Final Report

USE OF MOBILE SKILL TRAINING UNITS IN MOROCCO

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I. INTRODUCTION

This assignment was carried out at the request of AID NE/TECH, from August 16 through September 14, 1979, in accordance with a Work Order awarded to Experience, Incorporated. The work was performed by Mr. Milan Radovic.

The field work in Morocco was performed from August 17 through September 7, under the guidance of Mr. James F. Smith, Human Resources Officer, AID Mission, Rabat.

Mr. Mario Iachella, Peace Corps Volunteer, and instructor in the Entraide vocational schoool for auto-mechanics in Rabat, accompanied Mr. Radovic on several visits to different vocational training facilities and government offices in Morocco. His familiarity of the socio-economic conditions of the country and of vocational education, in particular, was very useful to the author of this study.

Also helpful were Mr. Robbin Walt, Director, International Programs, Industrial Development Services, Westinghouse Corporation, by drawing on his recent experience in industrial training in Iran in joint discussions of the Moroccan settings and needs; Ms. Patricia S. Gibson, AID Mission Health and Nutrition Officer, with her insight of the Moroccan rural environment; Mr. George Wood, Food-for-Peace Officer at the Mission, and Dr. Thomas Eighmy, Mission Economist.

Among the Moroccan officials, Mr. Hemtati, in charge of OFPPT (Office de Formation Professionelle et de Promotion du Travail - Vocational Training and Promotion of Employment) in the Ministry of Labor in Rabat, and Mr. M. Alaoui, Chief, Enterprises Services, OFPPT, in Casablanca, provided several valuable inputs for this report, through a series of informal discussions and by providing pertinent documentation.

Many other individuals in Rabat, Casablanca, Marrakech and around Meknes, did contribute to this effort. (See separate Log of Daily Activities).

The documentation -reports, correspondence, catalogs, photographs- read and used to prepare this report is referenced in the Log and the Survey of Literature. Most of it is in French and can be found in the AID Rabat Mission, and the OFPPT offices in Rabat and Casablanca.

II. OBJECTIVE

The objective of this three-week project was to determine the desirability and feasibility of introducing mobile skill training units (MUs) for expanding vocational training into the rural areas of Morocco.

This was to be accomplished by exploring the need for skill development in areas not presently served or reached by the existing vocational system; determining that there is an effective demand for MUs as a new and efficient training mode; making sure the deployment of MUs in the countryside and remote areas does not represent unsurmountable logistical problems due to lack of necessary infrastructure; and finally, assessing the experience of the pilot project with the two MUs now operated by the OFPPT.

It is understood that this report should assist the AID Mission in Rabat in evaluating the Government of Morocco (GOM) request for financial assistance to acquire 20 MUs and support equipment and that it may serve as the basis for the eventual preparation of a PID (Project Identification Document).

III. BACKGROUND

On July 20, 1979 the Moroccan Ministry of Foreign Affairs and Cooperation sent a formal request to the U.S. Embassy in Rabat requesting USAID assistance for the acquisition of 20 Mobile Skills Training Units, 4 tractors, 4 power generating units and supporting equipment. The total acquisition cost was estimated at 12,570,000 DH (dirhams - equivalent to $3,307,894 at the current rate of exchange of 3.80 DH to a U.S. dollar). See Enclosure 1.

The latter request was accompanied by a 14 page description - justification (see Enclosure 2 - Cooperation USAID-Morocco, Request for Financial Assistance).

The justification mentions vocational training as a priority objective in national development plans. In the 1973-77 five-year plan, the emphasis was on training in urban areas, while the 1978-80 three-year plan is oriented towards the rural areas ("campagne"). It is expected that this new direction for vocational training will stimulate the development of local industries and new enterprises in the interior of the country, and consequently slow down the exodus from rural to urban areas.

In order to minimize the needed capital investment and reduce the implementation time, the government has engaged OFPPT to conduct a two-year experimental program with two MUs.

The Ministry of Labor and Vocational Training considers the MU pilot project successful, and in the current three-year National Development Plan (see Reference K in the Log) it is budgeting for the acquisition of 20 MUs and their operations during the first two years.

The primary purpose of the MUs is to extend the reach of the existing 39 training centers of the OFPPT, all located in fairly large cities, to the countryside and smaller cities.

A secondary purpose of the MUs is to provide OJT (on-the-job training) and skill upgrading at different industrial plants and other enterprises.

