research programs. - 9 Courses prepared by 1979. - 120 Graduates in soil & plant sciences. - 120 theses & publications. 	<p>Annual project review. Special evaluations.</p>	<p>Assumptions for achieving outputs:</p> <ul style="list-style-type: none"> - GOM will provide adequate financial support for the development of research programs and graduate courses. - Qualified Moroccans will be available for faculty appointments. - Third cycle training in soil plant sciences will be offered in Morocco. - Students will specialize in above fields. 																																
<p>Inputs: U.S.</p> <ol style="list-style-type: none"> 1. Professors in soil & plant sciences at Hassan II Institute. 2. Participant training for third cycle students. 3. Participant training for faculty members in the higher agricultural system. 4. Consultant services related to teaching & research curriculum development. 5. Project related commodities. <p>GOM Buildings, teaching and research facilities, including laboratory technicians, field hands, and necessary equipment & supplies.</p> <p>OTHER INPUTS Contributions to operational and investment budgets, resident faculty, consultants, and training.</p>	<p>Implementation Target (Type and Quantity)</p> <p>Faculty</p> <table border="1"> <thead> <tr> <th>Man/years</th> <th>Specialization</th> </tr> </thead> <tbody> <tr> <td>7</td> <td>Soil Chemistry</td> </tr> <tr> <td>4</td> <td>Plant Breeding</td> </tr> <tr> <td>4</td> <td>Plant Pathology</td> </tr> <tr> <td>5</td> <td>Horticulture/Fruits</td> </tr> <tr> <td>5</td> <td>Horticulture/vegetables</td> </tr> <tr> <td>5</td> <td>Soils/Watershed Mgt.</td> </tr> <tr> <td>5</td> <td>Range Management</td> </tr> </tbody> </table> <p>Participants: 17 - 12 months training) students 13 - 10 months training) 12 - 9 months training - faculty</p> <p>Consultants: 3 m/m virology, microbiology and plant breeding. 15 m/m research & curriculum development.</p> <p>Commodities:</p> <table border="1"> <tbody> <tr> <td>3 vehicles</td> <td>\$18,000</td> </tr> <tr> <td>In-country supplies</td> <td>\$25,000</td> </tr> <tr> <td>On-campus supplies</td> <td>\$25,000</td> </tr> <tr> <td>Special lab equipment</td> <td>\$65,000</td> </tr> </tbody> </table> <p>Total U.S. contribution \$1.3 million</p> <table border="1"> <tbody> <tr> <td>Five-year operational budget</td> <td>\$20.5 million</td> </tr> <tr> <td>Five-year investment budget</td> <td>\$18.0 million</td> </tr> <tr> <td>8% inflation & contingency factors</td> <td>\$ 2.3 million</td> </tr> <tr> <td>Total GOM contribution</td> <td>\$38.8 million</td> </tr> </tbody> </table> <p>Operational budget - \$ 0.7 million Investment budget - \$ 1.5 million \$95 Man/Year of resident faculty - \$30.5 million 475 Man/Months of consultant - \$ 1.9 million \$35 long-term participants - \$ 3.7 million 8% inflation and contingency factors - \$ 3.6 million</p> <p>Total Other GOM contribution - \$41.9 million</p>	Man/years	Specialization	7	Soil Chemistry	4	Plant Breeding	4	Plant Pathology	5	Horticulture/Fruits	5	Horticulture/vegetables	5	Soils/Watershed Mgt.	5	Range Management	3 vehicles	\$18,000	In-country supplies	\$25,000	On-campus supplies	\$25,000	Special lab equipment	\$65,000	Five-year operational budget	\$20.5 million	Five-year investment budget	\$18.0 million	8% inflation & contingency factors	\$ 2.3 million	Total GOM contribution	\$38.8 million	<p>USAID records. On-site visits.</p>	<p>Assumptions for providing inputs:</p> <ol style="list-style-type: none"> 1. Contractor will provide and maintain qualified resident on a timely basis. 2. Contractor staff will have proficiency in French necessary for effective performance. 3. Contractor will provide consultant services on a timely basis. 4. Contractor will enroll trainees at appropriate institutions. <ol style="list-style-type: none"> 1. GOM will provide the major portion of necessary teaching & research equipment & supplies, as well as laboratory assistants and field laborers. 2. GOM will provide adequate financial support for operating expenses. 3. Students specializing in the fields of U.S. assistance will be selected for training in the U.S. 4. Faculty members will be selected for training in U.S. 5. Trainees will have adequate language proficiency.
Man/years	Specialization																																		
7	Soil Chemistry																																		
4	Plant Breeding																																		
4	Plant Pathology																																		
5	Horticulture/Fruits																																		
5	Horticulture/vegetables																																		
5	Soils/Watershed Mgt.																																		
5	Range Management																																		
3 vehicles	\$18,000																																		
In-country supplies	\$25,000																																		
On-campus supplies	\$25,000																																		
Special lab equipment	\$65,000																																		
Five-year operational budget	\$20.5 million																																		
Five-year investment budget	\$18.0 million																																		
8% inflation & contingency factors	\$ 2.3 million																																		
Total GOM contribution	\$38.8 million																																		

