

Evaluation Report
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OVERVIEW OF DEVELOPMENT AND FUTURE NEEDS

OF

HASSAN II NATIONAL INSTITUTE OF AGRICULTURE AND VETERINARY

AND OF THE

MINISTRY OF AGRICULTURE

MOROCCO

(Contract No. AID/NE-c-1560)

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SUMMARY

Moroccan Agricultural Need and Potential

Increased food production is necessary because a rather rapid increase in population and erratic food production in recent years have resulted in a decline in food production per capita. There is also a need for production for export to yield foreign exchange.

The potential for increasing food production appears to be phenomenal. Large areas of productive land are available in both dryland and potentially irrigable areas. Along with a favorable climate, this suggests the possibility of at least doubling the yields per acre and of producing two crops per year in some irrigated areas. The government's attitude toward agricultural improvement is indicated in recent statements attributed to King Hassan II. In essence: (a) agricultural production will receive very high priority, (b) there must be more help for the poor, and (c) uncropped arable land should be placed in the hands of cultivators who will crop it.

The need for increasing food production is obvious. The government appears to be firm in its commitment to development of agriculture.

Status and Future Role of IAV

In approximately twelve years of existence Hassan II Institute of Agriculture and Veterinary (IAV) has developed rapidly. It is, and evidently will continue to be, the only institution of higher agricultural education for training agricultural manpower. Its faculty consists of many foreigners and a student body that is 10 percent foreign, mostly from nearby African countries. IAV has a well-established four-year program. There is no

FOREWORD

Upon gaining independence in 1956, slightly more than two decades ago, Morocco found itself faced with a momentous task of economic development. It has been, and still is, predominantly an agricultural country with more than 60 percent of its population engaged in agriculture which provides the major source of its gross national product.

As is true in most newly independent countries, the Moroccan situation is one of low per capita food production and consumption, technologically and economically underdeveloped agriculture, low literacy rate, low per capita income, and inequitable income distribution (and ownership of resources). Morocco, however, has resources to develop a substantial agricultural industry. In the early 1960s it was recognized that one of the keys to its agricultural growth was the development of an agricultural education system. At that time plans were laid for such a system, culminating in the establishment of Hassan II National Institute of Agriculture and Veterinary (IAV) in 1966-1967. In 1969-1970 USAID initiated its technical assistance program in higher agricultural education, USAID Project 608-0134, which is presently in Phase II.

It is this project which the team is asked to review and evaluate and to make recommendations about future project directions. The report is to provide management orientations which will be used as a basis for decision making and action.

coursework for an M.S. program but this may be initiated in selected areas in a few years; Ph.D. work is unlikely for the near future.

The potential role and impact of IAV is unlimited. As the trainer of agricultural manpower for teaching, research, and extension, its influence will be felt throughout the agricultural and related sectors of the economy.

Without a strong IAV the agricultural development of Morocco could well be delayed, unbalanced, and far below its potential. IAV is at a critical stage of development and may well need more assistance in the next decade than in the past. The atmosphere appears to be very receptive to effective use of such assistance.

Past and Future Impact of USAID Assistance

In the approximately eight years that the University of Minnesota has been working with IAV, several noteworthy things have happened. Most important is a change in attitude toward the United States--especially in regard to its system and philosophy of higher agricultural education--from one of questioning, possibly even resisting, to one of whole-hearted, cordial acceptance. Several man-years of adviser service, both long- and short-term, have been instrumental in accomplishing this change and in initiating several continuing programs at IAV, notably those in soils and plant pathology. The presence of advisers and consultants has helped to speed up IAV development and to strengthen existing programs, especially in research.

In the long run, training of Moroccans will be the major factor contributing to development of a strong IAV. The director of the institute has expressed a desire to have approximately 50 percent of his faculty trained in the

United States. To date, 53 Moroccans have been sent for training, almost all at the M.S. level.

In this initial period, when progress would be expected to be slow, there have been noteworthy achievements under the contract.

Future opportunities for the USAID Assistance Contract to impact on IAV, and through it on agricultural development in Morocco, appear to be almost unlimited. IAV is probably at a more critical development stage than it was eight years ago. There are three priority areas for expanding assistance, or phasing it in as original components phase out: (1) agricultural economics, (2) extension education, and (3) institutional administrative organization and operation. Continued emphasis should be placed on (a) training, with more emphasis at the Ph.D. level as early as feasible, and (b) especially on development of a high-quality research program.

With an appropriate commitment and interest on the part of the contracting university(s) there is almost unlimited opportunity for developing an outstanding institute which will impact on all of agriculture in Morocco.

Suggestions for Continuing the Program

1. Continuing assistance in the development of IAV should have major impacts on agricultural development in Morocco and neighboring countries in the near future, but more importantly in the long-term, indefinite future. Assistance should be continued, within the collaborative assistance mode of Title XII.
2. Based on favorable reactions to the University of Minnesota by administrators of IAV and of the AID Mission it would be appropriate for that institution to serve in a lead role.

3. The University of Minnesota should affiliate with several other institutions to provide the breadth of subject matter, climatic conditions, and crop specialization to provide needed contract staffing and training. The affiliation should be sufficiently formal--at minimum a memorandum of understanding--to indicate interest and commitment of other institutions. The director of IAV was deeply interested in this and suggested several U.S. institutions by name.
4. Continuation of the program should be based on a ten-year program as a minimum, with a firm commitment for five years and an annual roll forward. A long-term commitment with considerable emphasis on training and research (a) is essential to intensifying the impact of USAID on the continuing development of IAV and thereby on Moroccan agricultural development, and (b) should enhance the ability of the University of Minnesota to recruit senior faculty members from its staff and from affiliated universities for assignment in Morocco. It is important that a senior faculty member of the University of Minnesota serve as team leader in Morocco. He should be able to speak authoritatively and knowledgeably for the University of Minnesota and serve in a program planning capacity. It is also suggested that at least 50 percent of the contract personnel in Morocco be faculty members of the University of Minnesota or of affiliated universities.
5. The present training program, consisting of coursework in the United States and memoir (M.S.) in Morocco, is very difficult to administer. Trainees who had returned to Morocco and those now

at the University of Minnesota had several common complaints.

The University of Minnesota should increase its efforts on a continuing basis to improve the program by:

- a. Continuing to improve the selection process as started by the present team in Morocco.
 - b. Providing more lead time for sending trainees to the United States.
 - c. Striving for accurate communications. False hopes are built up by inadequate communications.
 - d. Emphasizing the study of English in Morocco, with a goal of 90 percent of the students passing the final test in Intensive English Training at the University of Minnesota.
 - e. Until (a) and (b) are achieved the University of Minnesota and affiliated institutions must accept responsibility for more personal attention to individual trainees.
6. In the interests of complying with the strategy of AID and consistent with Morocco's desire to increase food production and assist the poor, near-future emphasis should be placed on developing the role of IAV in extension (cultivator education).

INTRODUCTION

Contractual arrangements for Project 608-0134 provided for a special external evaluation conducted at project midpoint. A four-member evaluation team was appointed in mid-October 1978. The team was charged with meeting the following objectives:

1. To review/evaluate the project in terms of contribution to AID/GOM/IAV objectives and planned accomplishments.
2. To recommend future project directions and/or changes to support the institute and to support Government of Morocco (GOM) development needs and strategies.
3. To serve as a management-oriented report commanding respect of concerned parties, and which will be used as basis for decision making and action.

The evaluation team assembled in Washington on October 16, 1978, and completed its evaluation November 11, 1978. Details of team activity are included in Table 1 of the Appendix.

The evaluation team reviewed available documents relevant to Project 608-0134 from its inception to the present. Confidential interviews were held with:

1. GOM officials.
2. IAV administrators and other personnel.
3. University of Minnesota team staff members in residence at Rabat and a short-term consultant.
4. Moroccan trainees who had returned from the United States.
5. Members of several other donor country teams.

6. Members of two international agencies assisting in developing Moroccan agriculture.
7. University of Minnesota administrative, teaching, and research personnel.