The MUs activities will correspond to local needs in terms of skilled and semi-skilled workers and the number of secondary schools dropouts, and for specialties-trades determined through the experience of the MUs experimental program. These are:

- Maintenance Mechanics
- Welding, Semi-automatic and Automatic
- Engines (gasoline and diesel, pumps and power generating units)
- Automation and Instrumentation
- Electrical Repair and Maintenance
- Electrical Engineering and Electronics
- Radio and Television
- Tailoring
- Work Safety and Occupational Health
- Training of Instructors and Supervisors Development (use of audio-visual aids, sociology of work, work organization), Secretarial (office organization, shorthand and typing, accounting).

The existing training units are shown, by skill or trade, for each of the seven socio-economic regions, a total of 53 units with over half in the Center (205) and North-West (100) economic regions.

The largest number of units is for masons--127, followed by tailoring--48, general mechanical--48, carpentry--42, and plumbing--36. Thus, these five skills, among a total of 45, account for over 50 percent of the total number of training units.

The balance of the justification deals with the technical description of the proposed MUs: dimensions, clearances, weights, power, lighting, etc, and gives price estimates for the acquisition of the 20 MUs, distributed as follows:

Mechanical Repairs and Maintenance	2 units
Welding	2
Automotive, Gasoline and Diesel Engines	2
Automation, Instrumentation	2
Electrical Repair and Maintenance	2
Electrical Engineering, Electronics	2
Radio and Television	2
Tailoring	1
Industrial Safety	2
Supervision and Administration	2
Secretarial	1

The experience of the MUs two-year pilot program is presented in a 17-page report on Vocational Training by Means of a Mobile Unit (Note sur la Formation Professionnelle par Unité Mobile), issued by OFPPT in June 1979 (Enclosure 3). The first two sections of the report deal with the objectives and advantages of MUs as training tools. Next, the possible applications are shown as:

Training in rural areas, by means of:

- Initiation (beginners) courses for literates, teaching them simple tasks to be performed under close supervision and lasting 4 to 10 weeks, depending on specialty taught.
- Training courses for secondary school dropouts, lasting 20 to 30 weeks.

Skill upgrading and on-the-job training

Logistic considerations for the operations of MUs are their liaison with the central base, personnel, management, tractors, shop-garage, scheduling of movements-trips, inventory, acquisition and management of spare parts, maintenance of vehicles and equipment.

If additional MUs are acquired, it is suggested that the central base (of operations) be in Casablanca, at the location of the OFPPT Employment Promotion Center, and that the first two secondary bases be in Fes and Agadir.

The MUs 1977-79 pilot experience consists of 24 short introductory (initiation) and skill upgrading courses in 15 provinces, in classes varying from 5 to 23, for a total of 356 trainees, with their education level varying from illiterate to 5 years of secondary schooling.

The rest of the report repeats, more or less, the information given in the loan request (Enclosure 2).

Enclosure 4 is an earlier (undated) version of the same report, but it presents more information on the 1977-78 experience with the first MU, a truck with a work area of about 15 square meters, as follows:

- type of training
- dates of course (varying from 5 days to one month)
- education level of trainees
- affiliation of trainees (i.e. working for industries, such as SUMAG (Sucreries Maghrebiennes - national sugar company), local cooperatives, farm workers, garage mechanics, government repair shops).

The four documents outlined above represent all of the formal (official) documentation given to Mr. Radovic as the background for the loan request. The analysis, however, is also based on additional written and oral inputs, as described in the Log of Daily Activities and documentation referred to in this report.

IV. ANALYSIS

A. Need and Demand

The analysis of the desirability and feasibility of introducing MUs in Morocco must begin with an assessment of the need for vocational

training in Morocco, in general.

According to Mr. Hemtati, the OFPPT current training capacity is about 10,000 students per year, while the demand is for 45,000, the great majority to be drawn from a pool of 120,0000 annual dropouts from secondary schools. The OFPPT training capacity is somewhat augmented by the vocational education programs and facilities of other ministries -of Social Affairs, Agriculture, Health, Youth and Sports- and a few small private technical schools in Casablanca. All together, these have a capacity of a few thousands students.

Industry needs for skilled and semi-skilled workers, as evidenced in the October 1978 labor market survey (see Enclosure 5 and the excerpts in the Survey of Literature, item VIII) indicate an excess of demand over present capacity in vocational training.