DRAFT PROJECT DESCRIPTION FOR PROAG

Since it regained its independence in 1957, Morocco has been faced with a serious shortage of qualified agriculturalists which has hampered its development efforts. To reduce and eventually eliminate this shortage, the GOM has established a network of higher agricultural education institutions which train "Ingenieur des Travaux" and "Ingenieurs-Agronomes" in the various agricultural sciences. To date, these institutions have had to depend largely on foreign professors, and, candidates for the diploma of "Ingenieur-Agronome" have had to go abroad for one year or more to complete their studies.

The GOM views these arrangements only as transitional steps in the development of a national system of higher agricultural education. It is fully committed to the Moroccanization of the programs and the faculty at these institutions.

Purpose

The Purpose of this project is to (1) develop at Hassan II National Agronomic and Veterinary Institute the indigenous teaching and research capability needed to train students in the fields of soil and plant sciences; and (2) train, in these fields, manpower needed to plan and implement the agricultural development programs of the GOM.

Outputs

Specifically, within the life of the project:

1. Moroccans will be selected, trained and appointed to the faculty of INAV and the other two institutions of higher agricultural education;
2. Moroccans already holding faculty positions will receive additional training to strengthen them in their respective specializations.
3. Third cycle courses in the fields of soil and plant sciences to be offered in the academic year 1979-80, will be developed.
4. Research programs in these fields will be established in order to train third cycle students.
5. Students will be trained in these areas.

PROPOSITIONS D' ACTIONS A MENER DANS
LE CADRE DE LA COOPERATION ENTRE LES
ETATS UNIS D'AMERIQUE
ET LE MAROC

2ème partie : les projets

ENSEIGNEMENT AGRICOLE

I - CONSIDERATIONS GENERALES -

Depuis 1968, le Gouvernement américain, par l'intermédiaire de l'U.S.A.I.D., apporte une assistance à l'enseignement supérieur agricole, dans le cadre de l'Institut National Agronomique et Vétérinaire HASSAN II.

Cette assistance est prévue pour une durée devant prendre fin en 1980.

1°) La nature de l'assistance, fournie à l'Institut National Agronomique et Vétérinaire HASSAN II.

Le principal objectif de cette assistance est d'aider cet Institut dans le planning de ses programmes et dans le développement de son enseignement et de ses travaux de recherches dans les secteurs des sciences des sols et des plantes.

A cet effet, quatre professeurs américains enseignent à l'Institut National Agronomique et Vétérinaire HASSAN II, avec le soutien de missions de support et de liaisons avec l'Université du Minnesota sous la responsabilité de deux professeurs, en sciences des sols et des productions végétales; missions équivalentes, au total, à 4 mois/an.