Group meetings were held with IAV trainees on the University of Minnesota campus. Observation trips were taken to the IAV campuses at Rabat and Agadir, to the affiliated campus at Meknes, and to a small agricultural training school, CIDERA, operated by missionaries near Rabat.

Based on the above, the team obtained an overview of the development of agricultural education system(s) in Morocco before and during the past decade.

AGRICULTURAL EDUCATION IN MOROCCO

Agriculture is a very important sector in the Moroccan economy. About 50 percent of the labor force is engaged in agriculture, accounting for about 30 percent of the gross domestic product and 40 percent of the country's exports. The main crops are cereals, pulses, a variety of fruits and vegetables, olives, sunflowers, cotton, and sugar beets. Livestock accounts for about 30 percent of agricultural production. The estimated livestock population includes an estimated 1.8 million sheep, 8 million goats, and 3.7 million cattle.

Morocco's agricultural land area covers some 23 million hectares comprising 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 are irrigable, of which 500,000 ha are currently under irrigation.

Moroccan agriculture is confronted with a deficiency of water. Annual rainfall varies 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, often causing considerable reduction in yield through either physiological damage to crops or outbreaks of disease, especially on ~~cereals~~.

Role of Higher Education in Agricultural Development

Programs in higher agriculture education, research, and extension must form an essential base from which solutions to food production and hunger problems will come. The role of an agricultural university, in this instance

Hassan II Institute of Agriculture and Veterinary (IAV), must be of considerable breadth and duration. The institute is the prime trainer of agricultural research workers for Morocco, who will be one of the most important keys to increasing agricultural production, whether they work in IAV, the government, or the private sector.

IAV also is responsible for formal higher-level education of persons for employment at various levels in the government and the agricultural industries of Morocco.

IAV also should play a substantial role in the training of workers in extension education, both in their formal university-level education and in special short courses and in-service training programs.

Successful and timely agricultural development depends on a high level of integration of these three major functions--teaching, research, and continuing (extension) education. How effectively this is done depends on cooperative relationships between IAV, the Ministry of Agriculture, and other public and private organizations and agencies involved in and related to agriculture.

The 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 'Ingenieurs-Agronomes' to meet the needs of the agricultural sector."

In October 1968 the institute opened its doors to 12 students selected from 33 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.

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 (MAPA), and its name was changed to the Hassan II National Agronomic and Veterinary Institute also referred to as the Institute of Agriculture and Veterinary (IAV). That same year, authority was granted to the institute to: (a) award the degree of Doctor of Agronomic Sciences and the diploma of Ingenieur des Travaux in Food Technology and Nutrition and in Topography and Rural Works, and (b) establish a two-year postsecondary program for the training of agricultural technicians.

The institute's six-year study program is divided into three cycles, each covering two years (see Figure 1, Appendix). The first cycle (first and second years) is one of preparatory studies in the basic physical, biological, and social sciences. The second cycle (third and fourth years) includes study of general agriculture with emphasis on the plant and animal sciences but with some coverage of agricultural engineering, agricultural economics, and rural sociology. Cycles 1 and 2 are supplemented with field experiences (stages) to provide a practical understanding of agricultural production and rural life. Students who complete the second cycle are awarded a general agronomy diploma, which is approximately equivalent to a B.S. degree.

In the third cycle (fifth and sixth years) study is in a specialized field of agriculture. During the fifth year students attend formal courses in another country, usually France, Belgium, or the United States. IAV offers no third-cycle courses at present but plans to do so as soon as it has enough adequately trained Moroccan faculty. During the sixth year most students return to the IAV to prepare a memoire (M.S. thesis). Upon completion of the thesis the students are awarded the diploma of Ingenieur-Agronome. IAV considers this diploma to be equivalent to a M.S. degree.

Admission to IAV is quite competitive. In 1975 the institute doubled its enrollment and began admitting 600 students each year from approximately 2,000 applicants selected from all regions of Morocco. In addition, 10 percent come from other countries, primarily North Africa. Twenty-four percent are sons and daughters of peasants while 1 percent have parents in the professions. Five percent of the entering class in 1977 were women.

Upon completion of the first year of the first cycle, approximately 17 percent or 100 students are selected for third cycle training. The remaining students are placed in various four-year programs in an agricultural specialization. Once students are admitted to the six-year program they apparently are not dropped by IAV. It appears that 95 percent of those admitted complete the six-year program on schedule. Thus by 1981, about 95 students should be graduating each year from the third cycle.

Also in 1968, the National School of Forestry Engineers at Sale was established to train Ingenieurs des Travaux specializing in forestry, range and watershed management, and soil conservation. The National School of Agriculture of Meknes was upgraded in 1966 to train Ingenieurs des Travaux in general agriculture. This diploma requires four years of studies and qualifies its holder for employment at the civil service rank of Ingenieur d'Application.

A new branch of IAV is under construction near Agadir for programs in horticulture and plant protection, with dormitory space for 540 students beginning in 1979. One-year, two-year, four-year (B.S.) and six-year (M.S.) training will be offered. Short-course training also will be offered.

IMPACT OF AID PROJECT 608-0134 ON IAV

USAID Project 608-0134 was initiated in 1969. In approximately twelve years, a very short period in the life of an educational institution, IAV has developed from almost nothing physically to a substantial campus with a rapidly growing faculty and student body.

Major donors to IAV have been Canada, Belgium, France, the United States, and the Government of Morocco. Assistance from the United States has been a small percentage of the total. The projected assistance for 1975-1976 was \$3,300,000--about 4 percent of the total. Assistance from Canada was also 4 percent of the total. Major donors were France (32 percent), Belgium (14 percent) and the Government of Morocco (46 percent). Seventy percent of the United States' assistance has consisted of providing faculty and consultants to IAV, with 22 percent allocated for training of Moroccans and 8 percent for purchases of equipment. Originally, Project 608-0134 was visualized as a multinational, multiinstitutional, collaborative effort. That goal has been achieved to a limited extent, more so in the early years than at present. Under such conditions it is difficult to isolate the impact of any one project or program.

To date U.S. personnel have provided 32 man-years of service as faculty members of IAV. In terms of training, 53 IAV students and faculty have completed or are presently undergoing training. Most of this has been at the M.S. level with Ph.D. training just recently initiated.

A major impact of this project has been a reversal of attitude toward the United States and its system of higher education in agriculture, as evidenced by two observations: The director of IAV indicated that he

considered the U.S. system of agricultural education to be the best in the world and that we should be doing more to export it. He hopes that ultimately approximately 50 percent of his faculty will have been trained in the United States. Trainees who had returned from the United States were asked why they wanted to go to the United States rather than to France for training. Common replies were that (a) English is the language of science in the world today and (b) they wanted to become familiar with a different culture. A first, often slow, step in a program such as this is to gain acceptance of ideas, concepts, and philosophies. This has been accomplished.

Another impact is in the area of research. Again, quantitative measures are unavailable but observations suggest that a major activity of U.S. faculty members at IAV has been in supervising theses individually and in cooperation with other faculty members. We suspect this has substantially upgraded the quality of research at that level.

The impact of the training program is reflected in the present situation which is the beginning of a transition—gradual to be sure—from emphasis on training at the M.S. level to Ph.D. training. Such evolution is essential to development of a high-quality faculty for a prestigious institution.

Costs and Benefits

A question occasionally was asked relative to estimated costs of and returns to the project. Admittedly the cost of such a project is substantial but the long-range nature of the investment must not be overlooked. Primarily it is an investment in people, mostly the training of young Moroccans with a productive life of 20 to 40 years ahead of them. It is an investment in an institution—one, it is hoped, of superior quality which should endure into the future, a century or more.

Questions were raised about the commitment of universities and their financial inputs. Such commitments undoubtedly vary from almost nil to rather substantial amounts by a limited number of institutions. It must be recognized that the major source of funds for most universities is the respective state government, which is much farther removed from international matters than is the federal government. Also, agricultural institutions have very strong commitments to their state clientele, in teaching, research, and extension. It is not likely that universities can or will shift funds in their present state budgets to international programs.