The skilled workers needs by geographic location, however, illustrate vividly the basic problem of Morocco's economic development -the concentration of industry and services in two of the seven economic regions, with 75 percent of additional skilled workers indicated for the Center and North West regions. Casablanca alone calls for 59 percent of all technical skills, and 81 percent of non-technical (administrative) support..

The OFPPT Enterprises Services pilot experiment with the two MUs did not really prove the rural skill training needs (the first one, a truck with a 15 sq.m. working area, operated for two years; a second one, a semi-trailer with a 30 sq.m. work area, was operational only for the last three of four months; a second semi-trailer was recently built and should be equipped in September). All they did was to offer a limited number, considering the program is in its third year, of short initiation and skill upgrading course

According to Mr. Hemtati, the MUs pilot project served to prove to the GOM and eventual loan grantors the feasibility of using MUs in Morocco as far as existing technical infrastructure and logistical constraints are concerned. As for satisfying the training needs, it has a quite different purpose: the existing MUs program will continue providing basic/introductory and skill upgrading courses, lengthened to a range from 3 to 30 weeks depending on specific local needs, while the proposed 20 MUs will be an extension of the existing 39 OFPPT centers,

giving the same two-year operational training in about 45 different subjects.

A cursory field survey -one day trips to Marrakech and villages east of Meknes- show little relation between apparent skill development and what is offered these days by the vocational education system.

In Marrakech, both the OFPPT and Entraide (Ministry of Social Affairs) vocational education schools offer the same industrial skill courses as anywhere else in Morocco. The Entraide schools give regular two-year courses in mechanical and electrical engineering skills, fully realizing that half of the students will not find employment in the province and will move to Casablanca or emigrate. On the other hand, graduates from the carpentry and welding classes will find a ready market in the area for their skills. No one offers courses related to the economic activities peculiar to Marrakech, such as a burgeoning tourist industry that could use skilled workers and employees in hotel services and management, restaurant operations, etc.

It is even more difficult to relate the rural training needs with the existing curriculum of OFPPT which would change slightly, if at all, for use with the MU system, as now proposed by the GOM.

First, a Moroccan rural environment is hard to define from the point of view of demand for industrial and trade skills. In the Meknes province, for instance, only Meknes, El Hajeb and Ifrane are cities. There are no intermediate localities, that we may call towns, as their development as market centers was not called for in view of the existence of rural souks -weekly markets, scattered around the countryside in such a way that nearby farmers could walk to one and return to their village the same day. (See Morocco - A Country Study, area handbook series, The American University 1978, p. 94).

Most of large private farms (945 in the mid-1950s) had their lands distributed to local people or continued to exist as public domain agricultural enterprises. The great majority of farms are small, 1 to 3 ha in size, with little or no farm equipment. A few, near the Ministry of Agriculture extension station borrow equipment, mainly tractors, and receive technical assistance, seed and fertilizers.

In villages, particularly those without electricity (half of all villages according to the Ministry of Labor delegate in Meknes), the demand for any vocational skills, as now offered by the existing training establishment appears limited -probably for general and automotive mechanics, as transportation vehicles are seen all over the countryside. Apparently, what is needed is a cross-disciplinary curriculum for training village youth to perform a series of simple repair, maintenance and building/fabricating tasks on farm equipment, vehicles (carts, bicycles and automobiles), water pumps, buildings and utilities, household equipment, utensils and appliances (radios and even battery operated TV sets are common in villages around Meknes). The training would produce a rural "jack-of-all trade", handyman, rural mechanic (the French words "bricoleur" and "dépannage" better describe what is meant to be their functions and activities). The new curriculum, to turn out for lack of a better name a 'rural technician', will provide the elements of automotive and electrical engineering as needed for simple repair and preventive maintenance of farm equipment, water pumps, all kind of vehicles; for construction trades such as masonry, plumbing, carpentry, sheet metal; for blacksmithing, including spot welding, etc.

Although the people interviewed in Marrakech and Meknes agree with that approach, it should be noted that Mr. Hemtati who (maybe reflecting the official position of the OFPPT) is very much opposed to that type of basic training in a combination of different traditional skills and trades. He believes a non-professional mechanic, i.e. not fully trained and qualified-certified after a two-year course, as offered now by OFPPT, will do more harm than good to an expensive piece of farm equipment he may try to fix.

