

A. SUMMARY DESCRIPTION

A technical assistance paper, dated October 18, 1967, and approved by AA/AFR on November 16, 1967, describes the project as originally conceived and approved. The purpose of this PROP is to revise the scope of the project, recalculate expected costs, modify the implementation plan on the basis of experience gained after eighteen months operation, and to reorient the project in view of recent GOM legislative action governing the management and development of the collective grazing lands.

The project addresses the problem of over-grazing and the low level of livestock production of Morocco's collective grazing lands, comprising some 5.3 million hectares, which constitute the large part of grazing resources in the country. Over the longer term, the project is also intended to assist Morocco to overcome a widening shortage of animal proteins to meet adequate nutritional standards and assist in the social and economic development of the pastoral people.

The agricultural sector in Morocco employs some 70% of the total population, and Morocco's livestock, principally sheep, cattle, and goats, accounts for about 50% of the value of annual agricultural production.

On July 25, 1969, GOM issued a Royal Decree (Dahir No. 1-69-171) establishing the legal basis for the management and development of the country's collective grazing lands. The law authorizes the establishment of management areas designated as "Range Improvement Perimeters" and sets forth the regulations governing the management and development of the lands within the "Perimeters" as well as penalties for violations. This new legislation provides a new

legal base for the management of collective lands.

The administrative organization for the implementation of the decree is still in the process of being established. One objective of the revised Project will be to assist in determining the administrative and organizational requirements at the various governmental levels for the effective implementation of the new enabling legislation.

The basic purpose of the project has not changed; it is to establish and carry out a demonstration range management and livestock improvement program in selected collective grazing areas. However, the scope has been substantially changed to broaden and intensify the research elements and to concentrate on less herbage than was originally conceived. Self help will be emphasized in the development programs.

The magnitude of the project is reduced from 12 management areas covering 325,000 hectares within three years of the project starting date to two areas to be established by Royal Decree under the new legislation as Range Improvement Perimeters covering 70,000 hectares by the end of FY 1970.

A pilot area of approximately 3,000 hectares will be established in each perimeter for intensive demonstration and research. Improved livestock and range management practices will be demonstrated and research data gathered to determine and evaluate management and development program alternatives that feasibly can be implemented on the entire perimeters and extendable, eventually, within GOM's administrative and fiscal capabilities to a substantial portion of the collective lands. The participation of

other GOM agencies such as the Forestry Service and the Agronomic Research Division in joint research projects of mutual interest will be encouraged.

These changes are being made in the project to develop a livestock and rangeland improvement program that will be more realistic in its approach to the local conditions that have contributed to the slow progress to date which has been caused primarily by:

1. The lack of an adequate GOM administrative authority;
2. The lack of an adequate research, demonstration and information program to convince the pastoral people of the value of rangeland and livestock improvement;
3. Reluctance of the pastoral people to support programs which infringe upon their traditional use of the land;
4. The short time programmed for drastically changing operational patterns and decreasing the number of animals grazing on the land.

Thus, a retrenchment of the amount of total area in the project is necessary, with an intensive demonstration-research project activity designed to find possible solutions to the problems inhibiting livestock and rangeland improvement on collective lands in Mexico.

Included in the above changes in scope are the following reseeding and animal health phases which were not programmed into the original project proposal:

1. Production of Forage and pasture crops in certain areas.

Those range areas incapable of natural rehabilitation but having substantial potential for increased forage production if reseeded, will be

planted to adapted forage species as determined by experimental trials. People dependent on the land will do the planting of forage grasses using animal drawn plows. It is anticipated that some financial assistance will be required.

2. Livestock health

An aggressive animal health program is essential to the success of the project. As originally conceived the treatment of animal parasites was a minor portion of the project and other livestock disease problems were not addressed completely. Research will be conducted in the pilot areas to determine an optimum animal health program reflecting those technical, personal, administrative, cultural and economic considerations which a national range management program must face.

The revised plan of action is summarized as follows:

1. Balance of FY 1970:

Issue Royal Decrees establishing Plaine d'Arid (25,000 hectares) and Tafrata (45,000 hectares) as Range Improvement Perimeters under Dahir 1-69-171.

2. During FY 1971:

a. Establish two 3,000 hectare demonstration areas in the Plaine d'Arid and in the Tafrata perimeters. Select local livestock operators to participate in demonstrations; construct necessary range improvement and livestock handling facilities (wells, shelters, forage centers); and initiate demonstration, information training and research programs including range reseeding and animal health.

b. Develop preliminary grazing management, livestock improvement and range development plans for the entire Plaine d'Arid and Tafrata Perimeters in accordance with the new legislation.

3. During FY 1972:

Finalize and implement management and development plans including construction of range improvement and livestock handling facilities in the two perimeters.

4. Priority will be given during the life of the project to developing GOM institutional capability to manage and develop the collective grazing lands.