Par ailleurs, cette assistance prévoit la spécialisation, aux U.S.A., d'étudiants marocains, au niveau du 3ème cycle de leur formation.

Dans ce contexte, 5 étudiants marocains poursuivent leurs études à l'Université du Minnesota (3) et à l'Université d'Utah (2).

Tel qu'il se déroule, le projet actuel donne entière satisfaction et se développe avec les possibilités de l'Institut, tant du point de vue des effectifs des promotions, en constante progression dans les différentes spécialisations, que du point de vue de l'extension du laboratoire et des départements.

2°) La nature de l'assistance demandée.

D'une manière générale, il ne s'agit point d'une demande nouvelle, mais d'un projet, devant se poursuivre jusqu'en 1980.

Dans ces conditions, pour l'année 1975, le Gouvernement marocain souhaite voir maintenus les 4 professeurs américains, déjà en place, ainsi que les missions de courte durée et l'allocation des bourses de formation; dispositions qui entrent dans le cadre du projet en cours.

Toutefois, il y a lieu de rappeler l'intention de l'Institut National Agronomique et Vétérinaire HASSAN II, de mettre en place les moyens nécessaires à la formation, au niveau du 3ème cycle, de spécialistes marocains, dans le domaine de l'horticulture.

Deux professeurs américains ont été prévus, à cet effet, dans la spécialisation de l'amélioration génétique des plantes horticoles.

Leur arrivée, au Maroc, se trouve retardée compte tenu du manque d'installations nécessaires pour cet enseignement particulier. Il s'agit de la construction d'une serre et d'un hangar à claire, réclamant une dépense de l'ordre de 800.000 RF.

.....

L'U.S.A.I.D. s'est montré disposée à une participation à cette dépense, en finançant les composants à importer, sous réserve d'une prise en charge, par l'Institut, du coût en dirhams de l'opération envisagée.

Compte tenu des disponibilités budgétaires réduites de l'Institut, la réserve, sus-visée, n'a jamais pu être livrée et l'opération de construction des installations concernées n'est pas encore entreprise.

Pour permettre le démarrage de cette phase du projet, il est souhaité voir l'U.S.A.I.D. prendre à sa charge l'ensemble des dépenses qui seront occasionnées par la construction de la serre et du hangar à claies; ce qui aboutira à la mise en place des 2 professeurs américains, prévus dans le projet en cours.

134
C

ASSISTANCE TO HIGHER AGRICULTURAL EDUCATION PHASE II

MOROCCO

PROJECT 134

APPROVED: John E. [Signature]

DATE: 4/30/75

ACTION MEMORANDUM FOR THE DEPUTY ADMINISTRATOR

APR 8 1976

THRU: ES

THRU: AA/PPC, Philip Birnbaum

FROM: AA/NE, Robert H. Nooter

SUBJECT: Morocco, Assistance to Higher Agricultural Education Phase II

Problem: USAID/Rabat has submitted the attached Higher Agricultural Education Project Paper (Tab A) which concentrates on staff development for an expanding institution. This new project would be a build on to an existing project which began in FY 1970 and which we plan to complete in FY 76. The new project, Assistance to Higher Agricultural Education Phase II, will begin in FY 1976 and will end in FY 1981, by which time all participants should be returned and placed, all commodities delivered and all technical assistance completed. The six-year project life was considered necessary to permit a proper phasing of participant training and an orderly delivery of technical assistance services linked to the development of Hassan II institutional capabilities, particularly in support of the dryland agricultural effort. Therefore, your approval is needed for both the total project cost of \$3.3 million and the extended life of the project. This also requires a notification to Congress of our intent to start the new project in FY 1976, rather than continuing with the existing project (088) as listed in the 76 CP.