There is an apparent lack of understanding of the meaning of rural areas to be served by the MUs. The word "campagne" (field, countryside, interior) is broad enough to include any location outside large urban centers. According to Mr. Hemtati, the 20 MUs will operate out of existing provincial OFPPT centers, staying in one location, yet to be defined, for one or two years, and drawing on the logistical support from one of three regional services centers. Mr. Alaoui, of the OFPPT Casablanca training center, however, believes the units will continue to provide skill upgrading courses in existing large plants outside

the main cities, such as the 13 SUMAG sugar refineries and several food processing plants.

B. Infrastructure and Logistics

Morocco is reputed to have the best road network in Africa. Although this allows ordinary passengers cars, buses and cars to have access to all population centers, one should still make sure that a 40-ton tractor trailer (17 ton axle load), almost 60 ft long (12.5 m semi-trailer plus the tractor) can handle all the curves, turns, and bridges on the way to the areas it is scheduled to reach.

The power generating units will provide electricity. They will be probably run by diesel fuel, thus a regular supply of it must be assured.

The OFPPT pilot project did point out that the personnel logistics of the MU drivers and instructors was a major problem. Almost all instructors' trip reports contained complaints about the total lack of lodging and feeding facilities during their field assignments.

The OFPPT management (both Messrs. Alaoui and Hemtati) tend to minimize the importance of the MUs personnel accommodations. It is true that the proposed MUs will have a 3 by 4 m platform extension with canvas walls and roof to house two instructors, and the tractors two bunk beds each (one should be sufficient as the distances from the provincial centers in any direction are not great). Mr. Hemtati envisages that both the instructors and students will live in tents during the one or two year training period. Therefore, feeding, study and recreation facilities should be provided at each location before the MUs arrive.

Instructors compensation, low compared to what people with comparable education and skills are paid and given in fringe benefits, in both the private sector and public services, is not increased for field assignments.

The practice experienced in the pilot MUs operation of the instructors depending for food and lodging on the good will of local people, and of expecting and receiving bonuses ("gratification") from the client should be avoided in the future, by giving the MUs personnel, while in the field, a premium pay and living advances (per diem), which now are apparently paid retroactively after considerable delay.

C. MUs Configuration

The proposed 20 MUs have a basic configuration very similar to that of the new, third OFPPT unit now ready to be equipped in their Ain Borja shop in Casablanca, as shown in the 7 photographs (Enclosure 6a, b and c). The 20 sets of 11 types of training equipment (repair and maintenance mechanics, welding, radio and TV, etc.), the four tractors and the four power generating units, are not described at all in the loan request (Enclosure 2), while the MU specifications are quite detailed.

The MUs configuration should be much more flexible (varied) particularly since their deployment is still rather vague. Vocational training can be provided in a range of facilities, from permanent building with fixed equipment and machinery to semi-fixed, meaning temporary building (quonset huts, barracks, tents) with bolted down or anchored equipment, that can be transported to a new location on trucks, railroad cars or ships; semi-mobile, i.e. trailers, semi-trailers and containers; and fully mobile-trucks or vans.

If the MUs will be used for carrying out the existing OFPPT one and two-year courses, as stated by Mr. Hemtati, them semi-fixed facilities may prove to be more appropriate and possibly more cost effective. On the other hand, if they are to be used for relatively short instruction and skill upgrading courses, particularly in remote and difficult access areas, which a semi-trialer may have difficulties in reaching, a truck or van shop may be a better alternative.

D. MUs Auxiliary and Training Equipment

As mentioned earlier, the request for a loan (Enclosure 2) does not elaborate on the tractors, power generating units and training equipment, tools and facilities.

First, there is no explanation on the ratio of four tractors and power units each to 20 MUs. If the MUs are intended to stay in one location for a period of one or two full schoool years, then the annual moves will be from 10 to 20 in all, in which case one tractor will be more than sufficient. However, considering that a single unit may be immobilized by breakdowns and that acquiring two tractors would be quite

uneconomical, OFPPT should consider the alternative of leasing tractors for moving the semi-trailers.

If semi-trailers are replaced by containers, or trailers, then their movement is even simpler: the former are carried on flat-bed trucks and set in place on their own lift jacks, while the latter can be also pulled by trucks which could carry the power generating units and/or other support equipment.

The number of power generating units is a direct function of electricity available in locations to which MUs are to be assigned, If, as indicated to us in Meknes, half of the villages are electified, then 10 portable generators will be needed.

E. Costs of MUs

The estimated costs of the MUs appears excessive -400,000 DHs ($105,263) each, without equipment. This may be the cost of the two semi-trailers fabricated in Casablanca. If a series of 20 is ordered the unit price should drop appreciably. The advantages of building the semi-trailers in Morocco are obvious (using domestic labor and materials, savings in foreign currency expenses), but not so if the price is twice that of a comparable unit acquired abroad.