5. Based on degree of success and support for the Plaine d'Arid and Tafrata Perimeters, decision will be made whether to expand the project to the original goal of 325,000 hectares; to continue on a smaller demonstration-research basis; or to phase out the project.

B. SETTING

Collective rangelands account for 5.3 million hectares, an area roughly equal to the total cropland in Morocco. Sheep and a significant number of goats account for the major portion of the livestock. Some cattle and a few camels are also raised in the collective land areas. The sheep are grazed in small flocks handa ranging mostly from 50 to 300 animals belonging to one to five owners. About 25 to 30% of the sheep grazing on the collective lands belong to absentee owners such as merchants and government employees.

In spite of extremely poor management conditions, the value of the livestock products produced on the collective rangelands due to their magnitude

constitutes an important portion of the country's total annual marketing of livestock products. Over 95% of Morocco's livestock are raised by traditional stockmen largely on unfenced grazing lands. Size of the herd or flock, not the condition of the animals, number sold or profit earned, is culturally the principal measure of success applied by most collective land operators. Herds and flocks are often two or three times larger than the carrying capacity of the grazing land based on sound management norms. Each year, the range becomes more denuded as the desirable range grasses are killed by overgrazing. The extensive seasonal and nomadic movement of animals in Morocco is largely the consequence of poor range management, mainly overgrazing.

The collective grazing lands are tribal owned, but the State maintains the right of expropriation without compensation when it is considered to be in the public interest to do so. Although the numerous tribal groups have established a form of unrecorded property rights to the lands through a history of occupation and use, definitive boundaries between the tribes and groups in general have not been established. Historically the collective grazing lands are administered locally by tribal councils. Ultimate authority, however, has rested with the Ministry of Interior.

In many areas the rangelands are interspersed with small patches of cultivation. While the range is used in common, the cultivated plots are allocated to individuals on short term assignments. Since he is not assured of the continued use of either the rangeland nor the crop land, the user has no incentive to conserve the land or invest in improvements.

The rate of takeoff for sheep in Morocco as a whole in 1968 reportedly averaged 34% which means that only 34 animals reached the market from each

100 head in the breeding flock. In western U.S., by comparison, the takeoff is approximately twice as many animals. Although the lack of sufficient feed to sustain proper body growth throughout the lives of the animals is the primary and most important factor causing low meat production, poor culling, inbreeding and almost non-existent disease control are also important contributing factors.

The low production of lambs combined with the high death loss of mature ewes requires the use of virtually all female lambs for replacement. There is little chance to do any culling for improvement of progeny with such a low annual lamb crop. An understanding of selection of male breeding stock for breed improvement is also lacking. Inbreeding and lack of good sires contribute to poor breeding yields, slow growth and poor conformation for meat production.

There has been a lack of appreciation of the role range management can play in water-shed protection. Trees are often planted where they are neither ecologically adapted, nor economically rewarding. Terraces and other high-cost structures are built where a grass cover would serve as well and cost much less. Stream bank stabilization by structures is recommended even though the value and effective life of the structures are in doubt so long as the watershed is left untreated. The terrace and reforestation approach to soil conservation/^{in some instances} in Morocco is too costly and time consuming. Greater attention needs to be paid to better land use that is based on consideration of climate possibilities for achieving soil and water conservation by the adoption of economically rewarding practices and techniques.

Range management, wisely applied and administered, is a low cost effective approach that can protect and improve Morocco's valuable watersheds.

There is every indication that the GOM is concerned about the abuse of the collective land resources and the extremely low social and economic status of pastoral people dependent on them. The highest illiteracy rate in the country is found in these areas.

The GOM has incorporated livestock and rangeland improvement in the five-year plan (1968-72) as a major development effort and has projected in excess of six million dollars for the development of over one million hectares of collective grazing land. This development planning was incorporated into the GOM five-year plan largely as a result of the AID-financed Carter Study and Range Management Plan of October 1966, which was the basis of the livestock and rangeland project approval and implementation to date.

The initial USAID/GOM project agreement was signed on March 25, 1968 and the original AID Range Management Advisor arrived at post in July 1968. He was followed in September by three IVS contract technicians. By November 1969, the number of IVS technicians assigned to the program had increased to six (out of nine authorized). These six IVS technicians, including a team leader, were assigned to three project sites. By the end of April, 1970, four of these IVS technicians will have left the project. The remaining two will work on project sites at Midelt and Guezif. The original AID Range Management Advisor was replaced in September, 1969, and in addition the Mission Livestock Advisor has been made available on a part time basis

to strengthen the livestock improvement portion of the project.

USAID has provided two U.S. made grass drills and a special purpose vehicle (camper) for the project. Ear tags for 25,000 sheep have been purchased. Over 10,500 lbs of grass and legume seeds have been procured in the U.S. for the reseeding trials. In addition, IVS has procured under its contract 200 lbs of seed for additional species trials making a total of 11,000 lbs of forage species and varieties imported for trial plantings.

