

Syria: Agricultural Sector Assessment

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CHAPTER II

AGRICULTURAL MANPOWER

by

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## 1. Introduction

The purpose of this study is to (1) discover what changes are taking place in regard to labor in farming, (2) identify what surpluses and/or shortages of labor there may be on a seasonal or regional basis, and (3) suggest possible policies to fulfill both immediate and long-run goals of the Syrian Government in regard to labor in agriculture.

### 1.1 Goals in Agricultural Manpower Planning in Syria

Some of the expressed goals of the Syrian Government as stated in the fourth Five Year Economic and Social Development Plan that are relevant to this study are: (1) to provide optimal full employment for the available manpower, to mobilize the rural manpower for the exploitation of idle agricultural resources, and to develop the countryside in general; (2) to achieve an optimal geographic distribution of projects among the various regions of the country so as to make available suitable work opportunities to rural manpower, to improve the rural living conditions, and provide rural populations with main services; (3) to effect an extensive survey of manpower in order to bring to light the extent of apparent, hidden, and partial unemployment; (4) to reconsider the distribution of excess manpower from sectors suffering from hidden and incomplete employment to sectors suffering from a shortage of manpower, as well as to transfer manpower from areas where it is in excess to areas suffering from a labor shortage; (5) to effect a survey of training needs in the country; and (6) to limit as much as possible the flow of internal migration to urban centers.

These goals, viewed in connection with Syria's past interest in land reform, would seem to indicate three major concerns toward which this study will be directed. These concerns are: (1) to maximize the production of farm products, food in particular, by making better use of existing physical and human resources; (2) to improve real incomes and living levels of people engaged in farming, both laborers and farmers; and (3) to simultaneously limit rural-to-urban migration.

### 1.2 Methods of the Study

The first part of the study is concerned with the supply of farm labor. Available census and labor survey materials are analyzed to present such information as could be surmised from somewhat contradictory data concerning the numbers of persons on farms and the characteristics of the farm labor force in regard to employment status, education, sex, and age.

The second part of the study is concerned with the requirements for labor. An attempt is made to take the surplus labor approach to the measurement problem of underemployment. In other words, an attempt is made to compare the numbers of workers with the amount

of work that needs to be done to produce the actual output. This can provide a basis for rough estimates, but the statistical requirements for the estimates of labor surplus having any claim to precision should not be understated.

An earlier investigation done by the author of the present study concerning the relationship between apparent labor requirements for major crops and livestock units in the United States indicated that the work done to produce the actual production would have occupied about half the time of the farm labor force working 40 hours per week. It is not very surprising that a greater proportion of the workers' time was not occupied by actual production time when one considers that: there is nonproductive work to be done in maintenance, etc.; there is time lost due to breakdowns and weather conditions; U.S. farmers earn as much off the farm as from farm earnings (the farm production cycle being seasonal). Therefore, as a point of departure I will postulate that if one could learn the labor requirements for all the crops and livestock enterprises in Syria, one could account for somewhat less than the apparent workingtime of the farm labor force. Besides the difficulties of defining the size of the farm working force in the first place, and the number of hours that each worker could be expected to work per week or per year, there is the other side of the equation which is at least as hard to estimate: that is, what are the labor requirements for the various crops themselves? There are many factors which contribute to a lack of precision in these estimates, such as the amount of mechanization for each of the production processes, the seriousness of the weed problems, whether or not the field is irrigated, and the type of irrigation and many other variables. Estimates will be made for each of the major crops in each Mohafaza with some allowances being made for livestock enterprises and minor crops.

There are at least two related, but somewhat different, concepts involved in this surplus or shortage of labor analysis. First, there is the static concept of determining the regions, seasons, and extent of surpluses and shortages at the present with current acreages of crops and livestock numbers. Second, there is the "Dynamic Concept," that is, what one can expect in the future as various factors change, such as farm size, farm practices (use of better seeds, weed control, etc.), and particularly mechanization. An attempt will be made to include both of these aspects in the analysis.

Also included are estimates of gross productivity per worker by Mohafaza. One must recognize that these are based on present prices and can change with prices. They can be used to measure differences in regions and over time but cannot be used to measure productivity in one sector of the economy as compared to another.

Included in the study are analyses of farm labor supply for the future and, closely related to it, the farm labor requirements for

the future. Finally, there is a discussion of alternative policies to attain the above expressed goals, and suggestions for further research that needs to be undertaken to better formulate policies to accomplish these goals.

## 2. Labor Supply in Agriculture

Analysis of the labor supply on farms will be presented in three parts: (1) data concerning the rural population; (2) data concerning the rural labor force; and (3) data concerning the farm labor force itself. There are two reasons for presenting some information concerning the rural population and rural labor force: first, to put the farm labor force into perspective; and second, to point to data gaps that make a more complete analysis impossible. The farm population is not likely to vary greatly from the rural population and the rural labor force in its characteristics, since it constitutes a large proportion of both.

### 2.1 Rural Population

For Syria as a whole, 56.5 percent of the population was considered rural in 1970. By 1976, this proportion had dropped slightly (54 percent). The Mohafazat of Sweida and Tartous had apparently experienced more rapid rural than urban growth in this period. Only the Mohafazat of Damascus and Aleppo were less than 50 percent rural in 1970, and were the only two that remained so in 1976. Al-Rakka, Dar'a, and Tartous were over 80 percent rural in 1970; the latter two remained above 80 percent in 1976. Homs and Al-Rakka both experienced decreases of over 10 percent in their rural percentages from 1970 to 1976 (see Appendix Tables 1 and 2).

The rural population increased only by 600,000 in six years, for an annual percentage growth rate of 2.62 percent as compared to 3.41 percent for the population as a whole. In spite of the fact that Syria's rural population grew more slowly than urban population during this time period, the absolute growth in rural population was still very large. The rural population of Al-Rakka showed the least percentage increase but was second only to Quneitra in absolute terms, a result consistent with the previously noted large drop in rural population as a percentage of total population in this Mohafaza. Increases in rural population over the six-year period ranged from 2.4 percent for Al-Rakka and 9.5 percent for Aleppo, to the relatively large proportional increases of about 25 percent for Tartous, Lattakia, and Idleb (see Appendix Table 3).

As shown in the population censuses, a disproportionate number of working age rural males have migrated from rural to urban areas. In order to obtain some indication of this trend, two comparisons were made: the rural and urban sex ratios were compared for 1970 and 1976; and comparisons of the rural proportion were made for each age group.

The sex ratio of the rural population as a whole was slightly less than that of the urban population--104 compared with 107. However, for both 1970 and 1976 the sex ratio for the rural population was less than 90 for the 25-40 age group, compared with over 100 for the same group in the urban population. For both years, the sex ratio for the rural age group 30-34 was about 81 (see Appendix Table 4).

In 1970, while the population as a whole was 56.6 percent rural and nearly as high for the male population as a whole, there were more males aged 25-34 living in urban than in rural areas. In 1976, the population on the whole was nearly 53 percent rural; again, there were more males aged 25-45 living in urban than in rural areas. Also for 1976, the proportion of females aged 20-24 who lived in rural areas was below 50 percent (see Appendix Table 5). Thus it appears that for both 1970 and 1976, a disproportionate number of the working age males had become urban. This is no indication, however, that the situation was much different in 1976 than in 1970. In total numbers, it was calculated that in 1970 the rural population would have been 62,000 greater if the number of persons in the working age groups had been identical to that in the total population; in 1976, the number would have been 79,000--a very small difference proportionate to the growth in total population.

It must be concluded that evidence from the 1970 Census and the 1976 Sample Census does not bear out the often heard contention that differential migration for the working age population increased from 1970 to 1976, though it may be correct in regard to what has happened since 1976. The number involved is insignificant compared to the entire population. But if one assumes that most members of this group are actively working (and therefore compare it to the number of persons farming), it is somewhat more significant--corresponding to about 13-14 percent of the farm work force.

Some information was obtained from the 1976 population sample census regarding internal migration. Since the data were unweighted, they cannot be taken as representative of the actual number of migrants. Rather, they are indicative of the direction of migration. About 38 percent of the migration from the rural areas was directly to the Mohafaza centers, about 50 percent to other Mohafaza centers. About 8 percent was to other urban centers; the remaining 4 percent was to urban centers in other Mohafazat, other than the Mohafaza center. As might be expected, most of the migration was to the two major urban centers, Aleppo and Damascus, with Aleppo being the destination of almost twice as many rural-to-urban migrants as Damascus (see Appendix Table 6). These data indicate that rural people migrate directly to the cities, since much of the migration to other Mohafaza centers was directly to Damascus and Aleppo.

Data concerning external migration are unavailable. In the Dar'a area, it was said that about 10 percent of the working age men in the rural areas are out of the country at any one time (working in the oil-producing Arab states). These men send money to their families and either return periodically for a short time or remain abroad for a number of years and return permanently. "Hearsay evidence" also indicates that it is common for rural, and also urban, men to migrate to Latin America and earn more than they are able to in Syria. The sex ratio for the ages 25-40 is lower than for other age groups for the combined urban and rural population, as can be inferred from Appendix Table 4. Differential external migration may be the cause (see James Williams's paper, "Population Growth and Migration in Syria," for more details).

## 2.2 Rural Labor Force

According to available evidence, the participation of the Syrian population in the labor force is lower than in most countries, particularly for females. For both males and females, the labor participation rate was below that of the less developed countries and above that of developed countries only for the age group 0-14. Participation by males in the labor force of Syria was apparently less than in both less developed and more developed countries, while for those over 55 participation was higher than in developed countries but less than in less developed countries. For females, the participation rate was over 20 percent in both less developed and more developed countries, but was only 5.3 percent in Syria, and much lower at all age groups above 14 (see Appendix Table 7). While the overall participation rate is partly a function of age structure, it is apparent that participation was also lower in Syria than in other countries for the most productive ages. This amounts to a possible deficit in Syria of 400,000 to 600,000 males and 660,000 to 800,000 females. In other words, if participation of Syrians in the work force were as high as in other countries, there would be from 1,000,000 to 1,400,000 more participants in the labor force. Perhaps this deficit may be due to different ways of measuring labor force participation, but this explanation does not account for the entire difference.

As one would expect, the labor force in Syria has grown during 1970-1976, but there have been apparent decreases in both 1973 and 1976 from the previous year. The rural labor force's proportion of the total labor force was also erratic, showing increases for 1973, 1975, and 1977--indicating some discrepancies in the data, particularly between the labor surveys and the population censuses (Appendix Table 8). This will be explained further in the section on farm labor (2.3).

In terms of labor force participation, there appears to be little difference in the rural and urban populations. The data for 1977 show a slightly higher participation rate by the rural population (as measured by the number in the work force divided by the



number of people over 10 years of age) (see Appendix Table 9). This appeared to be largely due to the greater participation by women in the rural labor force in 1977 as compared to the urban labor force.

Participation in the work force varied by Mohafazat in 1976, according to the Sample Census. Almost 73 percent of the rural males over 10 years of age were included in the work force in Al-Rakka, compared to only 55 percent in Tartous; female participation ranged from a low of less than 2 percent in Dar'a and Quneitra to over 10 percent in Homs and Lattakia and about 16 percent in Hama. These differences are quite large and do not appear to be a result of the degree of urbanization. Though the three Mohafazat which are highest in labor force participation are relatively rural, they are followed by the rates of the two most urban Mohafazat, Damascus and Aleppo (see Appendix Table 10).

### 2.3 Farm Labor Force

The farm labor force is evaluated according to its size and characteristics.

2.3.1 Size: According to the available data from the Census of 1970, the Sample Census of 1976, and the Labor Force Sample Surveys in 1971-75 and 1977, the number of farm workers varied greatly from year to year. The largest differences appear to be in the female farm work force, particularly since all labor force surveys recorded larger numbers of women than were in the population censuses (see Appendix Tables 10 and 11). The 1976 figures were admitted to be faulty by the Central Bureau of Statistics (CBS) because of technical difficulties in sample selection and lack of trained interviewers. Yet the numbers of females working on farms cannot have varied even as much as indicated by the labor force sample surveys (an increase from 221,000 female farm workers in 1974 to 309,000 in 1975).

If one only takes the male farm work force into consideration, there is much more consistency; the largest inconsistencies concerning numbers in this group are the drop in 1973 and the increase in 1974. The former apparently was a result of the drought which occurred that year. The wheat crop for 1973 was reported to be one-third that of 1972 on approximately 9 percent more land area, while the barley crop was reported to be only 14 percent as large as the previous year. Other major crops were also reported to have yielded one-fourth to one-half as much as in 1972. From the viewpoint of either labor requirements for a smaller crop or reduced farm income, a drop of this size in crop yields seems to be a logical reason for a smaller farm labor force in that year. The latter change in the 1974 male farm labor force (an even larger work force than in 1972) may at least be partially explained by a 26 percent increase in the area planted to vegetables and an 11 percent increase in the area planted to crops from 1972 to 1974.



Assuming then that the data concerning the male farm labor force are approximately correct, the trend indicates a decrease of 20 percent from 1970 to 1976, or an average annual decrease of 3.1 percent. Using the data for the farm work force as a whole, it apparently declined as a percentage of the total work force only slightly (from 50 percent to 49 percent from 1970 to 1975) but suddenly dropped to 31.6 percent in 1976. If one uses the percentage the male farm labor force bears to the total labor force, the decline is more gradual--declining more from 1974 to 1975 than from 1975 to 1976 (see Appendix Table 12).

As already mentioned, much of this change has occurred because of the wide variation in the number of farm women enumerated. It would appear that many women who participated part-time in farming were often missed in the surveys. Several reasons may account for these omissions. First, the censuses and surveys were all taken in September, a period of low activity in the farm sector; therefore, if the wife had not worked in farming recently at the time of the survey she might not be counted as a farm worker. Second, men do most of the work with tractors and animal power; their work is more visible and probably is considered more important by both husband and wife. Third, men may be reluctant, as in other cultures, to admit that the work of their wives is necessary to the farming operation, thereby admitting that the men cannot earn enough by themselves to support their families.