The tractors costs are estimated at 230,000 DH ($60,526) each, and power generating units at 90,000 DH ($23,684). Without any design and operating data on these units it is difficult to evaluate their costs. If the semi-trailers are replaced with trailers or containers then trucks, a more versatile unit, would replace the tractors.

Considering that the MUs will be stationary in one location during a one or two-year period, a comparative cost-benefit analysis of providing a permanent power generating unit versus a portable one in each location should be made, as the former could continue to serve the village for other purposes after the MU leaves.

The cost of the following proposed training equipment appears overestimated:

- Mechanical Repair and Maintenance, 2 units at	300,000 DH	($78,947) ea
- Welding, 2 units at	150,000 DH	($39,474) ea
- Auto shop, Gasoline, Diesel, 2 units at	200,000 DH	($52,632) ea
- Automation, Instrumentation, 2 units at	180,000 DH	($47,368) ea
- Electrical Repair and Maintenance, 2 units at	150,000 DH	($39,474) ea
- Electrical Engineering/Electronics, 2 units at	180,000 DH	($47,368) ea
- Radio, Television, 2 units at	200,000 DH	($52,632) ea
- Tailoring, 1 unit at	50,000 DH	($13,158) ea
- Industrial Safety Health, 2 units at	120,000 DH	($31,579) ea
- Administration Skills, 2 units at	100,000 DH	($31,579) ea
- Secretarial Skills, 1 unit at	40,000 DH	($21,053) ea

For comparison, listed below are the prices of comparable size (36 by 8 ft versus 12 by 2.40 m for the proposed MUs) semi-trailers manufactured in the U.S. (see layouts, equipment list and itemized prices in Enclosure 7a, b, c, and d).

- Industrial Arts Mobile Lab	$12,365
- Automotive Mobile Lab	14,729
- Building Construction Trades Training Unit	13,744
- Vocational Agriculture Training Unit	8,004

Even after adding 15% for eventual price increases since August 1978 (date of above quotes) and 50 percent for transportation in Morocco, the costs are appreciably lower than those given in the loan request.

Also worth considering is the purchase of used equipment, at least in the U.S., where reconditioned machine tools carry performance guarantees, and are quite adequate for training purpose. These should be acceptable in Morocco as used equipment, machine tools, etc., have been put to good use in vocational training schools in Rabat and Marrakech. The last advantage is considerable as exemplified by the price of a used boring machine, available from the AID Excess Property Division, at $537 (FOB Salt Lake City) compared to the price of $8,500 for a new one (see Enclosure 9).

F. The MU System

The request for a loan concerns itself only with the acquisition of 20 semi-trailers with 20 sets of training equipment (11 types/disciplines),

4 tractors, and 4 power generating units, for a total cost of 12,570,000 DH ($3,307,894).

In the three-year (1978-80) National Development Plan, the acquisition of the 20 MUs is priced at 40 million DH ($10,526,000) which sum presumably includes the cost of administrative and support facilities (such as the MU repair and maintenance shops in Casablanca, Fes and Agadir) but no details were available in the OFPPT office in Casablanca. The annual operating costs of 90,100 DH ($23,711), consisting of 57,000 DH ($15,000) for salaries, and 33,100 DH ($8,711) for other operating expenses seem underestimated; they are probably applicable to the MUs direct operating costs, i.e. salaries and allowances for the driver and instructors, fuel and operation expenses for the tractors, semi-trailers and power generating units while in the field, and do not account for the costs of all administrative and support personnel working full or part time for the MU system; nor do they cover depreciation. For example, for one tractor, assuming a straight line depreciation rate for a ten-year useful life, the annual cost would be 23,000 DH (i.e. 10 percent of the estimated 230,000 DH purchase price).

The three-year plan presents a two-year budget for the acquisition and operations of four different types of vocational training under the jurisdiction of OFPPT as summarized in the table below, which the author has adjusted to also show the cost per student/trainee for each option.