Under the project agreement GOM is to provide funds for project operating costs; furnish personnel; construct wells, forage centers, animal shelters; and handling facilities for ear tagging, health control and shearing; perform reseeding operations; provide supplemental feed; and make trust funds available to finance local costs of the U.S. personnel.

The Livestock Service of the Ministry of Agriculture has been responsible for implementation of the project since its inception.

The principle of committee action was introduced in May, 1969, by the establishment of Central and Provincial level committees. The Central Committee operates on a national level and is concerned with project policy determinations and coordination of the activities of the various agencies involved in the project. It is chaired by the Secretary General of the Ministry of Agriculture and is composed of director level representatives of the Ministry of Interior, Forestry Service, Agricultural Development Service (DMV) and Livestock Service.

Provincial committees are chaired by Governors and composed of local provincial officials of the concerned technical and administrative agencies.

They were established for each of the project areas to implement project plans (the Dahir of July, 1969, in general follows the above use of committees).

Six participants from the GOM Ministry of Agriculture were sent to the U.S. for 20 weeks training in range management during the summer of 1968 and on their return were assigned as counterparts to the IVS technicians. Eleven range wardens have been employed on the project areas. In December, 1969, the first step in the establishment of a Range Management Unit in the Livestock Service was taken with the appointment of graduate of the National Agricultural College to serve as Counterpart to the Range Management advisor and be vested with the responsibility for implementation of the project under the Director of the Livestock Service.

In addition, GOM has provided six project vehicles for the use of the IVS technicians, office space at the local level as available, purchased more than 1000 tons of supplement feed supplies, carried out the reseeding operations on more than 225 hectares and provided project operating expenses.

The primary effort to implement the project to date has been directed at finalizing and marking the boundaries of the proposed project management areas and development of plans in accordance with the Carter Study and the establishment of reseeding trials. Physical progress to date has been slow. The project management and development plans have not been initiated on any of the proposed management areas due primarily to resistance of the pastoral people to grazing restrictions and to intervention on traditional tribal lands. They are also suspicious of the GOM action because of some history

of government appropriation of such lands for reforestation of the Forestry Service. The time frame in the original plan has been too rapid to gain the acceptance of proposed reductions in stocking rates as well as other management and social changes.

Traditionally the project lands have been grazed mostly on a seasonal basis by large numbers of sheep for varying periods of time during the year coinciding with forage availability. Under the "Carter Plan" seasonal grazing was to be eliminated in favor of a static breeding herd population year round, maintained during the dry season, primarily with purchased supplemental feeds, such as hay and grain.

Persuading illiterate livestock owners to purchase supplemental feed when they have traditionally maintained their livestock in a semi-starvation condition will be difficult to achieve. An alternative to supplemental feeding needs, therefore, to be studied. It is hoped that the establishment of perennial pastures by reseeding adaptable grasses will help to provide adequate dry season nutrition and minimize the need for supplemental feeding in some of the range areas.

All of these factors have resulted in a need for a demonstration and research project before progressing into the vast areas originally envisioned for range management.

ECONOMIC JUSTIFICATION

The production cost and return estimates shown below are based on preliminary survey results and best informed judgments as to expected changes from introducing a "package" of improved practices and reduced rate of stocking. Earlier estimates have included rather costly development works

not economically justified. Also, since the project area has been scaled down to a total of 70,000 hectares, it would be unrealistic to charge all project costs including GOM and U.S. personnel against the returns from this limited area. It is expected that before the end of the project some of the improved practices would "spill over" and be carried on outside of the demonstration areas. In later years, the proven practices should continue to multiply returns throughout the entire country.

A specific example of the economic benefits to be realized from parasite control can be made on animals that do not die but merely suffer weight loss. One common parasite disease prevalent in Morocco is an internal worm called strongyles. A sheep infested with strongyles will harbor by conservative estimate about 500 worms in a rather typical light infection and each worm is responsible for the loss of one gram or one milliliter of blood per year. Thus, the animal loses 500 grams of weight per year due to infection by this parasite. The average live weight price of sheep in Morocco is DH 3.5/kilo (seventy cents). The cost of the medicine for treating a 25 kilo sheep is DH .40 (eight cents) per treatment which is done yearly for a saving of DH 1.75 (thirty-five cents) value of meat. The labor cost for treatment is negligible.

In addition to the effect of parasitism on carcass weight of sheep it has also been shown in the U.S. that the wool from severely parasitized sheep is short and dry and shows breaks in the fibers that reduce its value. A similar example could be given for almost all the diseases that this program will be directed against.

In addition to direct benefits presented, potential secondary benefits of the project would include:

1. Reduced water runoff and soil loss from the grazing area and lessened damage to downstream dams and irrigation works caused by silting.
2. Increased crop returns and fertility from reduced grazing on cultivated lands normally grazed on seasonal basis under existing practices.
3. Reduction in nomadism through more intensive use of the grazing resource.

