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A BENEFICIARY PROFILE OF HAUTE CHAOUIA

(MOROCCO)

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SUMMARY

This report presents a profile of farmer beneficiaries in the Haute Chaouia cereal-producing plateau region of Morocco, typical of rainfed areas with 200-400mm rainfall. It synthesizes research results provided to USAID/Rabat to date under "Project Chaouia," the socioeconomic research component of the Dryland Agriculture Applied Research Project performed by Hassan II Agronomic and Veterinary Institute. It provides additional background on social history and social organization, and discusses a number of trends likely to constrain the ability of farmer beneficiaries to adopt new technologies.

Social History and Social Mobility. Haute Chaouia's detailed social history is typically complex. Before the French Protectorate, the Chaouia tribes, some Arab and some Berber, engaged in continual warfare. This led to the accumulation of large amounts of land and large herds by the more successful tribes. By the 1900's, some tribes had become sedentarized cereal cultivators, still maintaining large herds. Different sub-tribal groups formed douars (villages), around their leaders, who were the notables later coopted by the French. Interaction with the French Administration by notables increased their land holdings and descendants of these notables are still important partons in the communities, acting as brokers for the poorer members of their agnatic kindship groups. Post-Independence, these notables often became elected and appointed officials.

The douar, based on kinship relations, is the basic unit of social organization, within the context of the lineage, and the larger fraction. The main avenues toward upward mobility within the douar are education and migration, successful migrants returning with enhanced status. There is also an influx successful urban entrepreneurs who are starting commercial farms. They are replacing the traditional notables, and con-

stitute the new elite.

The Role of Women. Sex roles remain largely traditionally defined, and women have little decision-making authority. They do, however, acquire power in the community by manipulation of the kinship structure through the arrangement of marriages, and formation of alliances with other women. Women perform agricultural tasks, expecially in livestock and grain legume production, but do not retain the income from their production, whether they work on or off the farm. There is a tendency to try to keep women from inheriting land, and the land they do inherit is managed by male kin or by their husbands. Women increasingly migrate to town, as do men, usually after divorce.

Land Accumulation and Fragmentation. Access to land is a key problem in the region. With increasing population pressure and given inheritance patterns, average farm size is decreasing for the non-commercial farmers, and is presently 8.12 hectares, less than the 10-20 ha required for adequate subsistence. Given increased mechanization, large commercial farms are being created. Some small farmers manage to accumulate land, however, through purchases made with income earned off the farm. Most farms are divided into a number of distinct, non-contiguous parcels, which tends to equalize access to fields with varying soil quality, but also presents problems for effective use of inputs, including mechnization, and increases production costs. There are several traditional responses to problems of land fragmentation, and the GOM is addressing the problem through a policy of parcel consolidation (remembrement), primarily in irrigated zones. The overall problem of access to land was being addressed through the Agrarian Reform, state lands being divided among small farmers, but this process has recently decelerated considerably,

Tenancy and Sharecropping. A major response to problems of access to land is sharecropping, taking land in association. For the region, 25% of all land farmed is rented and/or sharecropped. Smaller farmers either associate together, thus providing adequate production factors which each lacks on his own, or sharecrop land belonging to "micro" owners who have migrated to the city and/or land belonging to large-scale farmers. While credit is available for sharecropped land, farmers tend to use even fewer inputs on land they sharecrop than on land they own. In some cases, inputs are partly financed by the proprietor. The share to the proprietor is increasing as land pressure increases, so that the sharecropper is forced to sharecrop even more land than before, if he can find it.

Small farmers with sub-subsistence farms sharecrop to attain subsistence; medium-scale farmers sharecrop to produce both for subsistence and sale. Large farmers rent and/or share land in order to increase overall available land for mechanized cultivation. Animals are also shared, and the smaller farmer "client" may receive both land and animals to share from the same "patron." As mechanization--which is already well-advanced-- increases, it is likely that sharecropping will become a less viable option for the smaller farmers, who will then tend to migrate in greater numbers than is already the case.

Farm Typology and Cropping Patterns. Nine categories of farm have been discerned, based on area farmed, access to draft animals and traditional equipment, herd size, and number of family workers.

The first four categories all own less land than required for family subsistence, and sharecrop additional land. Even with sharecropping, subsistence is not guaranteed, and off-farm employment is a key part of the subsistence strategy. These farms have few draft animals and rudimentary traditional traction equipment. Their herds are very small, and are made up mainly of shared animals. They use little formal credit,

and few improved inputs. They emphasize producation of durum wheat and maize, with some grain legumes, produced as a cash crop. They may rent fallow land for grazing, although this is unlikely given limited cashflow. Even though they have too much family labor available for the area farmed, they may hire in additional labor at peak seasons.

Medium-scale farms (those in the fourth and fifth categories), have 13-25 hectares of owned land, but may tend to take additional land for sharecropping, and rent some land for grazing, while taking some shared animals in exchange for part of the annual increase of the herd. They also emphasize barley and durum wheat production, but may produce some bread wheat, and will produce more grain legumes for sale than the smaller farmers. These farmers have sufficient draft animals to farm their land effectively, and additional animal-drawn implements. They produce maize as a spring crop in about the same proportions as do smaller farmers, and are likely to use it for animal feed. As farm size increases, the proportion of sheep to cattle in the herd increases.

The medium farms still have less land than would be necessary to provide full on-farm employment for all available family workers, but fewer family members work for wages on the farms of others than is true for the smaller farm households. Rather, underemployed family members tend to migrate to the city somewhat more frequently than do those of smaller farm families. Non-family workers are hired in at peak seasons, and are often relatives through kinship or marriage. Farms in these categories may be large enough to produce sufficient surplus such that additional land can be accumulated solely through farm-generated income. These farm households are able to improve their nutritional status by including purchased meat in the diet, and rely on bread and tea alone for fewer meals than do the smaller farmers. They tend to deplete their stocks

of grain well before the next harvest, as do the smaller farmers.

Larger farms, of about 40 hectares, may be divided into those that derive from inherited land, on which techniques used are more traditional, where more capital is invested in improved livestock and whose owners are older, and new farms which are based on rapid land accumulation, are owned by younger, urban-based entrpreneurs, and have higher levels of mechanization. The older farms are essentially bigger versions of the medium-scale farms, relying largely on draft animals for at least some production operations, taking some land for sharecropping, and using a greater variety of animal-drawn implements. However, they are more likely to have much of their land partially mechanized than are the medium and small-scale farmers, renting equipment for custom work. Like the other farms, farms in this category produce durum wheat, barley and maize, but there is more wheat than maize, and bread wheat becomes more important in the cropping pattern.

Newer large farmers tend to own their own motorized equipment, which they use on the farm and also rent out to others. They use almost no family labor, relying on hired occasional and permanent workers. These farms are well-off and modernizing. They produce more bread wheat than the other farms, but continue to produce durum, and a lesser proportion of maize and barley. More grain legumes are produced on these farms, as well as more forage crops to feed the larger herds. Livestock management remains semi-extensive, and the proportion sheep to cattle is high; cattle are stall-fed and improved breeds are taking over from local breeds. Fallow increases as farm size increases, and larger farmers may rent considerable additional land to maintain flocks of sheep.

There is an additional category of modern capitalist farms, which are on average four times as large as the well-off modernizing ones.

Here, virtually all production is mechanized, using owned equipment. There is more motorized equipment and a greater variety of accompanying producation implements. Bread wheat becomes even more important in the cropping pattern, accompanied by durum wheat, a little maize, a considerable amount of grain legumes, and other forage crops. No family labor is used on these farms, and there tends to be one permanent employee who supervises all agricultural operations. It is these farmers who have the most access to improved inputs, and who use them most. All production is marketed.

There is a final composite category of farms, those owned by absentee urban-dwellers who have left farming but are likely to return on retirement. It is these farms that provide the majority of land for sharecropping to the other farm categories--90% of the land is given out to sharecrop or to rent. When the proprietors retire, however, they return largely to invest in mechanization, and accumulate more land in order to set up medium to large commercial enterprises.

It should be noted that most of the farms in the region have the characteristics of the smaller farms-insufficient access to land without sharecropping, marginal subsistence from production, low levels of necessary production inputs in addition to land, underemployed family labor, and limited cashflow for production improvements. For these farms, livestock is an integral part of the farming system, and constitutes an important margin, especially in bad years and in the dryer climatic subzones.

Access to Credit. Until very recently, little formal credit has been available to small farmers. Transaction costs are high, given the amount of documentation required, and the hesitancy of small, traditional farmers to become involved with the state apparatus. This year, eligibility requirements have been lowered, however, and an attempt is being made to reduce transaction costs by locating CNCA credit windows closer

to the farmers. The temporary forgiveness of repayment following the 1980-81 drought has also encouraged more small farmers to seek formal credit.

Much formal credit is not used for the purposes claimed, especially where these are improvements to the farm operation, such as construction of stables. Rather, it is used for the normal operations of the agricultural year--machinery rental, some fertilizer, and the cost of harvesting. Alternatively, it is used for consumption. Repayment rates are high, however, since the penalty for failure to repay may be imprisonment or seizure of land. Given these potential penalties, many farmers are reluctant to assume formal indebtedness, especially since it is considered shameful, unlike informal indebtedness, which is not.

Informal credit may be obtained from relatives, merchants, and from local notables who need the allegiance of clienteles to consolidate their political status. Interest rates for informal credit may be three times as high as for formal credit, and still preferred, given the lower transaction costs and flexibility allowed in repayment.

Overall credit availability is probably less than desirable to encourage increased adoption of available improved inputs, and there are problems with credit distribution, credit arriving too late to purchase inputs in time for effective use. These problems may be mitigated by the new small-farmer-oriented GOM credit policy.

Mechanization and Employment. The overall rate of mechanization in the region is about 70%, although motorized equipment is owned almost exclusively by farmers with more than 30 hectares. Increased mechanization is also found on smaller farms, where the farmers rent equipment from private entrepreneurs, including the largest local farmers, both for land preparation and for harvesting. Small farmers may work off the farm to earn wages in order to rent equipment to

mechanize their own production. There is a seeming paradox in that high rates of underemployment are noted as well as high cost of local labor. The apparent explanation is that mechanization is eliminating some jobs in agriculture, but that there is still a high labor requirement at peak seasons. Agricultural wage rates at peak seasons appear in fact to be higher than rates commanded by unskilled urban workers, although urban centers continue to pull more and more migrants from the rural area.

Most paid agricultural workers are either the heads of farm households or their children. Small farmers go to work as occasional workers for other small farmers and for medium and large-scale farmers. Children of small farmers tend both to work as paid workers in agriculture and to migrate to town, while children of medium-scale farm households appear to be more likely to migrate than to work for wages in the agriculture sector. Of those who migrate, 50% may return to the rural area either temporarily or permanently, and most tend to retire to the rural setting.

Aside from the problem of underemployment, a strong case can be made for agricultural mechanization It saves critical time for land preparation under semi-arid conditions when it is important to plant as soon as possible after the first rains, and according to respondents, mechanization is less expensive per hectare than traditional techniques, because of the high cost of labor. This is especially true for combine harvesting where labor costs on what would otherwise be several operations are saved. Mechanization also decreases harvest losses.

The effects of mechanization are mixed, however, even though the technical production effects are largely positive. Although migration was occuring before the great acceleration of mechanization in Haute Chaouia in the late 1970's, migration rates have probably increased as mechanization has increased. While not all production activities can be mechanized in the short term, on those farms with owned mechanized

equipment, the tendency is to mechnize as much as possible. While the cropping pattern has not yet changed in order to eliminate the most labor-intensive crops--maize and grain legumes--much less maize is produced on the larger, mechanized farms than is produced on all other types of farms. This means that seasonal jobs that were available when mechanization first became common in the region may be progressively eliminated as the cropping system changes and as innovations are made in the use of motorized equipment.

As small farmers attempt to mechanize, using rented equipment, they exacerbate the existing tendency toward underemployment of family workers which, in turn, spurs migration, but probably not enough to substantially affect the ratio of production to consumption needs on the smallest farms. In order to increase yields, these small farmers will at least have to employ the inputs that should be accompanying mechanization, but even it they are able to do so, the smallest farms are likely to remain marginal for subsistence.

As all farmers turn more and more toward mechnization, land is being brought under production which was previously considered unsuitable which, in turn, is eliminating available grazing land and leading to overgrazing where extensive livestock production is practiced. At the same time, the more marginal small farmers are dropping fallow from their rotations, alternating winter cereals with winter cereals on most of their land each year, which is leading to decreased yields and progressive soil exhaustion. This tendency may be partly encouraged by the tendency to mechanize, since more land can be prepared for planting faster and more cheaply under mechanization.

Increasing mechanization throughout the region, combined with demographic pressure and increasing land fragmentation, may thus be having some deleterious effects, including a substantial reduction in the

availability of wage employment.

Recommendations for Further Socioeconomic Research. As the Dryland Agriculture Applied Research project is expanded to include more favorable rainfed zones, and as the new Rainfed Agricultural Production Project goes into implementation in both more and less favorable rainfed zones, the socioeconomic research component of the Dryland project should be expanded. A continuation of the 50-farm study in Haute Chaouia is recommended, to obtain data on costs and outputs of production by farm type for two more normal agricultural years. A continuation of the Haute Chaouia Commodity Price Study is also recommended, and it should be expanded to include data on purchase of production inputs and volume of sales, as well as on ranges of prices offered for key commodities by types of merchants present. These two studies should be replicated in a more favorable rainfed zone, preferably where baseline data are already available from previous student stage work under the INAV Hassan II stage system.

As agronomic research under the project progresses, a farming systems applied research sub-component should be implemented, where teams of agronomists/researchers/extension agents working to test new technologies under farmer conditions would be complemented by a team of an agricultural economist and a rural sociologist to help design the tests, and to assess the economic viability of suggested improved practices. The agricultural economist/rural sociologist team would monitor farmer acceptance of the new technologies, and assist in improvements to packages after initial tests, so that socioeconomic constraints to acceptance would be taken into account.

The INAV Hassan II stage system has --without AID funding-- generated a great de of data on the economic behavior of farmers in a number of regions, but these data have largely not been analyzed. The services of a quantitative

rural sociologist from a U.S. university, preferably the University of Missouri, which has had an informal relationship with Project Chaouia for a number of years, should be provided to assist with the analysis of these data. This expert would also assist in the design of the 50-farm and commodity studies, and in analysis of results, as well as in the design of the farming systems sub-component.

Finally, a program of seminars is recommended in order to integrate the results of the socioeconomic research component of the Dryland project with the applied agronomic research component. This kind of integration has been largely absent under the first phase, and should be encouraged so that technologies offered will have the greatest possibility of farmer acceptance.

INTRODUCTION

This report is designed to provide an analytical description of the behavior of farmers in the Haute Chaouia region of Morocco, a cereal-producing plateau typical of the rainfed regions of the country with between 250 and 450 mm of rainfall per year. It also addresses a number of contextual factors that may be anticipated to have significant impact on farmers' ability to adopt new technologies and increase production. These farmers are the anticipated beneficiaries of the on-going Dryland Agriculture Applied Research Project (0136) and of the new Rainfed Agricultural Production Project (0170). A social analysis for the Dryland project was prepared in 1977 by the MidAtlantic International Agriculture Consortium (MIAC), the consortium which is implementing the agronomic research component of the project.

In addition to the applied agronomic research component, the Dryland Project also has a socioeconomic studies component, "Project Chaouia" which has been implemented by the staff and students of the Department of Human Sciences of Hassan II Agronomic and Veterinary Institute (INAV) under the direction of Professor Paul Pascon. These studies, which were recommended in the 1977 MIAC report, are nearing completion.

USAID/Morocco determined that it was essential that the diverse reports provided in French under the socioeconomic studies component be reviewed and synthesized in order to make the information provided more readily accessible to the Mission, AID/Washington and the MIAC contract team which is carrying out the agronomic research. Therefore, this report provides a synthesis of much of the data generated under this project component, and serves to update the original MIAC social analysis.

It is based largely, but not entirely, on an intensive review of research products provided by INAV Hassan II . It also includes contextual discussion deriving from an intensive review of other French and English-language literature, discussions with GOM officials, and with Moroccan and expatriate social scientists.

During design of the Dryland Project, it was agreed between INAV Hassan II and USAID/Rabat that the Institute would undertake a variety of activities to generate socioeconomic data on the farmers of Haute Chaouia. The Institute requires all students to undertake a series of field stages, one each year, in order to become familiar with agriculture on the ground. It was agreed that the third and fourth-year stages during the period of AID funding would be carried out in the Haute Chaouia, the region in which the applied agronomic research under the project would be carried out by the Institut National de Recherche Agronomique (INRA) and the contract technical

assistance team. These stages—the third-year stage d'exploitation, and the fourth-year stage de developpement rural --would then provide a comparative database for the work to be carried out later by Third Cycle (Master's) students and other researchers under the AID-funded Project Chaouia. The intensive relationships with farm households which evolve during the stages provide effective entrée for continuing research efforts. Third-year students live with farmers and fourth-year students interact both with the same farmers and with the development services in the rural area.

The research projects directly funded by AID under Project Chaouia have included a number of Third Cycle theses, based on original fieldwork. To date, these have included studies of mechanization, wage labor and migration, land accumulation, and human food consumption patterns. Further studies are being prepared, but were not available in time for the preparation of this report. In addition to the theses, AID has funded a survey of 1079 farm households, the results of which were analyzed using a principal components analysis approach, and a longitudinal study of farmer economic behavior on 50 farms, accompanied by a study of key commodity prices in representative souks in the region. Discussions of preliminary findings of the study of 50 farms indicate that a great deal of information on a variety of aspects of the farm system has been generated which will be useful for AID project design and implementation. The final report on this study is due in December, 1982.

The nature of the topics chosen for research under Project Chaouia has largely conditioned the definition of issues to be addressed in this report. The Project Chaouia studies have concentrated on the farm as the unit of analysis. While considerable amounts of data have been collected on the farmers, and on their responses to questions designed to elicit their own explanations of their behavior, these data have rarely been included in the written reports. Thus, it is difficult to get a clear picture from these reports of the process of farmer decision-making, as opposed to its results, or of the social, cultural and political factors which provide the context for that process. As a result, this profile includes less discussion of these factors than would have been desirable. Other studies that address these factors in more detail for the region or for similar regions are not available.

There are ethnographic studies available for some irrigated zones of rural Morocco, and for the Atlas Mountains and the Rif, but generalization from these areas to the Haute Chaouia, or to other rainfed cereal-producing areas of Morocco exclusive of the mountains would be unsound, and has therefore not been attempted. Similarly, generalizing from the analytical description of farmer behavior in Haute Chaouia presented here to the more favorable rainfed regions of Morocco should be undertaken with care.

Clearly, the farmers of Haute Chaouia employ a variety of

strategies to ensure subsistence and, if possible, to produce some surplus while confronting situations of climatic and economic uncertainty. It is likely that strategies employed by farmers to achieve the same objectives will be significantly different where risk is less, and that they will be facing different constraints to the adoption of new technologies although some constraints, such as land fragmentation, may be the same. The socio-cultural context in which farmers' objectives are defined, and in which strategies to meet these objectives are developed and modified by farmers is likely to differ from region to region, given the heterogeneity of the Moroccan social environment. This report, then, can provide a useful basis for the social analysis for the new Rainfed Agricultural Production Project (0170) now in the initial design stage. However, more data on beneficiaries in higher rainfall areas may be required during project design and implementation.

One means of ensuring the social soundness of this new project is to design it such that, for each new zone in which the project is to be implemented, a beneficiary analysis will be performed in advance of start-up of project activities. Another means, which may be more viable, is to design the anticipated second phase of socioeconomic studies under the expanded Dryland Project in such a way that they will provide the needed understanding of anticipated beneficiaries in the more favorable rainfed zones in which both projects will be operating.

It is with the latter approach in mind that the recommendations are made at the end of this report concerning the type and content of further socioeconomic studies to be undertaken.

THE SETTING AND SOCIAL HISTORY

Haute Chaouia is a cereal-producing plateau which begins south of the city of Settat, and is in the medium to low rainfall zone of the bour (dryland). As one moves south, rainfall decreases, but altitude increases. Chaouia is usually divided into two parts, Bassa Chaouia, which includes the area around the city of Casablanca, which has more favorable rainfall, and Haute Chaouia, the more southerly plateau area, which is characterized by less rainfall, and somewhat poorer soils. Total rainfall varies considerably from year to year, and there is extreme inter-annual variability of rainfall for any given month and from place to place within the region. Thus, the Haute Chaouia is a region of climatic uncertainty, a "zone aléatoire".

Basse and Haute Chaouia are the habitat for 13 Chaouia tribes, and for the Beni Meskine. Whereas the Chaouia tribes are sedentary cereal cultivators and many have been so for at least 100 years, the Beni Meskine rely more on livestock production and still engage in some transhumance. Cereal and livestock production are both practiced by both groups. The Beni Meskine extend from the south of the Province of Settat into the provinces of Beni-Mellal and Khouribga and to the southwest into the province of El Kala d'Sragrna. The

Beni Meskine traditionally practiced transhumance with a free right to grazing in some of the areas of the Chaouia tribes. This is less the case today than in the past, with increasing pressure on arable land in Haute Chaouia. It is estimated that in 1914, only 25% of the arable area of Haute Chaouia was under cultivation, while about 90% is cultivated today.

The Chaouia tribes are highly varied as to their origin. Some of them are fragments of the famous and larger Berber "families" that have maintained their base in the Atlas Mountains. During a relatively long period of siba or "anarchy", they resisted the inroads of the Arab Sultanic state (the makhzen), and engaged in a grand siba between 1903 and 1907. These tribes include some that were predominantly Berber with some Arab elements, and others that were predominantly Arab, with some Berber elements. Montagne, in his work on the social and political organization of the Berbers (1973), characterizes all the Chaouia tribes as Arabized. The Ouled Saïd and Ouled Bouziri, among whom most of the Project Chaouia field studies were carried out, are self-consciously Arab tribes tracing their origin to Syria.

The 13 Chaouia tribes were organized into a variety of sub-groups and fractions, lineages, sub-lineages and douars. The douar was made up of a series of extended families, depending for access to

land and for protection on a lineage or sub-fraction leader. There was considerable warfare and feuding among lineages and fractions, and access to land was a function of the ability to control what a group already had, and what more could be wrested from equivalent groups by feuding and pillage. Each leader's camp would be surrounded by hundreds of tents or huts of his followers, who would farm the land and maintain large flocks. The tribes around the town of Settat were largely sedentarized by the early 1900's and like the other Chaouia tribes, were growing cereals. Some of the surplus, like surplus animals, was marketed at Settat, while some was marketed in smaller local souks, and some to Casablanca.