COMPARATIVE COSTS - INITIAL INVESTMENT AND ANNUAL OPERATING COSTS

FOR FOUR DIFFERENT VOCATIONAL TRAINING MODES

Type of Training Facility - Voc. Ed. Mode	No. of Projects/ Units	Initial Investment (in 1000 DH)		Annual Operating Cost (in 1000 DH)		Student Annual Capacity
		Total	Per Student	Total	Per Student	
1.a Applied Technology Institutes - New	10	110,532	29.0	16,259	4.26	3,810
1.b Applied Technology Institutes - Extensions	3	27,627	16.2	3,086	1.80	1,710
2. Skilled Worker Centers	20	156,766	32.1	12,956	2.75	4,720
3. Apprenticeship Centers	4	88,132	5.1	24,020	1.39	17,250
4. Mobile Skill Training Centers	20	40,000	40.0	1.802	1.8	1,000
TOTALS		423,077	14.9	58,123	2.04	28,490

Source: Royaume du Maroc, Ministère du Travail et de la Formation Professionnelle, Plan Triennal 1978-80.

The MUs budgeted initial investment cost per trainee of 40,000 DH is almost three times the average of 14,900 DH. As for the level of skill of the student expected to use them, they are comparable to skilled worker centers, according to Mr. Hemtati, while the existing MUs are now giving courses (initiation type) which are somewhat similar to those given in apprenticeship centers.

The annual operating costs per student of 1,800 DH (probably underestimated) are comparable to the average for all of about 2,000 DH, and about 35 percent lower than those indicated for the skilled worker training centers.

No information was made available to the writer to assess if these estimates are realistic or even developed on a common basis in order to be truly comparable, so they can be used in a cost-benefit or cost-effectiveness analysis of the MUs versus conventional skill training facilities.

V. CONCLUSIONS AND RECOMMENDATIONS

These two sections of the report are combined so that the reader and decision-maker can easily relate a recommended action to the conclusion on which it is based. The order in which these are presented does not indicate necessarily a sequence, or priority, for their implementation.

A. Need for Vocational Training

Conclusion. There is no doubt that the need for vocational training exceeds by far the Moroccan capacity to provide such training. Most Moroccan vocational training -about 10,000 students a year- is now administered by the OFPPT. These trainees are drawn from a pool of some 120,000 secondary schools dropouts.

However, drawing any conclusions in greater detail, concerning geographical distribution of demand (particularly outside the main urban centers) for different skills, trades and levels of expertise, becomes problematical and even speculative. This is related to the information obtained during this three-week survey.

The latest OFPPT labor market survey (October 1978, see Enclosure 3) bears out these reservations by stating: that less than a quarter of the queried enterprises did respond; that less than half of the provinces indicated any need for new skilled workers; that it applies only to enterprises existing in 1975; and that no quantitative conclusions can be drawn from the survey.

The training demand in rural areas is not established at all, to the author's knowledge. In his understanding of the meaning of "campagne", it could include any enterprises outside the ten or so major Moroccan cities, that is townships and villages of any size, and all farms, from large public sector estates to small individual holdings.

Recommendation. The scope of training for small scale enterprise must be clearly defined. A market definition both existing and potential, over the next 10 years, and in specific locations to be considered is necessary. This planning must consider:

a) Enterprises, existing and future/planned or anticipated -industrial, agro-industrial and services (requiring skilled and semi-skilled workers);

b) Town and village infrastructure (utilities, public buildings and works), needing workers qualified in building trades, and vehicle repair and maintenance;

c) Town and village residential needs -in terms of building, construction and maintenance skills, utilities and appliances repair;

d) Farm needs for the repair and maintenance of agricultural equipment, tools and vehicles, and water pumps.

B. Demand for Training by MUs

Conclusion. As the overall employment and training needs in industrial arts and construction trades have not been determined for rural Morocco, obviously the specific market and area coverage of the proposed MU program cannot be known. Consequently, the number of MUs is an arbitrary one and not calculated to meet any specific demand, in terms of location/geographic distribution and type of training required.

In the loan request, 2 units each, equipped for training in 9 different skills/disciplines, are shown. This means, the GOM is assuming an equal demand for mechanical repair and maintenance, and for automation and instrumentation. This can be hardly expected to be the case in any rural environment.

In the three-year National Economic Plan, it is estimated that the 20 MUs will produce/graduate some 1,000 skilled and semi-skilled workers. Assuming an equal number of 1 and 2-year courses, this means an average class size of 35 to 40 students, producing each year twice as many graduates (electricians, mechanics, welders, radio and TV repairs, etc.), and again demonstrating a lack of a realistic training demand forecast.