Estimated production for improved versus existing practices, Tafraut and Plaine d'Arid Management Areas - 70,000 hectares:

	<u>Beginning of year No.</u>	<u>Death Loss No.</u>	<u>Kept for Replace- ment No.</u>	<u>No.</u>	<u>Sold or Slaughtered</u>		
					<u>Kilos</u>	<u>Price DH</u>	<u>Value DH</u>
I. Existing Practices							
Ewes	50,000	6,000		1,500		40	60,000
Rams	2,500	300		200	30	3.5	21,000
Lambs:							
Ewes	20,000	8,000	7,500	4,500	23	3.5	362,250
Rams	20,000	8,000	500	11,500	25	3.5	<u>1,006,250</u>
Total							1,449,500
Wool Production (1.5 Kilos/head)				78,750	3.75	295,313	
TOTAL							1,744,813

	<u>Beginning of year No.</u>	<u>Death Loss No.</u>	<u>Kept for Replac- ment, No.</u>	<u>No.</u>	<u>Sold or Slaughtered</u>		
					<u>Kilos</u>	<u>Price DH</u>	<u>Value DH</u>
II. <u>Improved Practices</u>							
Ewes	25,000	1,500		2,250		50	112,500
Rams	1,250	75		175	32	3.5	19,600
Lambs:							
Ewes	11,875	1,781	3,750	6,344	28	3.5	621,712
Rams	11,875	1,781	250	9,844	30	3.5	<u>1,033,620</u>
Total							1,787,432
Wool Production (2.5 kilo/head)				65,625	3.75	<u>246,095</u>	
TOTAL							2,033,527

NOTE: The above production estimates are based on the following assumptions:

	<u>Existing Practices</u>	<u>Improved Practices</u>
1. Lambing percentage	80	95
2. Death Losses: (%)		
Mature Animals	12	6
Lambs	40	15
3. Replacement: (%)		
Breeding ewes	15	15
Rams	20	20
4. Animals remain in collective farms	8 months	12 months

Estimated annual direct costs and returns for improved practices versus existing practices - Tafraata and Plaine d'Arid management areas; 70,000 hectares total rangeland ^{1/}

<u>Annual Returns</u>	<u>Existing Practices</u> DH	<u>Improved Practices</u> DH
Meat Production	1,449,500	1,787,432
Wool Production	<u>295,313</u>	<u>246,095</u>
TOTAL	1,744,813	2,033,527
Existing practices reduced since land used only 8 months	1,163,197	
<u>Costs (annual amortized cost excluding labor)</u>		
Capital cost of breeding herd - average of 80 DH/head @ 6%	25,200	12,600
Wells, 17 @ DH 7500 amortized 20 yrs @ 6%		11,116
Dipping Vats & Handling Facilities 6 @ DH 3500 amortized 10 yrs @ 6%		2,853
Forage Centers 4 @ DH 25000 amortized 20 yrs @ 6%		8,718
Animal shelters 20 @ DH 1000 amortized 10 yrs @ 6%		2,717
Reseeding 15% of land @ DH 150/ha amortized 10 yrs @ 6%		213,992
Veterinary & health, DH .25/head existing, 2.50/head improved	13,125	65,625
Supplemental feeding, DH 3.0/head existing, 11.5/head improved	<u>157,500</u>	<u>301,875</u>
TOTAL	195,825	619,496
<u>Net Return</u>	967,372	1,414,031

Gains for improved practices

446,659

Gains for improved practices
(per hectare)

6.38

1/ Includes only those capital and annual operating costs associated directly with the management areas, i.e., U.S. commodities including equipment, seeds, vaccines and veterinary supplies plus all GOM commodities and development costs. U.S. and GOM personnel, training, and certain overhead costs such as office space, vehicles, housing, etc., are not included in the above estimates but should be offset by the multiplication of practices and subsequent benefits to the livestock industry.

C. STRATEGY

Effecting management of collective grazing lands is complex and difficult to accomplish. To successfully achieve project objectives, requires the cooperation of the people, an effective administrative organization, and a sound acceptable management program.

The people are not aware of the need for the restrictions and the changes necessary to protect and rehabilitate the grazing resources. Lack of forage and low animal productivity is usually attributed to the will of God rather than to their abusive grazing practices. In addition, nearly all of the land has a low productivity potential compared to crop land because of low rainfall or poor soil conditions. Response to rehabilitation measures is, therefore, slower and makes convincing people of the benefits more difficult.

An alternative to implementing the project with the cooperation of the people using the lands is to disregard the people and carry out the rehabilitation program by compulsion. While this choice could possibly effect management and development plans, it would require strong action to force the people to comply and a strong Government to withstand the political

repercussions. Local government cadres have not shown the strength nor the desire to carry out the project by force during the life of the project thus far. Consequently, the strategy has been modified in this PROF to establish two range improvement perimeters under the new law (Dahir 1-69-171) and two pilot demonstration-research areas to begin a program of research demonstration, extension and institution building that it is hoped will be socially, economically, culturally and administratively acceptable to both the people on the land and the Moroccan Government.