An impression of levels of production around the time of the installation of the French in Haute Chaouia can be gained from examining the case of the Oulad Said, a group to the immediate southwest of Settat town. At this point, the Oulad Said controlled 150,000 hectares of primarily tirs soils, highly suited to cereal production. In 1911, they had 28,200 hectares planted to barley, wheat, chick peas, corn, broad beans, millet, sorghum and flax. By 1913, the area cultivated to these crops had nearly doubled, to 50,960 ha. (Mission Scientifique, 1915).

The French, under a system of essentially indirect rule, organized the Chaouia tribes into five regional detachments and one

mobile column. As the process of pacification progressed, they were reorganized into cercles of variable composition. Heads of tribes and/or fractions were chosen as the representatives of their groups to the Administration. Over time, additional individuals from the dominant lineages and fractions became functionaries in the Protectorate administration, reinforcing unequal distribution of wealth that dated from before the Protectorate.

Since Chaouia was a rich cereal producing area, French colon farmers began to take over large tracts of land for modern farms. However, the inroads of the colons seem to have been somewhat less in Haute Chaouia than in some other regions. Moroccan notables were able to retain rights to large tracts of domanial land themselves. Some of this land was held in collective tenure, especially toward the south, among the Beni Meskine. In the northern zone, most of the land was melk, privately owned. After Independence (1956), further inequalities in access to land resulted from the various systems of repossession of former colon farms by the State and by private individuals. In the south, a certain proportion of these lands, having been taken back by the State, were reallocated under the Agrarian Reform to the Beni Meskine, who were organized into pastoral cooperatives. In the northern zone, it appears that a number of private individuals were able to purchase, or otherwise gain rights to, some of the former colon

land that had reverted to the State and were thus in the category of domanial land.

During the famine of the 1940's, there was again considerable disruption. Lineages that had managed to accumulate large grain stores attracted to themselves large numbers of smaller farmers who had no seed and no grain stocks for consumption. From 1940-45, many farmers had to sell their land in return for small amounts of barley. They had to decide either to leave the rural area altogether, or else to accept the status of khammes,* or paid workers to work what had been their own land for others, either on a sharecropping basis or for wages. Hundreds of people from at least one fraction had to leave their own villages and come to work for members of the richest lineages, who had sufficient grain stocks. At that point, each notable of each douar of the grain-rich lineage had at least 10 of these refugees living around his household, either working the fields for 1/5 share of the harvest, or working as domestic servants. This has left a significant mark on land distribution in the area into the 1980's.

Thus, before the French Protectorate, we see a pattern of siba, where lineages, fractions, and tribal confederations warred against each other, success depending on the number of men who could be mobilized, the spoils shared unequally between the lineages that mobilized the others and those mobilized. There followed a period

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* a khammes is a landless client who works the land of a patron for a 1/5 share.

of pacification, during which some of these same leaders were coopted by the French, and served as representatives for their kinship groupings, gaining access to greater wealth and privilege for themselves and their kinsmen in the process. In the present situation descendants of these same notables constitute lineages and fractions which are still centers of power and of wealth when compared to others, their present status deriving partly from successful survival of the 1940's famine , during which they consolidated their power and wealth, and partly from present-day access to official and quasi-official positions of power and authority under the modern State.

As will be discussed further, there are a number of strategies which farmers use to cope with the basic fact of unequal access to land and other productive resources in the region. The success of many of these is, however, strongly conditioned by the patterns of social and economic stratification which were established before the Protectorate and persist, in a somewhat modified form, today.

SOCIAL ORGANIZATION AND PATTERNS OF MOBILITY

The douar or village is the basic unit of social organization above the household. A douar may be constituted by a set of extended and/or nuclear families, or a sub-lineage or a lineage. Several douars together comprise a fraction of a tribe. Douars may be concentrated or dispersed, resembling dispersed hamlets. For census purposes, three types are recognized, "grouped," "dispersed," and "exploded" douars. The implication of the term "exploded" is that a formerly grouped, cohesive douar has, for reasons relating to an inherent tendency toward segmentation and conflict and/or land and population pressure, divided itself into a series of relatively discrete smaller units.

At each level of social organization - the douar, lineage, and fraction - there are both traditional notables, and appointed officials (see Table I). Additionally, agnatic groups within the fraction are unlikely to be equal in numbers or to have equal status. Often, one lineage will have greater access to land, and thus to power and authority, with in a douar or set of douars. Rights in lineage land are crucial for the standing of an individual or a household, which is one of several reasons why even permanent migrants are loath to give up rights in land in the douar.

In the past, notables included those men who, as heads of lineages or fractions, were able to attract large numbers of clients who worked as Khammes on the land or as domestic servants and retainers. Today, while the khammesat institution is declining, partly because of increased employment options for poor young men in town, notables still maintain clienteles through a variety of

means. To a significant extent, these are men who are the descendants of traditional notables who have managed to complement inherited high status with achieved high status by effectively manipulating new offices. The government's establishment of rural communes, with elected councils, has provided a means for this kind of status enhancement. Thus, sons or grandsons of men who were representatives to the French Protectorate administration on behalf of their douars or fractions, are now likely to be members of rural commune councils, or appointive representatives in the Ministry of Interior hierarchy. In other cases, the election and appointment processes have provided avenues for achieved "notable" status.

These notables are not the only elite in the rural area. There are also descendants of the Prophet (chorfa) who are entitled to special prestige and deference, as well as the families of marabouts or saints, who are the central figures in Sufic religious brotherhoods. The Koranic teacher, also still receives respect and deference. Then, there is the new elite, constituted by a variety of petty functionaries - teachers and other members of the administration - as well as the growing urban-based commercial elite that has its roots in the rural area, and maintains ties with it.

Roles and offices in these elites may overlap; a man may be a member of a commune council, a large-scale merchant in Settat or Casablanca, the descendant of a former chaikh, and a large landowner in the douar, and is likely, if so, to be a member of a senior lineage in the fraction. Although the creation of the rural communes was, in part, designed to break down the already declining tribe as the basis of social and political organization, it appears that, partly

through the process of commune demarcation, this form of organization was actually reinforced at least to the fraction level (cf. Sedjari). At the same time, the institution of the communes was designed to revivify the local elites, and this objective seems to have been largely fulfilled, although the role of the elected council vis à vis that of the appointed caid is still problematic; the caid still has more power than the council in many instances. Councils do, however, provide a venue for the expression of local problems, and are one of the building blocks of representative government.

TABLE I

Moroccan Administrative Organization

Administrative Level	Appointed Positions	Elected Positions
Nat'l Government	Minister	Parliament
Province/Prefecture	Governor	Provincial Assembly
Cercle	Super-Caïd	- -
Commune	Caïd Khlifa	Commune President Commune Council
Fraction	Chaikh	Naib
Douar	Moqaddem	- -

While election to the rural commune council, by universal suffrage, is technically possible for anyone, it is most likely to be someone with these kinds of overlapping roles and statuses who will be elected. In this context, the elective official is the official spokesman for the poorer, lower-status members of his douar, or for a set of douars. These officials are, however, most often absentee landowners. They still maintain local clienteles which form their constituencies

but they may somewhat removed from local problems. It is these council members, as well as the chaikhs and the more traditional notables, who are likely to let land to other farmers to sharecrap, to give them animals on a share basis, to provide short-term loans, and act as brokers with the administration at various levels. They, and the town merchants, are the people most likely to be able to help a smaller farmer, whether or not he is a kinsman or an affine, to get access to state services, including schooling, medical care, and credit, and to assist people in finding jobs when they migrate to town. In return, the clients owe them allegiance which can then be converted into increased wealth, prestige and status.

There are a number of changes occuring in the composition of the elites, and thus in power relations within the douar. The traditional notables may not, in fact, be succeeded by their children, partly because inheritance patterns, which lead to extreme land fragmentation, may leave no single heir with sufficient wealth to carry on patronage obligations effectively, unless he can use funds gained from urban employment in order to buy out co-heirs. A traditional notable who practiced serial monogamy, would be likely to have a very large number of children, all of whom would inherit a portion of his land. With the breakdown of family solidarity, and given rivalries between the children of different mothers, the tendency is not to try to maintain these parcels of land as a single unit and farm them together.

A number of these co-heirs of former notables may already have given up the rural life before the death of the notable. Others, after his death, being unable to achieve subsistence on their very small portions of land, may migrate to town, soon after the inheritance has been shared out, either selling the land to heirs, leasing it, simply leaving it unfarmed, or selling it to outsiders.

The outsiders are often members of the new elite, the urban-based merchants and entrepreneurs. While some of these men, who are accumulating large tracts of land to start commercial farm entreprises,may have their roots in the douars of Haute Chaouia, many do not; but rather are from other regions of Morocco. It is they who are becoming the new notables in the douars, their notability being based solely on wealth rather than status locally validated through inheritance and tradition.

There are, then,at least two highly marked but changing strata in the rural area, although the stratum of non-notables is in turn divided according to occupational status, land tenure, lineage membership, age, and sex. The essentially democratic, segmentary model of Berber social and political organization, which has been extensively debated in the sociological and anthropological literature, on Morocco appears to be mitigated by a number of cross-cutting factors. "... Even where the emphasis is segmentary, in the political game for example, the impact of strata is not absent. Categories of origin, kinship, age and sex, even of activities (shepherds, irrigators, artisans, scholars) establish the social confrontation covertly but at times with as much virulence as the segments formally present on the political scene. All this happens as if segmentarity dissipates, divides and ensures the redistribution of forces, spoils, surplus - and consequently of power - into smaller social sections where they may be more easily dominated." (Pascon, 1977).

For the majority of men, the two main avenues to upward social mobility are migration and education. For Haute Chaouia, it appears that about one household in two has at least one male member who has migrated to town. Rates of school

attendance vary throughout the region. In the central zone they may be as low as 20%. In another area, however, school attendance was higher, at least for one douar sampled (Mouddene, 1980). There, household heads of all farm size categories, including the smallest farmers, sent some sons to school; 51% of all children between the ages of 7 and 14 still living with their parents were attending school. But 80% of boys were in school as against only 27% of girls. Fathers are apparently torn between the hope that sons will succeed in school and go on to find remunerative jobs in town, and the hope that they will succeed and still return to the farm.

Young men who migrate tend to do so between the ages of 18 and 28. In the urban setting, they rely on help from other members of the douar who have already migrated, so that social relationships within the douar are important in the urban context as well. The majority of men who migrate are initially employed as unskilled workers, or remain unemployed or only occasionally employed, although they remain in town. They may receive assistance from a notable residing in the city or in the douar, or simply from kin or affines who are already in the urban setting. They will tend, if steadily employed, to send remittances home, especially if they have left a wife and children at home in the douar.

Another avenue toward increased economic status, although this may be marginal, is through agricultural wage employment. Men (and women) may, instead of working as khammes, work as occasional paid agricultural workers for relatives, neighbors, and notables. Where their income accrues to the household, that household may be able to accumulate land, usually through sharecropping contracts and rent, but also through purchase, thus increasing household income from potential surplus agricultural production on the extended farm. The status of migrant is, however, more prestigeous than that of agricultural worker. The majority of agricultural

workers appear to be men who have some land that they own and farm themselves, or the children of such men, who work the rest of the time as unpaid family workers. There are, however, completely landless households in the douars who rely exclusively on others to provide them with agricultural and other employment and these people may still work as khammes, which is the lowest status, and usually the most poorly remunerated. The khammes is seen as working for the landowner, while someone who merely takes some land to sharecrap in addition to even a tiny amount of owned land, is not seen as working for someone else in the same sense.

If local notables have close and remunerative ties with the representatives of the state bureaucracy who intervene in the rural setting, these ties helping them to increase their social, political and economic status, the situation of the poorer famers vis à vis the bureaucracy is considerably different. For the smallest farmers, and probably for some of the small-to-medium farmers, the State is seen as threatening, as are its appointed officials.

Relationships with the State must be mediated, if possible, by the more powerful notables, so that problems will not arise or, if they arise, can be resolved. This attitude is often extended to representatives of the Agricultural Credit Bank (CNCA), and may also apply to extension workers from the extension centers (Centres de travaux, CTs). To the extent that extension workers are often seen as ineffective, unknowlegeable, and arrogant, there is considerable reluctance to follow their recommendations. CTs are seriously understaffed, serve very large numbers of farmers, and are responsible for a broad variety of

government programs. Thus, interaction between farmers and CT agents is extremely limited, and is often characterized by farmer hostility or reticence where it does occur. On the other hand, even a small farmer may be able to trace a relationship through kinship or marriage with someone in the CT hierarchy, or in the CNCA. If not, he will either depend on his relationship with a traditional or modern notable to create that linkage, or tend to do without the service.

While kinship and marriage ties, and neighborhood ties remain critical for social organization in the rural setting, as do ascribed status indicators such as age and gender, rural social life is not static. New influences associated with increased migration, education, and with the central government's attempts at decentralization and deconcentration are affecting attitudes and behavior in the douars. Yet, many douars remain isolated in terms of government services and other innovations. As land fragmentation and landlessness increase, more and more reliance is being placed by smaller and medium farmers on off-farm employment activities, either full-time or part-time, either in the rural setting or in town leading to exposure to new influences. Farm size fluctuates over time, and increased mechanization may be leading to trends toward land concentration at the expense of the smaller farmers. As small farmers adopt more multiplex strategies to achieve and maintain subsistence, and to produce some surplus where possible, they may be able to hold their own against this encroachment by new, large absentee farmers, at least in the short term. Suitable new technological packages, if accompanied by improvements in distribution systems and credit availability, may assist these farmers both to remain in agriculture and to achieve some surplus production.

THE ROLE OF WOMEN

The division of social roles by gender is still extremely marked in Haute Chaouia as in other areas of rural Morocco. Young women at marriage come under the strong influence of their husbands, but especially of their mothers-in-law. This is particularly true if the young husband and wife reside with the husband's parents in the same household, but the mother-in-law can remain a strong figure even where the households are separate, but where the son continues to farm with his father, or takes land from the father to farm on a sharecropping basis. The mother-in-law will tend to allocate tasks to her daughters-in-law both within the house, and, together with the household head, on the farm. Given the frequency of serial monogamy, however, the person who is playing this determining mother-in-law role may change several times during the life-cycle of the young family, just as the person playing the daughter-in-law role may change several times.

While households and communities are male-dominated, however, women form networks with other women through associations of various kinds. Through the arrangement of marriages and the organization of other rites de passage, and through the control of information exchange related to these events, women come to acquire considerable power, as has been noted by Belghiti, Davis and Meher.

These networks are frequently organized on the basis of kinship relationships through women, and continuing to relate to her matrilateral kin provides a woman with some security in the face of the high likelihood of eventual divorce. Divorce rates in rural Morocco appear to be quite high (Belghiti gives 49%), but so are rates of remarriage. The tendency is less toward plural marriage than toward serial monogamy, both for men and for women. This tendency seems to be exacerbated by rural to urban migration. Men who migrate may leave their wives at home in the douar, and return at least once a year to visit the farm and bring some money for the family's upkeep. If they remain in town over several years, however, they tend to form relationships with women in town, either formally divorcing the rural wife, or eventually simply deserting her. Since divorced women under Muslim law have no rights to property at inheritance, the woman who knows she is likely to be divorced will attempt to have as many children as possible so that they, who can inherit, will possibly support her in her old age.

Patterns of male migration result in a large number of rural households being effectively women-headed for much of the year. However, even where the husband has migrated quasi-permanently, retaining his rights in land, the wife remains under the tutelege of his agnatic kin group and will be unlikely to be able to make independent farm management

decisions. If the farm has been let out for sharecropping, she may receive her husband's share as part of the basis for family subsistence, as well as some remittances from the husband's urban earnings.

Land inherited by women is usually farmed and managed by their uncles and brothers until they marry, and then by their husbands. The woman, however, apparently retains the right to decide whether or not that land should be sold. Widows who have inherited land appear to allow their sons to farm and manage it, although they may instead let it out for sharecropping, lease it or sell it. Widows who are not thoroughly conversant with field crop production, and who do not have sons available to protect their interests, are often cheated by sharecroppers, being given less than the agreed share.

The exchange of women between kinship groups through marriage, either in the same douar or in neighboring douars is one way in which land distribution may be readjusted, through the share of inherited land that is expected ultimately to go to the woman. There is still a preference for endomagy and patrilateral cousin marriage, although this too, is breaking down given increased rural to urbai migration. At the same time, there is a reported tendency to attempt to keep women from inheriting land, which is completely illegal and against custom, presumably as a response to increased land fragmentation. A woman, finding herself in this situation, will have to take the case to the

Muslim court, or seek the intervention of local Ministry of Interior officials, both of which may be extremely difficult unless she has children who will assist her.

Women as well as men migrate to town, either following their husbands or on their own, especially after divorce. The main job opportunity is as a domestic servant, although there may be some options in sewing and weaving for others. Many poor women migrants appear to wind up as prostitutes. A woman who wishes to set up even a small business in town must have official permission of her husband, although this may be avoided in the informal sector.

School attendance rates for boys and for girls in Haute Chaouia are fairly low, the highest reported being 51% for boys between the ages of 7 and 14, but in this area, only 27% of girls attended school. Girls help their mothers with household tasks, but may also herd animals instead of boys, and will work with their mothers and young brothers weeding, protecting field crops from pests before the harvest, and harvesting grain legumes.

Women's main agricultural activities include the care of livestock, including picking and gathering weeds from the fields for fodder, cleaning stables, watering the animals, and milking. They are also involved in harvesting grain legumes, which is the most labor-intensive agricultural activity, and may also pick olives or harvest

other tree crops. All of these tasks require that the woman not be secluded.

Men who migrated young to town, and still retained rights in land in the douar, usually retire to the douar to take up part-time farming. At this point, the tend to marry young, local women, so as to be able to have someone to do the farm work. In these cases, it is the young wife who does the majority of the field agricultural tasks, while the husband may occupy himself with the livestock, or do very little work at all. Even if these men are relatively wealthy in local terms, this pattern precludes the seclusion of the new wife.

Seclusion of women in the rural area is a matter of degree. Some husbands keep their wives completely restricted to the house, taking care of the livestock themselves, gathering fire wood and water. However, in general, seclusion of women is only practiced by the richer farmers. Poorer farm wives are able to work outside the house, to visit within the douar and in other, nearby douars, and may, in some cases, work as paid agricultural workers.

Wage employment of women in agricultural field tasks may be disguised. A farmer can and will call for agricultural wage labor from among the members of his extended family, usually the wife and daughters of his brother or his son-in-law. He would not, however, admit to having piad them for this work, although he will have

done so, and they are unlikely to report themselves as having been paid. In order to avoid dishonor, pre-pubescent girls can go out to work as agricultural laborers only if they are accompanied by an older woman family member. Married women will tend to work in agriculture for wages only after they have been married for three or four years. Young girls tend to work only for farmers who are members of their kinship group. When they are paid, they are paid somewhat less than men for the same tasks.

Data from one study indicate that 13.9% of all women who worked for others for wages worked harvesting grain legumes. Although women do sometimes work in the hand harvesting of cereals, this tends to be done only among poorer households, and only when paid workers who are strangers to the family are not involved. Women glean the fields after hand harvesting, and may be involved in bringing hand-harvested grain to the thrashing floor. They also shell maize, often in groups of cooperating kinswomen or neighbors.

Wages earned by women in agriculture appear to be given to the male household head, as are wages earned by male dependents of the household head. They do not appear to share in the profits from the sale of animals that they tend, or from the sale of the milk. Widows who work as agricultural wage laborers do retain their wages, and increased mechanization may have a negative impact on them.

However, since the main field task performed by widows and other women is grain legumes harvesting, which is the least likely activity to be mechanized since it requires specialized equipment, this kind of negative impact is not likely in the short-term.

On the other hand, mechanization usually leads to increases in the amount of weeding required, which in turn means that women may have to spend more time weeding where land is prepared by tractor, leaving less time available for already labor-intensive and time-consumming household tasks. Data are not available to determine whether this in turn leads to poorer meal preparation, or to other negative impacts which are typical in such situations in other countries.

Overall, the tendency to take women out of agricultural production tasks tends to be the prerogative only of medium-scale and richer farmers. Whether or not this always is then accompanied by seclusion is not clear, and is probably practiced only by the richer farmers. While women share in the work, they do not appear to retain rights to the specific cash return for their share of the work, whether this work is done on the household farm or for cash wages on the farms of others. Women of poorer households establish links of clientship with the wives of notables, partly through the process of arranging marriages, and are able to enhance their status in the process. This, together with maintenance of ties with matrilateral kin, tends

to provide women with some protection against destitution upon divorce or widowhood, but the situation of divorced and widowed women in the rural area as in town is increasingly a very precarious one.

LAND ACCUMULATION AND LAND FRAGMENTATION

In general, the amount of land privately or collectively held by any lineage or set of lineages in a douar or a fraction initially depends on historical factors, particularly the success of the fraction or smaller kinship group in accumulating land as spoils in the period of inter-tribal feuding and warfare which characterized the pre-Protectorate siba period, and the subsequent tendency of these kinship groups either to fragment or to accept new members from other lineages, fractions or tribes. For example, of 5 douars belonging to the same fraction (Sninat Hfirt Chems), one douar of the 5 holds 70% of land owned by all fraction members. For this group, 61% of all households own only 12.5% of the land, while 2.4% of households own about 27% (Asserghine,1979). This kind of unequal land distribution appears to be characteristic of the area.

There are, however, considerable changes in farm size over time, resulting from the interaction among inheritance patterns, migration patterns, demographic pressure, and mechnization. The ability to accumulate land does not necessarily depend on initial farm size. However, study findings (Asserghine, 1979) indicate that land accumulation based solely on farm income takes place only for farms with an initial owned area of over 25 hectares. On the other hand, smaller farms have a high rate of change in size of area owned (as well as of area farmed due to association contracts). For Asserghine's sample of 141 farms, whose size was traced retrospectively over a 20-year period, the majority--66.5%--remained stable. Thirty-one percent increased in size, but of these 13.5% did not increase in size sufficiently to change them, for example, from "micro-farms" to medium sized farms--they remained essentially within the same category. Of farms that got smaller (13%), 3% merely diminished in size, but 10.5% completely disappeared.

Smaller farms became larger only if there was sufficient off-farm income to rent or purchase more land, but the mobility of these farms in terms of numbers of changes for the category was higher than that for larger farms. The main reason for the disappearance of smaller farms was lack of adult sons to work the land. Thus, while the household might remain intact until the death of the household head, upon his demise, with sharing out of the land through inheritance, no single discernible farm remained. Whether the remaining land was sold by all heirs, or given out in association in small fragments is unclear for these cases. For the small family farms, of 1-5 hectares, there were 25 changes in size, inluding 6 disappearances of the farm, out of an original sub-sample of 58. For the smallest farms, less than one hectare, from an original 40, there were 22 changes, including 5 complete disppearances.