It is also not known how much of the well defined rural demand for vocational training could be, effectively satisfied by two other existing, (and planned for expansion) vocational education modes, i.e., skilled worker centers and apprenticeship centers. We are told that OFPPT schools are not reaching the rural areas at all, but this may not be the case with the Ministry of Social Affairs Entraide schools. In the Marrakech province, for instance, at least one is more than 100 km away from the provincial seat.

Recommendation. Once the overall vocational education demand is estimated for the rural areas, a comparative cost-effectiveness analysis should be made for the fixed facilities and MUs. There is a definite advantage for MUs in the speed of implementation/activation, i.e., only 3 to 6 months for building a semi-trailer in Morocco (ordering a ready made trailer from Europe or the U.S., including delivery to Morocco, should not take much longer) compared to up to four years for building a fixed training center.

The other alleged advantages of MUs, i.e., lower initial investment and operations are questionable. Realistic life cycle cost estimates should be made for both training modes and their variations (semi-fixed facilities, containers, trucks and vans).

The comparative cost/benefit and effectiveness criteria including the socio-economic and cultural impact must also be considered and objectively evaluated.

C. MUs Curriculum

Conclusion. The skill training subject matter, length and method of presentation, according to Mr. Hemtati, will replicate the practice of the existing fixed OFPPT training centers. The courses/disciplines offered are patterned after the French vocational education system as exemplified by the OFPPT Upgrading Courses - First Semester 1979 (Enclosure 8) and the General Training Catalog, BTE, France (summarized in item IX, Survey of Literature). In brief, they will produce good specialists in well defined (and sometines narrow) skills and trade.

In the author's opinion, this type of vocational education will not meet the needs of the rural environment. First, the structures (building, facilities), vehicles, equipment and tools to be properly maintained, must be repaired on site without, for example, having to haul a tractor to the city for cleaning the injectors, or to wait for a specialist to eventually arrive at the village.

Second, there is no point to 'train' when the acquired skills cannot be exercised in the rural environment. For example, a well trained mechanic/machinist could repair a piece of agricultural equipment by re-designing the broken part and by machining it on a lathe, etc., but in the nearest village there is no mechanical shop (there is no electricity, or the village is too small to warrant a shop) and the best he can actually do is to file the part and spot weld it, hoping it will last through the season (planting or harvesting).

Recommendation. Once the demand for training in the rural areas, in general, and specifically for MUs (as the most effective means) has been determined, OFPPT should develop multi-disciplinary curricula tailored to the needs of the community, and capacities of the rural infrastructure to perform the work. These capacities may consist of a combination of skills, crafts, trades and a relatively low level of expertise and proficiency. Reliance on portable tools and equipment, rather than on elaborate repair and maintenance shops is indicated. This means producing a new breed of rural handyman ("bricoleur" in French) or a 'rural technician', who has practical knowledge in the basic applications of a combination of skills such as: mechanical and electrical repair; automotive repair

and maintenance; blacksmithing; carpentry; plumbing, etc.

These curricula should be given in different combinations of skills and proficiency levels. For instance, a three-month beginners/initiation course, with those who complete it successfully, continuing (immediately, or after acquiring some experience in the field) with a six-month intermediate course, and possibly a final one year advanced course.

D. MUs Pilot Project Experience

Conclusion. The MUs two-year pilot experiment is officially reported (see Enclosures 3 and 4) as an unqualified success. A review of the MUs correspondence files and particularly of the MU instructors' trip reports, however, do reveal certain problems, such as:

- The courses (initiation or skill upgrading) ranging from 5 days to one month were too short to have a real impact;
- Lack of homogeneity in students education level, from illiterates to 5th year secondary school dropouts;
- Inability to perform all exercises (practical work) due to lack of equipment and utilities;
- Lack of adequate sleeping and feeding facilities for the instructors and drivers.

It appears, as Mr. Hemtati emphasized, that the MU pilot project has proved only that MU trailers can be manufactured in Morocco, and that their deployment in Morocco is not constrained by major logistical and infrastructure problems. The pilot project does not however reflect the scope and feasibility of activities and deployment of the proposed 20 MUs program.

Recommendation. The MU Pilot project should be evaluated in more depth through interviews and discussions with the MUs drivers and instructors; with the management of several organizations which were served by the MUs -sugar refineries, a tobacco drying plant, agricultural cooperatives, etc.- in different locations and with sutdents/trainees who attended the MU courses.

E. Proposed MU Costs

Conclusion. There is wide discrepancy in the initial investment needed for the 20 MUs - 40 million DH ($10,526,000) in the three-year Economic Development Plan and 12,570,000 DH ($3,307,894) in the loan request. Obviously the two estimates have not the same basis, but no details are available of the 40 million DH estimate.