GOM must develop an administrative organization staffed with trained personnel capable of implementing such a program. Until recently responsibility for implementing the project has rested almost entirely on the USAID direct-hire and IVS contract technicians. GOM's role has been mainly one of providing financial and logistic support. This has been due largely to the USAID Project Manager not having a GOM counterpart prior to December, 1969, and due to the limited effectiveness of the six GOM participants who were assigned as counterparts to the IVS technicians following completion of their four month U.S. training program.

The IVS counterparts are young and very junior level Livestock Service employees, lacking the professional stature and ability to deal with senior level provincial officials and local people essential to project implementation. As a result, their role has been essentially that of interpreters for the IVS technicians with the latter carrying out the operational activities such as trying to establish and mark boundaries.

Although the Central and Provincial Committees established in May, 1969,

contributed to the coordination of the activities of the various parties involved and in making policy decisions, as committees they could provide little help in the daily operational activities involved in project implementation. The regular National Office and Provincial Livestock Service officials have been fully occupied in their primary program of animal health and therefore unable to perform in addition the operational activities of the project. As a result, the execution of the project has been almost entirely in the hands of the U.S. technicians.

The appointment in December of 1969 of a fulltime officer in the national office of the Livestock Service to head up the range management program and serve as the U.S. Project Manager's counterpart marked the beginning of an administrative organizational unit at the National level. To provide adequate COM direction at the field level the appointment of two additional professional level employees is being sought to serve as provincial Range Management Officers and counterparts to the IVS technicians at Mideit and Guercif. Only two of the six original IVS counterparts are currently working on the project.

It is proposed that the two counterparts will be reassigned as assistants to the proposed Provincial Range Management Officers and work as sub-professional officers with responsibilities for specific segments of project implementation.

Five Range Wardens at each of the two Range Improvement Perimeters to control trespassers and assist in general implementation of the development plans, plus presently assigned COM field veterinary personnel, will complete

the initial proposed organizational structure.

Prior to the enactment of Dahir 1-69-171 in July 1969, the responsibility and authority for the administration of the collective lands was vested in the Department of Interior and tribal councils which made project implementation by the Ministry of Agriculture difficult. This has been corrected by the Dahir which gives the Ministry of Agriculture responsibility for implementation of grazing management programs on collective lands established by decree as Range Improvement Perimeters.

The principal changes in range management and animal care required for project implementation on the Range Improvement Perimeters and pilot areas are (1) reduction in size of flocks to fit the grazing capacity, (2) establishment of a controlled system of deferred and rotational grazing to promote natural and artificial revegetation and maintenance of range vegetation at optimum density, (3) establishment of improved pastures through reseeding wherever feasible, and the integration of these higher intensity pastures into the over-all grazing management plans to speed up recovery of livestock numbers toward pre-project inventories and improve dry season forage supplies, (4) improvement in animal husbandry practices designed to improve breeding, livestock disease and parasite control, and marketing, (5) provision for supplemental feed during periods of stress and emergency, (6) the development of properly spaced stock watering facilities, handling corrals, shelters and other improvements essential to the management programs.

The new legislation provides that the Ministry of Agriculture shall determine the grazing rights within the established Rangeland Improvement

Perimeters, issue grazing permits to the authorized permittees and accordingly conduct surveys, research and trials as necessary, prepare plans and implement program for the rehabilitation and management of the lands within the Perimeters following submission to Provincial Boards for Rangeland Improvement for their advice.

The legislation also prohibits grazing of absentee-owned livestock in the Perimeters and sets forth penalties for violations of the law. The adequacy of the legislation will be tested during project implementation.

Much of the range lands in the Plaine d'Arid and Tafzata areas have deteriorated beyond the point of significant natural rehabilitation due to the lack of sufficient desirable species for stock and competition from established plants having low production characteristics. In addition, a great deal of the present vegetation provides little forage during the dry season necessitating the removal of the animals to other food sources or the purchase of costly supplemental feed supplies to sustain nutritional requirements.

Reseeding trials and observational plantings of 47 species of introduced grasses on 100 hectares in FY 1969 indicated there is significant potential for improved pasture establishment. Further trials of approximately 135 hectares are being planted in FY 1970 and will be continued in the pilot areas in an effort to select suitable species and develop reseeding techniques applicable to collective land development. Emphasis will be directed toward the use of animal power and equipment available to the local people.

An animal with a greater potential for production of meat and wool needs to be developed. Breeding trials will be incorporated for this purpose in the research program for the pilot areas. In addition to the selection of improved local sires, the procurement of up to 50 U.S. rams is planned for the research program. Efforts also are needed to control the diseases, internal and external parasites, presently inhibiting production.

The animal disease problems, though generally known to Moroccan veterinary authorities, have not been investigated in depth. Thus, the true prevalence of diseases and parasites is only superficially known and the economic significance, although thought to be large, has not been assessed.