During the past decade, universities that were able to obtain funds to increase salaries at the same rate as increased cost of living have been most fortunate. Expansion of programs has been minimal. Expecting state-supported universities to make major financial commitments to international activities under such conditions is unrealistic, but the team agrees that some minimal university commitment is essential. However, when a university permits a senior staff member, scientist, or administrator to go abroad for a few months or longer, it is in fact making a financial contribution even when the staff member's salary is paid from outside funds. Valuable services to the university are lost during that period of time. It is also important to realize that many, probably most senior staff members hesitate to interrupt strong ongoing programs with overseas assignments.

What are some alternatives?

1. Continue about as at present. Admittedly the present program is expensive but it is the surest way to develop a quality program and a quality institution in Morocco.
2. USAID could use the direct hire method. Within certain limitations costs could be reduced. The problem is that many highly qualified people still must be recruited from universities. Few top-quality

faculty members are willing, and in many cases are not allowed to take leave because there would be a critical staffing problem. Primarily the less experienced or less competent people would be available. Quite a few former Peace Corps volunteers and new Ph.D. students apparently are interested in overseas work and might be available.

3. Contracting could be done with private (non-university) U.S. consulting firms. There are many private consulting firms that have drawn on university personnel to some extent in the past but most of these firms are not staffed for projects such as this one. Most have limited permanent staffs and would have the same recruiting problems as USAID in a direct hire program.

There may be other alternatives. The above does not attempt to provide a specific answer to the cost-benefit question. If someone can provide an acceptable formula for calculating dollar returns, mostly long-run, to current input, meaningful ratios could be calculated. Many returns are not immediately evident and are not easily measured in monetary units. How much will Morocco gain from the investment in education of a person during 20 to 40 years of productive life? What is the value of an institution of higher education in agriculture, which should be productive for a century or more? One research breakthrough might add hundreds of thousands of dollars annually to Morocco's agricultural income for many years to come. Well-trained extension workers might well assist cultivators in doubling food production.

AGRICULTURAL SCIENCE MANPOWER NEEDS

Recent agricultural science manpower need projections by the Government of Morocco (GOM) and others probably have been rather conservative. When the need for more regionalized agricultural research findings becomes obvious, more trained manpower will be needed to upgrade many of the 1,491 budgeted positions in the Agricultural Research Department (Ministry of Agriculture) and to fill new positions not presently anticipated.

Another area that will have additional needs for trained agricultural manpower is the GOM Agricultural Extension Program. Increased emphasis on dry-land farming, expansion of irrigated farming areas, and servicing of small farmers will require vast increases in extension manpower needs.

In the private sector, increased intensity of agricultural production, introduction of modern production and marketing technology, and emphasis on better human nutrition and assistance to small farm businesses will increase trained manpower needs beyond the 1975 projections. Developing the infrastructure of agricultural credit, sources of farm production supplies, information services, and similar production and marketing services all require agriculturally trained persons.

The publication "Higher Agricultural Education Project, 608-0134" (September 1975), prepared by the USAID Mission to Morocco, presents data (pp. 28-30) on Morocco's long-term needs for college-trained agricultural manpower. Approximately 1,250 *Ingenieurs d'Etats* including veterinarians and 2,100 *Ingenieurs d'Applications* were estimated to be needed by 1988. In 1976-1977, 61 *Ingenieurs d'Etats* and 139 *Ingenieurs d'Applications* were produced. Annual output of *Ingenieurs* would have to approximately double to meet minimum trained manpower needs estimated for 1988.

Meeting these increased demands for trained manpower poses a tremendous challenge to IAV. It will require about 25 additional trained staff per year. When cast in this perspective, expanding IAV training into new areas and increasing emphasis on third-cycle training becomes extremely important.

Data provided by IAV indicate that the number of first-year students admitted at the Rabat campus increased from 48 in 1967 to 600 in 1977. Estimates projected through 1981 indicate first-year admissions will be maintained at the 600 level.

The number of second- through sixth-year students increased from 12 in 1967 to 667 in 1977. The expected addition of the campus at Agadir and the anticipated increase in third-cycle offerings indicate this group of students will increase twofold to approximately 1,340 by 1981. In addition, the 1977 enrollment of slightly more than 200 second- through fourth-year students at Meknes is expected to increase to 300 by 1981. Thus, current estimates indicate that agricultural students will total over 2,200 by 1981.

Present staff at IAV is 90. Projected staff needs of 200 by 1981 are expected to increase to 350 by 1987. Tremendous increases in third-cycle training will be needed to provide these prospective staff members. IAV administration hopes that by 1987 approximately half of the estimated 350 staff members will have had training in the United States.

The analysis and data presented above emphasize the importance of assistance given through Project 608-0134 in starting and developing the IAV third-cycle program. Continued emphasis on ~~expanding a high-quality~~ third-cycle IAV program is basic to meet staffing needs in the future. When placed in this perspective the project's impact has been vastly important and its continuance is essential if future development goals of IAV are to be realized.

FUTURE ROLE OF IAV IN AGRICULTURAL DEVELOPMENT

Moroccan Government Policy

As mentioned earlier, recent statements of King Hassan II have indicated that the Government of Morocco will give extremely high priority to agricultural development and to alleviating the plight of the poor, and unfarmed land is to be placed in the hands of cultivators who will bring it into production.

USAID Policy

The objectives of USAID assistance to the less developed countries are: (a) to increase their capacity to expand production and distribution of food supplies to alleviate hunger and malnutrition; (b) to increase participation of poor people in the process and benefits of development; and (c) to expand or emphasize foreign markets in quality and volume.

Agricultural Development

The modernization and development of Moroccan agriculture is essential for continued economic development. Food production not only must be increased, it also must become more efficient. The most urgent needs over the next decade appear to be:

Development of a sufficient number of adequately trained agricultural managers and technicians for (a) the agricultural educational institutions, especially IAV; (b) the GOM, especially the divisions of research and extension; (c) the agricultural supply, production, and marketing infrastructure, both public and private.

2. Development of an adequate research base and an increased and continuous output of research results, especially in the areas of dry-land farming, range management, and irrigation.
3. Expansion and improvement of the extension service.
4. Development and improvement of an agricultural infrastructure, both public and private, to supply inputs to farmers such as fertilizer, equipment, and credit and to market farm products, especially products for export.

Opportunities for IAV

IAV has an opportunity, if not an obligation, to play a vital role in the development of Moroccan agriculture and of the overall economy.

Teaching. The campuses at Rabat and Agadir and the schools at Meknes and Sale should be developed to provide a sufficient number of adequately trained agricultural managers and technicians to conduct research, teach, develop extension programs, and staff the public and private agencies and firms that produce agricultural products, inputs and services.

Research. An important function of IAV is to sponsor independent research by faculty members and to supervise thesis research of students. A significant contribution can be made by faculty and sixth-year students. Thesis projects should be increasingly directed toward providing answers to practical problems. Several small thesis projects could be coordinated to provide solutions to a relatively large, complex problem.

The faculty of IAV can conduct significant research while completing the requirements for the doctorate and can play the primary role in providing leadership and coordination for much of the agricultural research done in Morocco. Faculty appointments indicating a specific percentage of time to be devoted to research and with time provided and funds budgeted specifically

for the purpose would strengthen the research program.

Extension. A third role for IAV, and the most crucial in terms of short-run increases in food production and help for the poor, is in the area of extension education. This includes: (a) degree training for middle and top management extension personnel in agriculture and extension methods, (b) short-term (less than four years) and in-service training for extension workers to update their extension methods and subject-matter information, and (c) assistance in establishing and operating an agricultural communications system. The extension division of the Ministry of Agriculture apparently welcomes the opportunity to cooperate in these endeavors.

With the planned emphasis on dry-land farming and help for farmers on small holdings in the near future, it would be appropriate for IAV to establish a communications center for use in training students and channelling a continuous flow of current information to extension workers and farmers. Such a center would be broad in its approach and include work in all media--print, visual aids, demonstrations, radio, and television. The role of IAV should not include providing supplies and services to farmers.