Discussion: Although Morocco's agricultural sector produces a livelihood for about 70% of its population, it has only recently developed a system of higher agricultural education. The only institution awarding advanced degrees is the Hassan II National Agronomic and Veterinary Institute. The Institute enrolled its first students in 1968. Students earning the Ingenieur-Agronome degree (roughly equivalent to a U. S. Masters) still have to do part of their course work abroad although their memoire (thesis) is now occasionally done in Morocco. The existing project, Assistance to Higher Agricultural Education and Training (088), began in 1970 and has provided general assistance to develop the Institute. Resident professors from the University of Minnesota taught undergraduate courses, performed and guided research, planned and developed the curriculum and trained Moroccan students, some of whom are now beginning to return as staff members to the Institute. We were concerned that Moroccanization of the project was not proceeding fast enough to permit realization of the project's goals and therefore decided to hold a formal evaluation of our assistance efforts to determine if a different course of action was needed.

The evaluation was carried out by Practical Concepts Incorporated and the U. S. Mission during FY 75. The PCI evaluation* was very well and critically done. Careful attention was given to the results of the evaluation, the existing orientation of the Moroccan institute and role the institution will serve in meeting future Moroccan agricultural needs and U. S. assistance initiatives. While

*(attached at Tab C)

all of the conclusions could not be supported, the evaluation did highlight the critical need to redesign and reorient the project to better serve Moroccan human resource needs. As a result of this review, the new project was designed to establish clear targets for the production of Moroccan professional agriculturists and concise timetables for the Moroccanization and staffing of the institute. Additionally, staffing imbalances were examined which resulted in the replacement of a soil microbiologist and a virologist with a range management specialist who would fulfill the needs of the institute and the reorientation to a dryland supportive strategy.

In sum, the new project, while having broadly similar objectives to the previous project, will be more sharply focused upon developing full Moroccan capability for teaching and student research at the third cycle (masters) level. Thus a larger core of both teaching staff and researchers will be trained.

With the broad, albeit new, higher education institutional base established by the old project the GOM also realizes now that it can, and should, develop more self reliance in its education system if it is to meet its development goals. The former project demonstrated the value of U. S. training and technical assistance which significantly assisted in institutional development. Moroccan staff development remains the critical need.

The new project will therefore concentrate on developing a Moroccan staff for the expanding institution and even though it does not focus directly upon the rural poor, it does fulfill the Congressional Mandate in developing essential trained, professional manpower for a substantial expansion of development in the agriculture sector's "problem solving" approach. The new project will directly train 30 MS participants in the combined U. S. and host institutional programs. It will also provide 30 man years of U. S. scientist/teachers to train and provide technological services at Hassan II. These inputs will provide a significant contribution to the present Moroccan staff of resident Moroccan professors and assistants.

The FY 76 CP shows the old project (088) continuing through FY 80. The FY 77 CP, however, lists the new project (134) starting at the same level of obligation as the old project (088). In order to have Congress adequately informed of the FY 76 completion of the old project and the FY 76 start for the new project, a notification to Congress is recommended.

Recommendation: That you approve this project, and the attached Congressional Notification (Tab B) by signing the Project Paper Face Sheet (Tab A).

Attachments:

1. Tab A - Project Paper
2. Tab B - Congressional Notification
3. Tab C - PCI Evaluation Report

Clearances:

NE/DP:BLangmaid Jan
PPC/DPR:AMHandly AM
PPC/DPR:BOdell (draft) BO
NE/TECH:DSteinberg (draft)
GC/NE:CCostello (draft)
NE/NENA:GLaudato/MWard (draft)
NE/CD:RSlusser (draft)
GC:CLGladson (draft) CL
PPC/RB:GCauvin (draft) GC
PPC/RC: M. S. HEYL M.S.H.
L/PCS:AWestwood per AW

Notification to the Congress

COUNTRY : Morocco

PROJECT TITLE : Assistance to Higher Agricultural Education Phase II

PROJECT NUMBER : 608-11-110-134

APPROPRIATION CATEGORY : Food and Nutrition

INTENDED OBLIGATION : FY 1976 \$410,000

T.O. \$100,000

In accordance with Section 113 of the Foreign Assistance and Related Programs Appropriations Act, 1975, we are providing notification that we intend to start a new FY 1976 project in Morocco which follows closely the substance of the FY 1976 presentation, but does, nevertheless, constitute a new project rather than a continuation of an existing project.