In order to prepare practical programs for development of a viable livestock industry, accurate knowledge of disease and parasite problems is a prerequisite.

The animal health plan proposed in the PROP is aimed at collecting and analysing existing statistics and expanding services to provide additional data in the pilot areas scheduled for range management development, thus strengthening the existing services already administered by the Ministry of Agriculture. A basic plan to intensify the prevention and control of diseases and parasites on the pilot range management areas has therefore been developed as well as a system for increasing our knowledge of the animal health factors that are inhibiting the development of the livestock industry in Morocco.

The major sheep diseases and parasites for which control measures are proposed are enterotoxemia, nematodiasis, anthrax, symptomatic anthrax, rabies, pestade infection, echinococcosis, and external parasites as well

as the disease problems which may be discovered as the result of research at the project sites.

Enterotoxemia, anthrax, symptomatic anthrax (blackleg) and rabies can be basically controlled by immunization. Parasite control can be handled by intensive treatment with anthelmintics, dipping, and improved sanitary practices while research on the cause of livestock deaths in the area will point out other disease problems for which control measures will be devised.

D. PLANNED TARGETS

FY 1970-1971

1. Establish in FY 1970 the Plaine d'Arid and Tafrata management areas as Range Improvement Perimeters under Dahir 1-69-171, including the marking of boundaries, covering a total of 70,000 hectares of collective grazing land.
2. Establish a pilot area of approximately 3,000 hectares in each of the two perimeters to serve as both demonstration and research projects involving the operations of local livestock operators (approximately 1,000 sheep in each perimeter - FY 1971).
3. Select the livestock operators to participate in each of the pilot areas (approximately 5-10 livestock owners). Prepare research and demonstration plans for range management, development and livestock improvement in the pilot areas, construct necessary range improvements and livestock handling facilities, vaccinate against known prevalent vaccineable sheep diseases, and treat all demonstration-research animals against internal and external parasites (FY 1971).

4. Initiate demonstration-research plans in the two pilot areas in FY 1971 designed to:

a. Demonstrate a significant increase in forage and livestock production.

b. Indicate management policies and measures that have application for implementation under collective land conditions.

c. Demonstrate grazing, reseeding, improved animal husbandry breeding, health control and marketing practices which will serve as a pattern for development of the collective grazing land of Morocco.

5. Initiate the development of information and training programs to convince livestock owners that it is in their interest to cooperate with the government in programs for the management and development of the collective lands (FY 1970).

6. Prepare preliminary management and development plans for implementation on the remaining 70,000 hectares in the Plaine d'Arid and Tafnata perimeters (FY 1971).

FY 1972-1973

7. Determine livestock operators to be authorized to graze livestock in the 70,000 hectares Plaine d'Arid and Tafnata Perimeters and the number each can graze in accordance with the approved management plans (FY 1972).

8. Initiate in FY 1972 livestock and rangeland improvement plans in accordance with Dahir 1-69-171 for the entire Plaine d'Arid and Tafnata Perimeters utilizing experience gained in the pilot areas to:

a. Study and test the adequacy of the new legislation (Dahir 1-69-171)

for application on a national basis.

b. Develop national policy recommendations and operational procedures for bringing the collective lands under management and development programs which will contribute to the social stability and economic development of the collective areas, and improve the living conditions of the people dependent upon them.

c. Develop and demonstrate techniques for the rehabilitation of grazing land and livestock resources which, if applied nationally, will substantially increase the annual production of meat and livestock products on collective lands and will contribute materially toward Morocco's self-sufficiency in this sector.

E. COURSE OF ACTION

The activities under the project will be carried out in the Livestock Service of the Ministry of Agriculture in cooperation with the Ministry of Interior and in accordance with applicable legislation (Dahir 1-69-171).

The U.S. will provide a full-time range management adviser who will be the project manager and a livestock adviser who will ^{give assistance in the direction of} ~~assist~~ the livestock improvement and animal health aspects. Working at the National office level, they will help their COM counterparts in the Range Management Unit to develop administrative and technical policies, procedures and plans to carry out program objectives. Consideration will also be given to providing the following short-term consultants: (1) animal disease diagnostic specialist, (2) range research (plant materials) specialist and (3) rural sociologist.

To execute the program at the field level, a team of technicians will be provided under the contract with IVS (International Voluntary Services) to assist the GOM Provincial project personnel. The team presently consists of three technicians and a team leader. This number will be reduced to ^a two man team including the team leader by July 1970.

The team leader will be responsible, under the supervision of the USAID Project Manager, for the direct supervision of the other team members in the execution of the project. He will also have specific responsibility for the establishment and maintenance of the research records at the project sites.

The other three team members will be assigned to the Plains d'Arid and Tafrata Range Improvement Perimeters as project advisors and working through GOM counterparts will be specifically responsible for all USAID assistance and program implementation approved for their areas of jurisdiction including the training of GOM field level personnel. They will be under the general supervision and guidance of the USAID Project Manager.