A Regional Center. The potential role of IAV as a center of excellence for higher education in agriculture for a substantial area of Africa should not be overlooked. Approximately 10 percent of its four-year students are from other countries. The IAV campus serves as a natural conference center for activities involving several Arab and Francophone countries of Africa. ~~Substantial continued assistance of high quality will be essential to fulfilling~~ this role.

Agency Cooperation

The integration and coordination of efforts of institutions and agencies

in Morocco could enhance the rate and efficiency of agricultural development. An obvious area for such activity is in the relationships within the Ministry of Agriculture. This possibility for IAV and the Division of Extension was referred to above. Research could be a very fruitful area of cooperation between IAV and DRA of the Ministry of Agriculture. Qualified staff members of DRA could be given joint, courtesy or adjunct appointments for service as faculty members of IAV and/or vice versa. Supervision of thesis research and the conduct of major research projects could be done cooperatively.

Research and practical training could be arranged cooperatively with personnel of other agricultural development projects, for example other USAID, World Bank, and FAO projects. These could be carried out as integral parts of those projects and prove mutually beneficial. This could help eliminate current problems created by the lack of counterparts for foreign advisers in such programs.

INSTITUTE STRUCTURE AND STAFFING

Academic Structure

Hassan II Institute of Agronomy and Veterinary is administered by a director and an assistant director. The director is responsible for all higher education in agriculture in Morocco. IAV is divided into four subject-matter areas (agronomy, food industries, food technology, and veterinary medicine) which provide four years (first- and second-cycle) of training for the General Agronomy Diploma. Selected students can continue for two additional years (third-cycle) to the Diplome de Specialisation Agronomique (M.S.).

Training limited to four years leading to the Ingenieur d'Application diploma is available in food technology, rural equipment, topography, agricultural machinery, horticulture, landscape architecture, plant protection, and seafood science. Similar four-year programs are offered at the National School of Agriculture at Meknes in (a) technics and development and (b) livestock, and in forestry at the National School of Forestry at Sale.

All programs have a common basic curriculum during the first year. In each of the fifteen subject-matter areas, all students are required to take identical courses; no substitutes or electives are available.

During the fifth and sixth years leading to the Diplome de Specialisation Agronomique, students spend the fifth year abroad and return to IAV to complete their research (memoires) during the sixth year. ~~Coursework~~ for the fifth year is not yet offered at IAV but undoubtedly will be as soon as adequate faculty is trained to justify such offerings. Plans are to open an Institute of Horticulture at Agadir in 1979. Four-year programs will be offered in horticulture and plant protection and a six-year program in horticulture.

There is a tendency to think of each subject-matter area as a "department" in U.S. terminology. The administrative structure below the director is not entirely clear. Evidently a faculty member is responsible for the program in each area and there is some sort of committee structure. It is not known to what extent responsibility and authority are delegated to the "departmental" level.

Administrative Structure

The academic and administrative relationship between IAV and the other schools and the new Institute of Horticulture (Agadir) are not entirely clear. Possibly the terms "school" and "institute" are significantly different in meaning. It is assumed that IAV and the Institute of Horticulture will be academically equivalent. The latter might be regarded as a constituent (equivalent) unit in the system. On the other hand, the National School of Agriculture (Meknes) and the National School of Forestry (Sale) offer only four-year programs, and graduates of these schools are not eligible to go directly into third-cycle (M.S.) programs. In a sense the schools may be regarded as affiliates of IAV, but not constituent equivalent parts of it. Details of administrative lines and relationships were not obtained.

Functional Relationships

The three traditional functions of teaching, research, and extension are not equally developed in IAV. This is not unusual nor surprising for such a young institution.

Teaching. First, the emphasis has been on teaching, which is as it should be. Programs for all students in a given subject-matter area are common for all four years. This results in a lack of undergraduate specialization by U.S. standards and creates problems for students desiring to do graduate work

in the United States. There is some logic to common programs in IAV because most of the students lack an agricultural background and a broad exposure to agriculture may be desirable. It must be recognized that deficiencies must be made up if such students go to the United States for graduate study.

Another characteristic of the teaching program is that subject matter is offered in small units or blocks without planning or scheduling for the total academic term. This is explained by the heavy reliance on foreigners for teaching. Frequently they offer discrete units of subject matter and their services must be used when they are available, often for short periods of time. Hence, teaching schedules are planned and posted only a week or two in advance. It is assumed that, as the staff is Moroccanized, more adequate and more formal scheduling will prevail. It should be mentioned that teachers complained about teaching loads and students complained about heavy class and study loads. It was impossible to validate such complaints.

Research. The research function of IAV is presently centered primarily in the M.S. thesis work (memoires) of students, which is a rather minimal research program. Evidently a few faculty members manage to do some creditable research. The impression is that faculty members have both teaching and research responsibilities. However, it appears that the time to be devoted to each is unspecified and there may not be separate, clear-cut budgets for each. The reputation of an institution usually rests as much on research as on teaching. High-quality teaching depends on availability of current research results. As IAV grows and matures, research must receive increasing emphasis and funding. One item of concern is the relation of research responsibilities between IAV and the Ministry of Agriculture; the present or probable future responsibilities of each were unclear. It is important

that serious duplication not occur and as much cooperative effort as possible be achieved.

Extension. Functions with respect to extension education apparently are not a part of the structure of IAV at this time. This should be given serious consideration soon. Current GOM plans may call for large increases in extension functions appropriate to IAV. In conferences with extension personnel in the Ministry of Agriculture, there appeared to be a cordial atmosphere for developing cooperative relationships between IAV and the Division of Extension of the Ministry.

In summary, the functional roles of IAV are evolving gradually and probably in logical sequence. Pressure to assume additional responsibilities can be expected. It is an appropriate time to start planning the administrative structure for expanding the institution into a comprehensive one with teaching, research, and extension responsibilities.

FUTURE NEEDS OF LAV AND
THE ROLE OF USAID

General

Previous sections of this report have emphasized future additional demands upon LAV for its services. These demands will involve increased numbers of graduates with Ingenieur diplomas, increased emphasis in some fields of agricultural science, and expansion of third-cycle training. Meeting these needs will require increased effort and change over the next decade and beyond.

The present staff of the institute is inadequate in number of trained Moroccans and in the depth of their training. Past impacts of Project 608-0134 on problems involved in meeting anticipated needs have been considerable. Appraisal of future needs in view of present status of LAV's program, staff and physical facilities indicates AID assistance should be continued beyond the current contract. In fact, more critical problems of institutional development may lie ahead than have been experienced in the past. The program is appropriate to the collaborative assistance mode under Title XII. In terms of future development needs of LAV an appropriate planning horizon for the project would be five years with an annual roll forward for a minimum of ten years. The present level of funding is probably inadequate for the future; however, the mix of assistance (staff, training, commodities, etc.) ~~may vary over time.~~

Third-Cycle Training

Third-cycle training is roughly equivalent to the M.S. It normally consists of one year of coursework and one year of thesis. At present this training is accomplished by (a) going abroad to complete a degree or

(b) going abroad for a year of coursework and returning to Morocco to do the research and obtain a degree from IAV. Faculty limitations preclude offering fifth-year coursework at IAV.

Since the inception of this project third-cycle training has been emphasized. Fifty-three students have been sent to the United States, beginning with one in 1972 and increasing to 14 in 1978. Twenty-four of the 53 have completed the third cycle and 13 of these have been appointed to the staff of IAV. The numbers of students and areas of specialization are shown in Table 1.

Table 1. Number of Third-Cycle Students Sent to the United States (1972-1978) from Hassan II Institute of Agronomy and Veterinary Medicine, by Specialization.

Specialization	Students	Specialization	Students
Range Management	9	Vicology	1
Horticulture	7	Hydrology	1
Plant Pathology	7	Plant Protection	1
Plant Breeding	5	Soil Fertility	1
Soils	4	Soil Science	1
Watershed Management	4	Soil Physics	1
Forestry	4	Food Technology	1
Soil Conservation	2	Pomology	1
Photointerpretation	1	Nematology	1
Soil Microbiology	1		

Study in the United States has been a significant component of the project to date but some difficult problems are associated with it.