Where farms have disappeared completely, if family members remain in the douar, they will be landless unless they are able to acquire new land through marriage. In this area, there has been, over time, a fairly high rate of marriage into the richer lineages in the douars of men who were formerly poor khammes who were working for a 1/5 share of the crop for richer proprietors. These men were then able to farm land inherited by their wives. The ability of these lineages to absorb these khammes through marriage would indicate that 20 years ago, they controlled sufficient land that there was a surplus relative to needs of existing families in the lineages. Whether men from the poorer lineages were also able to marry into the richer lineages in order to gain access to land is unclear; most of the in-marrying khammes apparently came from outside the fraction.

For farmers with over 25 hectares, the study finds that in addition to surplus production leading to increased income, local and extra-local social status is a very significant variable in terms of the ability to

accumulate land. Farmers who had 25-50 ha were either chaikhs or members of the rural commune council. These individuals had, in turn, inherited high social status and significant amounts of land, and were then able to convert that inherited status successfully in the new context of the rural communes. They were also chosen as chaikhs by the Ministry of Interior at least partly because of this inherited status and wealth. Through their contacts with all the government entities serving the rural sector, they were able to obtain access to improved production inputs--improved seed, fertilizer and herbicides--the use of which, in turn, allowed them to increase production and income from production, which they could then use to buy or rent additional land.

Medium-sized farms both increased and decreased in size (owned and sharecropped). For those which had off-farm income, the tendency was to increase area farmed; for those without, land accumulation was either very slow or farm size remained stable. For medium-sized farms which got smaller, the same pattern prevailed as for smaller farms which got smaller--the farmer was too old to farm his hectares himself and/or did not have adult sons available to help him. This led to selling the land or giving it all out in association.

Some smaller farmers did not have the means either to buy additional land or even to take land in association to sharecrop. These farmers tended to seek off-farm employment, and to farm only part-time. Others in this category, however, sought to intensify production, by dropping fallow from the rotation and practicing continuous cultivation of winter cereals. This practice, in turn, led to decreased yields, worsening the existing sub-subsistence situation. Thus, while these farmers delayed their decision to take up other occupations, the implication of the data is that in the end, they would have to resort more and more to non-farm employment.

Availability of draft animals appears to have little effect on the rate of land accumulation. Among smaller farmers, draft animals remain under-utilized, as is the case for the larger farmers who increasingly mechanize. Medium-scale farmers, however, tend to maximize utilization of available draft animals. Initial area owned, somewhat surprisingly, appears to be negatively correlated with rates of accumulation; the smaller the initial area owned, the faster the rate of accumulation. This is not surprising if sharecropping is included in the rate of accumulation, but is surprising if only land purchase is considered. Regrettably, the data are not clear on this point.

The number of food consumption units correlates positively with the rate of land accumulation for all categories of farms taken together, but the correlation is weak. For the smallest farmers (0-5ha), large family size measured in food consumption units seems to be a significant constraint to accumulation. For farmers with 5-15 ha, the initial family size appears to encourage the farmer to accumulate land. The relevance of available family labor to rate of land accumulation also appears to vary with initial farm size. For the very smallest farmers, the correlation is strongly negative, and farmers use excess family labor to work for others at peak seasons, or to engage in part-time urban employment. For medium farms, the tendency is to use excess family labor by taking land in association. For the large farms, available family labor appears to have been irrelevant to rates of land accumulation. Family labor remained under-employed while paid workers were hired.

The proportion of non-working family members to all family members depending on the farm for food consumption appears to have little effect on rates of land accumulation. However, for larger farms, increases in the number of inactive family members appears to increase the rate of land accumulation slightly.

For smaller farmers, where there is a high proportion of working members in the household, the tendency is to seek to keep them fully employed both in on-and off-farm activities

What is not clear from these data on land accumulation is whether or not new farms are being created as old farms diappear, as well as the extent to which the tendency is to accumulate land through outright purchase rather than through iterative sharecropping and if so, under what circumstances. Nor is it clear whether land concentration in the lands of medium or larger farmers is occurring, or at what rate, if it is occurring. The implication of various data sets is that mechnization is leading richer people who were not farming their own land to return to farm it and to increase the size of their holdings. The case studies of larger medium farms in the Beneficiaries section support this, showing a trend toward rapid and extensive land accumulation on the part of urban-based farmers who have decided to take up modernized farming.

Land fragmentation poses two different kinds of problems, that of overall farm size, and that of the number of individual plots or parcels into which the farm is divided, and the respective size of these plots. both of these factors are considered to be constraints to increased production in Morocco.

All the Project Chaouia studies show that there are many farms in the region that are too small to guarantee subsistence for the farm family, and are thus certainly too small to produce a surplus at least with current cultural practices. There are a number of farms with less than 1 hectare of land, and many farms with less than 5 hectares. The GOM estimates that it requires from 15-25 hectares, depending on the region and land quality, to guarantee a reasonable income for a farm family.

Despite some trends toward land accumulation outlined above, the average

size of farm appears to be decreasing overall. Inheritance patterns, combined with population pressure, play a key role in the reduction of farm size. Land must be equally shared among all sons, with each daughter getting half as much as each son. This pattern has led to the breakdown of subsistence-level farms even in one generation. However, as will be seen in the section on farm types, many farmers with about one hectare continue to try to farm by gaining access to additional land through sharecropping arrangements, often from those who have similarly minute owned parcels of land but have decided not to farm themselves, either because they have migrated or because they do not have sufficient other production factors.

The GOM is attempting to revise inheritance laws in order to instritute something approximating primogeniture. This is likely to be extremely difficult, as it would go against traditional Muslim inheritance rules, and would also insititute the effective disinheritance of the majority of children. In the interim, more and more of the landless or nearly landless, those who have micro-farms, will have to continue to find either part-time or full-time employment off the farm, and will eventually find it necessary to leave agriculture altogether.

The second aspect of the fragmentation question, the number of discrete parcels into which the farm is divided, is also viewed as a critical problem for improved production. Each parcel is named, and regarded as a separable production unit. The average number of parcels for the 1079 Haute Chaouia farms surveyed by Schmitt (Schmitt, 1979), was 6.3 , in an average sized farm of 8.12 hectares, but at least one farm had as many as 31 parcels. The smallest parcel was only 100 square meters. Each parcel may have different quality soils, and those that are widely dispersed may even be subject to some micro-climatic variation.

Parcels may be of both sub-optimal size, and too widely dispersed for optimal farming practices to be pursued. In Haute Chaouia and similar regions,

planting early after the first rains is extremely important, and must be done quickly. If planting activities must be spread over a number of discontiguous parcels, significant delays are likely to be caused, with the last parcels prepared and seeded showing lower yields. Similarly, too much additional time may be required for the farmer to bring improved inputs to the most remote parcels, and these parcels may receive fewer inputs as a result.

As mechanization increases, parcelization becomes even more of a constraint, since some parcels may be too small to make it worthwhile to use rented equipment, while the fact that they are not contiguous means that someone who rents out equipment for custom work for land preparation or harvesting may be unwilling to use his equipment on all the disperesed parcels, since this takes much more time. The equipment owner is interested in plowing or harvesting the greatest area in the least possible time.

There are several traditional responses to these two aspects of the fragmentation problem, at least in the short-term. Farmers exchange parcels which are respectively too remote from the majority of their other parcels, and from the douar. These exchanges may be for varying lengths of time. It is unlikely that they will continue across generations, however. Such exchanges are made most often between members of the same lineage or fraction. Sharecropping, giving land out in association, is also a way to increase contiguity of plots.

Additionally, there is a traditional pattern, at least in parts of the region, under which members of a lineage or fraction localized in a douar agree to plant contiguous parcels to a particular crop. There will then be bands of wheat, barley or grain legumes extending out from the residential cluster like pieces of a pie. This is one way of addressing some of the technical problems posed by fragmentation on a group basis. These parcels

can tehn all be plowed at the same time, and harvested together, which is particularly important where mechanization is involved.

A further means of coping with increasing fragmentation through inheritance is maintaining inherited land in indivision. This too, is a traditional response. Under this system, co-heirs agree to keep their land undivided, without formally assigning specific parcels to each their, although each knows how much land is his or hers. This can continue over several generations, and may have served in the past as a brake on sale of parts of the inherited land to outsiders. Today, land in indivision can be sold. When it is sold, problems may arise, since the new owner may attempt to grab the best parcels. He, too, knows only that he now owns a certain number of hectares, but not which ones. When an outsider purchases land in indivision, litigation may result from this kind of attempt at appropriation of parcels traditionally farmed by the other heirs. The law provides that the co-heirs that did not sell have the right to re-purchase the portion sold within a year and day. If they do buy it back within that period, they must pay interest to the purchaser, and a fee to the court which decides that they can be allowed to buy it back.

The major response of the GOM to the problem of fragmentation of farms into a number of different parcels is remembrement. Remembrement is primarily carried out in irrigated perimeters, but there are some experiments in rainfed zones. Remembrement is based on the idea of an even trade between one farmer and another such that an exchanges of parcels will lead to the same balance of soil types, yields, and land area, but with the creation of larger, contiguous parcels. The implementation of remembrement policy is the responsibility of Ministry of Interior officials, and it is carried out in a series of concentrated regions. An initial survey of parcels and parcel ownership is carried out, and a proposal is then made to the local farmers. Since the matter of land ownership is so delicate, approaches are made one

by one to the individual farmers. Theoretically, no farmer can be forced to participate in a remembrement program, although positive and negative incentives are probably provided. On the positive side, farmers who have been willing to participate in such programs have, for example, been given faster access to credit. Those who do not have credit dossiers with the local CLCA have them opened for them, and their applications are presumeably expedited.

The traditional patterns outlined here appear to indicate that the farmers themselves regard fragmentation as problematic, both in terms of numbers of parcels per farm, and smallness of farm size overall. However, it is also worth noting that in this region, it may be advantageous to farmers to have some lesser number of parcels, since soil types vary over short distances, as do micro-climatic zones. Studies indicate that the farmer's sensitivity to the characteristics of each parcel is extreme, and that the parcel becomes the decision-making unit for all decisions about cultural practices. (This is why the parcel is taken as the unit of analysis in the 50-farm study.) Thus, for the farmer in a high-risk zone, it may be better to have even widely dispersed parcels, though relatively few of them, than to have one set of contiguous fields, even though the latter pattern would facilitate effective use of both animal and mechanized traction, and might encourage higher applications of chemical inputs.

TENANCY AND SHARECROPPING

Sharecropping (taking land in association) has been a significant feature of Moroccan agriculture in the dryland regions for many years. Although this pattern is said to be on the decline, partly due to pressure on available cultivable land, it is still significant for Haute Chaouia and other, similar regions. Estimates are that 25% of land farmed is land rented or sharecropped in Haute Chaouia, with sharecropping predominating over rental, although there is a tendency toward increasing rental versus association.

There are a variety of kinds of sharecropping arrangement. The basic type, bel khobza provides that the landowner be given a share of 1/3 to 1/2 of the crop. Traditionally, if a small farmer wanted to take land in association from a large farmer, he would present a "gift" of a loaf of bread. A large landowner who wanted to take land in association from a smaller farmer would not be required to give a gift. Today, this "gift", which was largely symbolic, has been replaced by a system of cash bids. The person who may have land to let out in association receives bids (primes) from potential associates.

The months of September and October are the period for making these association contacts, and this activity involves a great deal of the time of household heads during this period. A number of factors enter into the choice of associate, aside from the amount of the cash bid. (When an associate has been chosen, other bids are returned.) Prior relationships are important, as are kinship and co-residential ties, prior skill demonstrated by the potential associate as a farmer, and his ability to provide necessary inputs. These factors also condition the terms of the ultimate contract, as does, importantly, the quality of the soil on the parcel or parcels, and the nature of the crop to be grown.

While in some instances, the associate (preneur) is entirely responsible for providing all inputs other than the land against a given share of the crop, while maintaining the right to the choice of crop to be grown, in other cases the proprietor may make the crop choice, and/or may participate in some input costs, primarily seed.

There is a tendency for proprietors to maximize the work of the associate by requiring that he cultivate a bernicha crop, such as maize, which cleans the field. The next year, the proprietor will plant that land himself, for example to wheat, in the hope of getting a higher yield. With increasing pressure on land to be taken in association, this kind of pattern appears to be increasing. Formerly, the associate had the right to sharecrop such a parcel the second year, to benefit from the good effects of the bernicha crop. Alternatively, the proprietor may agree to participate in the cost for having a winter cereal crop combined, which saves him the cost of labor to gather the harvested grain and straw in the field, have it transported to the threshing floor, threshed, and then transported again to its ultimate destination. There is less mention of proprietors participating in costs of fertilizer, although this does also take place.

For eight types of association contract distinguished in one study, there are a number of minor variations. All these types of contracts are of the basic bel khobza variety.

1) the proprietor contributes only the land, and receives 1/2 the harvested grain, plus 1/2 the straw;

2) the priorietor contributes the land, and 1/2 the cost of fertilizer and/or combine harvesting, in return for 1/2 the grain and 1/2 the straw;

3) the proprietor takes an initial 1/10 of the harvest, said to be to pay taxes, and the associate then takes 1/5, with the remaining 7/10

divided between them in two equal shares, with the associate getting all the straw.

4) the associate gets 9/20 of the harvest and the proprietor 11/20, with the associate getting all the straw. Again, the proprietor is getting 1/10 of the harvest as a fee for paying taxes.

5) the proprietor gives the land only and gets 2/5 of the grain, the associate getting the remaining 3/5 and the straw. (The associate is entitled to take the 1/5 share, or "khoms" first.)

6) The proprietor gives the land only, against 1/3 of the harvest.

7) The proprietor gives the land only, against 1/5 of the harvest.

8) Where the association contract is between two or more small farmers, one will bring the land, one the tillage equipment and animals, and another the seed, with the work and other input costs, if any, being shared. The land giver gets 1/5 of the harvest, the other two sharing 4/5.

It should be noted that the content of these contracts will vary given assumptions about the yields that are likely, and given experiences in prior years. For example, given the severe drought of 1980-81, less land was cultivated overall in Haute Chaouia in 1981-82, there was a shortage of seed, and proprietors who had previously been requiring a half-share of the harvest were willing to settle for 1/6.

In general, these association contracts do not last longer than one agricultural year. This allows the proprietor to bid up the price of the land each year, and also discourages claims to de facto tenure on the part of the associate which would be likely to result if the contract were extended over several years. However, where contracts are negotiated among kinsmen or in-laws, the contract may be renewed over several years, with such de facto claims resulting. Similarly, among people with such relationships who give and take land in association, the actual content of the contract may change by the end of the year, apparently sometimes

to the advantage of the associate. This may be especially true where small parcels are involved, where the proprietor is a relative who is away working in town, and may be less interested in the yearly revenue from the land than he is in keeping it until his retirement.

There is some evidence that increasingly, land given and taken in association is moving among smaller farmers, rather than from larger farmers to smaller farmers (see MIAC study), since the larger farmers are cultivating more of their own land using mechanization. At the same time, there are growing numbers of migrants, who wish to retain rights in their small amounts of land, and therefore give it out in association. These, however, may give this land out to larger farmers, who are trying to accumulate land, rather than to smaller farmers. In either case, the associate may be a kinsman, or may not. Where the large farmer is an outsider to the douar whether he may find it more difficult to find people willing to give him land in association is not clear, although he may be more likely to be able to take land in association than to purchase it.

The association of several small farmers is most common to the south of the region, where collective land tenure predominates, and where there is less agricultural equipment available to each farm, and soils are poorer. To the north of the zone, where soils are better and yields generally higher, contracts of types 1-5 are most common.

While taking and giving land in association provides the smaller farmers with a means of maximizing available family labor, and extending the area farmed beyond the insufficient area represented by owned land, as well as providing a means for equalizing the quality of parcels, by giving some out and taking in others, the fact that land taken in association is not owned creates problems for production improvements.

Where the proprietor does not share in the inputs, the farmer will be less likely to expend already scarce resources on land improvement, including de-stoning, fertilizer, herbicide, and effective land preparation, but especially seed. Above a certain intensity of seeding, for example, the farmer concludes that he is effectively working for the proprietor rather than for himself. Data for cereal production in the Haouz region indicate that farmers will use more seed on their own fields than on those taken in association—for barley, amounts were respectively 83 kg/ha versus 70, for durum, 72 kg/ha versus 67, and for bread wheat, 62 kg/ha versus 60 (the comparision for breadwheat being based on a very small sample, Pascon, 1971).

Where there is a formal, written association contract that can be produced and presented to the CNCA, a farmer can receive credit for land in association. However, given the general reluctance to assume formal indebtedness, it is unlikely that a small farmer who is sharecropping land to increase subsistence, will be willing to increase his indebtedness by seeking formal credit to purchase inputs to be used on land that he does not own. This seems especially likely given the tendency to use fewer inputs on sharecropped land even where indebtedness to purchase those inputs is not at issue, as above.

It is possible that some small farmers, who do apply for formal credit, may use their association contracts in order to justify eligibility for more credit than is warranted given their area of owned land, and then use that additionl credit either to increase inputs used on the owned portion, or simply to meet family expenses. There are no data available to support this hypothesis, however. The larger farmer who is a party to an association contract as the proprietor, could also seek formal credit to purchase inputs for that land. However, given the current pressure on land for sharecropping, and what appears to be fierce

competition among those seeking such land, it would not be to the advantage of the larger farmer to seek credit for inputs given that there are potential sharecroppers available who will themselves provide what are mutually considered to be at least minimal inputs.

It is not clear whether, if the proprietor gives some proportion of the inputs, he is also entitled to share in the decision-making about what crops will be grown, although the MIAC study indicates that this is often the case. It is unclear to what extent a proprietor who is seeking to save on labor when he lets out a parcel and requires that it be planted in grain legumes, which have the highest labor requirement, for example, will be more or less willing to participate in input costs than where he does not share in that decision. In various discussions of these kinds of contracts, there is no indication that the proprietor, having made the crop choice, then necessarily contributed to the cost of inputs.

The MIAC study also notes that the kind of association contract under which the proprietor gives only the land, and does not share in other inputs, means that he is not sharing in the risks, and that this is against Islamic religious precepts. The authors take this as an indication of the extent to which values are changing in the countryside. Other studies, however, do not remark on this as a change from traditional patterns, but rather imply that this kind of contract has been in evidence for a number of years, and that what has changed over time is the share that the proprietor gets, that share having generally increased as pressure on land increases.

As may be seen from Table III, only the medium and larger farmers rented land for cash instead of taking it in association for sharecropping, with very few exceptions. In all categories of farm, more land was taken for sharcropping than for rent.

Table II, which shows the average percentage of land sharecropped by farm category, indicates that all categories of farmers - "micro," small, medium and large --sharecropped some land. This appears paradoxical-if they are all taking additional land, where is it coming from? In fact, in the category of small and large absentee owners, (IX) 90% of the land owned is given out for sharcropping and rent. In addition, some "micro" farms in the area, but not in the sample, probably gave some land for sharecropping.

Smaller and medium farmers would probably prefer to rent more land rather than sharecropping it if they had sufficient cash-flow. Leases tend to be for more than the one year typical of sharecropping contracts, and a multi-year lease at a price fixed the first year would prevent the kind of inflation typical of sharing arrangements given pressure on available land. However, landowners, who are very conscious of increasing land values, and who employ various means to raise the share they receive from year to year, would probably try to ensure that the rent paid for rented land increased annually as well.

Even if the tendency to give and take land in association may be diminishing throughout Morocco, and in Haute Chaouia, association contracts are still a significant factor in allocating the means of production among farmers in this region. To the extent that farmers who sharecrop or rent land are unwilling or unable to make investments in that land--especially by using adequate available purchased inputs to increase production that are already available, or by adopting improved packages--overall productivity will suffer.

Some incentives must be provided to encourage proprietors to share the cost of inputs more frequently than is presently the case. If, however, proprietors increase their share of the risk in this way, they are also

likely to want both a greater share of the harvest, and a greater share in decision-making about crops to be grown and other aspects of farm management. Evidence for this kind of a trend is the fact that increasingly, proprietors are requiring associates of cultivate the most labor-intensive crops on land given in association, in order to save the proprietors cash labor costs, but that they are no longer adhering to the traditional pattern of then allowing the same associate to cultivate the same parcel the second year, to benefit from the "cleaning" properties of these crops. Thus, in providing incentives to the larger proprietors to invest more in land given in association, care would have to be taken to ensure that arrangements which resulted from these incentives would not lead to increasing inequities for the often poorer associates. Also, these incentives would have to be sufficiently attractive such that those proprietors now letting land out in association will not decide that it is more advangeous to keep the land fallow, or cultivate it themselves, using either traditional or mechanized techniques.

Is should also be remembered that it is not only the large farmers who are proprietors in land association contracts. Smaller farmers share land among themselves, and frequently let it out to larger farmers. It the smaller farmer who lets out land in association to larger, "modern" farmer is required to provide half the inputs, he is unlikely to be able to do so. If he had sufficient means to provide the inputs, including labor and traction, he would not be likely to be giving the land in association to begin with, unless he is an urban migrant attempting primarily to maintain his rights in land in the douar.

Land association contracts are an important factor in maintaining the equilibrium of the traditional agricultural system, and especially for allowing smaller farmers to improve their agricultural base. Thus while changes in the system may be urgently required in order to encourage the adoption of improved practices on this portion of the total amount of arable land, these changes must be carefully designed, and should take account of the fact that social relationships of various kinds are key factors in the way in which decisions about association contracts are made and carried out.

ANIMAL SHARING

As has been mentioned, it is often the case that a farmer who is given land in association by a proprietor also takes animals in association from the same proprietor and/or from another. Livestock production is an integral part of the farming system in Haute Chaouia, as it is for farming systems in the other dryland areas of Morocco. The role of the herd or flock as savings account, capital, source of prestige, and source of traction as well as income is very important. Herding animals is a task assigned to young boys and girls, and contracting out as a shepherd may be the first experience a young boy may have with wage employment.

There are a variety of types of animal association contract, just as there are varieties of land association contracts. While there are also formal credit programs available for the purchase of animals, (especially after the recent drought, which is said to have decimited the national herd and to have seriously reduced access to draft animals for land preparation), informal animal association contracts are frequently preferred. In Haute Chaouia, these contracts become more common toward the south where livestock production is even more significant in the farming system than it is in the north of the region, where soils are better and rainfall is higher.

Animals are given in association by richer local or absentee farmers, or by smaller absentee owners who are urban residents. Kinship or friendship, and previous contractual relationships for land association, are important elements in the choice of associate. Under most kinds of sharing contracts, the associate--the person who is responsible for maintaining the herd or flock-- gets a share of the offspring, as well as a share of wool, milk and/or butter. It is this factor which causes owners often to prefer to give animals out in association rather than hiring shepherds for wages, since the associate

is more likely to take good care of the herd in order to increase his share of the product.