Thus, the number of women contributing to farm production must remain largely unknown, though it is very likely that the number enumerated for 1975 (in excess of 300,000) is much closer to the true figure than the 62,000 of 1976. If one postulates a percentage decline in female participation in the farm work force identical to that of men from 1970 to 1976 (a more likely occurrence than the 40 percent decline shown by the data), it would raise the 1976 figure for females to 83,000, the total number in farming to 598,638, and the percentage of the total work force being constituted by farm workers to about 32.4 percent--still a sizable decrease from 1975.

A second hypothesis is possible: the data for 1970 and the succeeding years for the male farm labor force were substantially correct, but that the female farm labor force was underestimated in 1970 and 1976. If one accepts the 1975 labor force figure of 300,000 females in the farm labor force as being nearly correct, and if this number did not decrease from 1970 to 1976, it would place the farm labor force for 1970 at 950,400 and for 1976 at 825,000. This hypothesis would appear to be closer to reality for two reasons: first, much of the mechanization that has taken place has been in field tillage, traditionally a man's task; and second, there apparently are few alternative job opportunities for farm women.

Even though more female workers were probably omitted in the 1976 data, the data for 1970 and 1976 seem to be fairly comparable on the Mohafaza level. Therefore, the following comparisons were made using the data for these two years. Of the 14 Mohafazat, over 20 percent of the farm labor force was in Aleppo in 1970; by 1976 this had decreased to less than 17 percent. Hama and Al-Hasakeh also had over 10 percent in 1970; both increased that percentage in 1976 (see Appendix Table 13).

Damascus City, Aleppo, Dar'a, and Sweida each experienced decreases in the farm work force from over 35 percent in 1970 to 19 percent in 1976. Although Quneitra, Hama, Deir-ez-zor, Idleb, and Lattakia experienced less than a 15 percent decrease, the change in the farm labor force as a whole was about 23 percent (see Appendix Table 14).

It is still uncertain whether the large decrease in farm workers, even for male farm workers, actually occurred or is simply due to errors in the data. However, a comparison of the apparent percentage decrease in the farm labor force from 1970-1976 by Mohafaza with the percentage increase in wage rates indicates that those Mohafazat in which wage rates were rising most rapidly in the 1970-1976 period were also those in which the most rapid decrease in percentage of farm workers occurred.

The farm work force apparently decreased from 30 percent to 40 percent in Sweida, Dar'a, Aleppo, and Damascus, but fell less than 10 percent in Quneitra, Hama, and Deir-ez-zor. For the four Mohafazat with the largest decrease in farm labor force, Sweida, Aleppo, Dar'a, and Damascus, the composite of the highest and lowest wages in construction increased from 40 to 111 percent for all four. Although the percentage changes in wage rates for the Mohafazat in which the farm labor force declined less rapidly were generally less, from 1975-76, Deir-ez-zor (with a 62 percent apparent increase in wage rates) had only a 7 percent decrease in farm labor force, and Lattakia (with a 30 percent increase in wage rates) had only a 15 percent decrease. This may be due to a combination of causes. First, data on 1976-1977 show a decline in wage rates in Deir-ez-zor, pointing to a possible exaggeration in the 1976 wage rate; for Lattakia, the data showed only a 6 percent increase. Thus, the wage rates in these two Mohafazat were either in error for 1976 or the wage rate in these two Mohafazat may already have been leveling off in 1976 (see Appendix Tables 15 and 16). Second, Lattakia has fairly large proportions of vegetable crops and tobacco, both of which have high labor requirements. A larger proportion of its wheat production is grown in areas in which the topography does not permit mechanization as compared to the other Mohafazat.

Thus, although the farm labor force has shrunk, perhaps it was not as much as the 1976 data indicate. This conclusion is in accord with the apparent increases in wages for picking cotton from

5 to 30 piasters per kilogram in five years. This evidence also seems to indicate that male farm workers have responded to higher wages in urban work by leaving farming in large numbers by 1976, a trend which has probably continued to occur.

2.3.2 Characteristics: Since no detailed information is available concerning the farm labor force in more recent years, the 1970 census data are used to provide certain characteristics of the farm labor force. The reader is advised to use this information with caution as changes have undoubtedly occurred in the past nine years.

The 1970 census classified the agricultural, animal husbandry and forestry workers, fishermen, and hunters in two ways. The first classification included farm managers and supervisors, farmers, agricultural and animal husbandry workers, forestry workers, and fishermen, hunters, and related workers. The majority of the workers were fairly equally divided between farmers and agricultural and animal husbandry workers, with only Aleppo, Hama, and Al-Rakka having more workers in the second category. Forestry, fishing, and hunting accounted for about 2,100 workers of the total of 732,821. The majority of Syria's 385 farm managers were reported in Damascus and Aleppo (see Appendix Tables 17 and 18).

A second classification was by employment status. The categories were unpaid family labor, wage workers, workers paid in kind, unpaid apprentices, self-employed, and employers. The largest group, accounting for over one-half of the total, were the self-employed. The second largest group were unpaid family workers (accounting for nearly 30 percent). About 17 percent of the farm labor force were paid wages; employers accounted for only about 1.1 percent of the total. These proportions indicate that each employer used an average of about 15 workers, which seems unlikely. Very probably, some employers are listed in other types of work, and some people listed as self-employed may also be part-time employers, though according to the international classification system they should not be counted as such. It is also probable that some workers are employed by persons who own a farm, but are not enumerated since they have other occupations (see Appendix Tables 18, 19, and 20).

Only about one-third of the agricultural labor force in 1970 was reported to be literate, though this proportion varied greatly (from 18 percent in Al-Hasakeh and Al-Rakka to 56 percent in Sweida). The workers appeared to have been slightly more literate than the farmers for Syria as a whole, but this varied by Mohafaza. About two-thirds of the farm managers were reported to be literate (see Appendix Table 21).

Information concerning the literacy level of the farm labor force for 1976 was not available; therefore, data presented here concern the change in literacy levels for the total labor force by

Mohafaza and sex. The literacy level was extremely low for 1970--only 51 percent for the total work force (about 55 percent for males and 22 percent for females). By 1976, these percentages had increased to 68 percent for males and 51 percent for females. Thus the greatest change in literacy was in the female work force, though females still lagged behind males in literacy.

Very large differences were noted between Mohafazat, however. The male work force literacy level in 1970 ranged from 78 percent (in Damascus City) to 30 percent (in Al-Hasakeh); for the female work force the range was from 75 percent (in Damascus City) to 2 percent (in Al-Rakka). The highest literacy level for the female work force was in Damascus City (88 percent), higher than for males (78 percent); the lowest was 17 percent (in Deir-ez-zor), except for Quneitra (see Appendix Table 22).

Thus much progress had been made by both sexes in improving literacy levels. If the same progress has been made by the farm labor force based on percentages presented earlier, the literacy level for the farm work force should have been about 50 percent by 1976 and above that by now.

The 1970 work force in farming consisted of a higher proportion of workers above age 60 and below age 19 than did the nonfarm work force. For males, 32.5 percent of the farm work force consisted of those over 60 or below 19; for females the percentage was 54.5. This compares with approximately 18 percent for the nonfarming male work force. It appears that daughters are more likely to be considered part of the work force than wives who are considered to be housewives, though it is very likely that many wives provide labor for farming (see Appendix Table 23).

In all cases, the agricultural labor force consisted of a higher proportion of people under 20 and over 64 years of age. The over-64 age group ranged from 5.6 percent to 11.7 percent of the farm labor force and 1.9 percent to 4.3 percent of the nonfarm group (see Appendix Tables 24 and 25).

2.3.3 Summary: While the Syrian rural population as a percentage of total population is decreasing, it is still growing quite rapidly. In fact, it had apparently grown by about 100,000 people per year from 1970 to 1976. According to my interpretation of the farm labor force data, the number engaged in farming dropped considerably over this period. Thus it appears that the participation of rural people in nonfarm occupations increased substantially, by an increase either in the number of rural sector jobs or in the number of rural people commuting to work in the urban sector. While the data do not appear to be very reliable, one conclusion of this study is that the Syrian farm work force has decreased substantially and is continuing to do so.

The data for 1970 indicated that many rural workers were landless; therefore, it is likely that many of them sought work elsewhere, in either farm or nonfarm work. The proportion that would be available depends on the permanency of their work relationships, a factor about which I found no reliable data.

Almost one-third of the farm workers were unpaid family workers. It is unknown to what extent these workers contribute to the operation of the farm. However, inasmuch as a substantial portion of this group consists of young persons (below 20 years of age), particularly girls, this group would also seem capable of contributing to the work force in a paid capacity. In other words, one could expect that some of these young people would be available for remunerative work, farm or nonfarm, if it were available at a wage somewhat above the value of food and lodging that they receive as part of the farm family.

Literacy levels are quite low. This has implications for training and education of the farm labor force. The rather rapid advance in literacy levels for the total labor force, however, gives evidence that this is probably a much smaller problem than previously, and certainly less so for younger people.

Comparison of the proportions of various age groups in the farm work force compared to that for the nonfarm work force indicates that there is a somewhat larger proportion of workers under age 20 and over age 60 in the farm work force. The disadvantage this indicates in terms of work capacity will, however, lessen as mechanization increases.

### 3. Labor Requirements

This section is a description of the methods used and the results obtained from an attempt to determine labor requirements for farming by Mohafaza and by month.

#### 3.1 Introduction

An attempt was made to determine the most important crops within each Mohafaza (without considering all of the minor crops) in order to account for as much crop labor as possible. Both acreage and value were considered, since using acreage alone would exclude certain crops with high labor requirements. Twenty-two crops were included in the analysis: not more than 16 appeared for any one Mohafaza, with an average of 11 per Mohafaza. The 22 crops include 2 grains, 2 dry legumes, sesame, vetches, cotton, sugar beets, tobacco, 4 fruits, and 9 vegetables (see Appendix Table 26).

The 22 selected crops, when we omit small acreage crops in some Mohafazat, occupied almost 97 percent of the total land area in crops. There were differences in this respect by Mohafaza, however. In Al-Rakka, two crops (wheat and barley) occupied almost

99 percent of the total cropped area, whereas in the Mohafaza of Damascus, 16 crops occupied only 73 percent. These differences reflect the concentration on a few crops of farm production in Al-Rakka, in contrast to the many different crops, particularly fruits and vegetables, grown in the Damascus Mohafaza. (Data for farming operations within the city of Damascus were added to the data for the remainder of the Mohafaza.)

An omission of a particular crop for certain Mohafazat does not mean that the actual area sown was less than in those Mohafazat for which it was included; rather, that it was less important in terms of the total land area devoted to crops within those Mohafazat. For example, eggplant was included for Lattakia but excluded for Homs, even though only 689 ha. were grown in Lattakia and 917 in Homs. But the proportion of eggplant in the total cropped area was greater for the former than for the latter since the cropped area for Homs was nearly three times that of Lattakia. In general, few crops were included for a particular Mohafaza if the cropped area was less than 1,000 ha.

The hectares included in the analysis of the 22 crops by Mohafaza are shown in Appendix Table 25, along with the omitted hectares for each of the 22 crops and the omitted hectares of all crops per Mohafaza.

On the labor requirements for the various field operations, data were obtained from the Ministry of Agriculture. This information had been gathered in various Mantika where the particular crop was important by personnel from the Ministry of Agriculture who interviewed several farmers at the same time. This information varied greatly from one Mantika to the next, even for adjoining Mantika. It is suspected that these variations are due more to differences in judgment than actual differences in situations, although these vary greatly (depending on the use of animal or hand labor versus the use of tractors and power equipment).

Another source of information was the budgets obtained from the Agricultural Relations Department of the Ministry of Social Affairs and Labor. These data were prepared by and represent agreements reached among committees of sharecroppers, landowners, local Ministry of Labor representatives, and others. Since they are used to determine how the crop will be shared between the landowner and the farmer according to the contributions of each, they are carefully prepared. However, they are cast in terms of cost rather than labor requirements; therefore, the labor requirements had to be computed from other information (based on wage rates). While the Ministry of Agriculture information included wage rates, the estimates varied. For instance, cost estimates from the Peasant's Union on the whole were slightly lower than from other sources, even though they referred to 1978 while the others were mostly for 1975 or 1976 (with just a few for 1977).

The reader is warned not to accept the labor requirements presented here as very accurate. Because of the complexity of agriculture in Syria, many simplifying assumptions were made. While data were obtained from the Ministry of Agriculture concerning planting and harvesting dates, the time schedule for other operations was estimated, and each was assigned a time that seemed most logical. Some of these problems will be discussed in the following section.

### 3.2 Labor Requirements for Crops

One of the difficult tasks of the study has been to determine realistic labor requirements of individual farm operations for crop production. The one area of reasonably close agreement was pre-plant tillage operations. What was difficult to determine were the numerous combinations of methods used and the proportions of each, taking the country or the Mohafaza as a whole. The degree of complexity is even higher for nontillage operations. The differences in labor requirements using different implements and power sources are so great that to assume all work was done by the most time-consuming methods would indicate the need for more workers than exist in Syria, whereas to assume the methods used the lowest labor requirements would necessitate only a fraction of the present farm labor force. Therefore, for wheat and barley (because of their large acreage they are crucial in labor needs estimation), standard labor requirements were estimated from the available information; the proportion of each method used was adjusted by Mohafaza according to the topography, the degree of mechanization as indicated by the number of combines and threshing machines per Mohafaza, and by the apparent availability of labor per Mohafaza.

3.2.1 Wheat and Barley Crop Requirements: Two types of plowing are used, but the implements utilized are very different, as are the results of the tillage. Much of the farmland is apparently plowed with tractors. Estimates of time used for plowing 1 hectare averaged about three hours per hectare (which is remarkably close to my own experience with a tractor and two-bottom plow, the type used most frequently in the regions I have seen). Plowing with the old style, single point plow is generally estimated at 30 hours per plowing, with two or three plowings being performed. It appears that plowing with the tractor shortly after harvest is common practice, with animal tillage being used to further prepare the soil.

Even with relatively low wages, the cost of plowing by tractor is much less than by animal; yet the use of animal plowing in addition to tractor plowing seems to be continuing. Perhaps this is due to lack of opportunity cost for animals and human labor. Or, to state it another way, to pay someone to plow by tractor requires cash payment; to plow with animals is a cost only if the animal and human resources can earn more elsewhere. Perhaps custom is also a factor.



Weed control with herbicides is apparently cheaper (and probably more effective) than hand weeding of grain, but again there is a cash-cost factor involved in herbicide use, while there may not be in hand weeding--especially if this is done by unpaid family labor.