Since FY 1970 AID has carried on an institutional building project to develop the principal Moroccan institution of higher agricultural education, the Hassan II Institute. Our FY 1976 Congressional Presentation indicated a continuation of this effort until FY 1980. During the course of carrying out this project a new set of needs emerged as Morocco attempted to expand its professional core agriculturists. To assess these needs an in-depth project evaluation was carried out by Practical Concepts Incorporated and the field Mission. As a result of the evaluation, a new project was formulated to assist the expansion of the Moroccan program for training university graduates. Hence in FY 1976 we propose to start the new Assistance to Higher Agricultural Education Phase II Project and the old project will be terminated. For both the terminating and new project we propose to obligate only the total amount of funds (\$410,000) which was presented in the FY 1976 Congressional Presentation as the level of effort for higher agricultural education.

Attachment: Grant Activity Data Sheet

Country: MOROCCO

GRANT ACTIVITY DATA

TABLE III

TITLE Assistance to Higher Agricultural Education Phase II NUMBER 608-11-110-134	FUNDS	PROPOSED OBLIGATION (\$000)	
	Food and Nutrition	FY 76 410	T.Q. 100
	PRIOR REFERENCE FY 1976 NESA Programs, p.73	INITIAL OBLIGATION FY: 1976	SCHEDULED FINAL OBLIGATION FY: 1980

Goal. To improve the capability and quality of Morocco's higher agricultural education system.

Purpose. To assist Morocco's higher agricultural education system in:

- developing an indigenous teaching and research capability geared to training students at the graduate level in soil and plant sciences;
- training needed manpower to increase food production and improve the nutrition status of the population.

Background. This new project is designed to reinforce and build on the successful experience of the Higher Agricultural Education Project - 608-11-110-088. Following a detailed evaluation of the Hassan II Agricultural Institute's program, the Government of Morocco has requested assistance to introduce a full cycle graduate level program into the Institute's offerings. The high quality of the instruction and research guidance provided by the University of Minnesota under the previous project convinced Moroccan academic

administrators of the merits of the U.S. problem-solving approach in higher education. This development -- an orientation away from the traditional theoretical European educational style -- will be completed in the Phase II project with the development and establishment of a full cycle graduate training program in soil and plant sciences at the Hassan II Agricultural Institute. The Government of Morocco is convinced that the U.S. approach to agricultural education is not only capable of producing competent agriculturalists more rapidly than the traditional European approach but that its graduates are more action-oriented and more immediately effective as professionals. Among the students who have studied in the U.S., or completed their thesis work under the supervision of U.S. professors in the previous project, seven have either been appointed to faculty positions at the Institute or are expected to receive such appointments by 1976.

Under the new project, the Institute will establish research programs designed for graduate training in soil and plant sciences, and enroll students in these programs. The full cycle graduate program will be taught at the Institute during the

U.S. DOLLAR COST (In Thousands)										PRINCIPAL CONTRACTORS/ AGENCIES				
6/30/74 Through	Obligations	Expenditures	Unliquidated	Cost Components	OBLIGATIONS									
					Estimated FY 75	Proposed FY 76	Proposed T. Q.	Direct AID	Contract/ Other Agency		Total			
Estimated through 6/30/75	-	-	-	U.S. Technicians ...	-	-	-	-	308	308	-	-	-	University of Minnesota
Proposed FY 76	410	Future Year Obligations	Estimated Total Cost	Participants	-	-	-	37	-	37	100	-	100	
Estimated T. Q.	100		3,300	Commodities	-	-	-	10	-	10	-	-	-	
				Other Costs	-	-	-	35	-	55	-	-	-	
				Total Obligations ...	-	-	-	102	308	410	100	-	100	

GRANT ACTIVITY DATA

MOROCCO

Continuation Sheet

TITLE	NUMBER
Assistance to Higher Agricultural Education Phase II	608-11-110-134

last two years of the project. Moroccan junior faculty will participate actively in both teaching and research activities under the guidance of U.S. professors.