Under the Ras-el-mal contract, which seems to have several variants, a proprietor has a herd of cattle. He wishes to find an associate to take care of the herd. At the beginning of the contract, the cash value of the herd is assessed by both parties--this is the capital invested by the proprietor. At the end of each year, and assessment is made of the calf crop, and also of any animals which have been sold off during the year. The associate is entitled to a previously-agreed share of the profits, either in cash or in kind. However, the associate must, during the year, provide feed for the animals, and shelter. If stall feeding is involved, the cost to the associate of maintaining the herd over the year may be considerable.

Apparently, there is a variant of the Ras-el-mal contract under which the associate may make some contribution to the purchase of the animals at the beginning. Reimbursement to the main proprietor for the rest of the cost of these animals is made in installments over the period of the contract, which in this case may last for three years. At the end of the period of reimbursement, these animals are then fully owned by the associate. In one description of this variant, the point is made that the associate may ultimately pay the major proprietor 350% of the value of the animal, but will prefer to use this traditional system of credit rather than seeking formal CNCA credit to purchase an equivalent animal Under these kinds of contracts, milk and butter are not shared.

The Bennous contract is used both for cattle and for sheep. The associate has a right to half the calf or lamb crop at the end of the contract, and for sheep, to half the wool produced by the whole flock. Here, too , the

associate must provide feed and shelter for the herd or flock.

The _Rbaa_ contract applies to sheep and goats. Here, the proprietor is responsible for the feeding and shelter of the animals, which are allowed to graze on land that he owns. The associate is only responsible for watching the animals over the life of the contract. In return, he is entitled to a lesser share--one--fourth of the lamb or kid crop and a corresponding proportion of the wool.

As may be seen from Table II, proportions of animals shared and land shared are fairly consistent across farm categories, except for the category of farms which have little owned land, but take on an average of 68% of land in association, thereby apparently already taking up a good deal of their surplus family labor in vegetable production on sharecropped land.

For large landowners, there appears to be a general tendency to increase the size of herds and flocks overall, but particularly to increase numbers of sheep and goats. The tendency regarding cattle is to improve the herd, with improved local breeds or exotic breeds, and to start stall feeding rather than merely increasing numbers. For these farmers, who do not involve family numbers in production, association contracts for the larger sheep flocks are advantageous. The associate tends to be reliable, does not need to be paid in cash, and may at the same time be the sole permanent employee who drives the tractor and supervises vegetable crop production. Alternatively, a man may be brought to live in the _douar_ where the proprietor has his land, in order to act as shepherd for a combination of cash wages and some payment in kind, if associates are not available in the _douar_.

THE BENEFICIARIES

Much of the documentation provided on farmers and farming in the Haute Chaouia region is based on a farm typology approach. Results of field surveys on varying topics related to farming --land accumulation, mechanization, credit, employment and migration--are largely conveyed in terms of these typologies, which include as variables household size in terms of adult food consumption and worker units, size of farm, numbers of animals, amount of farm equipment, and amount of land sharecropped. While these typologies tell a good deal about sample farms, they do not directly say much about the farmers and their behavior; farmer decision-making has to be extrapolated from the data provided.

Zagdouni's study of agricultural mechanization provides perhaps the most complete and useful available farm typology for the Haute Chaouia region, and includes some brief case studies of larger farmers (Zagdouni, L. La Mechanization Agricole, Cas de la Haute Chaouia, 1981). Its results are summarized in the material that follows.

The Northern Sub-Zone

The study is based on a sample of 71 farms chosen from seven douars in the more northern zone of the region extending from Settat to the Oum Rbia River. This means that the poorest farms, including those of the Beni Meskine to the south, are not included. The study zone is comparatively more favorable for agriculture in terms of soil types and climate than is the southern part of the plateau. This makes it more representative, however, of other rainfed regions of Morocco than would otherwise be the case, and it is the heart of the Haute Chaouia dryland farming region. This zone is also more highly mechanized,

with about 70% of area cultivated in 1979 under mechanization. The French, during the colonial period had relatively little impact on land tenure patterns in this zone--although there were large colon farms--but modern Moroccan larger farmers are presently having a significant impact, and some of their farms are included in the sample.

The study zone is within the action areas of the CTs of Settat (Ain Nzagh rural commune) and of Oulad Said (Oulad Said and Had Mzoura rural communes). The average yearly rainfall over seven agricultural years from 1971-2 to 1977-8 for O^{d} Said was 464.2 mm, and for Settat, 368.2 mm. There are six main soil types in the region, of which two--tirs and biad are most characteristic of the study farms.

Tirs soils are clayey soils, dark brown to black in color, and are self-mulching. They are well-structured and offer good chemical fertility. The tendency in Morocco is to use motorized equipment to work these soils where it is available, because they require heavy traction. Tirs soils are considered to be colder than biad soils. Biad soils have calcarious substrata, are not very deep, and are more coarse in texture than tirs. They are easy to work, even dry, despite their high content of calcarious stones. Local informants recognize four or five other soil types in the region, but it is these first two that are most common in the study zone.

The 1971 census gave population estimates for the old cercle of Settat, now the cercles of Settat and of El Brouj, of 208,706, of which 202,642 were listed as rural. For the province of Settat as a whole, for 1977, population estimates were 662,800, of whom 80% were estimated to be rural, and 70% were estimated to be in agricultural employment (Eighmy, 1979). Zagdouni points

out that for the study zone -the two cercles- the population has grown since the 1950's by only 12.3% overall and that this growth rate has been unevenly distributed within the zone. The annual population growth rate for the zone appears to be about 1.3%, as compared to an estimated population growth rate for the country as a whole of about 3.2%. This lower rate is partly accounted for by rural to urban migration, but also, partly because it is in the caidat of Settat that most of the modern Moroccan-owned farms in the region are found. These farms, which are largely mechanized, provide very little employment, and may have only one or two families living on 100 or more hectares.

Land tenure in the study zone is primarily melk, that is, privately owned land, with some collective land. However, the collective land is becoming "melk-ized", since the process of annual or pluri-annual re-allotment of usufruct rights to specific parcels has ceased over the last ten years or so, with individuals thus beginning to claim de facto ownership of these de jure collective lands.

The size of farms in the zone is as follows;

	% of farmers Settat CT	% of area	% of farmers O^d Said CT	% of area
0-5 ha	57.6	25.4	64	14.6
5-10 ha	21.4	22.4	20	16.7
10-20	9.0	18.4	10	23.0
20-50	4.8	19.7	4.4	20.1
50-100	.6	6.0	1.0	12.0
100 +	.2	8.0	.5	13.4

Thus, for both CT actions zones, the majority of farms are in the 0-5 ha category, although a very few large farms make up a fairly large proportion of the cultivable area, especially in the O^d Said CT action zone. The total number of farmers for the action zones of both CTs combined is 29,000 with a combined

total cultivable area of 194,000 hectares. Land concentration is fairly high in some parts of the zone, but is partly compensated for by sharecropping (taking land in association). The critical variable for production thus becomes the amount of load farmed, rather than the amount of land owned. For Haute Chaouia as a whole, about 20% of all land farmed is sharecropped.

Since 1960, there has been a significant increase in land under cultivation and taken out of fallow or pasture, including some marginal land that probably should not be farmed. In some parts of the region, there has been a decrease in the area devoted to winter cereals (wheats and barley), as well as a decrease in area planted in maize. The compensating factor has been an overall increase in area planted to grain legumes. This trend probably presents some advantages in terms of soil fertility, diet and marketing. There has also been an increase in cultivation of onions among the O^d Said, as a cash crop, and a general increase in planting of forage crops. Fallow is still common, but the rotation of a winter cereal crop with a bernicha crop--one which requires cultivation and thus cleans the field, such as maize--is increasing in the region. The old cereal-fallow rotation is more common in the dryer south of the region where agronomic possibilities are more limited than in the north, among the O^d Said and Mzamza tribes. Among the O^d Said, for example, fallow has decreased by 70% since the mid-1960's.

The overall decrease in grazing land in the region has modified former patterns of transhumance among groups with large herds (primarily the southern Beni Meskine). The rental of crop stubble on the field for grazing is becoming fairly common, with prices rising, with the result that there is less and less transhumance. For some time, transhumance has been less a phenomenon of the

tribal way of life in the area than a strictly economic phenomenon. Increasingly, those wishing to move animals make arrangements with relatives and close friends, and for Chaouia as a whole, the right of free grazing has practically disappeared.* Carrying capacity is considerably reduced, and over-grazing may be becoming a problem unless counter-acted by leguminous forage crops.

As far as inputs such as improved seed and fertilizer are concerned, Zagdouni notes that for the agricultural years 1978-79 and 1979-80, there were distribution problems in the region, the CTs either not getting enough inputs and/or getting them too late for effective distribution in time for planting. For 1981-82, there was a serious seed shortage because of the 1980-81 drought. There have also been problems with the extension of credit in the region. As of 1982, more credit is to be made available to smaller farmers here as elsewhere under new government policies.

Farm Typology - Summary

It is against the general background that the typology of the sample farms is presented. There are nine categories, based on variables of area owned, area farmed, number of human consumption units, number of (adult) human worker units available, number of large animal units, type of agricultural equipment and amount, and an indication of animal traction units.

The data available by farm category are quite detailed, and include brief case studies for farms in the composite categories. These data are included below for the benefit of readers with technical concerns. Here, the more general similarities and differences between and among farm types are summarized for the

*The Beni Meskine must move their sheep out of their own area at least once before they mature. Due to the high phosphorous content of the local soils, grazing is insufficient, and the sheep are subject to problems of dentition due to surplus fouride.

benefit of readers seeking an overview only. Key farm characteristics by farm type are presented in Table II.

The farm typology reflects a broad range of farm types, and thus of beneficiaries. The range is from "micro" sub-subsistence farms where the majority of income comes from off-farm employment, to very large commercial farms where all production is marketed. In the middle are three types of medium-scale farms which both guarantee subsistence and allow some surplus production for sa

A few generalizations hold for all farm types, as may be seen from Table II. All farms produce wheat, barley, maize and grain legumes, and raise some livestock, although crop proportions and herd composition vary across categories, given farm size, location, soil type, and available capital for investment. All farms show use of animal-drawn equipment and mechanization, although individual ownership of motorized machinery first appears on the larger medium-scale farms with 30 hectares or more. All farmers seek to increase the size of area farmed by taking some land in association for sharecropping and/or renting land, with the exception of Category IX, which is temporarily a group of land givers. Some land is given out by Category VI farms as well.

In general, access to other production factors, especially draft animals and animal drawn equipment, and non-draft animals, correlates fairly closely with access to land, and thus with farm size. As farm size increases through ownership and sharecropping, the number of draft animals increases, there is a greater variety of implements, which also tend to be heavier, and non-draft herd size increases, either through animal purchase or animal sharing or both. Additionally, as farm size increases beyond about 13 hectares, at which point

some surplus begins to be produced, the tendency to sharecrop large amounts of additional land begins to decrease, although it is still present. Similarly, animal sharing decreases sharply after this threshold, as does the tendency of family members to work off the farm for wages. Instead, most family members are either involved in on-farm production of they tend to migrate to urban areas rather than remaining in the rural area to work for wages for others. This is true despite the fact that the area per adult worker on these farms is less than the 7 hectares or so that would represent full employment without mechanization. Of those who migrate, indications are that 50% eventually return to their natal rural area.

Farms in the first two categories have insufficient owned land for subsistence production. Even with additional land sharecropped, subsistence is not attained, and off-farm income accounts for the majority of farm household income. Even for Category II farms, where the area farmed is more than doubled by sharecropping, moving from 2.57 to 7.00 hectares on average, this is still the case, and nearly half of all household members are working at least part-time for wages. Given the small area farmed in these two categories, farmers may choose to rent equipment for custom work for land preparation for wheat and barley rather than to maintain the draft animals that would be necessary to prepare their land well using only animal traction. The few animals that constitute their non-draft herds come largely from animal sharing.

Compared with farms in the second category, Category III farms appear to be anomolous. They are about the same size as those in Category II, an average of 7.6 hectares, but they take very little land in association in order to increase from the 7 hectares owned to the 7.6 hectates farmed. Here, farmers focus their

efforts on their owned production base more than is the case in the prior category. They take substantially fewer animals to share (16% versus 60% for the prior category), and do little sharecropping. This may be either because they do not have access to additional land to sharecrop or because working these 7.6 hectares, while having one-fourth of family members employed off the farm, provides sufficient income for family subsistence. If this is the case, if additional land were taken for sharecropping, it would be to produce a surplus for market, and apparently this choice is not made.

Farmers in Category IV have more access to land to sharecrop from relatives and associates in town, and have somewhat larger households. They treble the farm size through sharecropping, which yields an average farm size of 12.35 hectares. These farmers maintain twice as many draft animals as do those in the prior category, and significantly increase their herds through animal sharing. While there is still less area available per adult family worker than would represent full employment on the farm, substantially fewer household members are engaged in off-farm employment. This is the first category of medium farms. While subsistence is apparently largely guaranteed by farm production, no surplus production occurs. This is apparently due to the relatively large size of these farm households.

Category V, the second of the medium-scale farm categories, does show surplus production on farms of an average of 15.5 hectares. Like the largest of the small farmers, farmers in this category rely on sharecropping to increase farm size, but less than do farmers in the prior category, presumably because their average owned area of about 13 hectares already guarantees subsistence, while they do not have other production factors sufficient to expand farm size further

to produce larger surpluses. Here, almost all family workers are involved in on-farm work, including livestock production. Since animal sharing is less, herd size is slightly less than for the previous category, and fewer draft animals are maintained. This would seem to imply that profits from surplus production are either not reinvested in production, or are reinvested primarily in vegetable crop production. It may also be the case these farmers tend to rent equipment to mechanize more operations on more crops than do those in Category IV, which has the largest number of draft animals of any category.

The third category of medium-scale farms (VI) is somewhat different again. With sharecropping, average farm size moves from 21 to 25.5 hactares. There are two types of farms in this category, older farms which are inherited portions of formerly much larger feudal farms, as well as newer farms that have been recently formed through inheritance and land purchase. Capital to purchase land comes from sale of stall-fed animals and from grain marketing activities. Some farmers in this category give some of their land out to others to sharecrop, because they lack the financial resources to farm all the land they hold, or do not have enough available family labor, while other farmers take additional land in association to produce additional surplus of the most profitable crops for sale. Despite the larger farm size, most labor is provided by family members, and most family members are involved in work on, rather than off the farm. These farms have more heavy implements than do those in the prior categories, and maintain enough draft animals for three "large" teams. At the same time, they rent motorized equipment for custom work for some operations on some crops. Some farmers in this category have an urban economic base (mostly the "newer" farmers), and a significant proportion of family members already

in remunerative occupations in the urban setting.

The following category (VII), that of well-off, modernizing farms, is also heterogeneous. Again, there are older farms, where more traditional techniques are used, where land is largely inherited, and where farm profits and urban income are invested in improved livestock instead of in land accumulation. The newer farms, whose owners tend to be younger, are the result of rapid land accumulation, and profits are reinvested in purchase of additional land, and of motorized equipment. This is the first category in which ownership of motorized equipment appears. Although average farm size is only 37 hectares, including land sharecropped, the amount of equipment purchased for mechanization exceeds that required for use on the farm. Proprietors of the new, motorized farms, purchase additional equipment to rent out to others for custom work, and use the profits to buy still more equipment. Number of family workers and family size becomes largely irrelevant for these farms, and these farmers begin to hire a few permanent employees to carry out all farm operations.

Category VIII, that of modern, capitalist farms, represents the status which farmers in the previous category are largely seeking to attain. Here farm size is on average three and one-half times as large as for the previous category, an average of 153 hectares made up of land owned, rented and sharecropped. These farms tend to be sub-divided into discrete management units.

Milk and beef production from improved breeds is important on these farms, but with increasing numbers of animals, the proportion of sheep to cattle also increases. All possible vegetable crop production operations are mechanized, and farm work is supervised by a few permanent employees who drive the tractors herd the sheep, and maintain the stall-fed cattle. All production is marketed.

Additional supervision is provided by occasional visits from the farm owners, who are largely absentee.

The final category, IX, is made up of farms of 15.8 hectares on average, which are owned by men who migrated to town, were reasonably successful there, and are about to retire. They give out 90% of their owned land in association to others to sharecrop, but will soon return to farm the land themselves. If they have sufficient savings and income from their children who are employed in the urban setting, they may be able to purchase tractors, and also purchase additional land. They will, then, probably either enter the category of well-off, modernizing farmers, or, if they are very successful, may join the category of commercial farmers.

One major finding is that these data suggest that in Haute Chaouia, a family farm of 13 hectares is the minimum required to provide subsistence with a small marketable surplus to meet cash needs for basic family consumption items. The other major finding is the degree to which mechanization has reached the smallest farms in the region.

Farm Typology

Category I - Micro-Ownership and Micro-Farm

Here, both the amount of land owned, and the amount of land farmed are small. Amount of owned land varies from 0-4 ha for the nine farms, with an average of 1.65 ha per farm, and an average of .42 ha per family consumption unit (adult male= 1, adult female= .8), and of .54 ha per available family worker. Given the small amount of land owned for cultivation, in order to meet their subsistence needs, farmers in this category seek to take land in association, to increase the area cultivated and to utilize excess available family labor. (Another study, Asserghine, 1979, indicates that the amount of land an adult family worker can manage to cultivate on his own is about 7.5 ha while Pascon, 1962, indicates 6.5 ha in non-irrigated zones as compared to 4.4 in irrigated zones). Land rented or taken in association (sharecropped) represents 46% of the land cultivated by farmers in this category, giving an average farmed area per farm of 3.03 ha.

These farms are similarly poor in terms of production equipment. For all nine farms, there were three traditional plows, one small metal plow, one animal-drawn harrow, and two animal drawn carts, used by the owners and rented out for transport to others. Thus, unless they hire mechanized equipment for custom work, these farmers have to borrow or rent animal-drawn equipment from someone else in the douar in order to be able to work their fields and plant their crops. It is in this kind of situation that the option of entering into an association contract with others, one who may bring the animals and the equipment, and one the seed, for example, may still be practiced, with the harvest shared out proportionally. The situation for drafts animals is similarly poor -- a total of 9 for the 9 farms, of which four are donkeys.

The five larger animals are owned by three farmers, who use them for their own work and also rent them out for transport to others. The low level of production factors for these farms is also apparent from the low level of non-draft animals - 14.6 large animals units for all the farms together, of which 40% are animals taken in association under ras-el-mal contract. However, 68.5% of the total number of animals are cattle, and this per centage includes those shared.

For the whole group of farms in this category, there are the equivalent of 25.6 adult family workers, of whom a total of 45.3% are working as salaried agricultural workers, (occasional, seasonal) or in town. There are also four migrants, and one boy working as a shepherd. These workers provide the principal source of cash income for these micro-farms. The migrants are young men between the ages of 18 and 26. If all workers are included, the proportion of the family workforce available that is working for wages off the farm is about 53%.

Category II. Micro-Ownership but Small Farm

There are six farms in this category. Unlike category I, these farms while they still have only 0-4 ha of owned land, through rent and sharecropping farm between 5 and 9 ha. The average amount owned is 2.57 ha, with 7 hectares farmed on average. Land rented or sharecropped accounts for 63.3% of all land farmed. The average amount of land farmed per family consumption unit goes from .45 to 1.17 ha, and per adult work unit, from .61 to 1.69 ha. This group of 6 farms has a total of 10.5 draft animal units, of which 1.5 (one large draft animal and one donkey) are taken in ras-el-mal association.* Each farm has an average of 4.19 large animal units (as against 1.61/farm in category I), of

*A "large" traction unit (jouja kriba) made up of horses, mules or camels, or a combination of them. can work twice as much land in the same amount of time as a "small" traction team of cattle or of donkeys or donkeys+cattle combined (Pascon, La Main d'Oeuvre et l'Emploi, 1971).

which an average of 60% are shared. Farms in this category turn toward association more than do those in the first category, both for land and for animals, in order to increase their production base; 83% of the animals taken in association are cattle, whereas cattle account for 79.5% of the total herd for these farms.

Relatives appear to be the source of land and animals shared. Alternatively, these farmers depend on small traders and others in Settat city from whom they take land in association. Here, there is association of three people--the small trader in the city, and two people in the douar, one of whom actually farms the land. The same person who gives land tends also to give animals on a share basis as well as cash advances for required inputs--custom work, selected seed, and fertilizer. Similar resources may be obtained from retired petty functionaries who have returned to the douar.

For these farmers, non-farm income is also important, coming either from family members temporarily employed in the rural area or in town, or from family members who have fairly definitively emigrated, and have found secure occupations such as teaching, and who send remittances to the family in the douar. For this category, there were a total of 13 adult family worker units of 26.8 given as working off the farm, or 48.6% with three migrants in addition, and one teacher.

Category III - Small Scale Ownership and Small Farm

The nine farms in this category all have an owned and a farmed area of between 5 and 10 hectares, with an average of 7.12 ha owned and of 7.60 ha farmed. Thus, the proportion of land rented or sharecropped is lowest for this category, only an average of 6.3%. This gives an average area of land farmed

per adult worker unit of 1.76 ha. In terms of agricultural equipment, among the nine farms were found 3 traditional plows, 6 metal plows, three animal-drawn harrows, and seven carts. Each farm had one plow. The number of carts indicates that there is greater investment in equipment in these farms than in farms of the previous categories, which are relatively poorer. As a group, these farms also have 18 draft animal units, which gives an average of two draft animals per farm, or enough for a jouja kbira, or large traction unit. One such unit can effectively work about 12 ha. Only one of these animals was taken in association. In this group, donkeys are not used for working the land, but rather for drawing water from wells and for non-mechanical threshing, especially of grain legumes.

For non-draft animals, the average farm herd is 5.3 large animal units of which 84% are owned, 66.4% are cattle, and 33.6% are sheep. These farms, then, have sufficient access to owned production factors without, in general, having to resort to sharecropping or animal sharing. This conforms to other data available from Project Chaouia indicating that the minimum for self-contained subsistence production in terms of available cultivable land is between 10 and 15 hectares in this area, although these farms are slightly below that average. Similarly, in this category, recourse to off-farm employment to supplement income is considerably less, although it is still significant: 26.2% of available family labor for the category as a whole is involved at least part time in off-farm employment, including both men and women, while there are four migrants.

Category IV - Micro-Ownership and Medium Farm

While the average of owned land is 3.95 ha per farm, the area farmed varies between 10.75 and 16 ha, with an average of 12.35 ha per farm. Thus, 68% of the land farmed by these households is taken in association or rented, with the amount

of land farmed per worker unit moving from .93 ha to 3.20 ha. This denotes a considerable improvement in production possibilities and in use of available family labor. For the five farms in this category, the agricultural equipment situation is also better--each farm has a metal plow and a cart, and there are an average of 4 draft animal units per farm, with a total of 22 animal units for the category as a whole. In this case, as in Category III, only the 11 larger animals are used for farm work, but this provides enough for a large traction team for each team.