1. Students lose valuable training time because of the time required to achieve an acceptable level of competence in English.
2. Fourth-year grades are unavailable until near the time students are scheduled to depart. The Minnesota team at IAV has made substantial progress in improving the selection process.
3. Reliability of the grading system and determining its equivalency in the United States are major problems.
4. Some students feel they receive inadequate attention and consideration because they are not degree candidates in the U.S. universities.
5. Students complain about being moved from one institution to another and not being sent where they preferred to go.
6. Communications must be improved. The inadequacy of U.S. advisers at IAV in French and of IAV students in English creates a very difficult situation. Improvement of this situation should receive high priority. More emphasis should be placed on studying English in Morocco. Ideally, all students should be sufficiently advanced to be able to complete English requirements during the Minnesota intensive English program.

In general, efforts must be made to continue to improve the selection of trainees. The University of Minnesota must attempt to ~~assign these students to concerned advisers who will treat~~ them as graduate students, even though they are not degree candidates. Every effort must be made to avoid creating unjustified hopes and expectations in the students before they leave Morocco.

Expansion of Assistance Base

Discussion of the feasibility and probable evolution of Moroccan capacity for third-cycle training implied an expansion of the project to fields in addition to those currently served. It was wisely decided to limit first-phase operation to soil and plant science areas when starting a new approach at a new institution in a rapidly changing national environment.

Now that experience has been gained by IAV, the University of Minnesota, and AID, a shift of emphasis in training is proposed. When the staffs of soil and plant science departments expand to the point where each contains a minimum of one to three Moroccan professors with training to the Ph.D. level (or its equivalent), the departments should be considered adequately staffed to start third-cycle training. It is assumed that IAV is 5 to 10 years away from granting Ph.D. degrees. Training at that level must be carried out abroad for some time to come, but Ph.D. research in Morocco should be encouraged. As departments become adequately Moroccanized, U.S. project personnel should be recruited for other subject matter areas except for continuing consulting service in established areas. The tendency to fragment or subdivide the fields of soils and plant science into several narrow areas of specialization should be avoided at this stage of development.

Development of the horticultural school at Agadir should proceed as rapidly as possible. Shifting IAV horticultural staff and approximately 200 students to the Agadir campus by the fall of 1979 should be expedited. The horticultural program is a highly desirable addition of an applied field worthy of continuing assistance. The addition is justifiable in view of the diversity of horticultural crops in Morocco and the wide geographical distribution of areas with high potential for commercial production, plus

the possibilities for dietary improvement by extending horticultural crop production to individual rural homes. A goal of at least three Moroccan staff members, with training abroad to the Ph.D. level or its equivalent is recommended as minimum for initiating third-cycle training in this field at Agadir.

Of particular concern is the apparent absence of attention to development of third-cycle training in the field of agricultural economics, including marketing. The increasing complexity of a modernized commercial agriculture, particularly if it is to be extended to smaller family farm holdings, will require a great amount and variety of reliable economic information. If Morocco is to realize its aspiration to compete successfully in world markets for those agricultural products in which it has a climatic and labor supply advantage, IAV must offer its graduates more training and conduct more research in the agricultural marketing field. To this end, as soon as contract advisers are no longer essential in soils or plant sciences, emphasis should be shifted to provide at least one resident project staff member in agricultural economics. Third-cycle training should be initiated in the important fields of production economics and agricultural marketing.

Development of second- and third-cycle training and research in agricultural extension education and methodology should receive immediate consideration. The addition of a contract adviser in this field is recommended to encourage and assist IAV in starting such training. This is basic to improving IAV's service to all rural residents and to small farm operators in particular, and it will assist in encouraging an essential, more practical orientation to the other fields of agricultural science.

Another possible area of assistance is in the administrative area. Rapid growth of the institution in number of faculty and students and an

additional campus at Agadir may well create new administrative problems. Assistance should be expanded to permit a rather substantial program of so-called administrative interns--present or prospective administrators who would serve as interns with counterpart administrators at the department-head level or higher in colleges of agriculture in the United States.

Decentralization of IAV Activities

The projected 1979 transfer of second- and third-cycle horticultural students and staff from the Rabat campus, which is rapidly becoming urbanized, to the new campus under construction at Agadir is a desirable decentralization of IAV activities. Further decentralization may be advisable after existing third-cycle programs have been supplied with sufficient numbers of qualified staff.

The location, available land, existing buildings and, to some extent, the kind of students at the Meknes campus make it desirable for developing second- and possibly third-cycle training and research in animal science and extension education. Modern facilities for presenting short courses, refresher courses, and similar training for extension personnel should be developed. Meknes and Agadir appear to be more appropriate locations than IAV for such activities.

An inherent danger in decentralization of IAV Rabat activities lies in the administrative area. Administrative structure and procedures to facilitate efficient decentralization appear to be in the formative stage. It is recommended that consideration be given to the delicate but crucial proposal of appointing a long-term resident faculty member of the University of Minnesota, to work on administrative-organization matters with the director and assistant director of IAV as opportunities arise, and to serve as a scientist in his own right. He should possess the qualities of judgment, personality,

capability, and maturity essential to fulfilling a very basic assignment of giving sound advice in a tactful manner. The goal would be to assist, insofar as possible and when called upon, in developing effective administrative organization and operational procedures within the Moroccan setting.

Immediate attention should be given to providing U.S. administrative internships of at least three months' duration to LAV administrators within the contract. Selected LAV personnel would be assigned to administrative officers--deans, associate deans, department heads, experiment station directors, extension directors--in U.S. colleges of agriculture for several weeks to study administrative procedures. Such training has potential for extremely high rewards.

Participant-Advisor Programs

To determine effectiveness of the participant trainee-advisor programs at both LAV and the University of Minnesota, numerous interviews were held with trainees and University of Minnesota staff at LAV and at the University of Minnesota. Some trainees interviewed in Minnesota had been in residence for only a few months. Those had taken a five-week intensive English course and were currently enrolled in fall-quarter courses and in an additional English course where necessary--which applied to practically all recent arrivals.

Describing themselves as still undergoing cultural shock from changing environments, this group was somewhat critical of the advisement they were receiving. Some of their criticisms corresponded to those which a similar group of U.S. students would have emphasized but they loomed large in the minds of the Moroccans. Cultural differences, homesickness, disillusionment with an educational approach new to them, language limitations, and other conditions all contributed to their unfavorable reactions.

More person-to-person counseling probably would have eased many of the complaints voiced by the recent arrivals. The passage of time, permitting them to gain a longer-range perspective, also would improve their reaction to the situation. Because of this combination of circumstances, more weight has been given to opinions expressed by returned participant trainees in Morocco. Individual conferences were held with 14 Moroccans who had been participant trainees at the University of Minnesota or at universities in Arizona, California, Florida, Colorado, Montana, Oregon, and Utah. During these confidential discussions the trainees were questioned in detail concerning their experiences on the various campuses which, in their judgment, affected their training either positively or negatively. The trainees were almost unanimous in wishing that they had received earlier notice of being selected to study in the United States. Many insisted that earlier notice would have motivated them to more intensive study of English while in Morocco. Also there seemed to be general belief that the trainees should have been better informed before leaving for the United States as to course or curriculum requirements from university catalogues and similar services. IAV and project team members are aware of these uncertainties which disturb the prospective trainees and are working toward improving information and communications.

As would be expected, depending on differences in personality and personal experience, reaction to U.S. procedures and treatment varied from highly favorable to considerable dissatisfaction. A large majority were pleased with the reception, treatment, advisement, and teaching they received at Minnesota and at other campuses. The most frequent complaint was based upon the uncertainties resulting from changes in living quarter, being separated from friends, and procedures followed when they were moved from one campus to another. Several

one campus to another. Several believed they should have been sent directly to the campus where they eventually completed their work, rather than first studying at Minnesota. A minority who were not candidates for a master's degree felt they had not been accorded full graduate student privileges in library usage and advisement.

University of Minnesota on-campus technical advisors appeared deeply committed to serving participant trainees and were fully aware of the problems involved in that service. The same was true to an even greater degree on the part of the University of Minnesota field staff in Morocco. Administrators interviewed at the University of Minnesota voiced their commitment to the project and its objectives but it was not clear whether this had been effectively communicated to individual faculty members with whom participant trainees worked.