It is in harvesting, however, that differences in methods seem to be greatest. Apparently, there are cases where threshing is still done by animals treading on the grain, while workers (probably women and children) winnow and sift the grain from the debris. More common, however, is hand cutting with threshing done by machine. This appears to have given way to direct combining in many areas. Exceptions appear to be in some irrigated areas where it is difficult to cross some of the land formations made for irrigation; in mountainous areas where the plots are too small and access is impossible; and in excessively rocky areas. Another reason for hand harvesting seems to be a greater recovery rate of straw which is highly valued for feed.

As mentioned earlier, the labor requirements used in each Mohafaza are a composite of the three methods: most mechanized, least mechanized, and partially mechanized. In Appendix Tables 27 and 28, the labor requirements for the three methods are shown; in Appendix Table 29, data on mechanization by Mohafaza are shown.

3.2.2 Other Crops: Although labor requirements were described in some detail for wheat and barley, this will not be done for other crops for two reasons. First, none of the other crops is as important as these two combined, and therefore none is as important to the overall analysis of labor requirements. Second, the description of labor requirements for the grains gives a general idea of the wide range in labor requirements per hectare that is possible to project and still remain within the range of actual hours spent in crop production. The same is true of other crops, but the analysis is not as sensitive to differences in per hectare requirements for those crops on small plots. For further details on labor requirements of the other 20 crops, see Appendix Tables 27-49.

3.2.3 Computation of Labor Requirements: For each Mohafaza, hourly labor requirements for each field operation by crops considered important enough to be included for that specific Mohafaza were multiplied by the number of hectares of that crop grown and divided by eight to convert to man-days. Total labor requirements, as calculated by the above method, are presented in Appendix Table 50 by Mohafaza for the 22 major crops. Three crops--wheat, olives, and cotton--seem to have over one-half of the total labor requirements for the 22 crops.

Because of the omission of varying proportions of crop area for the various Mohafazat (for both the 22 major crops and the other miscellaneous crops), an obvious adjustment must be made before comparisons can be made between Mohafazat. Ideally, this would

be done by considering labor requirements for all the omitted crops by month. But the omission was originally made to avoid the amount of detail this would involve. Therefore, a simplifying assumption was made: all the remaining area required 250 man-hours per hectare, a compromise between extensive and intensive crops. Since it was not known in what months such labor would be required, it was allocated equally to all 12 months. Obviously, this includes error but it is better than no estimation for these crops (see Appendix Table 51 for the results of these estimates).

Inasmuch as labor requirements for livestock production have not been taken into account, an estimate was also made to include such labor needs. With only a general knowledge of how livestock is distributed in terms of herd size, the assumption was made that two-thirds of the milk cows and one-half of the sheep and goats were kept mainly for household use and therefore the number that each family owned could be taken care of by working an extra hour or two in addition to the daily eight hours each worker has been credited with. Of the remaining one-third of the milk cows, it was assumed that one worker would take care of 20 milk cows plus assorted other cattle. Of the remaining one-half of the sheep and goats, one worker was credited with caring for 150 milking and non-milking animals. The standard for milk cows was established on the basis of the writer's experience; the one concerning the sheep and goats on the statement of researchers that one man, perhaps with family help, cares for 150-200 animals where flocks are of large size.

The result of these allowances in labor requirements was to increase the overall labor requirements for the total farm sector from 70 million man-days to 90 million man-days. The increases were proportionally greater for some Mohafazat than for others, however, with Homs showing a far larger proportional increase than Tartous, for example (see Appendix Table 51).

The omitted area of about 281,000 ha. was calculated to require about 8,779,000 man-days of labor (see Appendix Table 51). Two groups of omitted crops were considered. For 59,000 ha., mostly of vegetables, about 500 man-hours per hectare were calculated as the labor requirements. The other group of omitted crops consisted approximately of 222,000 ha. (for a total of 281,000 ha.) of some 40 other crops grown in Syria, and was allocated slightly over 5 million man-days. The number of remaining man-days was thus about 185 man-hours per hectare, which is slightly below the number projected for the total hectares not included in the original analysis. While the other crops do consist of some low-labor requirement crops, there are many different types of fruits and vegetables. On balance, it would seem that the additional labor projected for those crops not included among the 22 major crops considered in the original analysis may be somewhat low. This is especially true for Damascus where, despite the inclusion of 16 crops, only 73 percent of the area was included in the original analysis (many vegetables and fruits are grown in that Mohafaza).

Decisions were then made to allocate the required man-days to those months in which labor would be required by the specific crop. These labor requirements were allocated for each field operation by the most logical means possible, i.e., by simply assuming that plowing and tillage took place before seeding; and that weeding, hoeing, irrigation, and insect control took place sometime between seeding and harvest. These assumptions were necessary since information concerning only the seeding and harvesting periods was available from the Ministry of Agriculture. This placement of these operations may be wrong in some instances, but probably is not too inaccurate. In addition, some would tend to vary by season depending upon rainfall, as this is the principal determining factor for the timing of irrigation and plowing.

For fruit crops, tillage was done throughout the year, since it probably takes place most often when other work in orchards is low. Pruning was indicated for the months when no fruit would be forming. A field trip in early March yielded some observations which were useful for determining the timing of a few operations.

Some complications arose, however. First, more than one planting and harvesting time may exist for an individual crop. There are spring, fall, and winter potatoes, summer and autumn sugar beets, and many other vegetables which are also planted in succession. Second, crops may be planted at different times in different regions of the country.

In some cases, the month may be too large a unit of analysis in that the crucial period for harvesting may be less than the month or two designated for that operation. For example, the data show that wheat is harvested in May and June (unless irrigated). The question is whether a shorter period of time may be more desirable to insure that the crop is harvested without loss. Another problem is how to allocate man-days when harvest begins about the middle of a month. Should one allocate the full number of man-days for the entire month or one-half of it? By allocating only one-half, the crucial nature of the labor shortage would be understated while if one allocated the full amount, it would tend to overstate the total number of man-days required. Also, the time of planting and of harvesting may vary from year to year due to weather conditions.

The following assumptions were made, ignoring these complexities. First, all crops were assumed to be planted and harvested at the time that the data indicated the largest proportion was planted and harvested. The correct times for these tasks were ignored for the rest of the crop, since it was not known what proportion of these crops was produced in each Mohafaza. Second, allocation of harvest labor was made for the entire month or two-month period, ignoring the problem of crucial shorter periods. Third, where a particular operation began or ended within a month, the total man-days were counted for the entire month. Fortunately, there were few such instances.

The data on requirements by months indicated that for the country as a whole, June was the month with the most labor activity, and that May, July, and October were also high months. The lowest labor requirements were during the months of January and December (see Appendix Table 53). Since the actual months during which labor was required for the 22 crops and for the miscellaneous crops were not determined, we assume that the estimated crop requirements were spread evenly throughout the year. This probably tended to overestimate the symmetry of calculated labor requirements. (Another method could have been to allocate these labor requirements in the same proportions, among months, as for those already calculated. However, this would probably prejudice the results too heavily toward the grain harvest period.) Livestock requirements were also divided equally among the 12 months. While there are certainly some differences in labor requirements during the year, this method of allocation should not be too inaccurate for the animal labor requirements.

As can be noted from Appendix Table 54, the same seasonal pattern was obtained for the total labor requirements as for the 22 crops shown in Appendix Table 53. Table 54, however, suggests different ranges between the lowest and highest months and the monthly variations seem less (although numerically they are the same in both tables). A comparison will be made in Section 4 of this report between the labor requirements as developed in this section and those of the farm labor force as discussed in Section 2.

### 3.3 Required Skills of Farm Workers

Up to this point, the farm labor requirements have been discussed solely in terms of number of workers needed without consideration for skills required. This, no doubt, is an oversimplification of the labor requirements, but a necessary assumption if we are to gain an indication of the number of workers needed.

Many farming operations, particularly hand labor, do not require a great deal of skill beyond that gained by experience in a relatively short period of time. Where machinery and equipment are concerned, however, somewhat more skill is required. For instance, learning to drive a tractor does not require much training or education, and most people can learn how very quickly. However, safety in the operation of tractors and equipment, proper maintenance (particularly of tractors), and proper adjustment of field equipment (especially of plows and combines) require much more instruction and training. Proper training in the use of insecticides, herbicides, and fungicides is extremely essential. These pesticides must be used properly for the safety of both the user and the eventual food consumer, particularly of fruits and vegetables.

While the above comments apply to all hired or self-employed workers, the self-employed and employers need a great deal more skill and training in farm management. These details will be discussed in a later portion of the study.

#### 4. Estimation of Underemployment and Worker Shortages

A series of tables for each Mohafaza and for the country as a whole was made to show the similarities and differences in labor use between Mohafazat (Appendix Tables 53-55) and for the country as a whole (see Figure 1). The reader is cautioned, however, to interpret the peaks and troughs of labor use as occurring during most of the month indicated, rather than just at the beginning of the month.

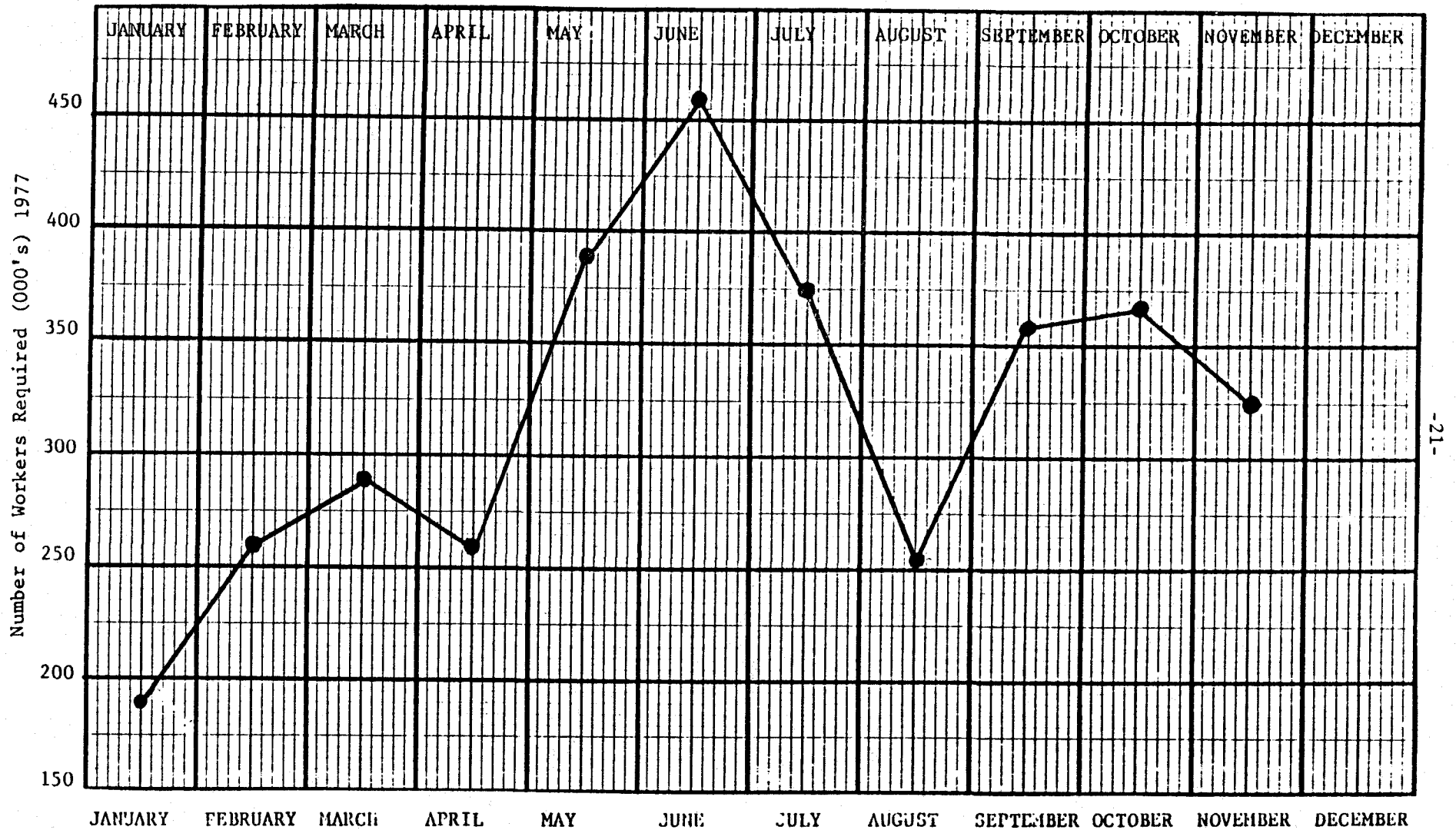
##### 4.1 Monthly Labor Requirements Compared to Farm Labor Supply, by Mohafaza

The most outstanding similarity in the pattern of labor requirements between Mohafazat were for the months of January and December. This tendency was strongest in the major grain-producing areas. The most notable exception to this pattern was Tartous, for which there were two other periods of low labor requirements. A second tendency was a period of low labor requirement in August (after grain harvest), though for Aleppo and Lattakia this trough occurred during September (see Appendix Table 54).

Dar'a and Sweida had labor requirements that apparently exceeded the available labor supply by 10 and 20 percent, respectively, in May and 12 percent (for Sweida) in June. This should not be interpreted as necessarily meaning these two Mohafazat imported labor during the month of May for it may quite simply be due to an underestimation of the degree of mechanization in these Mohafazat. Another factor here was the harvest of vetch; I have estimated that all of this crop was harvested in May, which was not true for other cereal and dry legume crops. If the labor requirements did indeed exceed the capacity of the indicated work force, these requirements may have been met in two other ways. First, as the requirements for the number of workers were based on a 25-day month and an 8-hour day, the workers may, like most farm workers during peak seasons, simply have worked more hours. Second, as conversations with development center personnel in Dar'a indicated, persons not otherwise in the work force, such as students, may work during harvest. For Al-Hasakeh also, the labor requirements seemed to have exceeded the available work force by 2 percent in June--again which may be due to an error in estimation of non-grain crop mechanization (I assumed almost 100 percent mechanization of the grain harvest).