For the non-draft animals, however, the situation is less advantageous. There are an average of 7.8 large animal units per farm, of which 37.6% are shared, and of these, 71.4% are cattle. Cattle account for 68% of the herd.

How do farmers in this category come to have access to so much more land to rent or sharecrop? For three of the five farms, the key factor is family relationships. These farmers are able to farm the land of co-heirs who have gone to live in Settat or Casablanca, and who have been able to buy additional land. These same persons provide shared animals. The second significant factor is large family size, 14.1 adult worker units for two of the farms. This means that these farms can use this available family labor both on and off the farm. While of a total of 23.7 adult worker units available, only 8.4% are counted as engaged in off-farm employment, there are, 5 migrants, and presumably it is from these migrants that the resources in land and animals to extend the farm are derived. Migration is preferred in this category to remaining to work part-time in the rural area.

Category V - Medium Ownership and Medium Farm

Here, the average area owned varies between 10.5 and 15.5 hectares, area farmed varying from 12.5 to 17.5 ha, giving an average farmed area of 15.51 ha

per farm. Land rented or sharecropped represents only 15% of land farmed, with 3.6 ha farmed per adult worker unit on average. For the seven farms in this category, available agricultural equipment is comprised of four traditional plows, four metal plows, five animal-drawn harrows and five carts. The presence of more traditional plows reflects the fact that three of these farms are in the south of the study zone. The further south one goes, the more use of the traditional plow increases. As far as draft animals are concerned, there are 15, giving an average of two per farm, or one large traction unit. In addition there are 13 donkeys, which are not used for field preparation. The same number of traction units are available per farm as for categories IV and V, although in category V, there is an average of 3 hectares more land to cultivate per farm.

For the non-draft animal herd, there are 7.1 large animal units per farm on average, fewer than for Category IV, but only 11% of them are taken in association as against 38% for category IV. Similarly, the overall herd composition also differs--74% cattle as against 69% cattle for category IV. Category V also differs from category IV to the extent that, having more owned land, farmers in this category are probably able to take advantage of credit programs to purchase draft animals and also animals for fattening, for eventual sale. Farms in this category may produce some marketable surplus, by using family labor which is kept primarily occupied in work on rather than off the farm. Thus, of 30 adult worker units available in the whole category, only one occasionally works off the farm for someone else, and there is only one migrant in this group of households.

Category VI - A "Composite" Category

This category includes two types of farms in terms of land tenure history.

Five farms derive from old feudal domaines which have been broken down over the years due to fragmentation through inheritance, while the four are new farms which, in the last ten years or so, have demonstrated rapid and intense land accumulation, and purchase of motorized equipment. The older farms are characterized by taking large amounts of land in rent, and, some in association having relatively large numbers of family workers available, and engaging in remunerative income-generating activities, such as cattle feeding, and grain marketing.

For the four newer farms, where land purchase has been the greatest, over the last ten years 35 hectares have been acquired overall, or 52% of the land owned for all these farms (67 ha). This accumulation represents an average cost of 5,110 DH/ha with a maximum price paid of 9,000 DH/ha. This yields an average annual investment in land per farm of 4,470 DH and an average increase in size of .88 ha per farm per year.

For the category as a whole, the owned area per farm varies between 11.3 and 41 ha, with an average of 21.8 ha, Area farmed ranges from 19.5 to 32 ha, with an average per farm of 25.5 ha. Some of these farms rent out part of their land. This is usually because they don't have sufficient income to farm the whole of the area owned. For example, one farmer's wife inherited 15.5 ha in 1978. In 1979 his son got married, and the wedding cost about 20,000 DH. As a result of this expenditure, the farmer gave out the 15.5 ha in association to several sharecroppers, and farmed himself only the 25.5 ha that he had inherited from his own father.

Other farms in this category, on the other hand, take land in association or rent land (more association than renting) so as to be able better to use available family labor, and to increase income by growing higher value crops on

that land, especially durum wheat, barley and onions. Thus, for the whole of the category, land given out in association is about 11.5% of the whole owned area for the category, and land taken in association or rented is 24.7% of the total area farmed for the category. Average area farmed per adult family worker is 3.93 hectares.

Agricultural equipment for this category is more varied, and there is more per farm, with an average of two traction units per farm. Two farmers--those with 41 and 31.6 owned hectares respectively,were planning to buy tractors at the time of the study. The situation for draft animals is equally advantageous---there are three draft animal units per farm; only large animals are used for working the land. This difference is linked both to the greater land area cultivated and to the greater weight of the equipment, when compared to the two draft-animal units available per farm for category V. For the non-draft herd, there are slightly more large animal units per farm than in the previous category—an average of 7.2 per farm. A further difference is that these animals are 95% owned. Cattle become less important-only 58.5% as against 74% in category V. There are relatively few available family workers, and only one household had members employed off the farm, There was one migrant for every two households.

Category VII - "Well-off Modernizing Farms

This category includes 10 farms, and like category VI, is heterogeneous in terms of land owned, agricultural equipment, off-farm employment activities pursued, and resulting income. Farmers in this category own between 14 and 46 ha of land, with an average of 29.42 ha, while the area farmed varies between 23 and 53.5 ha. Land sharecropped or rented constitutes 15.4% of the total area farmed. Average area per adult worker unit is 9.65 ha, indicating the high level

of production capacity of these farms, and essentially full employment of available adult workers. On average, each farm has two pieces of equipment--a metal plow or traditional plow and a harrow.a back-pack sprayer, or a cart. Six of these farms are in the southern zone of the study area, and have traditional plows. This equipment is used mainly for maize and grain legume cultivation.

It is in this category of farms that owned motorized equipment appears for the first time - there are 5 tractors, 4 cover-crops, 3 trailers, and 3 combine harvesters, and in addition, a truck, a small truck and a car. The category is, however, divided into motorized and a non-motorized farms. The non-motorized farms are owned by local notables who are more readily able to obtain custom work services from the CTs than are others. One farmer is a chaikk , and others have relationships with CT personnel through family members who are functionaries, Thus, about 60% of the farms where custom work by CTs was done in the sample area in 1978-79, were farms in this category, and the work was done on 41% of their land. These same farmers also had good relations with persons in the area who were carrying out private sector custom work.

Four of the ten farms had their own motorized equipment, and were run by younger people who were more open to new techniques. For example, one farm is run by two brothers who have 15 ha of melk land and take a further 18 ha in association. They had a truck bought for 65,000 DH in 1974, a combine bought for 190,000 DH in 1976, a tractor, a cover-crop and a second truck bought in 1979 (tractor : 60,000 D covercrop 4,000 DH and truck 70,000 DH). In order to finance the purchase of this equipment, these brothers got bank credit, using the equipment already owned as collateral. One brother directly manages the farm, while the other is a grain merchant based in Settat. They rent out the equipment for custon work, both in

the immediate area and beyond, and the merchant brother also trades grain out of the area. They intend to buy a baler and a trailer to maximize income from the equipment they already have.

For the older, non-motorized farms based on inherited domanial land, the major form of investment was in cattle rather than in agricultural equipment, even though the herds remained small. Emphasis was placed on improved breeds. For the new motorized farms, there were investments in animals and in land as well as in motorized equipment. Land acquired in the last 20 years by these farms represents 27.5 of the total land now owned by these farmers. Investment in motorized equipment is both much faster and more significant than investment in land, however. The total investment in land over 20 years was 165,900 DH as compared with an investment of 532,000 DH in mechanized equipment in less than ten years, of which 43% was self-financed. Interestingly, only 10.5% of all investments in machinery was financed through CNCA, other credit coming from commercial banks.

For the category as a whole, there are a large number of draft animals, of which only the larger ones are used for land preparation, giving an average of three per farm, Other animals are used to pull carts, and for reproduction (mares). For the non-draft herd, there are a total of 147 large animal units owned by these ten farms, with an average herd size of 14.5 large units per farm. This is nearly double the number, including those taken in association, for the three prior categories. As is the case for the prior categories, the proportion of cattle in the herd diminishes as the amount of land owned/farmed increases; for this category, it is only 46.3%.

Among farm families in this category, there is virtually no local sale

of labor for agricultural employment. Rather, there is greater frequency of migrants working in factories, and of government functionaries at various levels. Households in this category hired in three agricultural workers, 1 khammes and nine shepherds. Additionally, drivers and maintenance people were hired occasionally for the combines and tractors, but these tasks were primarily carried out by family members. This apparently poses problems in terms of equipment maintenance and quality work.

Category VIII - Modern Capitalist Farms

There are six farms in this category, each of which is presented as a case study. The case studies are briefly summarized here. Although these farms differ as to owned and farmed area, and to a lesser extent, in terms of herds and agricultural equipment, they are largely similar in terms of their management, which includes primarily the use of permanent or occasional employees with virtually no family labor, and an overall high degree of mechanization.

Case I

This is a farm of 120 ha in co-ownership since the death of the family head in 1963. Management is overseen by the eldest son, who is President of the Rural Commune Council. Three of his brothers are senior civil servants, one works in France, while two others are in school in Settat. Two sisters own part of the land, and the mother lives with the son who manages the farm. There are 17 parcels, of which there are none further than 20 km from the main farm. The land was purchased before 1956. Until 1963, 20 ha were given in association for maize production; 80 ha were cultivated for the owner by khammes, using 10 traction units. In 1953, the first tractor was purchased, reducing the number

of khammes and of traction units (2 remained). After the death of the family head, no land was given out in association, nor were animals given out for sharing. The first mechanized equipment purchased was for harvesting; tractors and equipment for land preparation were purchased later. Despite the presence of considerable harvesting equipment, first purchased in the '60's, this farm got a lot of help from the CT, partly because its own equipment was not well-maintained. For land preparation, it sought custom work only from the CT, if its own equipment was broken down. Although it maintained some draft aninals (mules), it stopped raising them on the farm, and instead, always bought them at the souk. The non-draft herd was steadly improved, bringing in improved local breeds and exotic breeds. Use of chemical fertilizer was high, for winter cereals and for grain legumes, but it is also pointed out that under a "rotation contract" the farmer got subsidized improved seed and fertilizer in large amounts from the CT. Recently, the farm has turned increasingly toward growing forage crops for sale, as well as for feed for its own animals.

As far as the workforce is concerned, the present situation is as follows (79-80): one worker is paid weakly for herding at 5 DH a day; a second worker, who has been working there for 6 years, maintains the mechanized equipment and is responsible for cattle feeding in the stables. At the end of the agricultural year, he is given 5 quintals of durum and 5 of barley, in addition to a wage of 5 DH a day, paid weekly plus 10 DH a day for the cattle feeding. The third worker is a tractor driver who is recruited occasionally for 4 months a year. He is paid 20 DH a day, plus 5 quintals each of barley and durum at the end of the agricultural year. These workers are from the same douar as the farm owner.

Case II

This farm produces no livestock, and markets all vegetables crops produced. There are 150 ha, of which 135 were purchased before Independence. There are 7 parcels, varying in size between 15 and 35 ha. The farm belongs to a former judge (cadi) who lives in Casa and has a fleet of trucks. There is a great deal of agricultural equipment, including three tractors and a combine. Bread wheat, durum wheat, broad beans, and maize are produced. The main rotation is winter cereals/grain legumes. Ten per cent of the land was given out in association in 1978-9, and 6.7% in 1979-80. One portion of this land was prepared by the landowner as though he would farm it himself. This served to take advantage of the rains, but primarily was used as a ruse to make those who wanted to sharecrop believe that there was less locally available land to contract for. As a result, the proprietor was able to get a larger share of the harvest when he did contract to have it sharecropped.

All agricultural work on this farm is mechanized. The work is overseen by two tractor drivers, each living on the farm with his family. These workers are paid about 10 DH a day for five months of the year, and 10 DH a week for the rest of the time when the owner visits the farm, which is rarely. Additional recompense, however, is forthcoming. The worker can use the owner's equipment to work the 5 hectares that he himself owns near the farm where he works (inherited land). He can also graze his animals on the owner's land including on crop stubble, and his children can be hired by the owner at peak periods, as for planting and spreading fertilizer, and transporting the harvest from the fields. He also receives some grain from the owner as a "gift" at the end of the agricultural year.

Case III

This is a farm, or more properly a set of farms, operated by a group of four brothers, who are co-owners. They have 130 ha of inherited melk land, 177 ha of purchased melk land (1965) plus 27 ha rented, a further 40 ha bought in 1972, and a further 180 bought between 1972 and 1979. There is a further 30 ha bought in 1979, together with 50 ha rented in that same area. Thus, the "farm" has five distinct sub-units. This group of co-owners show a rapid accumulation of land in the last 15 years, which is ongoing. This reflects an investment in land alone of 795,700 DH and an additional investment of 470,000 DH for equipment over 10 years, 61% of which was self-financed. Each unit is managed independently. The agricultural machinery is relatively new, and there are a number of implements for each tractor. The average area farmed per tractor is 211 hectares.

This composite farm produces primarily durum and bread wheat, but also barley (especially two-row barley and forage barley), as well as some grain legumes, oats, and maize. Considerable land is left fallow on 3 of the 5 units where livestock production is practiced. On these same units, forage crops are also grown. On at least one other unit, oats are planted as a forage crop for sale. Livestock production, while significant for this enterprise, is largely still extensive, at least for goats, while for cattle it is semi-extensive. Cattle and sheep are fattened in stables. For vegetable crop production, almost everyting is mechanized, except planting of grain legumes, maize and a barley/oat mixture, the weeding of chick peas and lentils, as well as the harvest of chick peas, lentils and petits pois, all of which is done by hand. Animal traction is used for cultivating of chick peas and petits pois.

There are five permanent workers on the five production units of the enterprise, of whom some either own or sharecrop small units themselves. There are also three shepherds; one who is in charge of the cattle is paid in cash, the other two, in charge of the sheep and goats, are paid in kind--one-fourth of the increase of the flock. Weekly salaries paid in cash are very low compared to the official norms. Again, these workers benefit to a certain extent from the use of the proprietor's equipment on the farms they cultivate themselves, and on occasional employment for their family members at peak labor seasons.

Case IV

This is the case of a large Settat merchant, who deals in radios, tvs and mobylettes, who came to live in a douar of the rural commune of Od Said. He has two farm units, one of 14.5 ha in Od Said with 40 ha of rented land nearby and a second in Mzamza, where he has rented 80 ha. The 14.5 ha cost him an investment of 134.000 DH, including the cost of buildings. This purchase began a process of land accumulation which, though slow, is still going on. He bought this land in parcels from small farmers who were from the douar into which he moved. The 40 rented hectares belong to a large landowner from another douar of the same fraction, who had inherited 147 hectares. There is a significant amount of motorized equipment, including three tractors, three covercrops, a combine, and a baler. Some of the equipment was bought as early as 1969, when the farmer first settled in the douar, but most of it was bought in the late '70's. The farmer uses this equipment to carry out custom work for others to a significant extent, both within the fraction and beyond it. He also has a fairly large herd. There are horses, a mule, improved local breed cattle, purebred cows and,

calves as well as 123 mature sheep. The animals are rotated from one sub-unit to the other. They are grazed 11 months of the year, both on pasture and on crop stubble, and fed in stables one month on fodder. Fattening includes improved feed--sugarbeet pulp, bran, and forage barley. Staw from forage barley is used to feed the rest of the herd. Cattle are kept on one sub-unit (no transhumance), and graze on land left fallow, with an addition of staw, and are then allowed to graze on stubble with additional forage maize. Between December and February, they are in stables and fattened with sugarbeet pulp and broad beans.

Here, the crops grown were bread wheat, durum, forage oats mixed with petit pois, and broad beans. Barley was rotated with bread wheat, broad beans with durum, forage maize with durum and fallow with durum. Proportions of crops grown were: 40.7% wheat, especially durum, 5.8% barley, 17.4% broad beans, and 21.7% forage crops, which reflects recent improvements in animal types in the herd, and growth of the herd overall.

The farmer employs one shepherd and his family on a permanent basis. The shepherd is in charge only of the sheep, and moves about with them. He is entitled to one-fourth of the annual increase of the flock. His wife is in charge of tending the cattle. Two sons herd the cattle, and one son acts as tractor driver for land preparation, planting and harvesting. It appears that the wife and the three sons together are paid 120 DH a week. During the planting season, two tractor drivers are hired, at 85 DH/week. At harvest time, one driver is hired for the combines at 50 DH a day, plus one "graisseur" (service man) who gets 80 DH a week. The driver for the tractor that pulls the baler who gets 85 DH a week, and one worker who works accompanying the baler who gets 50 DH a week.

Case V

The owner in this case is a large-scale wholesale cattle merchant who, though originally from the douar, has spent many years in Casa. When he decided to farm in 1973, he started on a parcel in the middle of the douar which he exchanged against another parcel that he had inherited from his father. The father has been a prominant landowner, but had sold the majority of his land before he died. He next set about buying or otherwise acquiring more land, buying 20 ha and taking 20 more ha in association at the rate of 1/3 of the harvest for the owner, who has his brother-in-law, and with whom he remained associated until 1978. In 1979, he sold the 20 ha and the farm buildings he had put up to his brother for 160,000 DH. The brother also has some land in the douar, which is rented out in association. He built more buildings, and dug wells, and the land he now owns and farms includes 54 ha, which cost him a total of 494,000 DH, and were bought between 1974 and 1979. He bought his first tractor in 1977, and bought and then sold a disc plow and a disc harrow which were damaged by incorrect use by a worker. He now has a tractor, a disc harrow, a trailer, a baler, a motor pump, a small plow, an animal-drawn harrow, and a truck used for transporting cattle bought at the souks.

There are two draft mules, two cows and 40 local bullocks, and one purebred cow with one calf. The young bulls are bought in summer, fattened in the stable, and sold in the winter.

In 1979-80, the farm produced 28 ha of durum, 10 ha of maize, 7 ha of broad beans, 1.2 ha of onions, and some land was left fallow. The previous year, the owner had only grown maize on land sharecropped, from which he got 50% of

grain and stalks, but only paid for one-half the cost of use of the maize planter, and barley. Lacking a trusted manager, he considered it easier to have 28 hectares sharecropped (divided among four sharecroppers). Similarly, he seems to have grown barley because it requires fewer operations than wheat, and also because he could feed it to his cattle.

Eventually, the farmer recruited an "associate" who supervises the farm, and receives in payment 1/4 of the net profit on fattened animals. There is also one worker, a tractor driver, who gets 100 DH a week, is involved in all other farming activities, lives on the farm add is provided with food by the owner. The farm's agricultural machinery is also used for custom work for others, the tractor being reserved for close relatives and friends, while the baler is rented out to others.

Case VI

This is a farm run by three associates, two of whom are brokers and one a hardware merchant in Casa. One of them visits the farm to manage it. The three have equal shares in the capital of the enterprise, and in the income. They have 60 ha in co-ownership, which involved an investment of 126,500 DH, and they rent 36 ha at 150 DH/hectare. These are low prices, and reflect the fact that the soils are poor. Soils of this type (ghaba) have only recently been used for farming, due to population pressure on the land. The owners are involved in considerable de-stoning in order to improve the quality of the land. There appear to have been some irregularities in terms of land tenure in the purchases resulting in the whole area owned, since some of the land appears to have been collective land. This has led to litigation between the owners and the residents of the douar.

In terms of equipment, the farm has a tractor, a cover-crop, a ridger, a trailer, a motorpump, two small plows, and a pick-up, as well as an animal-drawn harrow and a traditional plow. There is no harvesting machinery. These farmers are inexperienced. They have started some olive trees, which will probably not prosper. Additionally, they don't have the proper equipment for land preparation, and are using improper rotations--winter cereals followed by winter cereals which is lowering their yields. The workers they have hired are very young--between 17 and 26. There is one tractor driver, who earns 30 DH a week, and does all kinds of work on the farm, two workers who also work on everything grown, including the small amount of irrigated crops, and a shepherd who is in charge of the flock. The latter three get 100 DH a month each, plus food and lodging.

These six cases can be divided into those which derive from older farms, with formerly domanial land, and those which are new farms (and farmers), which have implanted themselves in the rural area, using income from highly remunerative urban occupations to begin quickly to accumulate land. Although all have a good deal of motorized equipment, it is not necessarily the appropriate kind for the kind of vegetable crop production in which they are engaged, nor is it necessarily used properly. For the older farms, state subsidies and other state services have been important for farm expansion. For the second newer subgroup, this is less true. While these farms are characterized by some intensification of production, their animal production remains at least semi-extensive, and a great deal of the crop production is destined to feed the herds. These are all primarily capitalist-speculative enterprises, on which no family labor is used. Wages paid to the permanent employees are such that these workers must farm micro-farms themselves

in order to meet their own family subsistence needs. Generally, these farms create very little employment, and attempt to mechanize as many operations as possible. They do, however, provide the equipment for custom work for a significant number of other farmers who are not able to buy equipment for themselves.

Category IX - Landlords and Absenteeists

This, too, is a composite category. It includes 10 farms, which are highly varied as area owned (from 5.7 to 45 ha) and area given out for sharecropping or rented out. They also vary in terms of the residential location of their owners, and the farming mode that the owners adopt. They are divided into three sub-categories. The first is made up to 3 farmers who have the most land, who live in the dou r, but give or rent out almost all of their land because they lack the workforce to farm it themselves. For the subgroup as a whole, 90% of owned land is given out--69% for sharecropping and 31% for rent. In each case, there are several lessors or sharecroppers, with an average of five per landowner. Thus, if these owners can't really be counted as farmers at the present time, they could at one time.

The second sub-group is composed of four landowners, all of whom live in Casablanca. One is a worker in the milk collection center who owns and farms 7 ha, one a textile worker who owns and works 6 ha, having inherited 20. The third has migrated to town with his family as of 1979, and has 12 ha of which he rents out 7 at 200 DH/ha, the other 5 given out in association on the basis of yearly contracts. The fourth owner works as a real estate broker, and has 17 ha of which 5 are given in association. All of these owners choose to cultivate land themselves in bread wheat and durum because they can be 100% mechanized,

while they give land out in association for the cultivation of other crops which require more hand labor. In alternate years, they take back this land and grow winter cereals on it. Where they grew cereals the last year, they either give the land out in association to sharecroppers who will grow feve beans or corn, or else rent it as pasture.

The third sub-group is made up of three farms whose owners live in Casablanca. It differs from the second sub-group to the extent that these are real farms, with the following characteristics: their owners were early migrants; the owners have only recently decided to return to farming, while still living in town; they have been able to buy relatively large amounts of land recently. Earlier, the two who bought land gave it out in association, but are now going to work in themselves. One of the two is five months away from retirement. The third, who inherited his land, is also a year away from retirement. He intends to buy a tractor so as to be able to work his land himslef; he will go to his sons to help pay for the tractor. These owners have relatively little land--one has bought 6.67 ha, one inherited 7.75 ha, one has 5.67 purchased hectares.