The overall impression was that the participant trainee-advisor program could be improved by greater attention to details in planning and executing the program plus a strong commitment to concern for the individual student. Poor communication probably causes misunderstandings and arouses unrealistic expectations.

The fact that a large majority of participant trainees interviewed in Morocco were returning or were hoping to return to the United States for Ph.D. training is regarded as strong endorsement of their previous trainee experience.

The University of Minnesota has established a potentially effective model for participant training. The presence of Minnesota faculty at IAV permits considerable interaction with prospective students and improves the probability of selecting students who can benefit from education in the

United States. The Minnesota team also can provide valuable advice in placing the students in an appropriate U.S. university. Back-up support is provided by the faculty in Minnesota. This combination of Minnesota field staff and home-campus staff should provide the mechanism for an effective job of selecting, placing, and directing the learning experiences of Moroccan participant trainees.

Participant Selection

The process of selecting students to study in the United States prior to 1978 was virtually to select all who applied. In 1978, 27 of the 46 fifth-year students applied to study in the United States and all 27 were interviewed by the Minnesota team. The team recommended 14 students and all were approved by the institute and sent to the United States.

The field staff indicates that the major criteria now used in the selection process are: (a) composite and area final test scores, (b) conferences with the students, (c) conferences with the student's professors, and (d) rank in the graduating class. Unfortunately, definite notification of selection for participant training and the area in which the student is to study is not received until about a week before the student departs for the United States. This procedure and timing is dictated by schedules at IAV. University of Minnesota field staff are pressing for a six-month earlier contact with prospective trainees. Some progress is being made to this end. Earlier selection would provide greater student motivation toward more intensive study of English before departing Morocco. Also it would give the field staff opportunity for more thorough briefing of trainees as to what to expect in the way of courses, educational procedures, and related matters. Lack of such preparation seemed to be the basis for the uncertainties to

which students objected. Greater ability in English and more consultation with field staff might make it possible to send trainees directly to the university offering work in the desired field and avoid the stay at the University of Minnesota.

Again, it is emphasized that the mechanics and timing of the selection process is an IAV matter. Structural changes in the second-cycle training program will be necessary to permit earlier participant selection, more English training in Morocco, and better predeparture briefing.

Contract Staffing

The model developed by Minnesota is appropriate to meet the objectives of the project--that is, some combination of regular field staff, on-campus scientific advisors, and short-term advisors, with overall program planning and execution being the responsibility of the director of international programs or his designee. The team also believes that the current size and balance of the regular field staff--six scientific advisors--is appropriate for the present. The six subject-matter areas represented by present team members should be continued until at least one well-trained Moroccan is on the faculty in each area, preferably two or three. When this occurs the regular field team member should be replaced with a faculty member in another discipline. IAV and the University of Minnesota jointly should develop a priority schedule of disciplines to be emphasized. Dry-land farming, agricultural production economics, agricultural marketing, and extension education with emphasis on agricultural communication appear to be high-priority areas. Germany and France evidently are providing assistance in veterinary and animal science at present.

As soon as possible, a senior University of Minnesota faculty member with administrative experience should be appointed as team leader. He should be capable of providing or advising IAV on administrative matters, especially with respect to organization, operational matters, delegation of authority, and budgeting. He also should have opportunity to provide leadership and be directly involved in giving advice and in conducting research in his own or closely related disciplines. He may need short-term administrative consultants in special problem areas from time to time.

IAV and the University of Minnesota should develop jointly a long-range plan, including a time schedule, for the development of IAV, discipline by discipline, using the current model, until at least one adequately trained Moroccan is established in each discipline. Assistance can be appropriately phased for such a plan after which much greater use can be made of short-term consultants, faculty exchanges, sabbatical leaves, travel grants, and so on.

Research

IAV has an opportunity, if not an obligation, to provide the leadership in developing a strong scientific research base and a continuous flow of research results essential to the development of agriculture in Morocco. The leadership can be exerted first by developing a quality teaching program that will produce competent research scientists for IAV and the Ministry of Agriculture and other public and private agencies, and by planning and organizing a research program utilizing faculty members and sixth-year and Ph.D. students. Faculty members should be encouraged to develop research programs of their own.

Memoire or master's degree research should be oriented primarily toward providing answers to practical problems. Several relatively small memoire

projects should be designed and coordinated to build upon each other and contribute to solving a relatively larger problem. Doctoral and faculty research may be oriented somewhat more toward basic research; thus some of it will be more theoretical and long-range in nature.

The most important elements needed to develop a good research program at the IAV are:

1. A sufficient number of adequately trained scientists to conduct research, and also to educate students in research methods and to help plan and supervise students' research projects. These scientists need a thorough education, both theoretical and applied, in a basic discipline. In addition, they need to learn the most appropriate research methods and data processing systems for their respective disciplines. They also need to gain substantial experience by conducting research themselves, before they will be able to instruct others.
2. Laboratories, field plots, and equipment. Research, except for the most simple and applied, in most agricultural disciplines requires some sophisticated laboratories, rather large amounts of land, and some elaborate equipment. IAV needs more of all three. A long-range plan should be developed for each discipline, outlining the laboratory, land, and equipment that will be needed when the faculty is at full strength. A gradual acquisition of all three should begin as Moroccan faculty are trained and added to the staff. Care should be exercised not to provide elaborate research facilities before faculty are in place to use them. Advice from counterpart faculty and departments at the University of

Minnesota and other affiliated U.S. universities might be provided to avoid costly mistakes.

3. Financial support. IAV is authorized under its charter to conduct agricultural research. It needs now to identify a budget for research projects and to recognize research as an official part of the work load of at least some of its faculty. Faculty should be encouraged to prepare and submit research proposals for approval and funding. Once a proposal is approved, an account and funds should be established for it. The faculty member should be permitted some discretion in the expenditure of funds—for example, in making relatively small purchases and decisions—without first obtaining permission from the department chairman or the director of IAV. AID and the University of Minnesota should provide both financial and administrative assistance for establishing a good research program. Over time, external support should be phased out and responsibility for it increasingly assumed by IAV.
4. Rewards and incentives. IAV needs to identify and formalize an incentive and reward system that will provide the motivation for faculty members to conduct more and better research. This could take several forms such as an increase in salary, more research facilities, facilities for publishing and publicizing results, sabbatical leaves, travel grants, and special recognition. AID might consider making provision for IAV to initiate one or more incentive programs, but under a schedule where AID's contribution will gradually decrease and be assumed by IAV.
5. Linkages with other scientists. As faculty members at IAV become more involved in research, it is important that they develop and

maintain linkages with scientists from the Ministry of Agriculture, universities in other countries, and public and private agencies in Morocco and in other countries. The rewards for a closer linkage between the Ministry and IAV appear to be substantial. Opportunities exist for joint appointments, joint research projects and authorship of results, and it should be possible for scientists of the ministry to supervise thesis research. Linkages with other scientists can be achieved through professional journals, correspondence, professional meetings, faculty exchanges, short visits to other scientist's laboratories, and so on.

CONCLUSIONS AND RECOMMENDATIONS

The Setting

At the time of this evaluation there had recently been major U.S. personnel changes in Morocco. The director and assistant director of the AID Mission had only recently arrived in Morocco and they were most cooperative and cordial. The agricultural officer in the mission was on "acting" status.

A six-man contract team was in residence. Three members had been on assignment for about a year or more and the other three had arrived more recently. None was recruited from the faculty of the University of Minnesota, and all are on temporary appointments.

Overall Observations

1. The project has made and is continuing to make a basic contribution to the agricultural development policies of AID and of GOM. Trained agricultural science manpower is an essential ingredient in agricultural development. IAV is the one such training institution in higher agricultural education in Morocco.

2. Agricultural potential is very great in Morocco. Agriculture is a major component of the total economy of the country, hence its development is critical to the economy.

3. The growth and development of IAV since its establishment in the mid-1960s is impressive. It is approaching the point of becoming a dynamic institution that could have a major impact on agricultural development.