There was a considerable difference between Mohafazat in the relationship of farm labor force and the apparent labor requirements. For example, the peak month for Damascus barely reached 50 percent. This indicates an underestimation of labor requirements, particularly for the large proportion of the area (27 percent) remaining in that Mohafaza after labor requirements for 16 crops were accounted for.

FIGURE 1: Farm Labor Force Required by Month, 1977



There is serious concern about labor shortages for three crops--sugar beets, cotton, and olives--particularly for harvesting. Most sugar beets are produced in three Mohafazat: Homs, Hama, and Al-Rakka. Of these, only Al-Rakka (as far as each Mohafaza as a whole was concerned) showed large requirements compared to the available labor force. Labor requirements appeared to be about 70 percent of the labor force in Al-Rakka during July, September, and October, as compared to 60 percent or less for Homs for these three months and 50 percent or less for Hama. According to information from the Ministry of Agriculture, autumn sugar beets, planted in autumn, are harvested in July and August; summer sugar beets, planted in February and March, are harvested in September and October.

Cotton, grown mainly in Deir-ez-zor, Al-Hasakeh, Aleppo, Hama, and Al-Rakka, is generally harvested between August 15 and November 15. Al-Hasakeh showed a peak labor utilization of 85 percent in September and 70 percent in October; Aleppo reached about 70 percent for October and November.

Olives are most heavily grown in Aleppo, Idleb, Tartous, and Lattakia. The olive harvest season is October through January. Of this crop, Idleb seemed to have high labor force requirements in proportion to its work force (80-90 percent from September through November). For Tartous, the rate was 80-95 percent for October and November. For Aleppo, the rate appeared to be only about 70 percent for October and November. For all Mohafazat (including these four), the rates were quite low for January and December.

As shown in the tables, there does not appear to be as extreme a labor shortage during the cotton, sugar beet, and olive harvests as for the grain harvest, in spite of the fact that more is heard about labor shortages for the former three crops than for grains. Of course, the data may simply be wrong. But there may be another explanation. Wheat, barley, and to some extent the other crops harvested during the May-July period are more widespread than are the three more labor-intensive crops. Therefore, the shortages of farm labor that exist for grain harvest can be more easily solved by working longer hours or hiring persons not ordinarily in the farm work force from the local community than shortages for other crops. Sugar beets, cotton, and to some extent olives are grown in more restricted areas and, with high labor requirements per hectare, the demand for labor is more highly concentrated.

In terms of the proportion of labor requirements, Tartous, Idleb, and Sweida had average labor requirements of 76 percent of the farm work force in those Mohafazat; this compares to averages of 45 percent or below for Lattakia, Quneitra, Damascus, Hama, and Al-Rakka (see Appendix Table 53). For the country as a whole, labor requirements were 53.3 percent of the farm work force on the average throughout the year, which is slightly above the 50 percent calculated for the U.S. in a previous study by this writer.



All of the tables were prepared and the labor shortages noted on the basis of a farm labor force of 578,000 according to the 1976 Sample Population Census. If, however, as seems likely, the farm labor force contains large numbers of women who were not counted in the Sample Census, it would mean that even at the peak periods of labor requirements, there would be enough workers present considering each Mohafaza as a whole.

Comparison of peak periods between Mohafazat show that very few of them do not have a peak period in the May-July grain and legume harvest period. Exceptions are Lattakia and Damascus, both of which have low labor requirements compared to the labor force size throughout the year, possibly because of underestimation of labor requirements for fruits and vegetables. However, one official said that there is never a shortage of labor in Lattakia, indicating that there may, in fact, be underemployment in that Mohafaza.

The period of September through November also requires considerable amounts of labor, depending on the extent that demands for two or all three of these crops (olives, cotton, and sugar beets) coincide. Again, the same comments apply in relation to Damascus and Lattakia. The data indicate, in addition, rather low labor force requirements in relation to the farm labor force for Homs and Hama, in spite of the fact that Homs is one of the leading producers for both sugar beets and cotton. Also shown in the data are low labor requirements for Dar'a in the autumn; this is reflected in the comments of people in Aleppo that workers come from Dar'a for olive picking.

In short, our analysis shows no overall farm labor shortage in Syria, but it does show possible shortages in a few Mohafazat for summer grain harvest. For the autumn period, harvest labor shortages appear less severe for the Mohafazat as a whole, but they are likely to be more serious in the local areas where these crops are produced. It appears that in spite of regional and seasonal labor shortages, there is still a considerable amount of underemployment based on the number of days worked by each individual throughout the year. This topic will be further discussed in Section 7 of this report.

#### 4.2 Additional Evidence Concerning Underemployment--Farm Labor Shortages

Some additional evidence concerning underemployment versus farm or labor shortages will be presented in this section on trends in rural and farm unemployment, wage rates, changes in cultivated land area per worker, and gross productivity per worker.

4.2.1 Unemployment in Farming: According to the Central Bureau of Statistics (CBS), a person is considered employed if he worked for at least three hours on the day of the survey or "if he could not work for seasonal reasons or because of illness or other reasons." The Population Sample Census and the labor surveys are both

done in September, a period of light farming activity. September, therefore, is a good time to take a population survey that records people as residents where they are at the time of the survey, but possibly a poor moment for a labor survey.

About 6.5 percent of both the rural and the urban labor forces were unemployed in September of 1976. However, there was wide variation by Mohafazat. Sweida, Tartous, and Deir-ez-zor reported urban labor force unemployment of over 10 percent, with Lattakia almost as high. For the rural labor force, these same Mohafazat had less than 10 percent unemployment, but Al-Hasakeh recorded over 10 percent (see Appendix Table 56).

According to the Statistical Bulletin of the Ministry of Social Affairs and Labor, unemployment increased by 28 percent (from 88,000 in 1975 to 113,000 in 1976), or from 4.8 percent to 6.2 percent of the total labor force. However, the number of unemployed listed as farmers declined from 21,000 (24 percent of unemployed) to 14,000 (12 percent of the unemployed). Owing to the inflated figures for the 1975 farm labor force, the apparent percentage unemployed of farmers was 2.3 percent for both years.

The number of people seeking work for the first time increased from 45,000 to 67,500 from 1975 to 1976 (from 51 percent to 60 percent of the unemployed). The number and percentage of unemployed farmers was extremely low. It would be interesting to know how many of those seeking work for the first time were sons and daughters of farmers. A perusal of unemployment office data showed the principal reasons for seeking work in the city of Damascus were lack of land and lack of jobs in the home community. Most of those registering were young men in their late teens and early twenties. It is unknown how much this increase in persons seeking employment was due to an increase in awareness of employment opportunities. The unemployment office in Damascus reported that 80 percent of job applicants in that city came directly from villages.

Data concerning unemployed farmers showed that only 2.4 percent for the country as a whole considered themselves unemployed in September of 1976, ranging from 1.1 percent in Sweida to 3.3 percent in Tartous, with the exception of 9.1 percent for the small number of farmers within Damascus City. Again, one can only speculate if the latter figure represents a true difference in unemployment or merely a greater awareness of opportunities for nonfarm employment (see Appendix Table 37). Inasmuch as this evidence indicates a trend, it tends to strengthen the argument that there is a greater shortage of farm labor than previously existed.

4.2.2 Wage Rates: Minimum wage rates are set for farm workers for each cropping operation and for each Mohafaza. These wage rates are set by a committee of employers, employees, and officials in each Mohafaza and then are approved by the Ministry of

Social Affairs and Labor. They are supposed to reflect actual living costs in the various Mohafazat. But these minimum wages have not been brought up to date from 1977 and are said to have been mostly exceeded by 1978 and certainly by 1979 (see Appendix Table 57 for a copy of the 1977 minimum wage rates). These rates varied from S.f 4 per day in 1977 in Idleb for hoeing to S.f 6.5 for harvesting. By contrast, the wage rates for the same tasks were S.f 8.34 and S.f 9.96 in Aleppo Mohafaza, respectively. The average minimum wage by Mohafaza ranged from S.f 4.71 for Idleb to S.f 8.52 for Aleppo. Wage rates were set much higher for harvesting than for threshing.

Some evidence--Ministry of Agriculture crop budgets--indicates that wage rates did not greatly differ from task to task, nor from Mohafaza to Mohafaza (see Appendix Table 58). Hourly wage rates shown are for 1975 for Damascus and Idleb, 1976 for Idleb, Lattakia, and Aleppo, and 1977 for Dar'a. In addition to the lack of any discernible regularity in the differences over task or Mohafaza, there does not appear to be any trend toward higher wages from 1975 to 1977.

The average wage rate for Damascus does, however, appear to have been higher than for Idleb, but evidence is far from conclusive. The S.f 1.71 hourly wage rate indicates about S.f 14 for an eight-hour day for 1975. This seems quite high in view of the fact I have been told by an employer that in 1978 he was paying S.f 10 per day to women workers in the Damascus City area, though he would have to pay S.f 14 in 1979. (In 1979 he would have to pay S.f 20 per day to men.) This individual asserted that men could earn S.f 35 per day for an eight-hour day, but that they often prefer to work five hours and earn S.f 20-25.

Respondents in Dar'a stated the wage rate of harvest labor was S.f 4-6 per hour, which would imply earnings of S.f 32-48 per day. However, the same persons said that 12-16 year old girls also harvested for S.f 10 per day.

Persons in the Aleppo Mohafaza reported wages of S.f 8-10 for women, with foremen receiving double those rates. Irrigation workers were said to be paid higher wages (from S.f 25-30 per day). In cotton, the rate was said to be 30 piasters per kilo, with average amount picked per day at 40-50 kilos, though some can pick 60-70 kilos at yields of 200-205 kilos per dunum. This would imply earnings of S.f 12 to S.f. 21 per day for picking cotton. Sources in the Ministry of Social Affairs and Labor asserted that the wage rate for picking cotton had risen roughly 15 piasters from 1975 to 1978 (from 5 to 20 piasters), although this figure may be low since published data from the same ministry indicated 1975 rates were about 10.5 piasters per kilo.

In general, approximately one-fourth of the cotton crop must be paid to the picker. At the price of 190 piasters per kilo,

25 percent for picking would yield approximately 48 piasters. Although some technicians asserted that as much as 50 piasters per kilo is paid to workers, the 48 piaster figure is high. Data from the Peasants Union placed the price at 15 piasters for the first picking of 200 kg./dunum and 25 piasters for the second picking of 50 kg./dunum. It is probable, then, that the highest prices quoted are for picking the second (or even the third) time when the yield is less, since the worker must be paid more if he is to earn as much as at a lower per kilo rate but with better picking.

For olive picking it is common for the worker to receive one-seventh of the crop, that is, six olives go to the owner and one to the picker. This would mean that someone who picked 70-100 kilos per day would earn a daily wage of S.f 20-30. At another village in Aleppo, it was said that four workers could pick ten olive trees per day with an average yield per tree of 30 kilos of olives. This would imply 75 kilos per day per worker (which is probably too high for the country as a whole in view of the reported yield of approximately 9.5 kilos per tree in 1977 and 13 kilos per tree in 1976). Using the Aleppo average of 16 kg./tree in 1977, a worker who picked 2.5 trees per day with an average price of S.f 2 per kilo would earn only S.f 11.5 per day if s/he was allotted one-seventh of the crop. In this same village, the average wage rate for men doing hard work was S.f 25 per day, but only S.f 15 per day for light work, and S.f 8-12 for girls. Wages, then, vary widely across regions, but even more widely between the sexes.

We can conclude that wage rates in farming are not high enough to attract men who could earn only up to S.f 20-25 per day on the farm (at least on a regular basis) and S.f 30 to S.f 50 in the city. Wage differentials tend to favor a situation where men go to nonfarm employment leaving much of the farm work in the hands of women who still work for S.f 5-15 per day.

It is difficult from such conflicting evidence to determine the extent to which wage rates in farming have increased in recent years. It seems apparent that they have increased, but whether they have risen more rapidly than the rate of inflation and prices of farm products would be difficult to ascertain. It appears, however, that wages paid to women for most work have not increased very much, while those for men have. This indicates that the relative earning opportunities in off-farm jobs for men are greater than for women.

#### 4.3 Underdevelopment as Low Productivity

Up to this point, the problem of underemployment versus labor shortage in Syria has been examined solely from the viewpoint of the numbers of people employed in farming versus the amount of farm work to be done. But underemployment, from the viewpoint of hours worked, is due more to the biological nature of farming than to any particular organization of farming. It would thus

appear that the question of underemployment relates to the productivity of the workers and not the number of hours worked. As mentioned earlier, it would appear that U.S. farm workers are more underemployed than their Syrian counterparts since the amount of farm labor required seems to be a slightly lower percentage of the farm work force available. U.S. farmers, however, are relatively productive and prosperous.

It is evident, then, that the key to understanding the farm labor situation in Syria is to examine the productivity per worker. As will be discussed at greater length later, the productivity per worker is a function of two elements--productivity per land and animal unit, and the number of land or animal units handled per worker. At this point, however, I will discuss the relationship between the number of cropped hectares per worker and the value produced per hectare and per worker.

As mentioned earlier, I have used the 1976 labor force data, in part because it was the most recent data set available which indicated labor force by Mohafaza. In the following productivity comparisons one must keep in mind that if the farm labor force consists of a large number of women not accounted for in the 1976 data, then these comparisons overstate productivity by as much as one-third or even more.

The land area planted to crops for the country as a whole increased about 20 percent from 1970 to 1976 while the number of farm workers apparently declined by about 30 percent. As a result, the planted area per worker increased from 4.5 ha. in 1970 to 7.03 ha. in 1976, varying from 0.8 to 8.1 ha. by Mohafaza in 1970 and from 2.05 ha. to 14.26 ha. in 1976. This, of course, reflects a different mix of crops between Mohafazat, adaptability of terrain to mechanization, and other factors. It does indicate, however, about a 56 percent increase in farmland per worker in the six-year period, probably reflecting both the effects of mechanization in some areas and the pull of nonfarm jobs as well (see Appendix Tables 60 and 61). As per hectare yields have increased (due to more irrigation and improved practices), the total agricultural production of Syria has virtually doubled from the 1970 period. Since production varies a great deal from year to year, a direct comparison of 1970 and 1976 is not very meaningful, especially when reported in broad categories. It is apparent, however, that production per farm worker has increased even more than the increase of 56 percent in land area per worker, since yields have also increased.