In addition to technical assistance, a modest amount of U.S. commodities will be provided for the project at an estimated cost of \$38,000 for the four year period (FY 1970 - 1973) as follows:

U. S. Government (U.S. \$ 000)

	<u>FY 1970</u>	<u>FY 1971</u>	<u>FY 1972-73</u>
Seed	2	8	-
Equipment for seeding and livestock research projects		6	1
Vaccines, parasiticide pharmaceuticals and equipment	2	2	10
Breeding rams	<u>-</u>	<u>7</u>	<u>-</u>
Total	4	23	11

The seed purchased in FY 1971 will be used for field trials to be planted during October-November 1971. Seed supplies for subsequent years are to be procured by GOM. The total estimated U.S. funding requirements for the project during the period FY 1970-1973 are summarized in Table 1 attached.

GOM will provide personnel, operating expenses, equipment, local supplies and materials, funds for construction of improvements, supplemental feed, seedbed preparation and planting, office space, secretarial services and other project related local costs.

GOM estimated funding support for the project over the four years of FY 1970-1973 is summarized in Table 2 attached.

The reseeding program will be confined primarily to the pilot areas during FY 1971 through 1972 with expansion in FY 1973 into the adjacent perimeter areas. In addition, however, other GOM agencies and educational institutions will be encouraged during the life of the project to participate in joint ventures in plant materials research and field trials of mutual interest, thereby broadening and intensifying the search for suitable

range forage species adaptable to the various ecological sites.

The development of private local seed sources will also be stressed so that GOM can eventually become self-sufficient in the production of plant material for range development.

The FY 1970 reseeding program of approximately 135 hectares has been completed. The program for the period of FY 1971-1973 is estimated as follows:

FY 1971 - 200 hectares
FY 1972 - 400 hectares
FY 1973 - 1000 hectares

It is anticipated that GOM will greatly expand the reseeding program beyond FY 1973 as local seed supplies are developed.

GOM will be urged to develop the institutional capability leading to the management and development of collective lands on a national basis. On-the-job training will be conducted at the local level by GOM and U.S. technicians. In addition, up to four GOM technicians will be selected for two year graduate programs in the U.S. leading to Master Degrees in Range Management/Animal Science to provide continuity to the project.

To encourage support among the local people for the project a short-term third country observation tour to Tunisia will be arranged for up to 12 local leaders in the Perimeters and GOM officials.

The following steps are envisioned to carry out the project:

1. Hold meetings with the local officials and the people involved in the Plaine d'Arid and Tafarata Perimeters to explain the revised project and solicit their cooperation. Take some of the leaders on visits to Moroccan livestock ranches and third country grazing projects to demonstrate objectives (FY 1970).

2. Prepare and issue Royal Decrees establishing Plaine d'Arid (25,000 hectares) and Tafrata (45,000 hectares) as Range Improvement Perimeters under Dahir 1-69-171. Mark boundaries (FY 1970).

3. In consultation with the local authorities and livestock users, select a 3,000 hectare pilot area in each perimeter to be established as an extension demonstration-research area and the livestock operators that will participate in the program (FY 1970).

4. Develop detailed demonstration and research plans to be implemented in the pilot areas and issue formal notices for their establishment (FY 1971).

5. Demarcate the boundaries of the Pilot Demonstration-Research areas and initiate the implementation of the management, development and livestock improvement plans in FY 1971 including the following:

a. Construct range improvements (wells, shelters, etc.) and livestock handling facilities (corrals and dips).

b. Select and ear-tag livestock. Vaccinate and treat for parasites, etc.

c. Establish grazing, livestock breeding, animal health, management, supplemental feeding and reseeding demonstration-research trials.

6. Maintain records for each pilot area regarding the success or lack of success of the different species of grasses, methods of seeding, time and cost of seeding, disease losses among the animals and its cause to obtain the necessary baseline data needed to develop a more widespread livestock and rangeland improvement program.

7. Establish and maintain a record system on the pilot areas which

will reflect charted progress in livestock improvement by selected animals during the course of the project in such categories as:

- a. Birth and weaning percentages.
- b. Weaning weights.
- c. Market weights.
- d. Wool clipping weights.
- e. Mortality rates.
- f. Total sales; and sales to breeding herd ratio.

8. Examine animals which die in the pilot areas for cause of death and when not identified in the field send the diseased tissues and blood samples to the National Livestock Disease Laboratory in Casablanca.

9. Select and send participants (two in 1970-71 and two in 1972) for advanced degree training in the U.S. in Range Management and Animal Sciences.

10. Conduct surveys and collect data necessary for the preparation of range and livestock management and development plans for the entire 70,000 hectares in the Plaine d'Arid and Tafraut Perimeters exclusive of the pilot areas.

11. Issue orders in accordance with Dahir 1-69-171 to implement the development plans in the Perimeters following approval of the plans by the "Local Boards for Rangeland Improvement" (FY 1972).