4. Individually the University of Minnesota team members appear to be very competent in the professional areas of their assignments. A feeling of being a part of the University of Minnesota appears to be lacking.

5. Apparently both the AID Mission and IAV are receptive to the University of Minnesota as a possible lead university in a continuing program.

6. As a result of the training program and efforts of team members (past and present) and other University of Minnesota personnel, IAV has developed a very positive attitude toward the United States, and especially its agricultural educational system and the philosophy underlying it. This evidently is a reversal of attitudes that prevailed in earlier years.

Recommendations

Program Continuation. In view of the substantial development of IAV to date, the potential for agriculture in Morocco, the urgent need for continuing agricultural development, and the important contributions IAV can make to it--and the corresponding need to develop IAV as a center of agricultural educational excellence--it is recommended that the program of assistance be continued. The present level of funding should be considered an absolute minimum. IAV is probably at least a decade or more away from reasonable maturity; therefore, long-term (10-year) planning is recommended with a 5-year planning and funding base and an annual roll forward.

Title XII. It is recommended that the program be classified as collaborative assistance under Title XII with emphasis on longer-term staffing, planning, and funding.

Contracting Entity. Because the scope of subject matter in Morocco and IAV is broader than that encompassed by the University of Minnesota, it is recommended that a "consortium" or "affiliation" of universities be established to provide the breadth needed for staffing the project and training Moroccans.

Lead University. Whatever "affiliation" of universities is developed, one institution must serve in a lead capacity. It is recommended that the

University of Minnesota serve as lead university subject to the following conditions:

- That an experienced senior faculty member of the University of Minnesota be recruited to serve as team leader in Morocco on a two-year assignment beginning not later than the end of Phase II of the current contract. He also could serve as an advisor in his subject-matter area.
2. That a minimum of 50 percent of the long-term advisors, preferably most of them from the University of Minnesota, be recruited from existing faculties of the universities in the "affiliation" in the future.

Training. The training component of the program is most important to the future development of IAV. It has many problems and difficulties.

M.S. training is the essential first-step training and serves a valuable purpose in screening for IAV faculty assignments and for future training to the Ph.D. It is recommended that:

1. The team in Morocco continually strive to improve its present good work in selection with emphasis on achieving more lead time in the selection process.
2. Communications be improved to avoid misunderstandings. The French-English language problems probably account for many of these.
3. The University of Minnesota should develop a more personalized on-campus system for the trainees.
4. In cooperation with affiliating U.S. universities, attention be given to developing a selection-placement process that will better select trainees and place them promptly according to their interests.

More emphasis be placed on English training in Morocco. This would alleviate complaints and problems of trainees during their first few months in the United States and make more time available for coursework.

The calibre of the Ph.D. training of faculty members and the institutions at which they are trained will affect the reputation of IAV more than any other single item. To achieve orderly development of IAV it is recommended that:

1. Ph.D. training should be phased in, following the M.S. training as soon as qualified faculty members are available in selected departments; concurrently M.S. training in the United States should be initiated in other departments.
2. Ph.D. research programs should be considered on an individual basis. Three possible alternatives for a U.S. degree are (a) all work to be done in the United States; (b) coursework to be done in the United States, research to be done in Morocco, followed by return to the United States for completion of degree work; or (c) coursework to be done in the United States with research in Morocco and the final examination in Morocco.
3. Research work, either in the United States or in Morocco, should be on Moroccan problems and, to the maximum extent possible, should be done in Morocco.

Future Directions. In terms of future development of IAV and its contribution to agricultural development in Morocco, it is recommended that:

1. Technical assistance in agricultural economics be initiated at the earliest feasible date.
2. Development of appropriate extension activities, especially a communications center, be initiated soon.

3. Assistance in institutional administrative organization and operation be initiated at an early date.

Integration of Assistance Programs. Many agencies and countries are providing technical assistance in agriculture to Morocco. Cooperation and integration of efforts should have a complementary effect on agricultural development and prove valuable to IAV in its development. Cooperative field research and practical training could be provided for students and faculty, to the benefit of all involved.

It is recommended that consideration be given to encouraging the coordination and integration of the University of Minnesota and IAV efforts with other agricultural development programs such as Dryland Agricultural Applied Research (0130), Range Improvement Project (0145), and similar activities of other national and international agencies such as the World Bank and the Food and Agriculture Organization.

Coordination of IAV and Ministry of Agricultural Activities. The Ministry of Agriculture is responsible for extension education and services. There appears to be an excellent opportunity to coordinate efforts in extension, with IAV having a major role in training personnel in extension and communication methods and providing updated technical information for cultivators. The respective roles of IAV and the Ministry of Agriculture need to be clearly defined with respect to research. Efforts should be coordinated to maximize research output and to avoid duplication.

It is recommended that these relationships be kept in mind by both USAID Mission personnel and University of Minnesota staff and that effort be made, as opportunities arise, to encourage improvement of working relationships between IAV and Ministry of Agriculture.

Institutional Structure. Continuing growth and expansion of IAV is reflected in the addition of the Institute of Horticulture at Agadir. This will enhance its impact on Moroccan agriculture. It is recommended that:

1. Agadir be developed as planned and that it become a strong regional extension and training center.
2. The administrative and academic relationship of the outlying units to IAV be carefully defined and formalized.
3. The National School of Agriculture (Meknes) be expanded to become a major regional extension and training center.

Contractual Arrangements. Maximum output under a contract can be achieved when the contractor can operate with maximum freedom and flexibility. To achieve this it is recommended that:

1. The concerned parties (contractor, USAID, and IAV) should jointly plan programs.
2. After contractual negotiations are complete: (a) the contractor be given authority and freedom to carry out the work without unnecessary regulation and control, thereby streamlining operations, and (b) the contractor accept accountability and express such by operating and reporting within the terms of the contract.