If we took at this category as a whole, we find that it is the largest owners within it that have made the decision to give virtually all their land out to sharecroppers or to rent it out. The smaller among them, on the other hand, cultivate some themselves and, given the possibilities offered by mechanization, are likely to farm all of it themselves in the near future, as they retire.

If we attempt to determine approximately how representative the farms in the various categories of this typology are, we must rely on the data provided

by Schmitt's survey of 1079 households in Haute Chaouia Region (Schmitt, 1979). These data also help us to fill in some of the gaps about household composition.

The average number of persons dependent on the farm's production is 7.25 for this broader sample. The average household will include 2.10 adult males, 2.03 adult females, 1.74 children between the ages of 0-7 and 1.35 children between the ages of 7-15. The average number of children in school at the time of the survey (1979) was .66/household (one other study gives 20% school attendance, while another gives 51%). It is important to note, with Schmitt, that there is significant variation in household size within the sample--some households having as many as 24 members, that is, there are 24 people dependent on the production of the farm. The average number of adult worker units (UTH) for the whole sample is 5.02 per household, with a minimum of .5 and a maximum of 17. Children under the age of 15 are classed as a fraction of an adult worker unit acoording to their age. The preliminary findings of the on-going 50-farm study indicate that children actually give more in work on the farm than they consume in food. Thus, it is advantageous for household heads to assign a significant number of agricultural tasks to children.

The average size of farm is 8.12 ha, but the coefficient of variation is 125%. The range of size if between 4 are and more than 100 ha. (1 are: 1/10 ha), although there are very few farms of 100 ha or more in the region. The average herd size is 7.68 large animal units, varying between a minimum of .1 and a maximum of 45, and average number of draft animal units is 2.8. The average number of parcels per farm is 6.3, indicating a high degree of fragmentation. The range is from .1 are to 27.5 ha per parcel, and there may be as many as 31 parcels per farm. Of the 8.12 ha average farm, an average of 72.3% will be owned rather than rented or sharecropped. The coefficient of variation is 49%, and "all

situations are possible, going from the whole of the area farmed being owned by the farmer, to the complete absence of owned land" (Schmitt, 1979, p. 1 bis). This average of 72.3% owned land indicates a somewhat higher proportion of land rented or sharecropped than the 20% indicated by Zagdouni. Given the apparent importance of the potential to rent and/or sharecrop land in the strategies of farmers in a number of the categories of the typology, this is a significant finding, especially given the conventional wisdom that this system is on the way out elsewhere in Morocco.

If we take these few indicators, and compare them with Zagdouni's typology of farms, it would appear that it is the farms in Category III which most closely approximate the averages found by Schmitt. For this category, the average size of area farmed is 7.60 ha, the average number of draft animal units is 2, and the average herd size is 5.3 large animal units. However, it is for this category that the proportion of land taken in association or rented in to increase area farmed is the smallest--6.3% as against 63.3% for category II and 68.0% for category IV. If, however, we consider category IV instead, the amount of area farmed, on average, (12.35 ha) is half again as much as for Schmitt's average farm. The average herd size is closer (8.4), but the average number of draft animal units is twice as large for the category as for Schmitt's average farm. The numbers of adult worker units per farm as between the two categories appear to indicate that category III is closer to the Schmitt average than is category (Scmitt indicates that average area farmed per UTH would be 1.57 ha, while that for category III is 1.76, and for category IV, it is 3.20).

TABLE II

FARM TYPOLOGY - KEY FARM CHARACTERISTICS

Farm Category	N.	Average Area Owned (ha)	Average Area Farmed (ha)	% Area Rented/ Sharecropped	Area/Adult Family Worker (ha)	Average Draft Animals/Farm	Mech. Equip./ Farm present/ absent owned/ rented	Av. Large Animals Units	% Animals Shared	% Crops Grown			% Family workers Earning Wages
										Wheat & Barley	Maize	Legumes	
I	9	1.65	3.03	46.0%	1.24	1	present/ rented	1.6	41%	56.6%	28.3%	5%	53.0%
II	6	2.57	7.00	63.3	1.69	1.75	present/ rented	4.9	60	47.5	34.0	U.K.	48.6
III	9	7.12	7.60	6.3	1.76	2.0	present/ rented	5.3	16	50.5	23.4	14.5	26.2
IV	5	3.95	12.35	68.0	3.20	4.0	present/ rented	8.4	38	43.6	29.4	8.0	8.4
V	7	13.16	15.51	15.0	3.61	2.0	present/ rented	7.1	11	46.7	21.5	8.0	.06
VI	9	21.1	25.51	24.7	3.93	3.0	present/ rented	7.2	5	44.3	24.3	14.0	U.K.
VII	10	29.42	37.47	15.4	9.65	U.K.	present/ owned	14.5	U.K.	46.3	10.8	18.0	U.K.
VIII	6	153.00	N.A.	U.K.	N.A.	N.A.	present/ owned	U.K.	U.K.	49.2	3.0	U.K.	N.A.
IX	10	15.79	U.K.	N.A.	N.A.	N.A.	present/ owned	U.K.	7	60.8	3.0	18.0	U.K.

Key
I : micro-ownership, micro-farm
II : small-scale ownership, small farm
III : micro-ownership, medium farm
IV : medium ownership, medium farm
V : medium ownership, medium farm
VI : composite - 5 old, 4 new medium farms
VII : well-off, modernizing farms
VIII : modern capitalist farms
IX : landlords, absentee farmers

U.K.: Unknown
N.A.: Not Applicable

Source: Synthesis from text and tables in Zagdouni, La Mechanization Agricole, Cas de la Haute Chaouia, 1981

CROPPING PATTERNS

Having established and discussed the production base characteristics of different farm types, it is possible to turn to a review of cropping patterns for different farm categories. Some data are available by category for the whole farms, as well as more detailed data for portions of land in each category of farms which is rented or sharecropped (see Table III). A comparison of these two sets of data should provide an understanding of farmer's objectives in deciding to plant various proportions of different crops based on different tenure patterns. Table III also gives an indication of the relative proportions of land sharecropped as compared with land rented for seven of the farm categories.

As might be expected given their limited cash resources, farmers with the least average amount of owned land sharecrop more than they rent. However, they did rent some land--1.7 ha of a total of 12.25 ha of unowned land--for farms in the category as a whole. On most of this land, they grew barley, while a very small amount was used to plant grain legumes, probably as a cash or forage crop. Farmers with slightly more owned land, while taking land to sharecrop, didn't rent any land at all. This may mean that the most land-poor farmers, who are in an acutely sub-subsistence situation, have been forced to take whatever additional land they could get, even if they had to pay cash to rent it, while those whose farms are slightly less marginal for subsistence were able to do without renting land, but only sharecropping.

Farmers with an average of 7.12 owned hectares who, as a group, tend

to rent or sharecrop very little additional land, rented very small amounts in order to grow onions as a cash crop, and to grow maize, probably for animal consumption. Farmers with only an average of 4 hectares, but who take more than half again as much in association and/or rental, rented some land on which they produced wheat and grain legumes. Those farmers with medium-sized farms, with average owned areas of 13.16 ha, rented some land on which they produced wheat, barley and grain legumes, while larger farmers also produced wheat, barley, grain legumes, and maize on rented land. For these categories, onions were produced only on sharecropped land, however.

For all sample farms, the crops grown were bread wheat, durum wheat, barley (including that grown as a forage crop and for human consumption, and malting barley grown on larger farms as a cash crop), maize (both for human and animal consumption), grain legumes including two varieties of broad beans, for human and animal consumption, petit pois, chick peas, lentils, and a mix of petit pois and barley grown for forage. Small and larger farmers in one douar also grew onions as a cash crop, and some farms produced some small amounts of coriander and fenugreek. Very few farms had any tree crops. While sorghum is grown in the region as a spring crop, maize was the only spring crop produced on these farms.

As is shown in Table II, winter cereals--barley, durum wheat and bread wheat--predominate in the cropping pattern for all farm types, with the very smallest and the largest farms having the highest per centages of area planted to these crops. For bread wheat, however, there is more variation. While bread wheat is produced on farms in almost all categories, it is produced more by the

TABLE III

CROPS GROWN ON LAND SHARECROPPED AND/OR RENTED, 1979-1980

Farm Category	Total Area S.C. or Rented by Farm Category	Durum & Breadwheat				Barley				Maize				Grain Legumes				Onions				Fallow/Grazing	
		S.C.	R	Tot	%	S.C.	R	Tot	%	S.C.	R	Tot	%	S.C.	R	Tot	%	S.C.	R	Tot	%	Total	%
I	12.25 ha	.2	-	.2	16.3	2.6	1.3	3.9	32.0	.5	-	.5	41.0	-	.4	.4	3.3	-	-	-	-	.9	7.4
II	26.50 ha	6.2	-	6.2	23.4	6.3	-	6.3	23.8	9.4	-	9.4	35.5	.6	-	.6	2.3	.2	-	.2		.2	7.5
III	5.70 ha	.5	-	.5	8.8	2.0	-	2.0	35.0	-	.5	.5	8.8	.5	1.8	1.3	22.2	-	.4	.4		-	-
IV	42.00 ha	14	4	18	43.0	1.0	1	2.0	4.7	15	-	15	35.7	2.0	1.0	3	7.0	2.5		2.5		1.5	3.6
V	17.00 ha	.2	-	.2	11.7	3.3	-	3.3	19.4	1.7	3.5	5.2	30.6	-	1.5	1.5	8.8	.2	-	.2		.3	17.7
VI	80.50 ha	12	.5	17	31	-	10.7	10.7	19.4	3.5	.4	17.5	31.8	-	-	-	-	2.5	-	2.5	-	7.3	13.3
VII	55.00 ha	24.3	.3	27.3	33.8	7	9.5	9.5	12.0	-	.3	3	3.7	8.25	.9	17.3	21.4	-	-	-	-	23.5	23.5

Note: Categories VIII and IX which are composed of some new and some old absentee farmers, farming some owned and some rented or sharecropped land, are absent from the original table. Some corrections to the original table have been made. Per centages do not add to 100% across rows because of presence of other crops.

S.C. : sharecropped
R : rental

Source: Zagdouni
La Mechanisation Agricole
Cas de la Haute Chaouia, 1981

larger farms, in categories VIII and IX, than on the smaller farms. More bread wheat seems to have been grown on smaller farms during the 1979-80 than in 1978-79, but it is impossible to say whether this represents a trend or not. Thus, while farmers in category I grew very small amounts of bread wheat in both years, farmers with slightly more owned land seem to have grown no bread wheat in 1978-79, although they grew a small amount in 1970-80. Farms in category II appear to have produced no bread wheat at all, while farmers in the fourth category appear to have doubled their small amount of bread wheat production in 1979-80.

It is also fairly clear that the proportion of land given to maize decreases as farm size increases, while the proportion of grain legumes tends to increase as farm size increases. In this area, grain legumes are either a cash crop, or a forage crop, and they are regarded by smaller farmers as a more risky crop than winter cereals while, at the same time, they are more labor-intensive than winter cereals or maize (grain legumes are not a new crop in the region; they have been produced since at least the early 1900's.). Land left fallow (which may be rented out for grazing to others) also increases from the smaller to the larger farms, and the smallest farms leave no land in fallow. All farm categories, however, are characterized by some forage crop production, either for use by own animals, or for sale.

If we turn to land sharecropped, Table III shows that proportions of the same crops vary as compared to proportions for the farm as a whole. The smallest farmers who sharecrop additional land, plant it to wheat and to barley, but twice as much to barley as to wheat. They also use a small amount of it

as fallow, and a small amount for grain legumes. But they use almost as much of sharecropped land to plant maize as they do for winter cereals combined. (Here, it should be reiterated that this may not be voluntary, but rather a requirement of the proprietor of the land.) Small farmers with slightly more owned land, but who have the means of taking relatively more land for sharecropping, use most of it for wheat and barley in equal amounts, and slightly more for maize. For those farms with larger owned areas, which overall take relatively little land for sharecropping, more is used to produce barley than wheat, much less is used to produce maize (the same amount as for wheat), while a considerable amount is planted to grain legumes (22%).

For medium-sized farms, wheat is more important than maize in terms of area of sharecropped land planted, with some land left fallow, and some planted to barley, but much less than to either wheat or maize. Some is reserved for grain legumes, but relatively little (7%). For the largest farms for which data are available, wheat and maize remain important, but maize is less important for the largest farms than either wheat or barley, with wheat predominating (33%), followed by fallow (29%), and grain legumes (21%), with barley representing 12%.

It is difficult to tell from these data whether farmers are primarily taking land in association (sharecropping) in order to improve subsistence or to improve subsistence and produce forage crops as well. On the whole, it seems that with the relatively high proportions of sharecropped land for the smaller farm categories planted to winter cereals and to maize, improving subsistence is the major objective. In this area, maize is used for human consumption. In the months immediately following the harvest, a bread made of mixed grains, including

maize, is preferred. Later on, when durum wheat stocks have been depleted (see below), bread made from corn becomes the staple element in the diet. For all farm categories, bread is the most important element for most meals, although it becomes less important for the richest farm families (Benjelloun).

High levels of maize production probably can be explained in part by the availability of draft animals and traditional agricultural equipment on all farms. Small farmers, who have limited draft animal resources, and little traditional equipment, prefer to plant maize as a spring crop because it extends the period over which they can use these limited resources. They would probably not be able to plant all the area taken in association to winter cereals unless they rented traditional, non-motorized equipment from others, or hired mechanized equipment for custom work.

These farmers, however, do usually have one surplus resource, namely family labor. Since grain legumes are the most labor-intensive crop, and since proprietors may require that it be planted on sharecropped land to save themselves labor expenses, it is somewhat surprising that the smaller farmers use so little of sharecropped land to produce grain legumes. If, however, they are a cash crop and/or a forage crop, this becomes less surprising. Smaller farmers would then be tending to restrict themselves primarily to extending the area planted to winter cereals for human consumption exclusive of grain legumes to increase family subsistence potential, using more family labor than if they din't sharecrop at all, but using less than if they produced more grain legumes.

Larger farmers appear to be using land taken in association and rented to diversify, and to increase income overall. Given the importance of livestock

to their operations, and their comparatively larger herds and flocks, they leave more of this land in fallow, and produce more grain legumes, which may be mixed with barley or oats on the same field. For these forage crops, mechanization is becoming increasingly common, both for planting and for harvesting.

Turning to inter-annual crop rotations, for durum and barley, there may be significant differences in the amount planted from one year to another, especially for the smallest farms. Variations seem to be caused by rainfall estimates made by farmers at the beginning of the planting season, by requirements made by proprietors who let land out in association, and uncertainly as to how much land to be let in association there will be in any given year. For the larger farms, where associates have been required to plant maize or grain legumes the previous year, owners will tend to choose to plant wheat rather than barley on those same parcels, thus increasing income from grain sold. Alternatively, on larger farms, wheat will be planted after a year of fallow.

Bread wheat, if grown, will tend to be rotated either with durum wheat, or with barley on smaller farms, or where possible, with maize or grain legumes or fallow. Bread wheat may be more likely to be planted after grain legumes, while durum will more likely be planted after maize, where there is an option. On the whole, however, again where there is an option in terms of parcels available and soil type, wheats will be grown on good, tirs soil, while barley will be grown on biad, and other poorer soils, thus eliminating a wheat/barley rotation.

The option to plant wheat after maize or grain legumes increases in likelihood from the smallest farms to the largest farms. Barley is frequently rotated with barley on poorer farms, and there is a tendency for the poorest farmers to practice continuous rotations of winter cereals with winter cereals,

which soon reduces overall yields. Farmers who take this option are those facing the greatest number of constraints, and who have no other short-term means of increasing subsistence.

In summary, we see that there is little difference in the types of crops between small farms and the largest farms, although there is some variation in the amounts of different crops grown with farm size. Larger farms produce more bread wheat, more malting barley, leave more land in fallow for grazing, and produce mixed forage crops on the same fields. The largest farms produce more than three times as much grain legumes than the smaller farms, while the smallest farms produce about nine times as much maize as the largest farms. The proportion of wheats and barley taken together remains at about 50% for all sizes of farm, but whereas on the small and medium farms, production is used for subsistence primarily (some being sold for cash to meet family expenses and to finance the next year's agricultural production), on the largest farms, all production of wheats and barley is sold.

The smaller and medium farmers that sharecrop land tend to do so to increase subsistence, and plant most of this sharecropped land to wheats, maize and barley, with barley predominating. Medium-scale farmers are less consistent, using sharecropped land to produce additional wheats, maize and barley, but in differing proportions, some emphasizing wheats, others barley, and all producing considerable amounts of maize, and almost as much grain legumes as the largest farmers. Both small and medium-scale farmers rent some land which they leave fallow, using it for grazing. The proportion of non-owned land used in this way increases as owned farm size increases. This pattern indicates the importance of animals in the farming system.

More detailed information on cropping patterns, including rotations and different crops grown on different types of parcels will be provided by the 50-farm study, which is nearing completion. This study will also provide information on yields by crop and by parcel type, as well as on costs of production by crop.

CEREAL STOCKS

Sabah Benjelloun's food consumption study (1982) attempts to track the rates at which cereal stocks are depleted, both in terms of all households producing each of the four main cereals (durum wheat, bread wheat, barley and maize), and in terms of households grouped by socioeconomic status (poor, medium and rich). The data are based on a sub-sample of 45 households, and Benjelloun introduces a number of caveats concerning the reliability of the data, especially for the results concerning households that do not exhaust their stocks of cereals by six months after the harvest. (Calculations were made for these households on the basis of the assumption that stocks would only be used for human and animal consumption, that there would be neither gift nor sale, nor saving out of seed, and that the rate of utilization would be equivalent to that actually reported by informants for the period June-December, the study fieldwork having been carried out at two stages--in the end of October and the end of December). In fact, as will be seen below, the majority of households do exhaust their stocks by six months after the harvest, or very nearly so.

There are several facts which have to be taken into consideration in order to evaluate the data that follow. First, almost all bread wheat is sold, having been grown as a cash crop. Second, nearly all barley is grown for animal feed. Third, maize, which is harvested in August, is largely grown for animal feed, although it is also used, as is barley, in bread for human consumption when durum wheat becomes scarce. Fourth, durum wheat is the preferred cereal for human consumption, and cereals in general are absolutely critical to the diet in the survey area. Fifth, Benjelloun does not have

data on amount of cereal harvest saved for seed from year to year, but instead gives per centages of households using local seed: (durum - 35%, bread wheat - 43%, and barley - 65%) as a proxy. Sixth, while durum wheat may be sold, it is only sold in cases of extreme need, and when other cereals are not available to sell,while barley may be more readily sold if it is still available.

To get a picture of stock utilization, Benjelloun begins with the amount of grain available for stocking at harvest. Taking into account all cereal-producing households, whether or not they actually produced a particular cereal, the average total amount of cereal available at harvest is 2735 Kg, constituted as follows:

1,116 kg	durum wheat
187	bread wheat
909	barley
523	maize

If these amounts are corrected for the number of households actually producing the cereals, the averages change significantly:

1,322 kg	durum wheat
600	bread wheat
1,204	barley
872	maize

Benjelloun argues, however, that it is better to retain the general averages, since they more adequately reflect the reality that a number of households having not produced one cereal or the other, will have to either do without or start buying it from the beginning (p. 93). To give an indication of proportions of households that did not produce one cereal or another, 15.5% produced no durum, 69% produced no bread wheat, 24% produced no barley, and 22% produced no maize.

In order to give an indication of whether these stocks, available at harvest, are sufficient to cover family consumption needs, they are divided by the number of consumption units per household (1UC:an adult male, .8UC:adult female), giving the following results in grams/UC/day cereal; again in general averages:

619 grams	durum
88	bread wheat
474	barley
238	maize
1,419	total

While these averages give a total of 1,419 grams of cereal per day for each adult consumption unit, they are, as Benjelloun points out, largely illusory. This is because nearly all of the barley and most of the maize are not available for human consumption, being used for animal feed. Virtually all the bread wheat would have to be subtracted as well, since virtually all of it is sold at harvest. Further, the average is not really very reliable, since the standard deviation is large. In comparing nutritional status of members of these farm households with FAO minimum requirements, however, Benjelloun finds that nutritional status exceeds the minimum requirements by a comfortable margin.

In discussing rates of stock depletion, Benjelloun indicates that stocks of cereals are largely depleted several months after the harvest, households then beginning to buy cereals for human consumption at the souks. However, this presents a paradox since it means that most farmers are forced to buy grain at the market for somewhat more than half the year, and it seems very unlikely that they have the cash resources to do so. Unfortunately, Benjelloun's

study does not include income data. It is possible either that the respondents were under-reporting their stocks (Zagdouni, in discussing preliminary findings of the 50-farm study indicates that this is probably the case), or have more income from off-farm employment activities than would seem to be indicated by other available data from the region, or both. Nevertheless, it is worthwile to present Benjelloun's data as they are the only ones available at present in the literature on Haute Chaouia concerning stock depletion.

Generally speaking, stocks diminish at a fairly irregular rate, depending on different uses--sales, gifts, seed, animal feed, stocking and human consumption. Immediately after the harvest, there is a considerable amount of festive activity, when stocks are at their highest, and durum stocks are used more liberally than at other times of the year. If we take the figures presented for durum for the first five months after harvest, it is consumed at a rate of 148 kg per month, while for the following two months, utilization is at a rate of 126 kg per month. Stocks of barley tend to be completely depleted after the first five months after the harvest, since grazing is least available during this period. Bread wheat is generally sold immediately after the harvest, but for those (richer) households that keep some stocks, very little remains after the first five months, and virtually nothing after seven months. Given that maize is harvested two and a half months after the other cereals, it is worth noting that on average, it is already about 9/10 depleted by the end of December, as are the stocks of other cereals.

Looking at per centages of stock depletion by cereal crop, it emerges that for 38 households that produced durum wheat, 31% had no stocks left

five or six months after the harvest. One household had sold all its durum production immediately after the harvest (which seems to be an anomoly) , and one household would have enough to last until the next harvest. The other households would have run out by April, 1981, that is, at least a month before the next harvest.

The figures for bread wheat are somewhat confusing, given the finding, reiterated in the report, that bread wheat is produced as a cash crop, and usually sold almost immediately after the harvest. For the 13 households that had produced any bread wheat, one household (8%) had sold it all in July; 77% had depleted stocks completely by December, 1980 and two would completely deplete their stocks by January, 1981--well before the next harvest. Since it is predominantly the richer households with the most land and the most off-farm income that produce the most bread wheat, it is possible to conclude that these two households had good yields and also were able to afford to stock a significant part of the harvest until a point in the agricultural year at which prices would be higher. However, the study does not provide data either to directly support or directly reject this hypothesis.