Outputs. By the end of the project, the following outputs will have been achieved:

- Twenty-eight Moroccan faculty members will have received U.S. training
- Sixteen Moroccan junior faculty members will have been appointed to Institute positions
- Six Research programs will have been undertaken
- Nine courses will have been prepared (by 1979)
- One hundred twenty students will have graduated in soil and plant sciences
- One hundred twenty theses and publications will have been produced

U.S. Technicians

\$308,000

- will fund the services of six professors in soil and plant sciences at an average cost of approximately \$51,000 each, per year, plus short-term advisory assistance

Participants

37,000

- for three long-term and two short-term participants

Commodities

10,000

- for two vehicles and special research and training equipment

Other Costs

55,000

- for local and logistic support, i.e., housing, utilities and transportation

Host Country and Other Donors. By the end of the project, the total Government of Morocco contribution will be \$38,800,000 for buildings, teaching and research facilities, including laboratory technicians, field workers and necessary equipment and supplies. Contributions by other donors (for operational and investment budgets, resident faculty, consultants and training) will total \$41,900,000 by the end of the project.

FY 1976 Program.

AGENCY FOR INTERNATIONAL DEVELOPMENT
PROJECT PAPER FACESHEET
 TO BE COMPLETED BY ORIGINATING OFFICE
 AGENCY/NATIONAL ENTITY/GRATEE
MOROCCO

1. TRANSACTION CODE (IN APPROPRIATE BOX)
 ORIGINAL CHANGE
 ADD DELETE

2. DOCUMENT REVISION NUMBER

3. ESTIMATED FY OF PROJECT COMPLETION
 FY 81

4. ESTIMATED FY OF AUTHORIZATION/OBLIGATION
 A. INITIAL MO. YR. 3 76 B. FINAL FY 80

5. PROJECT TITLE - SHORT (STAY WITHIN BRACKETS)
Assistance to Higher Agricultural Education Phase II

6. SECONDARY TECHNICAL CODES (MAXIMUM SIX CODES OF THREE POSITIONS EACH)

7. PROGRAM FINANCING	8. ESTIMATED TOTAL COST (\$000 OR EQUIVALENT, \$17 = 100)					
	FIRST YEAR			ALL YEARS		
	H. FY	I. L/C	J. TOTAL	K. FY	L. L/C	M. TOTAL
GRANT TOTAL	410	-	410	2,715	585	3,300
LOAN TOTAL	(410)	(-)	(410)	(2,715)	(585)	(3,300)
GOVERNMENT	-	6,700	6,700	-	38,790	38,790
TOTAL	6,605	445	7,050	39,470	2,440	41,910
	7,015	7,145	14,160	42,185	41,815	84,000

9. ESTIMATED COSTS/AID APPROPRIATED FUNDS (\$000)

A. PROGRAM	B. PROJECT	C. CATEGORY	FY <u>76</u>		FY <u>77</u>		FY <u>77</u>		ALL YEARS	
			D. GRANT	E. LOAN	F. GRANT	G. LOAN	H. GRANT	I. LOAN	J. GRANT	K. LOAN
IN	101	081	410	-	100	-	715	-	3,300	-
			410	-	100	-	715	-	3,300	-
			-	-	100	-	520	-		

PROJECT PURPOSE(S) (STAY WITHIN BRACKETS) CHECK IF DIFFERENT FROM PID/PPP
 To assist Morocco's Higher Agricultural Education system in: (1) developing an indigenous teaching and research capability geared to training students in soil and plant sciences; and, (2) training needed manpower to increase food production and improve nutrition status of the population.