In order to find the total value of crop production, the quantity of the 22 major crops produced was multiplied by the price of each crop per Mohafaza. The Mohafaza totals were then summed to reach the total value of the crops. However, the percentage these crops constituted of the area in each Mohafaza varied from 76 to 97 percent. Therefore, in order to make a reasonable adjustment for these differences, the value of production was divided by the

percentage that the area these 22 crops represented in the total area per Mohafaza. This assumed that the value of production on the remaining hectares was the same as for the 22 crops accounted for.

The value of production per hectare ranged from S.£ 593 in Al-Hasakeh to S.£ 349 in Damascus. There are two important reasons for this large difference: the proportion of irrigated land, and the mixture of crops grown. Wheat production yields less value per hectare than most other crops, but costs are also less, particularly for labor (see Appendix Table 62).

Appendix Table 63 shows the value of production of crops per worker. These data do not include animal production, which means that there is a bias in favor of the Mohafazat which are least involved in animal products. The value of crop production ranged from S.£ 5,983 in Lattakia to S.£ 11,234 in Aleppo, with the average for the country as a whole being S.£ 8,891. Insofar as this represents an accurate value of production per worker, it indicates that if there were no other costs of production, the average worker would make only S.£ 29.6 per day if he worked 300 days per year. If, as indicated earlier, he worked 53 percent of the 300 days, a more reasonable proportion, he could earn more on a daily basis but it still would represent less than S.£ 9,000 per year. Given that there are other costs of production besides labor, the value of production which can be credited to labor would be perhaps about one-half this amount.

Since no allowance in the above analysis has been made for value of livestock production, an adjustment was made to take into account such production by Mohafaza. Adding the value of animal production (after adjusting animal production so as not to double-count crops used as animal feed) raised the value of production to almost S.£ 14,000 in Homs which put it ahead of Aleppo (slightly less than S.£ 13,000). The average for the country as a whole was slightly over S.£ 10,000, with Lattakia being raised to S.£ 6,492. One can see that with a gross annual value of production per farm worker as low as S.£ 6,500, it would be difficult to pay very high wages. If one-half of the production costs can be attributed to costs other than wages, this would put the value of farm labor at about S.£ 11 per day on a 300-day basis for Lattakia and about twice that for Homs. This lends credibility to statements that wages are not high enough in farming to attract males, particularly in the coastal areas, and that the year-round return to farm labor is probably less than wages paid to workers during certain times of the year, particularly during harvest. One can appreciate that if this is true, farmers would consider wages they have to pay as very high and would tend to resent and resist paying wages on a daily basis to seasonal workers which are higher than they themselves earn on a year-round basis.

The above figures were based upon a farm labor force of 578,000 in 1976. If based instead upon the estimate that the number of farm workers was closer to 878,000 (due to the undercounting of females), the productivity figures presented here would be reduced by 34 percent. Thus the average gross value per worker would drop from S.f 10,000 to S.f 6,600 (for Lattakia, S.f 4,300 if the undercounting of females assumed under Hypothesis Number 2 were to be proportionate among Mohafazat).

One must also keep in mind that these measures of productivity are based on given price levels which presumably bear a reasonably close relationship to world prices. If higher prices were to be used, of course, productivity as measured by value would then increase. Any measure based on value is, therefore, subject to change as prices change and should never be used to measure productivity of dissimilar items.

The issue of productivity per worker will be reexamined in Section 7, where the possible short- and long-term policies toward solutions to the underemployment-labor shortage problem are discussed.

## 5. Potential Changes in Agricultural Manpower Availability

Projections for the future are very risky, even when based on the best of data, since many factors may change the present trends. In the case of agricultural manpower, moreover, it is uncertain what the past trends actually have been. In spite of these difficulties, and in recognition of the risks involved, projections of past trends will be presented in this chapter; the factors likely to change these projections will then be discussed.

### 5.1 Projections of Recent Past Trends in Farm Manpower

In Section 2, it was shown that statistics concerning the number of male farm workers seemed quite consistent from 1970 to 1976. Two hypotheses were suggested; the first was that the female labor force had declined at the same percentage as the male. This hypothesis was consistent with the concept that families left the farm work force together, as would happen if the farm families moved from the farms to urban areas. The second hypothesis was that the 1971-75 statistics showing there were approximately 300,000 females in the farm work force were correct and that the number did not decline over the period 1970-76. This hypothesis seems more consistent with the apparent lack of employment in other sectors for females, with the fact that mechanization has taken place more in tillage (a primarily male task), and with the fact that there are still large areas of wheat and barley as well as lentils and other crops harvested by hand (done by women and children).



The above calculations are presented only to show what would happen if the apparent trend were to continue; they should not be considered as predictions as there are too many unpredictable variables to be considered--among them deliberate government policy.

## 5.2 Rural Population Change

Population estimates made for mid-1976 indicate there were at that time 523,000 persons aged 10-14 living in rural areas, and that the rural population aged 5-9 consisted of 692,000 persons. This indicates that, not counting for migration or deaths, 523,000 youth would have now reached the 15-19 age group, and by 1986 another 692,000 rural youth would have reached this age level. Available data indicate that this age cohort has an even higher participation rate in the labor force than the 20-24 age group.

Using the 1976 labor force participation rates and making some allowances for deaths and retirement of the older elements of the work force, it would appear that the rural labor force could reach 1,181,000 by 1981 (an increase of 223,346 or about 23 percent) and by 1986 it could reach 1,480,449 (a further increase of about 308,000 workers or 25 percent over 1981). These calculations have disregarded deaths within the younger age groups, but did estimate 32,000 total deaths from 1976 to 1981 and 45,000 from 1981 to 1986 (see Appendix Table 64). If the death rate of 9.5 per thousand were to continue for these years and were proportionate for each group (not a very precise assumption), it would account for a probable reduction in the estimated rural labor force to 1,151,250 for 1981 and 1,457,500 for 1986.

Migration could, of course, reduce the numbers of the persons living in the rural areas and thus the rural labor force. Evidence indicates, however, that the rural population grew more rapidly from 1970 to 1976 than from 1960 to 1970, whereas the urban population growth pattern was the opposite. This would indicate either that the migration from rural to urban areas had slowed during the 1970-76 period, or that birth rates in the urban areas had become lower.

Syria's rural population grew at an annual rate of 2.15 percent from 1960-70 with an increase to 2.62 percent from 1970 to 1976. Urban population, which had grown at the annually compounded rate of 4.99 percent from 1960 to 1970, had grown only at the rate of 4.41 percent during the latter period (see Appendix Table 65). These data would seem to indicate that large numbers of young people will enter the rural labor force in future years.

Thus, there appear to be two somewhat contradictory patterns. One is a fairly rapid decrease in farm workers; the other is a rapid increase in the rural nonfarm labor force. This difference, if it does exist and is not merely the result of errors in the data, can only be explained by three possible developments.

The first possible explanation is the movement of rural residents to urban jobs. In view of the relatively short distance involved and the fact that Syria has more than one growth center, this could be a substantial movement (and is rumored to be so). Unfortunately, no data seem to be available to prove or disprove this hypothesis.

The second possibility is that a substantial increase in non-farm employment has occurred. Evidence from other countries indicates it is not unusual for as high as 40 percent of rural employment to be in nonfarm jobs, where rural towns are included in the definition of rural as is done in Syria. This percentage was apparently reached in Syria in 1970. According to the World Bank report referred to above, rural households spend much larger amounts for nonfood items as their incomes rise, with the income elasticity for such nonfood consumer items as well as for inputs to agriculture in excess of unity. This means that as farm income increases, the demand for goods and services of the nonfarm rural sector increases more rapidly percentage-wise than does income. The author, however, knows of no data indicating that this has taken place in Syria.

The third possibility is an increased out-migration of workers to other countries, but I do not know of any data to show that this has occurred.

Regardless of the cause, it does seem clear that there will be large increases in the rural labor force in the foreseeable future as the rural population continues to grow. Whether the apparent trend in reduction of the farm labor force will continue depends on many factors, some of which will be discussed in the next subsections.

### 5.3 Change in Farm Labor Force Characteristics

Some of the farm labor force characteristics which could change over time and thus affect the future size of Syria's farm labor force are education, mobility, status, and attitudinal changes.

Increased participation in education would mean that children would remain out of the farm labor force for a longer time, or more likely, would spend fewer hours working on the farm. This is particularly true for girls since the female labor force, according to the 1970 Census, consisted of an extremely large number of girls below 20 years of age. Depending upon the educational levels reached, further education may prepare more farm youth for nonfarm jobs and accelerate the migration of rural young people to urban areas.

While road building is often promoted as a means to assist the farmers in a particular area to sell their products and bring in inputs, it can also increase the mobility of the farm labor force in seeking either rural nonfarm or urban jobs.

According to the evidence presented in Section 2, the 1970 labor force consisted of about 30 percent unpaid family workers, 18 percent wage workers, 52 percent self-employed, and the remaining 10 percent employers. It would be desirable to know to what extent these proportions have been changing. One might expect that the reduction of the farm labor force would have reduced the number of wage workers and possibly unpaid family workers more than the number of self-employed, since the latter would tend to be less mobile and would have less reason to leave farming unless the amount of land they had was very small. In the case of unpaid family workers, however, inasmuch as they consist of young children, they are evidently being replaced quite rapidly.

One would expect, also, that with more education, young people would tend to be less likely to see farming as a way of life and more likely to seek employment elsewhere. Changing ideas about the role of women would also tend to induce many women to seek work elsewhere, as would increasing awareness of higher levels of living attained by nonfarm people.

#### 5.4 Economic Conditions

From the viewpoint of farm labor supply, the economic conditions outside farming are very important. No doubt such conditions have been important in reducing the farm labor force in the past. The opportunity cost for labor is important in determining the supply of farm labor, that is, in determining whether a person will work in farming or some other occupation. This is particularly true for hired farm workers and unpaid family workers since they are freer to make occupational choices than the established self-employed farmer. As long as wage rates in the nonfarm sector are sufficiently greater than in the farm sector, rural employment is continuous rather than seasonal, or other aspects of nonfarm employment are viewed as preferable to farming, workers will leave farming.

Judging by pay rate scales in farming as well as other evidence, off-farm opportunities have existed chiefly for men rather than women. The fact that so much barley and wheat are harvested by hand in the face of higher costs for hand harvesting if labor is paid at the rate of even \$10 per day seems to indicate that the opportunity cost for female labor is considered by either the females themselves, the heads of their households, or both to be either zero or very low. Otherwise they would not continue to harvest grain by hand. If opportunities for off-farm employment of women and girls were to increase, they would be more likely to leave farming; if not, they will probably continue to work on harvests.

Should economic conditions adversely affect the availability of nonfarm employment or lead to the loss of jobs by those presently holding them, the apparent decrease in farm employment might slow

down and possibly even reverse if the slump in economic activity is severe. While it is evident that actions would be taken to prevent this, world events can have effects beyond the influence of a single government.

### 5.5 Government Policies

One assumption of this study is that farmers react to economic incentives, even though social and cultural conditions also affect their actions. Governments can create, augment, or counteract economic incentives. For example, government agencies are not allowed to register an unemployed farmer and to assist with his obtaining a job unless they are officially assured by an authority in the home community that his farm is not large enough to allow him to earn a living. Such rules are evidently designed to prevent some farmers from earning off-farm money and leaving the farm. If governments require children to remain in school until a certain age, or offer them free education or stipends while attending school, they also affect the number of farm workers. Government policies, of course, can affect the farm labor force even more so in other ways, such as improvements in rural living and price supports.

The future supply of farm labor is closely linked to the demand for farm labor, since once individuals are forced to leave farming (because there is no job or land), they will generally not return to farming unless, as indicated above, drastic economic distress forces them to do so. Although possibilities of change in the requirements for farm labor will be discussed in Section 7, it is well to remember that the requirements for farm labor become a push factor if these requirements are reduced. That is, they tend to push farm workers out of farming, just as pull factors in other portions of the economy tend to attract them from farming. Therefore, I will return to the probable departures from the apparent farm labor force trend after discussing probable changes in labor requirements.

## 6. Potential Changes in Manpower Requirements

Up to this point, this chapter has been based upon tentative data and observations and analyses of both. The present section is more speculative and theoretical.

### 6.1 Mechanization

As can be inferred from evidence already discussed in this report, mechanization has had, and will continue to have, a tremendous effect upon labor requirements--particularly in wheat and barley. The Syrian government apparently has taken an active role in promoting the mechanization of grain production, particularly in seeding and harvesting. According to the budgets from which the labor requirements were obtained, hand cutting of grain, threshing with the use of animals, and winnowing and sifting

of grain cost S.f 405-480 per hectare, while machine threshing cost S.f 100 per hectare. Manual weeding was said to cost S.f 70 per hectare compared to S.f 30 per hectare for herbicide use. For the second tillage, the use of animal power cost S.f 150 per hectare, while tractor tillage cost S.f 50 per hectare. Planting cost S.f 25 with tractors and S.f 150 with animal power. Readyng the land for irrigation by hand methods cost S.f 100, with machinery S.f 60. Summing up these costs, we can see costs from S.f 875-950 per hectare using animal and hand power and S.f 250 with tractor power. Comparing this to the 1977 average wheat yield (about 800 kg./ha. at 75 piasters/kilo or S.f 600 per hectare) puts these operating costs into perspective. It is clear that for anyone who pays for labor, there is a powerful economic incentive to mechanize grain production.

For the self-employed farmer with family help for which opportunity cost is very low, it may maximize family income to continue to harvest by hand. This is probably the major reason that much grain is still harvested by hand, though more straw is recovered by hand methods. With the premium price of forage in Syria, this is a second major reason for hand harvest.

While there appears to be quite an ample number of tractors and combines, in many instances farming operations other than plowing and combining are done to a large degree by hand or with animals. I have read of interest in and experimentation with windrowers for lentils, olive tree shakers to pick olives, airplanes to spray olives, cotton pickers and beet harvesters, but not for pre-plant and, particularly, post-plant tillage equipment.