The plan also shows an annual operating cost for each MU of 90,100 DH ($23,711), a low and incomplete estimate, as it does not include depreciation, among other things.

The estimates, for the purchase of vehicles and especially of the training equipment (machines, tools, etc.) are on the high side, but are shown without sufficient detail, i.e. type, size, rating, etc. of machine tools, to allow a precise evaluation.

Recommendation. A chart of accounts should be developed for the life cycle cost of an MU, to include all direct and indirect costs incurred in the acquisition and operation of an MU system.

Costs estimates should be for increments of, say 5 units, as the eventual acquisition will be probably phased over time, to show the effect of the economy of scale both on initial investment and recurring costs.

At least three main procurement sources should be priced: Moroccan, whenever feasible (essentially the semi-trailers and some equipment), U.S. and West European manufacturers (and possibly Japanese). In addition to price, careful consideration must be given to ready availability of spare parts and of local servicing facilities of each manufacturer/supplier.

The possibility of acquisition of used (second hand) equipment should be explored.

F. The MU System

Conclusion. The loan request deals only with the acquisition of 20 MUs with their auxiliaries (tractors and power generating units) and training equipment (20 sets for 11 different types of skills). The three times as large initial investment budgeted for in the three-year plan implies a 'system' but no details were made available (which leads the author to believe that details do not exist rather than that they may be of a GOM confidential nature.

Mr. Hemtati would welcome an expression of willingness on the part of the AID Mission for the GOM to expand their loan request to include technical assistance and training in the U.S.

Recommendation. A definition and description of the MU system must be made to include at least the following:

- Management and Administration: central, in the OFPPT headquarters in Casablanca, the Enterprises Services Department in Ain Borja (Casablanca), Ministry of Labor in Rabat, stating what will be done by the existing personnel, and what expansion will be needed for the same functions in the regional/provincial OFPPT and/or Ministry of Labor offices.
- Support, in personnel and facilities from the 39 OFPPT existing (and future) training centers.
- Description of the new regional logistical centers in Agadir, and Fes and what expansion may be needed in the Ain Borja shop.
- Housing, feeding and recreation facilities in the locations of the MUs planned deployment.
- Students/trainees follow-up action plan -to assist them in obtaining employment in the area, and possibly financial and technical assistance to set up small local enterprises.

G. Alternative (Different) MUs

Conclusion. Only one configuration of MUs is proposed, essentially a duplication of the MU experimental project third unit (as shown in Enclosure 6a, b, and c, and described in Enclosure 2). Although most of the demonstration program was conducted with a truck shop, that configuration is not envisaged at all by the GOM for use in the future.

Recommendation. Once the rural training needs have been established, both in quantitative terms and by type of skills, or combination of skills needed as well as in which specific locations it is expected to be carried out, several different options of mobile and semi-mobile skill training units should be reviewed with respect to their life cycle costs and effectiveness. These are:

- fully mobile, i.e. trucks and vans;
- semi-mobile, i.e. trailers, semi-trailers and containers.

H. Alternative Uses of MUs

Conclusion. The proposed MUs have a stated (by the representative of the Ministry of Labor) objective of extending the existing mode of vocational training of the OFPPT training centers to rural areas presently not covered, in order to stimulate industry and businesses to move into rural areas and also to reduce the exodus of rural youth to large Moroccan cities and abroad.

Recommendation. Consideration should be given to several options for MU applications, either singly or in different combinations:

- MUs to be used as field and emergency repair and maintenance shops in the rural areas, particularly during the period of intensive agricultural activities when a minor breakdown or maintenance problem may immobilize a piece of farm equipment for the rest of the season.
- MUs to be used as vocational training and promotional units, travelling in the countryside, showing youth by means of short demonstration exercises what they could do with different skills they can acquire in the existing OFPPT centers.
- MUs giving initiation courses in rural areas, lasting from a few days to a few weeks, teaching the rudiments of different skills to rural youth, which they can apply at home or on the farms, and also helping them in deciding if industrial skills, or construction trades are what they would like to do for a living. These types of courses were given in the experimental MU project, with an apparently mixed success (see D, Recommendation).
- MUs providing skills upgrading courses. This was also done in the MU experimental program, apparently with better success than the initiation courses. In the cement plant near Meknes which the author has visited, the automotive repair shop supervisor expressed an immediate need for such a course.