For barley, of 32 households producing the crop, for which there were data, 48% had completely depleted their stocks by the end of December, while 9% had sold virtually all the harvest within two months after it was harvested. Of 25 households producing maize for which data were available, 72% were able to maintain some stocks until 1981, but one household could maintain stocks until the end of 1981, that is, past the next harvest.

Overall, it appears from these data that, both for rates of depletion by October and by December, the majority of households deplete their stocks of bread wheat first, then of barley, then of durum wheat, and last of maize. The bread wheat is sold; the barley is used primarily as animal feed and early use compensates for the lack of grazing in the period between the harvest and December, except for stubble left on the fields immediately after the harvest. The relatively longer duration of stocks of durum wheat relates to the higher overall production of durum, and the relatively long duration for maize is related both to the fact that maize is harvested later than the other cereals, and also to the fact that poorer households will attempt to keep some maize over for as long as possible in order to provide for human consumption when stocks of durum wheat are becoming depleted.

Sample households in this study are divided into three socioeconomic categories--poor, middle and rich. Each category contains 17 households. The categorization is based on weighting of three variables--off-farm income generating activities, total cultivable land from which harvest is received (allowing for land taken in association), and total large animal units, each of which is divided by the number of consumption units in the household. Total land from which harvest is received by the household is given twice asheavy weighting as the other variables.

Before examining study results concerning in the rates of stock depletion among socioeconomic categories, it is interesting to note which proportions of households in which categories produced which cereals. These data complement those presented in the previous section, derived from a different

study sample. It should be noted that none of these households has very much land--the corrected total allowing for all land from which the harvest comes to the household is on average 4.4 hectares, with a maximum of 19.8 hectares. Beginning with durum wheat, which is the critical component in the local diet, while 100% of richer households produced some, and 81% of poorer households produced some, only 71% of medium households produced durum. For bread wheat--a cash crop in the area--the differences are more extreme: 69% of richer households produced bread wheat, while only 33% of medium households and 12.5% of poorer households did. For barley, proportions of farmers in each category producing the cereal are more nearly equal--the richer farmers, 69% middle farmers 73% and poorer farmers, 75%. Again for maize, proportions are relatively similar: richer farmers, 61%, medium farmers, 53%, and poorer farmers, 56%.

Turning to the stock depletion rates, Benjelloun finds that richer farmers do not deplete their stocks at a rate significantly different from medium farmers or poorer farmers. Rather, having started with more of any given crop, given their respectively greater amounts of cultivable area and income, and thus greater production, they have more of any particular crop left stocked at a given period of the agricultural cycle. The per centages are as follows:

Per centages of cereal stock depleted by socioeconomic category and by cereal 7 months after harvest

	durum wheat	bread wheat	barley	maize
Class I	69	-	100	33
Class II	64	100	82	50
Class III*	39	100	67	62

*Class I : poor
Class II: medium
Class III: rich

Source: Benjelloun, 1982

Unfortunately, these per centages do not indicate what will happen for the next five months before the next harvest. They do, however, indicate that there are significant disparities between the stocks maintained by poorer farmers and richer farmers, for all cereals produced. Presented in this way, the data would appear to indicate that poorer farmers in fact completely exhaust supplies of cereals stocked from the last harvest even more quickly than appeared to be the case elsewhere in the study. Whether richer farmers are intentionally holding back stocks either for later sale, or for seed, or against future years is not clear from the data. Apparently, they consume at the same rate as poorer farmers, but merely have more to begin with, which would argue against a conclusion that they are intentionally limiting consumption in favor of stocking. Further, it should be noted that the consumption of cereal-based staples in the diets of the richer farmers is proportionally less than for poorer farmers and their family members. Richer farmers are able to supplement the basic bread/tea or bread/coffeee combination with meat purchased at the souk more than one or two days a week, with eggs produced by poultry raised by household members, and with milk produced by owned cows. Poorer househols on the other hand may have seven out of 14 meals aside from breakfast composed essentially of bread and tea, during any given week.

ACCESS TO CREDIT

Formal agricultural credit is primarily the domain of the National Agricultural Credit Bank (Caisse Nationale de Crédit Agricole- CNCA), which is likely to receive a fifth World Bank loan. Some credit is also available to large farmers from the commercial banking system, for the purchase of agricultural equipment. Smaller farmers must rely on the local branches of the CNCA, and on informal credit sources.

The CNCA is organized into several levels. There are regional branches (CRCA) and local branches (CLCA) which, together, number about 100. The smaller farmers are supposed to deal with the CLCA; these are farmers whose annual tax assessment is from 50-3000DH, or with a minimum income of 1000DH. The minimum of 50 was announced in the 1981-85 Five-Year Plan; during the previous plan period, the minimum had been 100DH tax assessment. Larger farmers apply for credit to the regional credit windows, the CRCA.

CNCA has short-, medium and long-term credit programs. Long-term credit, which is from 6-25 years, has rarely been offered. However, with continued emphasis on expanding agricultural mechanization, and on milk production using exotic breeds, these and some others activities which were formally included under medium-term credit are being shifted to long-term credit. Meanwhile, increased emphasis under the current Five-Year Plan is being given to reaching more, and poorer, farmers.

By 1980, the CNCA was estimated to have reached about 400,000 of the 2,200,000 farmers in Morocco, but until the past year, few of these were, or were intended to be, smaller farmers. In 1979-1980, distribution was foreseen at 1,330 million dirhams,

of which it was estimated that 1,170 million was lent, and during the same year, 1,003 million dirhams were repaid. Estimates for loans for 1980-81 totaled 1,335 million, of which 735 million was for long-term loans, and 600 million for short-term loans. The projections for 1982 were 845 million short-term, and 800 million for medium term loans, for a total of 1645 million dirham. Given the severity of the drought in 1980-81, and thus during the period of land preparation for the 1982 harvest (October-December, 1981), it is unlikely that the CNCA was able successfully to distribute the anticipated number of loans. In fact, given the drought conditions, repayment of loans made in 1980-81 was forgiven, and repayment of these loans will be prorated over a number of years. One result of this is that apparently, there was considerably greater willingness on the part of farmers in Haute Chaouia to apply for CNCA credit in 1981-82 than there had been in previous years.

One part of the new effort to extend more credit to smaller farmers is the institution in 1982 of about 90 new credit windows at agricultural extension work centers (CTs). While these windows are to be operated by CNCA personnel, extension agents are also receiving short-courses in the credit application procedure, so that they can encourage farmers to apply for credit when they are visiting them in the context of other, extension, programs. If these extension agents, who already run a multiplicity of programs of their own, are able to reach the farmers with credit as well, it is possible that the transaction costs of applying for formal credit will be reduced using this approach. However, since extension agents are often unable to reach all of their clients even once a year, the extent to which they will be able to extend credit information effectively is not certain.

The tax assessment, which in turn is based primarily on amount of land owner, is supposed to be the crucial criterion in judging credit eligibility. In fact, credit agents reportedly may pay more attention to land titles, and contracts for rental or share-cropping of land. The farmer's land is the collateral against which the loan is made, and can be sized if repayment is not forthcoming. No new loan may be made until the previous loan has been repaid. Short-term credit is more readily available than medium-term credit, and in some cases, farmers may have to wait as much as five years before a medium-term credit application is considered worthy of approval.

According to the lending rules of the CNCA, the farmer is supposed to put up a per centage of the total cost of the project or activity for which credit is sought. However, a study of credit in the Rommani are a - a somewhat more favorable rainfed zone than Haute Chaouia - shows that often, the farmer's share is not forthcoming. In the majority of cases, CNCA credit constituted 100% of the amount invested, and in all cases was higher than 90%. Self-financing contributions were 3.6% for the purchase of draft animals, and 9.5% for stable construction.

For the sample of 59 farmers, 55.8% of loans received were not used for the purpose listed in the application. However, the situation varied according the purpose of the loan. For loans made for purchase of seed and fertilizer, 68.5% were reported used for that purpose, and for loans made for the cost of harvesting, 100% was used for harvesting costs. For stable construction, 70% was used to construct stables, while for well-digging, none was invested for the intended purpose, and no wells were apparently dug, since the farmers didn't want to be faced with a half-dug well and no money - the amount of the loan having been judged insufficient to complete the project.

Where funds were not used for the stated purpose, they were usually used to pay for normal production costs of the agricultural year. Alternatively, they were used to tide family consumption over the most difficult period of the year when food and funds were scarce. Nonetheless, repayment rates were quite high, in some areas as high as 98%.

Sources of funds for repayment included, in order of priority, sale of grain legumes, sale of cereals and sale of animals. Alternatively, where funds were insufficient from crop sales to pay back the credit, farmers resorted to borrowing informally from relatives, friends and patrons in order to avoid the grave consequences of failure to repay. Thus, this repayment rates do not necessarily reflect income increases obtained through the appropriate use of credit. Only one farmer in the sample was apparently able to repay his loan directly as a result of the investment of loan funds he had made in production.

Short-term credit is made available at the beginning of the planting season, and is repayable at harvest time, in July. There have been a number of instances in which credit was not distributed in time for the effective purchase of inputs-fields had already been plowed, but credit distribution was too late. Even where credit is distributed late, the farmer is required to pay back the loan and the interest as though he had had the use of the money for the full year. The interest rate is 8.5%. The requirement to repay at harvest time effectively means that the farmer is forced to sell his crop at the least opportune moment, when prices are lowest. The same situation obtains even if he is selling an animal or animals to pay back the loan, since other farmers in the area are in the same situation, and the price offered for animals drops as well.

Zagdouni presents some data on credit available for the purchase of mechanized agricultural equipment for the CRCA of Settat between 1977 and 1980. The total amount lent was 50,494,913 DH for all loans made by this CRCA during a 37 month period. Of these loans, 64.7% were short-term. These loans are to the larger farmers, who are eligible to apply the CRCA rather than to the CLCA, and to cooperatives formed under the agrarian reform program. The proportion of funds lent for short-term purposes to individuals was only about 25%, the rest having been lent to cooperatives, and to the various types of groupements - more informal service cooperatives that have been formed through the CTs and are outside the agrarian reform sector. It is noted that the total level of lending is quite low given the number of farmers in the region.

For loans to individuals for purchase of heavy agricultural equipment, the majority, 52.4%, were given for tractor purchase, followed by transport equipment 20%, and harvesting equipment, 18%. Loans made to individuals for heavy equipment constituted 60% of all medium-term loans made by that CRCA during the 37 month-period. For group lending, the majority of loans were for harvesting equipment (59%), followed by tractors, and tractor-pulled implements. The point is made that it is only the larger farmers, who are able to bring the appropriate collateral and guarantees, who are able to benefit from these loans for equipment purchase as individuals.

Little information is available on sources of informal credit. There does appear to be a thriving system of borrowing from relatives and from local notables-often those through whom land for sharecropping is obtained. Poorer farmers seek advances against their share of the harvest from the proprietor of sharecropped land, either to purchase necessary inputs, or for other purposes. Alternatively,

they may sell a parcel's production in advance, and take an advance on that estimated production value. Borrowing from local merchants, either in cash or in kind, as for seed, is also common. In order to be able to borrow from a merchant, the farmer must have a prior relationship with him, and/or bring someone as a guarantor who has such a relationship with the potential lender, and who has a reputation for credit-worthiness. Estimates for interest rates for informal lending are in the area of 20-30%. Opinion varies as to how extensive such borrowing is, however.

Borrowing from family members and others in the local community is regarded as qualitatively different from formal indebtedness, which is considered to be shameful. Informal indebtedness, however, is not regarded as shameful or dishonorable. With informal borrowing, the penalties for late repayment are unlikely to be so grave as they are when the "State" is involved. To the extend thatCNCA credit is associated with the power of the State, and given that it is the gendarmerie that brings around overdue notices and is involved in repayment enforcement, smaller and less experienced farmers are likely to avoid undertaking formal credit obligations, seeking all other alternatives first.

In the study of credit in the Rommani area (Gaddah), of 59 sample farmers, slightly more than half had not received CNCA credit. When asked why, they gave a variety of responses: 9% said it was because they were afraid of the government; 24% because of fear of risk of imprisonment if they did not repay; 51% because they had insufficient land to be eligible; 6% - who had 25-30 hectares each - because they didn't need it, and 6% because their land was in <u>indivision</u> and they could thus not produce titles as required.

Transaction costs, although not mentioned in these responses, are also quite high, and provide a disincentive to seeking formal CNCA credit. The effort required to visit the CLCA, to go from one office to another to obtain the appropriate documentation, to return time and again to make sure all the documents required are assembled, means that the farmer is paying a high transaction cost. As Gaddah notes, a small farmer who ultimately receives 300-500 DH worth of credit, may well have spent very nearly that much in transaction costs. Whether these costs will be substantially decreased with the new emphasis on credit availability to small farmers remains to be seen.

There is some indication that small farmers in Haute Chaouia were more willing to seek formal credit in the 1981-82 agricultural year than before. In the sample of 1079 farms carried out in 1979, only 38 farmers had received formal credit, and in the on-going study of 50 farms in the region, only 2 farmers had formal credit up to the 1980-81 drought. However, with the temporary forgiveness of repayment for loans for that year, and the new policy of reducing the basis for credit eligibility - coupled with the severe shortage of seed resulting from the drought - there appears to be a tendency to seek credit this year among those who were unwilling to do so before. Whether this is a real trend, or one primarily associated with the drought is a question for further study.

Additional socioeconomic studies to be carried out under the Dryland Agriculture Applied Research Project should address the question of credit in more detail, and particularly the area of informal credit. What are the prevalent informal sources of credit and interest rates? How much informal credit is given in kind and how much in cash, and how is it repaid? What social sanctions are actually in operation to control usurious interest rates aside from the generalized Muslim proscription on usury? What are the implications of date of repayment for formal and informal credit

for the farmer's ability to refrain from marketing immediately after the harvest, and for the ability to accumulate cereal stocks? To what extent are formal and informal credit available in time for the purchase of inputs and the hiring of necessary labor and/or machinery for planting? Is there a consistent lag between the availability of credit and the distribution of physical inputs, and if so, is this a remediable constraint? These kinds of questions must be answered in order to inform project decisions about the likelihood of adoption of various technical packages by the different categories of farmers, both in the same and in different rainfed regions.

MECHANIZATION AND EMPLOYMENT

All of the Project Chaouia studies which deal directly or indirectly with mechanization and/or employment (Zagdouni, Asserghine, El Harizi, Laraichi et al) present data and assertions to support a paradoxical conclusion, namely that there is considerable under-employment in agriculture in the region, which is being exacerbated by rapidly increasing mechanization, but that one of the main reasons for increased mechanization is the high local cost of labor. The apparent explanation for this seeming paradox is the highly seasonal demand for agricultural labor despite increasing mechanization. Further, given rural to urban migration patterns, seasonal demand for skilled workers, such as harvesters, may have increased over previous years. Average daily wage rates in agriculture appear to exceed the agricultural minimum wage (10.15 DH in 1981) and the average industrial minimum wage (15.68 DH in 1981), at least in peak seasons, ranging as high as 40 DH per day for harvesting, for example.

The high cost of labor is not the only reason for increased rates of mechanization, however, especially for farmers with smaller farms and an excess of available family labor. Reasons given by these farmers for renting motorized equipment included the following: 1) ability to respond to highly varied climatic conditions and plant at the most opportune time; 2) freeing family labor for wage employment at peak seasons. Here, the wages earned have to off-set the cost of the custom work, and whether this will prove a consistently viable option for more than a few small farm families will depend on the rate and diversification of mechanization in the region overall. The increasing number of large farmers who mechanize their farms almost entirely, using one or two

permanent or even occasional workers on the farm means that there are progressively fewer jobs for these excess family workers; 3) a "spread-effect"--some farmers indicated that they turned to custom work because they had neighbors and relatives in the douar who had already done so. This is particularly true for harvesting. Crop losses are greater for grain left standing waiting to be hand-harvested both from birds and other pests and from encroachments of cattle allowed to graze the stubble of neighboring fields already harvested with combines. Similarly, for land preparation, access to parcels not yet plowed through adjacent parcels already plowed or planted using mechanized techniques becomes difficult and may be a source of conflict; 4) the desire to decrease grain losses on the threshing floor, especially where animal traction is used for threshing. Additionally, where land is sharecropped, some owners are willing to pay half the cost of combining the crop in order to save on expenses of occasional laborers who would have to gather the crop in the field and transport it to the threshing floor, as well as the labor associated with threshing; 5) allowing a reallocation of time to other productive on-farm activities; 5) reducing the difficulty of tasks assigned to family workers.

Ownership of tractors is also a status marker. Apparently, farmers who can afford to do so may buy tractors partly in order to convince older sons who have left the farm to seek a better life in town, to return. The status associated with driving the tractor is sometimes a sufficient inducement, especially where the son who has migrated has not been able to find consistent remunerative employment in the urban setting.

Despite the increasing cost of custom work (for harvesting, costs range

from about 100 DH/ha in 1978-79 to 250 DH/ha in 1981-82), there was apparently excess demand for combine harvester services in Haute Chaouia, as elsewhere in the dryland zones during the 1982 harvest, with the cost doubling in some areas during the harvest period. This was true despite the fact that total land cultivated was less than for the previous year. This kind of excess demand should, in theory, be met to some extent by custom work services offered by the extension work centers (CTs). These centers, however, suffer from bureaucratic inertia, often have problems maintaining their equipment, lack spare parts, and/or have insufficient equipment to meet local demand. Available service agents do not wish to service CT equipment since there are very long delays in payment. CTs are also, generally, more likely to service the larger rather than the smaller farmers. One study, for example, found that 64% of all CT custom work in the study zone where average farm size was 8 hectares had been carried out for farms of 11-23 ha and 22% had been done for "large commercial farmers".

Another means of meeting the increasing demand for mechanization is the GOM program, run through the CT, of organizing farmers into groupements to purchase equipment at subsidized prices. For the country as a whole, 693 of these groups were formed between 1978 and 1980. There are also credit programs for larger farmers to obtain medium or long-term loans for the purchase of motorized equipment at advantageous rates. Although the evidence is sparse, there is apparently a tendency for richer farmers--including groups of relatives--to have themselves formed into a group to benefit from the group purchase price, and then let one member buy the others out.

If smaller farmers are likely to be forced to depend on private entrepreneurs for custom work rather than being able to turn to the CTs, where they do have

a choice, they are more likely to rent machinery from private entrepreneurs anyway. During the 1979-80 agricultural year, private entrepreneurs were charging 10 DH less per hectare than were the CTs. Also, whereas CTs required payment immediately, in some cases the private entrepreneurs were willing to delay payment for at least a short time. In fact, smaller farmers were actually paying more to the private entrepreneurs given the quality of work done than they would have been if they had rented CT equipment. The norm for CT work was 105 minutes/ha while private custom work averaged about 45 minutes/ha. Also, smaller farmers were less able to take advantage of the hiatus in paying for private sector custom work than were larger farmers, who could wait to sell grain until sometime after the harvest, then paying for the custom work. Due to the press of other debts, the smaller farmers still had to sell immediately after the harvest.

It is difficult to generalize concerning the impact of increasing mechanization on employment. Rates of mechanization vary across Haute Chaouia, being higher in the north than in the south, and vary across farm types, with larger farms clearly using more mechanization (see Table IV.). For the Province of Settat overall, the level of mechanization appears to be somewhat higher than for other dryland areas of the country. Between 1969 and 1978, the number of tractors in the Province increased from 896 to 2082, an increase of 132% as against 112% for the same period for the country as a whole. In 1978, this province, which comprises 7.23% of arable land in the country, had about 10% of all tractors in Morocco. and about 25% of all combine harvesters. As is shown in Table V, tractorization has kept marginally ahead of purchase of combines, at least in some zones of the region.

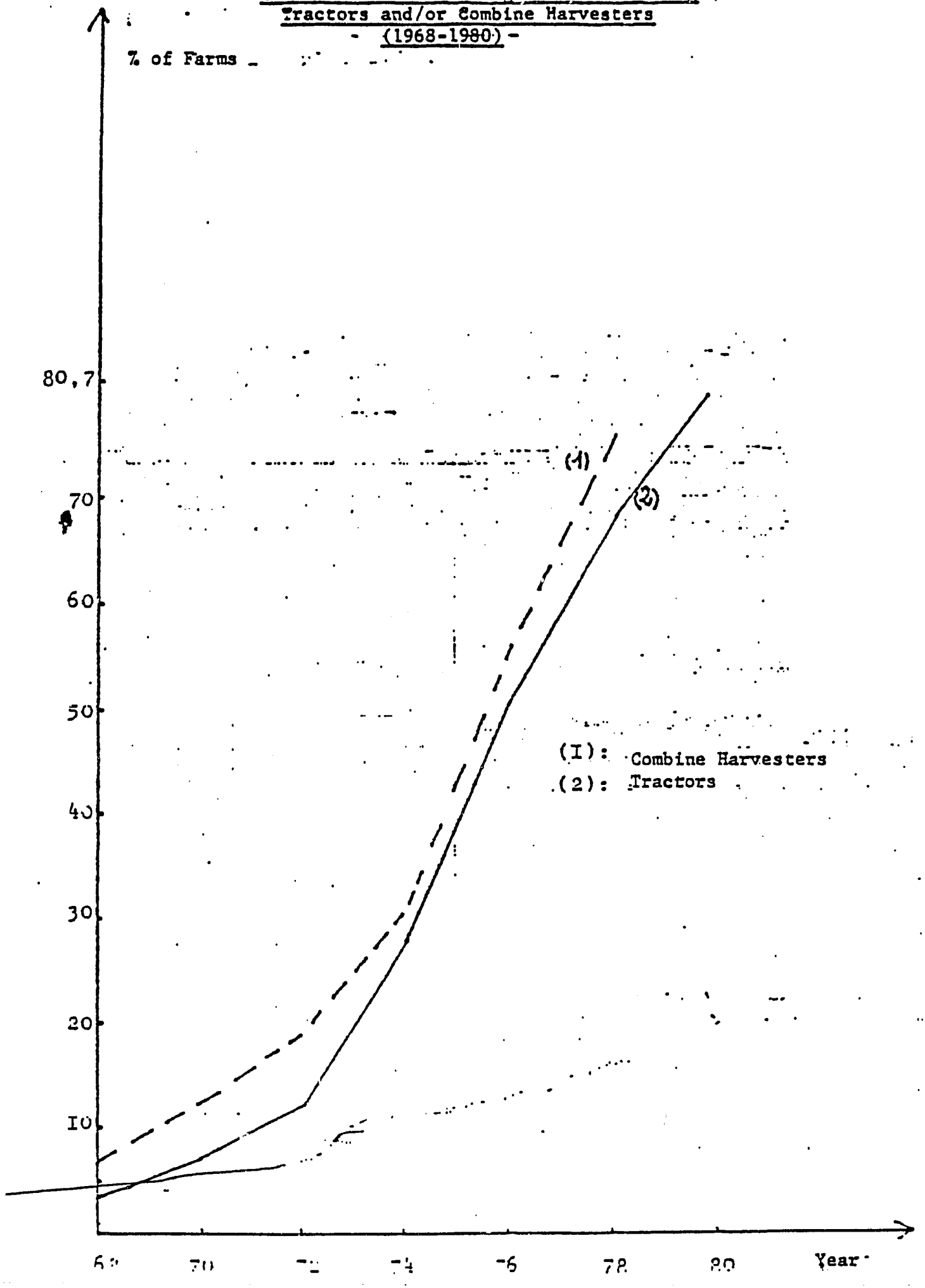
TABLE IV -

Animal Traction and Mechanization Rates for Cumulative Area Farmed by Farm Category

Category	Animal Traction as % Cumulative Area Farmed	Mechanization as % of Cumulative Area Farmed
I	36.6	63.4
II	26.0	74.0
III	35.0	65.0
IV	30.0	70.0
V	23.6	76.4
VI	24.3	75.7
VII	11.2	88.8
VIII	0.1	99.9
IX	5.9	94.1

Source: Zagdouni, L. La Mechanisation en Zone Bour: Cas de la Haute Chaouia, 1981, p. 334.