Expansion of tractor usage to replace livestock tillage for planting and harvesting of crops would to a greater extent reduce labor requirements. However, there appears to be not much precedent in the use of nonhuman power for tillage after planting, particularly after the crop is growing. That is to say, animal power is not traditionally used for this purpose. If it were, conversion to tractor power could be done more quickly. However, the major reason that mechanization does not proceed more rapidly is the lack of economic opportunity for women in the farm work force who do much of the weeding and hoeing and the harvest work. Unless such opportunities occur or unless farming becomes more profitable (through higher yields or prices) so that it becomes desirable for farm families to trade leisure for slightly lower cash income, motives for further mechanization are lacking.

As I understand the sharecrop system (which I am told is fairly widespread in Syria), this could be another factor in favor of mechanization--if the landlord furnishes or pays for any portion of the production inputs other than land. Since, according to the suggested share arrangements, the proportion of the harvest's profits going to the landlord for tillage operations or for seed would probably increase as the cost of some other operation (harvest,

for example) decreases, there is an incentive for the landlord to press for this cost-reducing change. If the farmer and his family furnish the harvest labor, they may prefer to continue using hand methods as it would tend to maintain their share of income. Therefore, there is a conflict of interest between farmer and landlord, resolved on the basis of who has the most economic power in any given situation.

It is to be expected, then, that mechanization and the substitution of mechanical power for animal and human labor will continue reducing labor requirements. This, in turn, will affect the number of people in the farm work force as employees, self-employed, or both. The rapidity with which this will happen depends on whether farm labor, and particularly female labor, continues to be of low value. If the former continues to be of low value, mechanization may not occur very rapidly. Government policies again will influence the rate of change.

## 6.2 Farm Size

If mechanization becomes economically more desirable, there will be pressure to increase the farm size of individual farms. Since the cost of tractors and other equipment is very high, if borne by small farmers the cost per hectare is high. The hiring of tractors appears to be common in Syria, and seems to have been effective in keeping plowing costs quite reasonable but hours used per tractor quite high. Whether this will be the case if tractors are used for more farm operations remains to be seen. The tendency would seem to be toward more ownership by individual farmers as tractors are used for more farm operations. If this occurs, then there would tend to be pressure for larger farms, displacing more individual farmers, in order to spread tractor and equipment fixed costs over larger tracts of land.

On the other hand, if cooperative organizations are efficient, they could slow down such a development by making access to machinery at reasonable prices feasible. Government policy is also important in determining farm size. Information from the farm survey may be useful in better determining what farm size best accomplishes the goals of maximum food production, equity among farmers, and sustaining rural population numbers.

Without more concrete knowledge of the situation and government policies toward certain farm sizes, what I have been saying is mere speculation. I simply wish to point out that if mechanization is carried out by individual farmers, there is likely to be pressure to increase farm size, thus eliminating smaller producers. Should it be desired, this tendency can probably be slowed down or speeded up by deliberate government policy.

### 6.3 Individual Farm Organization

This refers to the mix of crop and livestock enterprises on the individual farm. Wherever there are complementarities in the use of resources, a mix of farm enterprises would seem to make best use of these resources. For example, if more labor is needed at certain times of the year than a farm family can provide but at other times of the year there is excess family labor under a one-crop system, growing two or more crops may make better use of the labor supply. Livestock enterprises likewise can make use of family labor otherwise unused. It has been calculated that on the average livestock farms need to be only 60 percent as large as farms without livestock in terms of land area to achieve the same income levels.

However, labor saving by specialization, lower machinery and equipment costs by spreading these costs over more land area, and efficiency in management (in that it may be more efficient to learn how to manage one enterprise rather than many) all point to specialization rather than diversification.

Labor on the individual farm may, however, be put to better use through logical diversification with labor demands spread out throughout the year rather than concentrated in a peak time period, as is true for one-crop farms. This is also the case at the Mohafaza level. In fact, the Mohafazat with a wider range of products showed less peak demand for labor in May and June compared to those Mohafazat with one crop completely dominating the farm economy, as shown in Section 4.

### 6.4 Land Area Availability Changes

The potential changes in land area will be discussed from two viewpoints: factors expanding cultivated land area, and factors reducing cultivated land area.

The principal addition to cultivated land area is through the extension of irrigation. If 435,000 ha. of additional land are added to the cultivated area of Syria, this could greatly increase the demand for farm workers. According to the labor requirements developed earlier (and assuming work for 150 days per year), it would take 20-30,000 farm workers if this land were planted for irrigated wheat and up to 300,000 workers for mostly nonmechanized sugar beet production. These figures are given not because the land would be exclusively planted for wheat or sugar beets, but to demonstrate the wide range in feasible requirements. Even with mechanization of sugar beet growing, about 40,000 workers would be required, and about 30 percent fewer for cotton production, if mechanized completely. From these figures it can be concluded that if the expansion of hectares is to be large for labor-intensive cotton and sugar beet production, at least partial mechanization will be needed.



The other factors affecting land availability are concerned with reduction in productive land. First, there is deterioration of rangeland, which has been investigated by others (see "Semi-Nomadic Systems of Production and the Delivery of Social Services," by Andrew Manzardo). If it is true that rangeland is slowly deteriorating, then to maintain the livestock numbers--particularly sheep and goats--substantial amounts of cropped land would have to be used. Roughage appears to be in very short supply in relation to livestock numbers. Secondly, there is land taken up or destroyed by city growth. One of the most apparent examples is the extension of Damascus into productive farmland in spite of the verticality of most recent construction. The same is likely to be occurring around other cities. Since this land area is farmed labor intensively, the effect such expansion has upon farm labor will be great--probably about one worker for each 2 ha., where production is entirely vegetables, and somewhat less with some mix of less labor-intensive crops. Road construction likewise reduces the amount of available cultivable land, but probably does not affect as high a proportion of highly productive land as does urban expansion. There are some reports of irrigation water pollution from factory chemicals which are already injuring certain crops in the Damascus area. Again, should such reports be substantiated, this could also sharply reduce labor requirements by decreasing the amount of land area being irrigated or by causing the land to go out of production.

On the whole, then, it is difficult to conclude what the numbers of persons engaged in agriculture would be by 1985 or by 2000. Mechanization, advanced to the point that it is today in the most mechanized agricultures in the world of 1979, whenever it is reached, would reduce labor requirements to about 100,000 workers. But I do not expect that this will be attained during the twentieth century in Syria.

My conclusion concerning the future of underemployment and labor shortages in Syrian agriculture is that both will continue to exist, perhaps even at any single particular period of the year in the same Mohafaza. This is due to some extent to the immobility of human resources in farming. If an individual is needed for even a few hours of work during a day or a few days during the week, he or she is not likely to seek work elsewhere. The distance that an individual will be willing to commute to work is probably less than distances he might have to travel even within a Mohafaza. As long as people are not too desperate to earn money, they would be reluctant to travel longer distances to locations where they would have to stay for weeks at a time within the vicinity of the particular crop for which they may be hired, unless adequate housing, sanitary facilities, etc., are made available. The apparent fact that most farm workers are women or children contributes further to the resistance to travel over long distances.

The fact of the biological nature of farming--that farming is a batch process rather than a continuous process such as most of

manufacturing--will dominate employment in farming. Except for certain types of livestock production, farm workers will always tend to be less employed during some parts of the year than others.

#### 6.5 Qualitative Changes in Farm Labor Force

In most of the discussion, the emphasis has been upon manpower requirements in terms of numbers rather than upon changes needed in characteristics of the farm work force itself.

One should not underestimate the ability of farmers to adjust to adverse farming conditions. The fact that they have been able to survive testifies to this. However, as conditions change and new opportunities become available, farmers will probably need more skills and training to take full advantage of these opportunities. Since changes in farming methods come about because of multiple sources of information, the increasing literacy of farmers will make it possible to reach them through written materials as well as by word of mouth.

Farmers' ability to maintain tractors and equipment has come a long way in the past ten years when, according to one publication, 40 percent of Syria's tractors were inoperative because of poor maintenance and lack of parts. There still is room for improvement, however.

Some training in farm management would be useful. Farmers have, no doubt, adjusted quite well to the use of the limited resources at hand, though there are some instances where resource allocation could be improved (particularly in regard to mechanization) in those instances where labor has a high cash or opportunity cost.

Where new crops are being promoted, training in both the culture of the crops and the use of any machinery different from that used for other crops is still necessary. One example is sugar beets where lack of familiarity with the crop seems to be retarding its development.

At this point in time, it is impossible to prescribe the detailed educational and skill needs of Syria's farm population, except that what is needed is better information about developments in farming. The Syrian government will need to exercise excellent judgment in deciding to accept or reject new developments. It will also need to become better able to articulate the needs of the large number of peasants outside the Peasant's Union, either as individuals or through some type of organization. As much of the farm work is done by females and since females, particularly in rural areas, are less literate than males, an obvious choice would be for literacy education for females.

There is some evidence that literacy may not be a great advantage for female employment in the countryside, however. For the

urban male work force, the percentage unemployed was lower (4.5 percent) than for their illiterate counterparts. For the urban female and the rural male work forces, the percentage unemployed is slightly greater for the literate than for the illiterate. However, for the female rural work force the percentage of unemployment (25 percent) is considerably greater for the literate than for the illiterate work force (5 percent). If this evidence reflects the general trends, it is little wonder that Syria's rural females are not motivated to obtain an education. This does not indicate that literacy education for females on farms may not be beneficial, but it does suggest that some restructuring is necessary for females if they are to take advantage of education as far as employment is concerned.

## 7. Alternative Policies

Various alternative and/or complementary policies are presented in this section. Changing conditions may make some more pertinent than others and some may be more in accord with the Syrian Government's objectives and overall goals.

This section is divided into two major sub-sections: short-range policies dealing with the problems of underemployment and labor shortages during the year and among Mohafazat, and longer-range considerations of farm labor productivity and earnings of farm people.

### 7.1 Short-Range Policies

This first sub-section is divided into five topics: (1) the possible reduction of peak seasonal needs; (2) spatial distribution of farm labor on a seasonal basis; (3) use of nonfarm labor in farming for peak labor needs; (4) improvement in farm management in order to be able to compete in labor markets; and (5) non-farm employment of farm labor on a seasonal basis.

7.1.1 Reduction of Peak Seasonal Needs: Seasonal needs for manpower are somewhat different in Syria on a crop-by-crop basis than in countries with more mechanized agriculture, where one would expect that planting and harvesting would be the periods of peak demand. In Syria, however, planting does not require as much labor as does weed control for row crops and vegetables. This means that there is a particularly heavy seasonal demand for labor during the growing season, especially for irrigated crops, vegetables, and tobacco when the period of labor needs for irrigation overlaps with the labor need for weeding and hoeing. Harvesting remains a period of heavy seasonal demand for labor; for wheat and barley as well as for the legume crops, it is the most important period of labor needs even when the crop harvest is nearly completely mechanized by the use of combines.

A first strategy, then, might be to reduce the peak labor needs. This could be done by creating a different crop combination on both a national and a regional basis. But probably any attempt to do this would result in poorer use of land resources. It would be disadvantageous to make such an attempt without an exhaustive study of overall productivity and efficient allocation of land resources to the production for which they are best suited.

A more fruitful approach would be to directly reduce the peak labor requirements for each affected crop. The most important and first approach should be to increase the productivity on a per land unit basis, particularly in the process of weed control, as it takes as much labor to control weeds for a low-yielding crop as for higher yielders, and perhaps more so. Therefore, whatever is necessary to promote higher yields of the various crops should be the first priority in attempting to reduce the peak seasonal needs for labor. More will be said about methods to do this under the section on longer-range policies.

A third approach is somewhat more obvious--the use of machinery and equipment. As mentioned, labor requirements for hoeing and weeding are high. There appears to be some use of herbicides in grain, but apparently it is not widespread. The Ministry of Labor has calculated savings of about S.f 4 per hectare by using herbicides rather than hand weeding for wheat. Very probably the value of the yield increase would be larger than this, particularly if the chemicals were applied at the proper time. While the savings are not large either in time or cost, given the almost 2,000,000 ha. of wheat and barley, it would still result in a direct savings of S.f 2,000,000, and at least 1 million man-days (2 million if the labor cost referred to female labor).

There is apparently little use of cultivators in Syria for weed control in row crops. The cost of cultivators is relatively small. They can save labor at a very crucial time, particularly for irrigated crops where labor demands for irrigation are likewise high. Thus, it would appear that investments in cultivators for tractors, or even possibly for livestock, would save considerable amounts of labor in cotton and sugar beet production, and possibly in vegetables. This alternative requires some adaptation of existing tractors, and perhaps more flexibility either in the production of more tractor sizes within Syria or in permission to import foreign-made tractors and/or equipment.

Harvesting is also a major outlet for farm labor. It is possible that the introduction of more grain combines, cotton pickers, and sugar beet machinery should have the third priority because of the large capital investments required and the subsequent loss in balance of payments as foreign labor in the production of this equipment is in effect substituted for Syrian agricultural labor. From the farm management viewpoint, the use of equipment may be justified, although landholding patterns and irrigation methods

may be obstacles to further mechanization (for further details, see Chapter III.) From the macroeconomic viewpoint of the society, a mechanization strategy must be closely examined for externality effects.

In spite of efforts to reduce the seasonality of labor demands, the nature of agriculture in Syria is such that some seasonality will always remain. Particularly for the industrial crops, this means that the need for hired labor during the harvest will continue.

#### 7.1.2 Spatial Distribution of Farm Labor on a Seasonal Basis:

At the present time, there is considerable relocation/migration movement of people to jobs in Syria, whether agricultural or otherwise. To date there has been little crop loss because of seasonal labor shortages. The biggest complaint comes from employers of farm labor who yearly have to pay higher wages for labor. Part of the reason for this increase is due to the rapid inflation which is evident in Syria. But farm wage rates for certain periods of the year and for certain tasks have apparently increased more rapidly than the rate of inflation. Statements have been made by employers and others that wage rates have increased approximately 5 to 30 piasters per kilo in the past five years for cotton picking, indicating a higher rate of increase than the 15-20 percent annual inflation rate said to have prevailed for the past several years.

There are several possible ways/means to help provide a more efficient and effective distribution of seasonal labor supplies, dependent to some extent on what is feasible within the framework of existing circumstances and institutions. First, the activities of existing employment agencies could be expanded to include placement of farm workers on a short-term basis, as well as a longer-term basis. At present, existing employment services do not register either farm employers or potential farm workers. This would, of course, necessitate more employees and cost for the employment services, but use could be made of the considerable expertise which has already been developed in at least some of the agencies.