10. ARE THERE ANY CHANGES IN THE PID/PPP FACESHEET DATA NOT INCLUDED ABOVE? IF YES, ATTACH CHANGED PID/PPP FACESHEET.
 YES NO

11. ORIGINATING OFFICE CLEARANCE

12. DATE SIGNED
 Mission Director Colbert P. Keston MO. DAY YR. 09 15 75

13. DATE RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION
 MO. DAY YR. _____

Assistance to Higher Agricultural Education Phase II

PROJECT PAPER

	<u>Page No.</u>
I. <u>SUMMARY & RECOMMENDATIONS</u>	
A - Face Sheet Data	1
B - Recommendations	2
C - Summary Description of Project	2
D - Summary Findings	2
E - Project Issues	3
II. <u>PROJECT BACKGROUND & DETAILED DESCRIPTION</u>	
A - Project Background	6
1. Setting	6
2. Higher Agricultural Education System	7
3. Current U.S. Assistance	8
4. Special Evaluation	10
5. Continued Critical Shortage of Qualified Manpower	11
B - Detailed Description (Logical Framework Matrix)	14
III. <u>PROJECT ANALYSES</u>	
A - Technical Analysis	19
1. Institutions of Higher Agricultural Education	
2. Administration	19
3. Student Recruitment	20
4. Training Programs	20
5. Faculty	24
6. Graduates	26
7. Manpower Needs & Projections of Graduates	28
8. Assessment of Project Suitability	30
B - Financial Analysis	31
1. Analysis of Hassan II Recurrent Budget and Other Donors' Contributions	31
2. Financial Plan/Budget Tables	33

III.	<u>PROJECT ANALYSES (Cont'd).</u>	
	C - Socio-Economic Analysis	40
	1. Setting	40
	2. Problems	40
	3. Impediment to Resolution of Problems - Manpower Shortage	45
IV.	<u>IMPLEMENTATION PLANNING</u>	
	A - Recipient's & A.I.D.'s Administrative Arrangements	47
	B - Implementation Plan (PPT Network)	47
	C - Evaluation Strategy	54
V.	<u>ANNEXES</u>	
	1. Student Enrollment-1966-75 and Projections-- Through 1981	
	2. Graduates 1968-1975 and Projections through 1981	
	3. Draft Project Description for ProAg	
	4. Logical Framework	
	5. COM Request for Project	

Notification to the Congress

COUNTRY : Morocco

PROJECT TITLE : Assistance to Higher Agricultural Education Phase II

PROJECT NUMBER : 608-11-110-134

APPROPRIATION CATEGORY : Food and Nutrition

INTENDED OBLIGATION : FY 1976 \$410,000

T.Q. \$100,000

In accordance with Section 113 of the Foreign Assistance and Related Programs Appropriations Act, 1975, we are providing notification that we intend to start a new FY 1976 project in Morocco which follows closely the substance of the FY 1976 presentation, but does, nevertheless, constitute a new project rather than a continuation of an existing project.

Since FY 1970 AID has carried on an institutional building project to develop the principal Moroccan institution of higher agricultural education, the Hassan II Institute. Our FY 1976 Congressional Presentation indicated a continuation of this effort until FY 1980. During the course of carrying out this project a new set of needs emerged as Morocco attempted to expand its professional core agriculturists. To assess these needs an in-depth project evaluation was carried out by Practical Concepts Incorporated and the field Mission. As a result of the evaluation, a new project was formulated to assist the expansion of the Moroccan program for training university graduates. Hence in FY 1976 we propose to start the new Assistance to Higher Agricultural Education Phase II Project and the old project will be terminated. For both the terminating and new project we propose to obligate only the total amount of funds (\$410,000) which was presented in the FY 1976 Congressional Presentation as the level of effort for higher agricultural education.

Attachment: Grant Activity Data Sheet

GRANT ACTIVITY DATA

TABLE III

Assistance to Higher Agricultural Education Phase II Morocco 603-11-110-131	Food and Nutrition FY 1976 NESEA Programs, p.73	FY 76	410	T.O.	100
		INITIAL OBLIGATION	SCHEDULED	TOTAL OBLIGATION	
		FY: 1976		FY: 1980	

Goal. To improve the capability and quality of Morocco's higher agricultural education system.