12. Determine the livestock operators and the number of animals each will be allowed to graze in the two Perimeters and issue grazing permits to the livestock owners as prescribed in the Dahir (FY 1972).

13. Construct range improvements and livestock handling facilities in the Perimeters and implement the management programs (FY 1972).

14. Organize a comprehensive breeding plan for the total "Range Improvement Perimeter" based on findings from the research conducted in the demonstration areas which will select and introduce breeding animals for disease resistance, body conformation, twinning and rapid maturation, (heavier weaning and market weights). In addition to the research mentioned earlier regarding the introduction of high quality male breeding stock, it is proposed that experiments be established to determine cost per kilo of grain on supplemental feed, as well as determining the best feed supplements to utilize, when conception rates are obtained when ewes are given supplemental feeds at breeding time (FY 1972).

15. Conduct rotation of range grazing systems research to determine which type of range rotation system is best suited to the ecologic conditions present on the selected grazing areas (FY 1971-1973).

16. Encourage market research and a uniform marketing pattern of livestock from the "Range Improvement Perimeters", in accordance with the Moroccan market demand and the range conditions (FY 1972-1973).

17. Develop and conduct an effective extension-type educational and training program for project personnel and participating tribal groups and field days for adjoining communal groups to acquaint the people with the objectives and step by step activities of the overall project (FY 1971 - 1973).

18. Develop GOM nucleus administrative institution with the potential capability of expanding the rehabilitation and development of the collective grazing lands to a national program covering one million hectares or more (FY 1970-1973).

19. Based on degree of success and support for the Plaine d'Arid and Tafraoute Perimeters, decision will be made whether to expand the project to the original goal of 325,000 hectares; to continue on a smaller demonstration-research basis; or to phase the project out (FY 1973).

BENCHMARKS, RESULTS & OUTPUTS

<u>ITEM</u>	<u>Prior Years</u>	<u>FY 70</u>	<u>FY 71</u>	<u>FY 72</u>	<u>FY 73</u>	<u>TOTAL</u>
Range Improvement Perimeter established -2- (No. of Hacs.)	-	70,000	-	-	-	70,000
Pilot areas established -2- (No. of hectares)			6,000			6,000
Boundary delineation (kilometers each year)	-	50	260	-	-	310
Grazing permits issued (approximate number)	-	-	-	800	-	800
Sheep selected and cartagged (No.)	-	-	2,000	14,000	-	16,000
Animals vaccinated and treated for parasites annually (No.)			2,000	16,000	16,000	34,000
Watering facilities constructed (No.)*	-	1	6	10	-	17
Animal shelters constructed (No.)	-	-	6	14	-	20
Animal handling facilities constructed (number).*	-	-	2	4		6
Forage storage facilities constructed (number)*.	-	-	2	2	-	4
Reseeding (No. of hectares)	100	135	200	400	1,000	1,835
Field Day Demonstrations Pilot areas (no.)	-	-	4	12	12	28
Participant training: U.S. Range Management orientation, 4 mos. (No.)	6	-	-	-	-	6
Participant training: Range Mgt. Advanced degree - 2 yrs. (No. of candidates sent)	-	1	2	1	-	4
Participant training: Third-country observation (No. of participants)	-	12	-	-	-	12

* Approximations only as actual number dependent on areas selected and management needs.

TABLE 1U.S. GOVERNMENT (Estimated costs)(U.S. \$ 000)

	<u>Prior Years</u>	<u>FY 70</u>	<u>FY 71</u>	<u>FY 72-73</u>	<u>TOTAL</u>
A. <u>Personnel</u>					
Range Management Advisor (Project Manager)	30	25	25	50	130
Livestock Advisor	-	25	25	50	100
Local Hire Project Assistant	-	2	4	8	16
Consultants (3 for 3 months)	-	-	18	-	18
B. <u>Commodities</u>	18	4	23	11	56
C. <u>Participants</u>					
4 candidates (U.S. Masters degrees)	-	-	24	24	48
Range Management Orientation (4 months in the USA for 6 technicians)	20	-	-	-	20
Leadership Orientation for local livestock operators and GOM officials (Third-Country for 2 weeks, 12 candidates)	-	10	-	-	10
D. <u>Contract Services</u>					
IVS Volunteers and Team Leader	41	39	28	56	164
Number	(4)	(6)	(4)	(4)	
TOTAL	111	105	147	205	562

Table 2GOVERNMENT OF MOROCCO (Estimated costs)

(Funded from Operating and Investment Budgets)

(DH equivalent in \$ 000)

	<u>Prior Years</u>	<u>FY 70</u>	<u>FY 71</u>	<u>FY 72-73</u>	<u>TOTAL</u>
A. Personnel	26	36	44	94	200
B. Development Costs	4	6	30	72	112
C. Operating costs	27	29	49	128	233
D. Supplemental feed	60	-	10	80	150
	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
TOTAL	117	71	133	374	695
E. Other costs, Trust Fund	22	36	27	54	139

DICKINSON