Another possibility includes the creation of a separate government agency operating on a national basis to facilitate the recruitment and redistribution of itinerant farm laborers. This would benefit employers, but could also benefit landless laborers by facilitating more months of work per year. It is possible that other existing entities, such as the Peasant's Union or existing organizations of either employers or laborers, could facilitate this movement but this writer is unaware of any in existence except the Peasant's Union, which is closely tied to the Government. However, government supervision is essential to ensure fair wage rates and other conditions of employment, particularly housing for the labor force which must travel beyond commuting distance.

7.1.3 Use of Nonfarm Labor: No doubt, some use of nonfarm labor exists at present, such as the employment of students during summer vacation. College-level agricultural students could be another potential labor group, especially if done in such a way as to acquaint the students with farming, particularly since the data indicate that most college-level agricultural students are not children of farmers who work on their own fields.

Another possibility would be to introduce enough flexibility into urban employment to allow the urban labor force to work in farm crops for limited periods of time. Cuba, for example, has done this with a goal of acquainting white-collar workers with farm work, as well as to get the work done. If, as seems to be the case, farm harvest work is considered to be women's work and paid accordingly, this suggestion will meet with a great deal of opposition.

7.1.4 Improvement in Farm Management to Compete in Labor Markets: A basic reason why farmers complain about the high price of labor is that with given price levels, farms do not produce efficiently enough to allow farmers to pay the wages that the potential employees can earn elsewhere; or at least farmers think that they cannot and still earn from the land what they previously had earned. Greater efficiency in the use of land through higher yields is the first step toward better labor productivity. If wages continue to rise in spite of the productivity gains from higher production per land unit, then it will be necessary to introduce labor-saving equipment, starting with those that will give the highest return per Syrian pound invested. These investments appear most needed in cultivation equipment (as discussed elsewhere), in harvesting equipment, and in tillage equipment (tractors to replace oxen power used in addition to tractor plowing on much land area).

In other words, farm employers are competing both with other farmers and with nonfarm employers for the services of the prospective farm workers. They need to pay close attention to keeping gross income per land unit as high as possible and other costs as low as possible, consistent with optimum yield levels, in order to compete in the marketplace for available labor supplies. Thus, farmers would be able to attract people from other labor activities as well as people not in the labor force. The attraction for the former group, however, would probably be limited due to the temporary nature of farm employment.

7.1.5 Nonfarm Employment of Farm Labor on Seasonal Basis: Some attention should be directed to developing types of nonfarm employment that would be flexible enough to allow workers to take sizable blocks of time off for participating in farm work during peak seasons. This should take place in rural regions wherever possible. In this way, some of the workers who cannot work year-round and/or earn enough in farming would not be lost to farming entirely, but instead could have part-time employment in the urban centers.

One needs to face the fact, however, that even if all of these policies were put into effect in an efficient manner, the nature of agriculture is such that periods of underemployment and periods of relatively labor shortages throughout the year will continue to occur. The possibilities of increasing farm efficiency through leveling out these periods are limited. Of more importance is the efficiency of labor on farms during the periods in which it is employed, which is the subject of the remainder of this section.

## 7.2 Labor-Saving Technologies

Two labor-saving technologies are discussed: replacing of people by mechanical power and equipment, and increasing production per land or animal unit.

7.2.1 Changes in Mechanization: It is difficult to judge the exact state of mechanization in Syrian agriculture from available data, but it is obvious that a great number of tractors are in use. These tractors have been used primarily for plowing, with grain harvest also being highly mechanized in some areas. Apparently there is not a large amount of cultivation equipment being used to destroy weed seedlings and remove weeds after they have started. Most weeding is done by hand with little herbicide usage. Hoeing and weeding tend to consume more labor than harvest or planting in many cases.

Animal plowing, either alone or in combination with tractor plowing, still seems to be common. While the most common type of tractor pulls two bottoms and plows a hectare in 2-4 hours (depending on conditions), plowing with oxen requires 20-40 hours, and it is difficult to suppose it can do as good a job in most cases. As the cost of livestock plowing seems to have been at least S.f 100 compared to about S.f 40 with tractors, it is difficult to see why the farmers continue to use oxen. Two explanations seem logical, though there may be other reasons. First, most tractor plowing is hired and done during the slack period of the year. Therefore, one tractor can cover many hectares even though only pulling two bottoms, or at most three as is done in the eastern part of the country. At planting time, enough tractors may not be available to work the soil. Therefore, the farmer uses horses or oxen with a wooden plow to destroy weeds and prepare the seedbed. Secondly, the opportunity cost to the farmer may be close to zero if he has no readily available alternative use for his labor and owns oxen.

Perhaps during the time when mechanization is initiated, tractors are used for only a few tasks. Syria appears to be at this stage of development, at least in regard to row crops. The data show there were about 135,000 plows in Syria in 1977, of which 108,000 were old-type plows (indicating there were about 26,000 modern plows). At the rate of 3 hours per hectare, it would take 34 eight-hour days for 26,000 plows to turn over three-quarters of the 3,142,000 ha. of nonfruit cultivated land in Syria (in 1976).



This is not impossible, of course, particularly where much time is available between one harvest and the next planting. Where land is fallowed, it would appear to be even more feasible.

It seems, therefore, that if tractors are used for more purposes, particularly cultivation of row crops (that is, cultivation after planting), the use of oxen and horses will decrease except in mountainous areas where tractors cannot possibly operate. With 133,000 mules, horses, and oxen in Syria, it would seem that a quite sizable reduction in these numbers would probably occur. This reduction in the number of horses and mules could, of course, result in greater labor productivity from various sources. First, the land would be worked more rapidly by tractor, reducing man-hours per hectare. Second, farmers would no longer have to feed and care for the animals. It is difficult to estimate how much feed might be saved by having fewer draft animals, since apparently many animals subsist partly on feed that might otherwise be wasted.

7.2.2 Increasing Production per Land Unit: It is only by producing more per land unit that more crop production can be obtained except for additions to the area being cropped. The latter means is likely to produce a small increase except for some lands to be irrigated. If production per hectare is increased by 50 percent, this would increase total production by 50 percent, providing the same number of hectares are still cultivated. This would probably increase farm incomes by more than 50 percent.

However, increasing crop yields will probably not be very easy. Increasing the use of more productive varieties (such as Mexican wheat), more fertilization, better weed control, etc., can lead to some small gains. I will leave it to the soil scientists and agronomists to make a more precise evaluation of the productive capacity of Syrian soils given the vagaries of weather that exist.

One of the disadvantages to developmental aids such as Mexican wheat is that some people consider it to be a one-time solution rather than part of a continuous process of search and research for better varieties and cultural practices. Syria needs to have an indigenous research staff imaginatively and vigorously carrying out research on plants already grown in Syria and on plants not presently grown in Syria, such as sorghum and Sudan grass.

In other words, anything that would increase land productivity would also increase the productivity of labor. While the labor productivity gains are not as spectacular as those from labor-saving equipment, the gains are more solid, resulting in higher incomes for an existing rural population rather than reducing the number of farm workers and thus increasing the income of each as is true of labor-saving equipment. That is, these beneficial results occur if the bulk of the productivity gains do not go to a separate equipment-owning class.

7.2.3 Livestock Production per Animal Unit: The potential for increasing production per livestock unit is often greater than for crop production. In fact, during the period of rapid increase in crop yields in the U.S. and other parts of the world, livestock production per unit increased more rapidly on a percentage basis than did crop production. Increasing livestock production per unit is one area in which better breeding, feeding, and management can have profound effects not only in return to labor, by increasing labor efficiency, but also in increasing food production and perhaps upgrading diets (for a discussion of animal versus vegetable protein, see "Nutritional Status and the Planning of Nutrition Programs," by Dean Wilson). The emphasis here, however, is on labor productivity.

One example is milk production. For the year 1977, the record shows that 4,239,167 animals were milked and cared for along with large numbers of young stock and other nonmilk producing animals, resulting in 645,155 metric tons of milk. The number of animals milked had increased by 6,628 sheep, 50,831 goats, and 34,954 cows from 1976. However, reduction in per head annual production from 45.5 kg. to 30.6 kg. for goats, 127.9 kg. to 56.6 kg. for sheep, and 1,195 kg. to 1,147 kg. for cows resulted in a total reduction of 18,743 metric tons of milk from the 1976 level.

A practical goal for Syria to reach would be 10,000 lbs. or 4545 kg. per cow annually. At that level, exceeded by dairy production in many other countries, it will require only 142,000 cows to produce that amount of milk. The point is that improvements need to be made in production per animal in order to increase the productivity of labor, which is essential if the laborers are to earn a relatively good wage. At the same time, with the shortage of roughage in Syria feeding fewer animals more adequately would save greatly on roughage and somewhat on concentrates if production from fewer animals was increased.

Though dairy production was used as an example, the same principle is appropriate for other animals and poultry. Production of eggs was apparently 120 per hen for 1976, whereas feed would have been saved if production were closer to the 200 per hen level achieved in many other countries. If flocks were reduced correspondingly, this would also make the labor of those caring for the hens more productive. It is much more difficult to ascertain levels of production per animal unit for meat production, but no doubt roughage savings could also be made and labor productivity increased.

It must be recognized, of course, that the distribution of livestock at present has its advantages from the viewpoint of roughage utilization. Many animals scattered over large areas of grazing land, crop aftermath, etc., utilize roughage which would be wasted in a more concentrated animal agriculture. In spite of this, there appear to be possibilities of making better use of existing roughage sources in some areas through better

feeding of fewer animals. Yields of 30,000 kg./ha. of forage also seem encouraging.

One of the advantages of developing animal production on smaller farms is that techniques such as better breeding through artificial insemination, better feeding, and improvement of management techniques can be applied to farms of all sizes, in contrast to many farming practices which favor larger producers.

### 7.3 Labor-Intensive High-Value Production

Much of the agricultural work force of Syria is engaged in the production of vegetables and fruits. In fact, one can estimate that approximately one-half of Syria's farm labor is spent on these two areas, even though they occupy a much smaller proportion of land area. Labor requirements per hectare are very high for planting on crops such as onions; for weeding and hoeing they may be higher even than in harvesting. When irrigated, as they must be for satisfactory production in much of Syria, even more labor is required. It is said that growers find it difficult to make money even at wage rates of S.f 10-14 per day, though families continue to grow vegetables on their own land, often at labor returns that are less than the going wage. Even with high-value crops, labor intensity does not seem to yield satisfactory incomes at given (presumably world) vegetable and fruit prices. Attempts to increase labor productivity on the part of employers seem to consist largely of attempts to get workers to work harder. There may not be very effective ways to increase productivity per worker. Higher production levels per hectare would help, of course, but production already appears to be quite high. Mechanization is costly and not easily achieved, though there are some who would like to see such innovations as airplanes spraying olive orchards and tree shakers.

It does appear that the increased productivity route has been satisfactory in other countries. What has happened in advanced countries is that as wages in the nonfarm sector increase, the growers either must go out of business or must get the government to aid them. One action these governments have taken is to keep out foreign fruits and vegetables, allowing domestic prices to rise above world market prices. A second action has been to allow the importation of cheaper foreign labor to provide an additional work force and keep down domestic wages. Neither of these solutions is very satisfactory, the first in respect to the consumer, and the second in respect to the farm worker. Nonetheless, it would seem that a good case can be made for government intervention in the pricing of these types of crops, at least, the subject of the next sub-section.

### 7.4 Farm Subsidies

In much of this study, I have stressed the need for greater labor productivity. However, the only measure of labor productivity

among disparate products is by means of value produced per worker, as is determined by price as well as quantity produced. I have assumed that government-established prices are at or above world prices for those commodities, since a government interested in the welfare of its farm people would be unlikely to set them lower. If the government wished to increase labor productivity according to this method of calculation, all it would need to do is increase farm prices.

Thus, one goal of the government, to increase incomes of its farm people, could be accomplished by paying the farmers higher prices. In the short run, this is a simple transfer of income to farmers, but it does have some other implications. First, it increases income flow in the rural areas, helping the rural areas to increase in prosperity and jobs. Second, it may increase production by encouraging investments in fertilizer, seeds, and equipment. Third, it increases land prices since higher prices are distributed to other factors of production, with labor receiving the residuum.

Better results may be obtained by subsidizing inputs such as fertilizer, etc. In my own experience, this type of subsidy was more effective in increasing fertilizer use in the U.S. than it received credit for doing. It would, in effect, increase farmers' incomes even if it did not increase fertilizer use and simply reduced farm costs. In all likelihood such subsidies, however, would result in higher production with possibly lower product prices, which would result in higher incomes--at least in the short run. If the higher levels of production are allowed to depress the product prices, it could also lead to lower food prices to consumers than would otherwise be the case. At any rate, there would appear to be some benefits as well as costs to the economy as a whole.

The principal purpose of such subsidies would be to raise the incomes of farmers. It may be desirable to do so in spite of the fact that it constitutes a transfer from sectors which on the one hand may be more productive, but on the other hand may simply be able to command higher prices because of more market power. Judgment as to which is the case may be difficult.

#### 7.5 Nonfarm Rural Employment, Particularly for Females

Mechanization of Syrian agriculture will only occur when female labor is no longer available at low wage rates. To force mechanization would no doubt cause loss of farm family income from family workers, for the most part to owners of machinery. Only if there are other employment opportunities will harvesting labor become scarce enough to force the mechanization of harvest of grain and legume crops.

According to the available data, nonfarm rural employment seems to be increasing substantially. Research is needed to understand where this is occurring in order to encourage its further development. A World Bank publication suggests that examples in some Asian countries might be models on which to base such development, citing Taiwan as an example of decentralization of industry where people shifted occupations but not residences. Another example cited was Iran, where carpet-making and handicrafts were important rural nonfarm occupations.

The same publication stressed the necessity of government assistance to small-scale enterprises in rural areas (i.e., in infrastructure, banking and credit, trading services, research and technical assistance services, rural industrial estates, and employment policies of government organizations).

Since the World Bank appears to be interested in supporting this type of activity, it is suggested that this agency be utilized as a source of information and support for efforts to increase rural nonfarm employment, particularly in regard to what appears to be a very large proportion of the female farm labor force. Some effort is already underway in Syria in this regard under the Rural Development Program of the Ministry of Social Affairs and Labor (see "Delivery of Social Services to the Rural Population," by Harold Lemel).