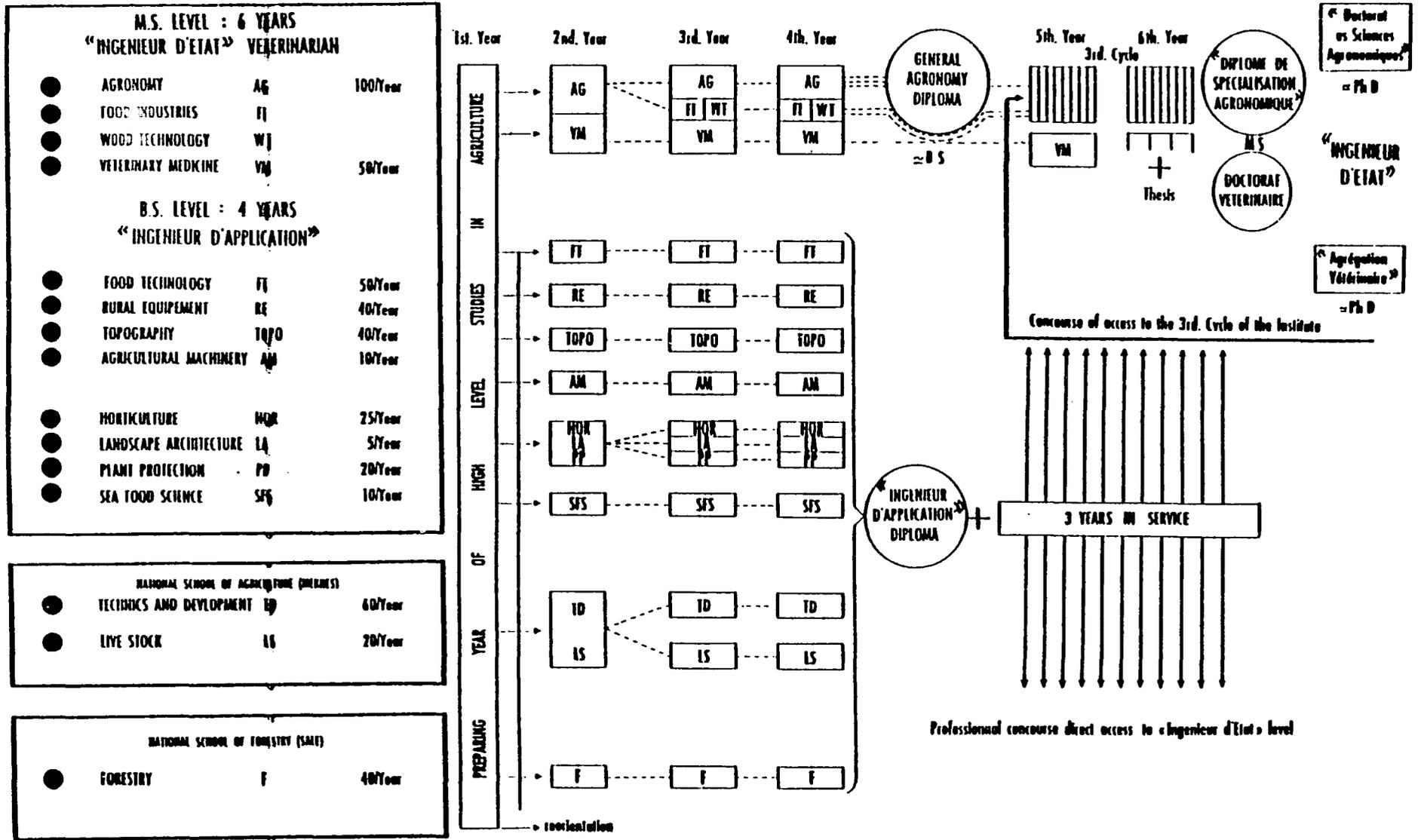
A P P E N D I X

Figure 1

MINISTRE DE L'AGRICULTURE

INSTITUT NATIONAL D'AGRICULTURE ET DE MÉDECINE VÉTÉRINAIRE

HIGH TRAINING OF AGRICULTURAL MANPOWER



APPENDIX

Table 1: Notes on Activities of Team

October 16, 1978	Travel from respective homes to Washington, D. C.
October 17, 1978	Conferences with: <ul style="list-style-type: none">i. Contracts Officer, Robert Knightii. N E Office, USAID<ul style="list-style-type: none">Lewis ClarkJoan SilverRussell Olson (by phone)Marion Word Departed for Morocco,
October 18, 1978	Completed travel to Casablanca and by auto to Rabat.
October 19, 1978	Conference with AID/Rabat personnel: <ul style="list-style-type: none">Harold Flemming, DirectorEric Griffel, Assistant DirectorMark Ward, Program OfficerAlfred Ford, Evaluation OfficerLee Hall, Food and Agriculture Officer, ActingM'Hamed Hanafi, Interpreter Conferred with Donard Torell, contract consultant on range management from University of California, Davis Initiated review of previous reports and documents.
October 20, 1978	Conferences with: <ul style="list-style-type: none">i. Malcolm Purvis, University of Minnesota, contract program directorii. Frank Piason, Agricultural Attache, U.S. Embassy Continued review of literature.
October 21, 1978	Meeting with University of Minnesota team, Rabat Individual conferences with eleven returned Moroccan trainees Evaluation team planning and discussions.
October 22, 1978	(Sunday)

- October 23, 1978 Confidential individual conferences with Minnesota team members: Erwin Berglund; James Burleigh; Lynn Gallagher; Aly Lasheen; James O'Rourke; Joseph Vavra.
- Continued review of reports and documents and started writing preliminary report to be left with USAID/Rabat.
- October 24, 1978 Conferences with Mr. Abdellah Bekkali, Director and Mr. Larbi Firdawcy, Secretary General of IAV.
- Continued conferences with University of Minnesota team leader Joseph Vavra.
- October 25, 1978 Trip to National School of Agriculture, Meknes, accompanied by Messrs. O'Rourke and Burleigh. Toured facilities and interviewed returned trainees.
- October 26, 1978 Conference with Mr. Abdelouabad Ben Jellcul, Chief of Research and Experimentation Division, Ministry of Agriculture.
- Seminar on Title XII presented by Earl Brown to University of Minnesota team members.
- Meeting with USAID/Rabat personnel.
- October 27, 1978 Travelled Rabat-Casablanca-Agadir. Accompanied by Mr. Firdawcy who conducted a tour and discussed the Institute of Horticulture which is under construction and the future plans for it. Mr. Aly Lasheen, a Minnesota team member, also accompanied us.
- October 28, 1978 Comprehensive tour of a major irrigation project. Accompanied by Mr. Firdawcy, Mr. Lasheen and Mr. Kratka, a vegetable production specialist employed through World Bank. We visited the dam and lake, the main pumping station, a district pumping system, irrigated experimental tomato plots, a cooperative irrigation system with eight cultivators on small holdings as members.
- Visited two large private irrigation operations. One was ten hectares under plastic for vegetable production. Private water supply. Labor force of 60 men. The other was a 20 hectare rose production unit. Private water supply. Roses produced in slatted sheds.

October 29, 1978
(Sunday) Observed variations in agricultural resources and production enroute from Agadir to Rabat via Marrakech.

October 30, 1978 Conferred with:

- i. Canadian Embassy personnel concerning Canadian assistance to Morocco, especially to IAV.
- ii. Mr. Molina and Mr. Schmidt of the University of Minnesota about the early history of project 608-0134.

Intensified work on preliminary report to be left with USAID/Rabat.

October 31, 1978 Spent day planning and preparing materials for report.

November 1, 1978 Conferred with Orville Goodman, FAO Agronomy expert.

Report writing.

November 2, 1978 Conferred with person in the French Agricultural Development Unit.

Final conference with Mr. Bekkali and Mr. Firdawcy, IVA. Messrs. Flemming and Griffel, USAID/Rabat participated in the conference.

November 3, 1978 Conferences with:

- i. Mr. Ben Said, Acting Extension Director, Ministry of Agriculture
- ii. Final conference with USAID/Rabat personnel to discuss preliminary report.

November 4, 1978 Final conference with University of Minnesota team members.

Team discussions and preparation for departure.

November 5, 1978
(Sunday) Travelled from Rabat to Minneapolis, Minnesota

November 6, 1978 Recuperate. Work on report.

November 7, 1978 Conferences with:

- i. Deans Hueg, Tammen and Skok
- ii. Heads of Departments involved in project.
- iii. President McGrath
- iv. Malcolm Purvis and James Sentz

Intensified work on report.

November 8, 1978

Conferred with:

- i. Messrs. Antoine and Lockhart, University of Minnesota faculty members, who have been on long-term project assignments in Morocco.
- ii. University of Minnesota faculty scientific advisers to Moroccan students on campus --- Messrs. Davis, Blake, Rasmussen, Wilcox and Mohn.
- iii. Messrs. Marvin and Anderson from Agricultural Education and Extension.
- iv. John Blackmore, originator of the project.
- v. Moroccan trainees on campus.

November 9, 1978

Conferred with:

- i. Dean Tammen and Malcolm Purvis
- ii. The faculty member in charge of the training program in French on the University of Minnesota campus.

November 10, 1978

Intensive effort on completing report.

November 11, 1978

Team members travelled to respective homes.

APPENDIX

Table 2: Itinerary

Monday, October 16, 1978	Team members travel to Washington, D. C.
Tuesday, October 17, 1978	Conferences in Washington, D. C. Depart for Morocco
Wednesday, October 18, 1978	Arrive Casablanca Travel to Rabat by auto
Thursday, October 19, 1978	
to	
Tuesday, October 24, 1978	Work in Rabat
Wednesday, October 25, 1978	Visit National School of Agriculture, Meknes
Thursday, October 26, 1978	Work in Rabat
Friday, October 27, 1978	To Casablanca by auto To Agadir by plane
Saturday, October 28, 1978	Work at Agadir
Sunday, October 29, 1978	Travel by auto from Agadir to Rabat via Marrakech
Monday, October 30, 1978	
to	
Saturday, November 4, 1978	Work in Rabat
Sunday, November 5, 1978	Rabat-Casablanca-New York-Minneapolis
Monday, November 6, 1978	
to	
Friday, November 10, 1978	Work at University of Minnesota
Saturday, November 11, 1978	Team members return to homes