- TABLE V -
Evolution of Per centages of Farms using
Tractors and/or Combine Harvesters
- (1968-1980) -



A very recent estimate for the last agricultural year, 1981-82, is that about 70% of all production operations--land preparation and planting and harvesting--were mechanized in Haute Chaouia, although the total amount of land planted was significantly less than in previous years because of shortages of seed resulting from the previous year's drought.

Some recent field surveys indicate levels of mechanization as high as 81% for northern study zones, while others give levels of about 50%. One sample of 51 farms, for example, with an average of 4.4 hectares fron which the harvest came to the household (Benjelloun), had only four farms owning tractors in 1979, and no household owned a combine harvester. Half of the sample farms used a rented tractor for land preparation, 23% used only animal traction equipment, and 18.7% used both.

For the northern zone of Haute Chaouia, some additional data are available showing per centages of animal traction and motorized equipment use by crop. Here, the average area farmed is about 13 hectares.

	non mechanized	mechanized planting	mechanized harvest	all mechanized
Barley	43.5%	34.5%	2.0%	20.0%
Durum	41.2	unknown	9.0	49.8
Bread Wheat	40.0	unknown	40.0	28.0
Maize	33.0	67.1%	unknown	unknown

For farms of less than 10 hectares somewhat further south, the per centages of different crops all or partly mechanized are somewhat different. Here, 71% of barley planting is mechanized, but only 32% is combined; bread wheat planting is somewhat more highly mechanized--50%, but there is much less

combining of bread wheat, only 10%. Mechanization of durum wheat is higher for both planting and harvesting--80% and 27% respectively. No data are given for maize. For these farms, only 4% of farm work done is done by occasional paid workers. Estimates for the four main cereal crops by work days under different conditions of mechanization are as follows:

	non mechanized	mechanized planting	all mechanized
Barley	35-40 days/ha	30 days/ha	5 days/ha
Durum and Bread Wheat	50 days/ha	30-35 days/ha	5 days/ha
Maize	55 days/ha	unknown	unknown

Source: Laraichi et al Propriété des Moyens de Production et Possibilités d'Emploi, 1977-78.

These data show that mechanization of harvesting saves more labor than does mechanization of land preparation and seeding. Since the machines used for harvesting are combines, they are saving labor not just for cutting the grain, but also for gathering and threshing it, operations which are done separately and paid for separately in the absence of combines, and for which wage rates differ. Mechanization of both processes may save as much as 90% of labor. Whether this labor is then without employment is not clear. The cropping system to which these data apply includes broad beans, which require 67 days per hectare and onions, requiring 191 days/hectares. Additional days are required for livestock production.

In almost all cases, farms of all sizes except the largest farms, where family labor is not used at all, are characterized both by substantial

underemployment of family workers and by the hiring of wage workers, at peak seasons. The range for hired workers appears to be from a low of 4% to a high of 53% of all workdays required for on-farm production (Laraichi et al).

Most available data suggest that those who work for wages in agriculture in Haute Chaouia are either themselves farmers, working for others on a part-time basis, or the children of farm-owning households, both males and females. Agricultural wage labor is thus, apparently, a key part of the adaptive strategy being pursued by small farmers, combined with increasing farm size by sharecropping, and thus absorbing additional excess family labor. Since, in the short term, not all farm operations are likely to be mechanized, including the most labor-intensive operations such as weeding of cereals, harvesting grain legumes and the cultivation of maize, peak season employment of this kind is likely to remain available despite trends toward increasing mechanization. However, as land is consolidated by larger farmers who produce cereals on at least half of their land using only motorized machinery, there will be both fewer peak season jobs overall, and less land to sharecrop. This tendency will, as it has elsewhere, probably accelerate the rate of rural to urban migration, either seasonal or permanent.

As was demonstrated in the farm typology section, the larger farmers hire very few employees, either permanent or seasonal and pay them so little that they themselves continue to farm "micro" farms, often sharecropping some additional land. Their children, then, add to the pool of excess family workers.

Mouddene provides information on wage employment and migration patterns by household/farm type. (Mouddène, n.d.). The data he presents on women agriculture workers have already been summarized in the section on women's roles.

Mouddene shows that 57% of male agricultural workers were themselves heads of farm households, and that 11% of all household members had worked for wages in agriculture at one point in their lives. Present agricultural workers range in age from 12-65. Those from 12-15 are generally hired to harvest grain legumes, for weeding, and less often for land preparation and planting. To harvest or thresh grain workers must be over 18, given the practice and skills seen to be required. All but harvesters were recruited at home, while harvesters tended to be recruited from local souks. These occasional workers mainly worked for farmers with whom they had kin or marriage ties, or who were neighbors. Given these ties, they were recruited more often, and might be given land or animals in association by these same persons. Having worked for wages for these same people also meant that they could more readily seek informal credit from them as well. Similarly, if a man has been a khammes for someone earlier in his life, he is likely to return to work for wages for the same person later in life.

The work history of a wage worker tends to be somewhat complex. For example, a young boy will first be hired out by his father on contract to work for someone else as shepherd. Later, the same boy may become a khammes for the same landowner, or for another; 73% of all those who had become khammes had originally been either shepherds or unpaid family workers. The rest had either been agricultural wage workers first, or migrants. Of all men who had ever been khammes, 41% then went directly on to being occasional or full-time agricultural wage workers while at the same time working their wives' land (these are poor khammes who have married into families from the richer lineages in the douar), and/or working land and herding animals taken on a share basis. But 22% of those

who were wage workers then went next directly to town as migrants, while 13% became khammes, (even though the khammessat institution is declining since the mid-1970's) and 22% stopped working for wages at all.

In terms of social status within the douar, the hierarchy goes up from shepherd to khammes to agricultural wage worker to migrant. Access to the higher-status roles corresponds to greater levels of wealth of the family and to greater possibilities of exploiting advantageous relationships with kin and other residents of the douar. These relationships, in turn, depend on the respective socio-political standing of the douar's lineages and sub-lineages, and the standing of various families within them, as well as on the degree of solidarity among lineage and sub-lineage members.

For this sample population, wage rates varied by task, hours worked, location of the work, and the age and sex of the worker. Thus, for 1978-79, wages rates were as follows:

--harvesting: 25 DH/day in the douar, 30-35 DH/day among neighboring fractions of the same tribe, and among the Beni Meskine;

--harvesting grain legumes: 15-20 DH/day for a man, 7-10 DH/day for young men, and 10-15 DH/day for women;

--threshing and winnowing: 10 DH/half-day;

--land preparation and planting: 6-10 DH for about 4 hours;

--weeding 1.50-2.50 DH/half-day for children under 15, and 5 DH/day for adults.

Among are male wage workers surveyed, occasional workers accounted for 70.4% among whom occasional worker.

The average number of days worked a year was 40, although there was significant variation. These workers estimated that increasing mechanization in the area of the douar deprived them of at least 15 days of work a year. Among residents of the douar, although most farmers hired a paid worker or workers at some point, only 23% used hired workers regularly every year. The majority of those households were farming more than 5 hectares. The other 77% only hired laborers to harvest winter cereals and to harvest lentils, and did not necessarily do so every year. For the agricultural year 1978-79, no farm household hired any person or combination of persons for a total of more than 300 work days, or one person-year. In the study area, 81% of land preparation is mechanized, but 74% of farms maintain animal traction units which are used on 42% of the cultivated area, e.g., for maize cultivation.

Turning to migration, there is a marginal difference between the types of households whose members migrate and those whose members work for wages in agriculture. Of 91 sample households, 72.5% had a least one member who was either an agricultural wage worker or a migrant. Nor surprisingly, 92.3% of all landless households, and 94% of households with 0-2 ha had someone working for wages off the farm. Of households that had one member who had migrated, but no agricultural wage workers, most were in farm categories with greater access to land: 15% of such households had more than 10 ha, and 46% more than 5 ha, while only 31% had less than 2 hectares or were completely landless. Overall, households that had someone working outside for wages had fewer resources when land, herd size and numbers of draft animals were taken into account than households where no one was working for wages. But households that had members who had migrated and no

local wage workers, tended to have relatively greater access to production factors than did others.

Of all persons who had migrated, only 11.4% were women, although this per centage did not include women who had left the douar with their husbands, or to follow their husbands to town, or who had left immediately after divorce, so the data for women migrants who may have gotten jobs in town are under-representations.

All migrants left the douar at over 12 years of age, but 58% of all migrants were less than 20 years old, and 87% were less than 28. In terms of birth order, 53% were eldest sons, and about 13% were youngest sons. The rest of the migrants left when they were themselves already household heads (21%), and of these, 50% returned to live in the douar at a later date. Thus, the majority of those who left for town were young, unmarried, potentially economically active males, the status of household head appearing to act as a brake on migration. Of married migrants, it is unclear how many took their families with them, or how many effectively gave up their rights in land in the douar, although the general tendency is to maintain such rights, and often initially to leave wives and children under the supervision of other family members until the migrant is established. In the city, the migrants in this sample were confronted by low wages and a lack of permanent employment opportunities which, together with maintaining some land-use rights in the douar, probably accounts for the 50% return rate.

The case made for increased mechanization by available data is very strong. Time required per hectare is substantially less both for land preparation and for harvesting, which means that farmers can plant all their land early after

the rains, and can minimize harvest losses resulting from allowing the crop to remain in the fields too long. According to respondents, the cost per hectare of production is less using motorized machinery, especially when the necessity to feed wage workers in addition to paying them a daily rate in cash is taken into account. Mechanization probably frees up some land that is otherwise used to produce forage and fodder for draft animals, and allows changes in herd composition that are likely to be advantageous in terms of animal sales. Mechanization of the most labor-intensive crops--grain legumes--will probably come slowly, due to the need for specialized equipment. Mechanization may, however, increase the weeding requirement, and weeding, largely done by women and children, may become a bottleneck as both women and children are involved in other domestic and farm tasks, including livestock production.

The effects of mechanization on migration are mixed. It is clear that rural to urban migration in Morocco is a problem, and it may be exacerbated by increased mechanization. On the other hand, there is evidence that people were migrating before mechanization increased in Haute Chaouia and elsewhere, and in any event, return rates are high. Some people appear to be migrating at least temporarily in order to acquire capital to achieve mechanization on farms to which they have retained rights. Household heads who have no adult sons left in the rural area are forced either to hire wage workers, to mechanize, or to give up farming. Migration seems to have aggravated the existing tendency toward labor shortages at peak seaons--planting and harvesting. These shortages, however, have led to increased wage rates for those who remain in the rural area and are willing to engage in occasional agricultural wage work.

Alternatives to heavy mechanization for land preparation are being explored under the machinery sub-component of the applied agronomic research being carried out under the Dryland Agriculture Applied Research Project, both to solve technical problems that arise from inappropriate use of heavy machinery, and to provide substitutes for the smaller farmers.

RECOMMENDATIONS FOR EXPANDED SOCIOECONOMIC RESEARCH

There are several reasons why USAID/Rabat should continue to fund socioeconomic research to be carried out by the Department of Human Sciences at INAV Hassan II. First, as the Dryland Agriculture Applied Research project is expanded to include more favorable rainfed zones, data on farmer behavior in these zones will be required to ensure that the results of the applied agronomic research component will be suitable for farmer adoption in these areas as well. Current data comparable to those generated by Project Chaouia for Haute Chaouia are not available for these areas. Second, as the new Rainfed Agricultural Production project goes into implementation, in order to ensure both social and economic soundness, the same kinds of data on farmer behavior in more and less favorable zones will be needed, especially since this project, too, will be active in extending improved technologies to farmers.

Third, the activities carried out under Project Chaouia have had a significant institution-building impact. They have exposed staff and students of the Department of Human Sciences to a farming systems kind of approach to socioeconomic research, have provided experience in field research to Third Cycle students who are then employed in the Ministry of Agriculture, at the Institute itself, at the National Agronomic Research Institute (INRA) or in the private sector, and have provided a focal point for staff and student research collaboration. Project Chaouia research activities have also improved the working relationships between INRA and the Department at INAV Hassan II, so that socioeconomic factors are more likely to be taken into account in the definition and implementation of INRA's research program than may have been the case in the past.

Finally, there are some research topics originally planned for which, to date, have been less thoroughly covered than is desirable to facilitate

effective project implementaton. These include access to credit and other production inputs for different categories of farms, and broader social organizational impacts on farmer economic behavior. To date, little information has been included in study reports on the way in which broader social and political factors may condition farmer behavior, or on the nature of relationships within the household that may impact upon farm management decisions. Very little information, for example, is available from these studies on the role of women in farm decision-making and in on-farm tasks.

The continued and new research activities that are proposed here are intended to lead to the generation of the kind of data for more and less favorable rainfed regions of Morocco that will have direct relevance for implementation of both projects. The emphasis is no longer on thesis preparation, but rather on continuation and replication of the special studies that have been carried out under Project Chaouia, designed with the requirements of project implementation more firmly in mind, and on the initiation of a new activity that will be closely integrated with activities under the agronomic research component of the Dryland project. A collaborative relationship with a U.S. institution is also proposed to provide the services of a U.S.-based quantitative rural sociologist to assist in the design and analysis of future studies, ensuring greater quantitative rigor than has been typical in the past, and contributing to the institution-building aspect of the socioeconomic studies component.

Proposed Activities

1. Continuation of the Haute Chaouia 50-farm Study. Discussions of preliminary findings from this study indicate that considerable useful baseline information is being generated on production patterns, production

costs, yields, and non-farm activities for these 50 farms. The parcel is the basic unit of analysis for vegetable crops, and livestock production activities are also examined. To date the study has been carried out during the 1981-82 agricultural year, which was a-typical due to the impact of the devestating drought of the year before. In order to provide data for farmer behavior on these different types of farms under more normal conditions, this study should be continued for two years, using the same farm sample. Given the extent of climatic variability in this and similar regions from year to year, a more realistic baseline will then be available for evaluation of the impact of improved technologies extended under the Dryland and Rainfed projects by the end their respective LOPs. Data will also be available for comparison between regions for the same years given that the study is replicated in a more favorable rainfed region.

This study should continue to gather data on household composition, cropping patterns, yields, land tenure patterns, and labor allocation by farm type. Greater emphasis should be placed on credit availability and utilization, and on availability and utilization of physical inputs than was the case in the first phase. Quantifiable data should be provided on allocation of household and non-household labor and of mechanization by hectare or by farm, with cost, by each farming task. Data should also be provided on disposition of crop and livestock production(to family consumption, exchange or sale), with prices as appropriate. In general, more attention should be given to time, cost and price data than has been the case in the first phase.

The study team has, during the first phase, achieved considerable familiarity with some of the broader social contextual factors that may inpact upon farmer economic decision-making. Some of this information

has been gathered in the course of the study itself, while some of it is available from previous stage studies carried out among some of the same farmers, which the team has fully exploited in designing the 50-farm study. This kind of information includes, but is not restricted to, qualitative information about household decision-making, social factors that condition access to land, including inheritance patterns, kinship relations, and patron-client relationships, patterns of labor exchange, access to information about new farming techniques, including which farmers other farmers are likely to emulate in adopting improved techniques as they become available.

The study team should be encouraged to synthesize this information and present it in a qualitative form so that a better understanding can be achieved of some of the non-economic causes of differences and similarities in farmer behavior across farm types. This would complement the quantitative presentation of the economic data.

2. Continuation of Haute Chaouia Commodity Price Study

Under this study to date, prices of key agricultural commodities have been examined at six representative markets in the region. Each market has been visited once every three months. Data generated include prices asked and prices paid for all cereal crops grown in the region, and all types of animals, as well as the range of prices paid for key household consumption staples (eg., tea, meat, flour). In order not to affect the prices, study team members have used the most inobtrusive approaches possible to data collection. Thus, they have not attempted to follow a set of farmers to market, to see what prices they receive for their production, since this might seriously compromise the data, and would also compromise the farmers. These commodity prices are, then, a proxy for the prices actually received by the 50 farmers in the farm study, and serve as a check on prices received as reported by the farmers

themselves. The study results give a picture of the range of prices of key commodities over the year, but in fairly gross terms, given that few visits are made to each market.

In the second phase, the study should be intensified, so that each market is visited once a month, at mid-month, given researcher availability. This will give a more refined picture of price fluctuations. If this study is contined for two more years, it will complement the price findings of the 50 farm study, and will also provide an understanding of price trends over a representative period of time. The study should also be extended to include data collection on the types of merchants to whom crops are sold, and variations in price received by type of merchant, particularly for grains. Prices received should be compared to the official announced price by commodity where applicable. In addition, the study should include data on prices of production inputs, as well as volume of sales to the extent possible.

3. A 50-Farm Study in a Favorable Rainfed Zone. The same kind of longitudinal study of 50 farms as has been begun in Haute Chaouia should be carried out in a more favorable rainfed zone. The same variables should be examined, to allow effective inter-regional comparisons. The study should last for two years, in order to provide reliable baseline data and allow for inter-annual comparisions, for example for crop rotations. The study area chosen should if possible be one in which students from INAV Hassan II have already been on stages. This will ensure that background data are available for sample selection, eliminating the necessity for a baseline household survey to be carried out as was the case in Haute Chaouia. If possible, the zone should also be within a region in which the GOM has, with AID assistance, been conducting areaframe sampling, again to provide a basis for sample selection,

as well as comparative data on yields.

4. A Favorable Rainfed Zone Commodity Price Study. This study should replicate the commodity price study for Haute Chaouia, including the addition of data on prices received by types of merchants, and on prices of production inputs. If possible, it, too should be designed to include monthly visits by the study team at mid-month. Given the nature of the study zone chosen, more or fewer than six markets may be required for representativenenss.

5. Farming Systems Applied Research. Under the expansion of the agronomic research component of the Dryland project, it is proposed to place U.S.-resident agronomists at three research field stations. This agronomists will be working with newly-constituted teams of Moroccan researchers and extension agents to test new technologies with farmers on their fields. These tests will involve presentation to farmers of new technologies that have been developed under the project and in pre-project INRA research. The farmers will provide land and other inputs, integrating the new practices into their normal cropping system on part of their land.

The three teams of agronomists, researchers and extension agents should be complemented by one team consisting of an agricultural economist, and a rural sociologist. The team of social scientists will rotate among the three research stations, assisting the researcher/extension agent teams in test design, and farmer selection, and will be present when the recommended technology is being introduced. They will then return at several points during the agricultural year in order to monitor farmer responses, and to assess the socioeconomic viability of the recommended practices. They will continue to work with the research station-based teams to ensure that results of the socioeconomic assessment as well as

the agronomic assessment are fed back into further agronomic research and the design of new farmer testing programs.

It may be possible to include in among farmers selected for these tests some who are included in the two 50-farm samples, depending on the zones chosen. Consideration should, however, be given to the potential problem presented by over-studying the same farmers.

6. Analysis of Existing Stage Data. INAV Hassan II has been sending students to study individual farms under its stage program for 10 years in various rainfed regions of the country. These stages have generated a considerable amount of largely qualitative baseline data on farmer behavior in these zones. Due to limited staff and funding resources, however, the majority of these data have not been analyzed, either quantitatively or qualitatively. Analysis of these data would provide AID and the GOM with a significantly improved understanding of the range of farmer behavior in the rainfed zones. There is a need for limited professional assistance in designing and implementing an analysis and summary program which will make this resource more readily accessible.

7. Collaborative Relationship with University of Missouri.

Since 1977, an informal collaborative relationship has existed between the Department of Rural Sociology, University of Missouri, Columbia and the Department of Human Sciences at INAV Hassan II. This relationship has included informal consultations about the progress of Project Chaouia. Formalization of the relationship had been suggested in the MIAC study report which provided background for the design of the Dryland Project, but was not included at that time. Given the variety of activities proposed for this expansion of the socioeconomic research component, it appears desirable to formalize this collaborative relationship.

Technical assistance would be provided by a quantitative rural sociologist from the Department of Rural Sociology at University of Missouri to the Department of Human Sciences at INAV Hassan II. In the first year, the rural sociologist would spend two months of short-term consultancy to assist the Department in establishing the quantifiable research paradigm for the 50-farm studies, including the preparation of dummy tables in order to provide an agreed-upon structure for this research component, which will serve the ananlytic needs of applied research and extension. He would also assist in designing the data analysis and summary program for the existing stage data.

The rural sociologist would spend the second year in residence at INAV Hassan II, assisting the study teams in analyzing data from the 50-farm and commodity price studies, monitoring the progress of the stage data analysis program, and working with the agronomic researchers in designing the farming systems applied research activity. In the third year, he would return for three months of short-term consultancy to assist in analysis of final results of the 50-farm and commodity price studies.

Funding under this activity would also be provided for a visit of the INAV Hassan II Project Director, Dr.Pascon, to Columbia, to gain increased familiarity with U.S. farming systems research approaches and other contemporary U.S. agricultural economics methodologies.

8. Seminars As the Dryland Project expands to include new zones, and as new results of applied agronomic and socioeconomic research are generated, it is critical that there be interaction between the two sets of researchers, so that results can be shared and where appropriate, integrated into the planning of further efforts under the respective components. In addition to increased integration represented by the proposed farming systems applied research activity. a modest program of

seminars is proposed, to take place before the beginning of each agricultural year. These seminars would also serve a training function for Moroccan researchers at INRA who are not directly involved with the work of the project, and for students at INAV Hassan II. The seminars can also provide a means for increased on-going project evaluation by the Mission and the GOM.

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