Purpose. To assist Morocco's higher agricultural education system in:

- developing an indigenous teaching and research capability geared to training students at the graduate level in soil and plant sciences;
- training needed manpower to increase food production and improve the nutrition status of the population.

Background. This new project is designed to reinforce and build on the successful experience of the Higher Agricultural Education Project - 603-11-110-089. Following a detailed evaluation of the Hassan II Agricultural Institute's program, the Government of Morocco has requested assistance to introduce a full cycle graduate level program into the Institute's offerings. The high quality of the instruction and research guidance provided by the University of Minnesota under the previous project convinced Moroccan academic

administrators of the merits of the U.S. problem-solving approach in higher education. This development -- an orientation away from the traditional theoretical European educational style -- will be completed in the Phase II project with the development and establishment of a full cycle graduate training program in soil and plant sciences at the Hassan II Agricultural Institute. The Government of Morocco is convinced that the U.S. approach to agricultural education is not only capable of producing competent agriculturalists more rapidly than the traditional European approach but that its graduates are more action-oriented and more immediately effective as professionals. Among the students who have studied in the U.S., or completed their thesis work under the supervision of U.S. professors in the previous project, seven have either been appointed to faculty positions at the Institute or are expected to receive such appointments by 1976.

Under the new project, the Institute will establish research programs designed for graduate training in soil and plant sciences, and enroll students in these programs. The full cycle graduate program will be taught at the Institute during the

U.S. DOLLAR COST (In Thousands)										PRINCIPAL CONTRACTORS/ AGENCIES			
6/30/74 Through	Obligations	Expenditures	Unliquidated	Cost Components	OBLIGATIONS								
	Estimated FY 75	Proposed FY 76	Estimated T. Q.		Estimated FY 75	Proposed FY 76	Proposed T. Q.	Estimated FY 75	Proposed FY 76		Proposed T. Q.		
					Direct AID	Contract/Other Agency	Total	Direct AID	Contract/Other Agency	Total	Direct AID	Contract/Other Agency	Total
	-	-	-	U.S. Technicians ...	-	-	-	-	308	308	-	-	-
	-	-	-	Participants	-	-	-	37	-	37	100	-	100
	-	-	-	Commodities	-	-	-	10	-	10	-	-	-
	-	-	-	Other Costs	-	-	-	55	-	55	-	-	-
Proposed FY 76	410	Future Year Obligations	Estimated Total Cost	Total Obligations ..	-	-	-	102	308	410	100	-	100
Estimated T. Q.	100	2,790	3,300										

University of
Minnesota

GRANT ACTIVITY DATA

Continuation Sheet

MO 0000

TITLE	NUMBER
Assistance to Higher Agricultural Education Phase II	608-11-110-134

last two years of the project. Moroccan junior faculty will participate actively in both teaching and research activities under the guidance of U.S. professors.

Outputs. By the end of the project, the following outputs will have been achieved:

- Twenty-eight Moroccan faculty members will have received U.S. training
- Sixteen Moroccan junior faculty members will have been appointed to Institute positions
- Six Research programs will have been undertaken
- Nine courses will have been prepared (by 1979)
- One hundred twenty students will have graduated in soil and plant sciences
- One hundred twenty theses and publications will have been produced

Host Country and Other Donors. By the end of the project, the total Government of Morocco contribution will be \$39,800,000 for buildings, teaching and research facilities, including laboratory technicians, field workers and necessary equipment and supplies. Contributions by other donors (for operational and investment budgets, resident faculty, consultants and training) will total \$41,900,000 by the end of the project.

FY 1976 Program.

U.S. Technicians	\$308,000	- will fund the services of six professors in soil and plant sciences at an average cost of approximately \$51,000 each, per year, plus short-term advisory assistance
Participants	37,000	- for three long-term and two short-term participants
Commodities	10,000	- for two vehicles and special research and training equipment
Other Costs	55,000	- for local and logistic support, i.e., housing, utilities and transportation