In conclusion, and in reference to the three goals enunciated at the beginning of this paper, any increase in productivity per land unit or per animal unit would be beneficial in satisfying all three goals--increasing total farm product, increasing labor productivity of workers, and helping to keep people in the countryside. Improvements in labor productivity through further mechanization have both beneficial and detrimental effects, however. The most important beneficial effect is that it makes possible improvement in the incomes of farm workers or farmers by increasing their productivity. It has the detrimental effect of reducing the number of persons employed in farming and may contribute to the migration of people to urban areas. In order to counteract this detrimental effect of mechanization, increases in nonfarm rural employment are needed to offset the decreases in farm employment.

#### 8. Research Needs Relating to Farm Labor

This section contains some suggestions for future research on the current farm labor situation in order to enhance the effectiveness of future policy recommendations. The first portion is concerned with data generated by the farm survey being conducted in Syria at present; the second deals with more general research subjects.

### 8.1 Farm-Holders Survey Data Analysis

Two areas have been defined for analysis--underemployment and labor shortages in farming, and the family farm concept.

8.1.1 Labor in Farming: The first suggestion is to make use of crop labor requirement data generated by the farm-holders survey together with numbers of individuals available for farm work within villages to make a more accurate and detailed analysis of underemployment and labor shortages on a smaller geographical basis than I have done in this study. It appears that either the labor requirements or the estimates of farm worker numbers were wrong, or that the Mohafaza was too large a geographical area to adequately measure labor shortages. Using data from the large number of farms (within an RPU) from which interviews will be obtained should insure considerable accuracy in the labor requirements and farm work force data. The smaller geographical unit of analysis should enable the researcher to pinpoint areas of labor shortage more accurately.

The second area of study would be the income approach to underemployment. The objective would be to identify the optimal farm size in several farming patterns below which unsatisfactory incomes would be attained and from which not only the farm children but also the farmer himself would seek either seasonal or permanent off-farm work.

8.1.2 The Family Farm in Syria: The family farm concept basically consists of the idea that the farm family should own the land it tills, that most of the farm work should be done by the farm family, and that the income of the farm family should be comparable to that earned in other occupations requiring similar levels of skill. The idea that the family should own the land it works contributes to the security of the farm family, to the feeling of dignity and worth of the individuals in the farm family, and to the sharing of wealth since the increase in land value accrues to the cultivator-owner. If most of the farm work is done by the farm family, it precludes the development of a farm laboring class, which would be economically and socially a lower class than the farm owners. By including adequate farm income levels in the definition, the concept excludes farms that are inadequate in size as measured by production level and net income possibilities.

The existence of this type of family farm has generally been thought to contribute to the creation of a large rural middle class. Under certain conditions, family-farm agriculture can induce high labor and land productivity and if controlled, a certain degree of economic equality and economic and political stability. The family farm concept is consistent with and closely related to the idea that as many viable farming opportunities as possible should be available to young people reaching working age.

Analysis of the farm survey data would attempt to identify the approximate farm size for various types of farming systems that would fit the above description of the ideal family farm. One classification of farming systems to use might be Vince Harrel's 14 farming systems. If appropriate farm crop and livestock combinations can be defined for the RPU's, then the ideal family farm could be described.

Two problems need to be solved if one is to use this approach. The first and most easily solved is what income level should be designated as adequate. One could take one-half or two-thirds that of fully employed workers in urban areas (presuming that living costs would still be lower in the country). Instead of using the same income level, as the study is repeated, the standard would be raised not only to keep up with inflation but also to keep up with the advancements in living standards.

The second problem is what size family should be projected for the ideal family farm, particularly in terms of the work force. Where hand labor is important, the amount of land that can be adequately handled by one family defines the farm size. Ideally then, the size of farm should be changed during different stages of the farm family life cycle. When the farmer is young and has no children or the children are small, the farm size would have to be small so that he could do the work himself. As the children get older, they help eventually as much as an adult; therefore, the farm would have to be larger to fully employ the farm family. It would seem that the first postulate--that the farm family should own the land they work--would need to be modified to say that they should own part of the land they work. If enough was owned to occupy the time of one individual male, then adjustments in size of farm by renting land could be made as the farm family grew in labor capability and by eliminating rentals as the on-farm family size decreased. Alternatively, in some regions animal enterprises could be yet another method of adjusting farm size of family size, but more needs to be known about the cultural setting and individual circumstances to postulate a preferred pattern along these lines.

One of the basic assumptions of this analysis is that there is some farm size at which farm incomes can reach a satisfactory level with all the work done by only the farm family. There may be types of production in which this is not possible with existing mechanization levels and prices, or even at levels of mechanization and prices conceivably attainable. If this is true, of course, the ideal of the family farm would be impossible to attain. But it is important to determine the feasibility of family farms given Syrian agricultural conditions and present landholding patterns.

## 8.2 Analysis of Nonfarm Rural Employment Possibilities

If it is essential to improve labor productivity in farming to a greater extent than can be done only through increases in total



farm production, as appears to be the case, it will be necessary to reduce the number of workers in farming. Thus each worker will be producing a greater proportion of the whole. On the other hand, in order to improve farm income by increasing total output, individual income can only be increased by reducing the number of total workers. This assumes that the State will act to prevent unequal distribution of productivity gains.

If the number of farm workers is to decrease while the rural population increases, more workers must seek work elsewhere, either in urban employment or nonfarm rural employment. If it is a goal to slow down growth of urban areas, then it is imperative to give importance to the development of nonfarm rural employment possibilities.

It is necessary to know what activities are being carried on in this sector in Syria, and what obstacles there may be to their expansion. Only by understanding the situation which exists and the successes and failures of present attempts to promote this type of employment can a comprehensive strategy for the promotion of nonfarm rural economic activities be formulated and implemented.

### 8.3 Analysis of Nonfarm, Agriculturally Related Employment

Closely related to the nonfarm employment question (and partially overlapping it) is the question of the relationship between declines in farm employment and increases in nonfarm by farm related employment. When farmers substitute inputs produced off-farm such as fertilizer, improved seeds (though it may be questionable whether this should be classified as a farm activity), farm chemicals and machinery for farm-produced inputs, it causes an expansion of jobs in agriculturally related areas. Likewise, as more of the population becomes urban, marketing services become more important; more of the farm product is sold off-farm, food travels longer distances from the farm to the consumer, and more processing of farm products must occur.

The 1970 Census lists 82,000 persons who are involved in occupations that process or market mostly agricultural products. This does not include restaurants which hire another 12,000. While about 41 percent of employed persons in Syria are farm workers, only 2.5 percent work in food retailing. These percentages probably reflect small farm size in Syria and lower productivity per worker in the farm marketing sector since it would seem that a smaller proportion of total production must be marketed.

There seems to be no available estimates of growth of the farm input industry in Syria. While this lack of information has scarcely been a matter of concern in the U.S. (except for educators interested in job opportunities for their students), it would appear to be of greater concern to a planned economy such as Syria's.

#### 8.4 Share Rental System and Machinery Ownership

It would seem that the system of share renting would tend to force an increase in mechanization. The clearest example of this is wheat production in Al-Rakka, where the land is prepared for irrigation by hand, some animal tillage is used, and the crop is cut by hand and threshed by hand methods. The person who supplied or paid for the first tillage with a tractor would receive 3.5 percent of the crop as his return on the cost of S.f 50 per hectare, whereas if all of these tasks were performed by mechanical means, the tractor tillage would be worth 7.1 percent of the crop. It would appear, therefore, that if the landowner furnished some inputs besides land he would be motivated to mechanize the entire operation. The farm family might feel differently since if it performed the various tasks by hand it would receive higher proportions of the crop. With machine harvesting (combining), 14 percent of the crop share accrues to the individual who paid for the harvesting. In contrast, hand harvesting takes 28 percent of the crop when done entirely by hand. It would seem, therefore, to make a great deal of difference who furnished the various inputs as to whether mechanization would proceed rapidly or more slowly. Research should attempt to describe these relationships.

#### 8.5 Labor Conditions

If it is found desirable to continue hand labor in cotton and sugar beet production, there should be a study on the need to bring workers in from beyond daily commuting distances. If it is found necessary to do so, then there need to be regulations concerning the conditions of employment, particularly in the areas of housing, sanitation, and health. These investments, necessary for the protection of the workers, may well sway growers in the direction of labor-saving equipment. If this means the loss of some employment in agriculture, it would probably be preferable to the creation of a migratory labor class.

The apparently low labor force participation on the part of both males and females in Syria may be partially, at least, a matter of errors or differences in the method of determining labor force participation, i.e., the omission in most surveys of farm women who participate during part of the year. The published data show that Syria has from 1 to 1.5 million fewer persons in the work force than if participation rates were as high as in other countries, with the larger proportion of these omitted people being females.

There has been some recognition of the problematic lack of women's participation in economic activities, as evidenced by a paper by Safadi in 1969 which emphasized its importance. As mentioned earlier, the key to higher labor productivity in agriculture is the provision of alternatives for the thousands of females who still do hand labor in farming.

I propose, therefore, that the manpower planners hire a woman who is cognizant of both the cultural and the social setting of Syria and is well-informed about the changing role of women in other societies to study the situation and develop proposals to bring farm women into the mainstream of economic life in Syria. Only with alternative opportunities will sufficient farm labor leave agriculture to force more modern methods which are more productive in returns to labor. Should further mechanization take place without these opportunities, it would cause hardship on the displaced workers.

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APPENDIX TABLE 1: RURAL POPULATION BY MOHAFAZAT AND AS PERCENT OF Total  
MOHAFAZA POPULATION, 1970

<u>MOHAFAZAT</u>	<u>RURAL POPULATION</u>	<u>Percent RURAL OF TOTAL POPULATION</u>
DAMASCUS	438,974	30.3 %
ALEPPO	608,367	46.2
HOMS	292,561	53.6
HAMA	339,989	75.8
LATTAKIA	240,518	61.7
DEIR EZ ZOR	203,722	69.6
IDLEB	298,731	77.8
AL HASAKEH	372,621	79.5
AL RAKKA	204,450	83.9
AL SWEIDA	100,944	72.3
DAR'A	199,288	85.7
TARTOUS	246,859	81.7
QUNEITRA	16,490	100.
TOTAL	3,563,514	56.5 %

SOURCE: STATISTICAL ABSTRACT, 1977



APPENDIX TABLE 2: RURAL POPULATION BY MOHAFAZAT AND, AS PERCENT OF  
MOHAFAZAT POPULATION, 1976 AND CHANGE FROM 1970

<u>MOHAFAZAT</u>	<u>RURAL POPULATION</u>	<u>PERCENT RURAL OF</u> <u>TOTAL POPULATION</u>	<u>CHANGE IN PERCENT</u> <u>RURAL</u>
DAMASCUS	531,659	28.7 %	-0.6 %
ALEPPO	666,023	41.5	-4.7
HOMS	337,759	51.5	-2.1
HAMA	412,503	65.8	-10.0
LATTAKIA	300,323	60.8	-0.9
DEIR EZ ZOR	230,519	68.4	-1.2
IDLEB	378,710	78.3	+0.6
AL HASAKEH	419,830	77.8	-1.7
AL RAKKA	209,279	71.0	-12.9
AL SWEIDA	113, 378	73.6	+1.3
DAR'A	232,126	84.1	-1.6
TARTOUS	310,848	81.0	-0.7
QUNEITRA	18,398	100.	0
TOTAL	4,161,355	53.9 %	-2.6

SOURCE: STATISTICAL ABSTRACT, 1977

APPENDIX TABLE 3: RURAL POPULATION INCREASE FROM 1970 TO 1976 AND PERCENT  
CHANGE BY MOHAFAZAT

<u>MOHOFAZAT</u>	<u>RURAL POPULATION INCREASE</u>	<u>INCREASE<sup>24</sup> % OF 1970 RURAL POPULATION</u>
DAMASCUS	92,685	21.1 %
ALEPPO	57,656	9.5
HOMS	45,198	15.4
HAMA	72,514	21.3
LATTAKIA	59,805	24.9
DEIR EZ ZOR	26,797	13.2
IDLEB	79,979	26.8
AL HASAKEH	47,209	12.7
AL RAKKA	4,829	2.4
AL SWEIDA	12,434	12.3
DAR'A	32,838	16.5
TARTOUS	63,989	25.9
QUNEITRA	1,908	11.6
TOTAL	597,841	16.8 %

SOURCE: STATISTICAL ABSTRACT, 1977

APPENDIX TABLE 4

SEX RATIOS OF RURAL AND URBAN POPULATION BY AGE GROUPS

1970 and 1976

	<u>RURAL</u>		<u>URBAN</u>	
	<u>1970</u>	<u>1976</u>	<u>1970</u>	<u>1976</u>
Less than 1 year	109.5	108.3	106.9	108.3
1-4	106.1	105.9	106.8	106.5
5-9	109.0	108.4	107.1	107.3
10-14	113.4	113.4	108.8	108.6
15-19	100.7	103.1	108.1	111.0
20-24	110.1	105.9	105.1	101.4
25-29	083.9	85.8	103.0	107.0
30-34	081.4	80.7	108.5	109.1
35-39	089.2	84.6	113.7	111.7
40-44	104.1	100.0	119.1	115.4
45-49	106.8	104.6	117.1	116.9
50-54	104.6	114.8	106.5	97.7
55-59	108.9	102.8	111.1	105.5
60-64	102.1	105.2	88.1	93.5
65 & over	107.3	105.2	90.6	92.9
TOTAL	103.8	103.6	107.1	107.1

Statistical Abstract 1977-- Midyear estimates.

APPENDIX TABLE 5

PERCENT RURAL BY AGE GROUP 1970 and 1976

	<u>Percent Rural 1970</u>			<u>Percent Rural 1976</u>		
	<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
Less than 1 year	58.5	57.7	58.1	54.5	54.5	54.5
1-4	59.2	59.4	59.3	55.8	55.9	55.8
5-9	57.7	57.3	57.5	54.0	53.7	53.9
10-14	56.4	55.4	56.0	52.6	51.5	52.0
15-19	54.4	56.2	55.3	50.6	52.5	51.5
20-24	54.2	53.1	53.7	50.2	49.1	49.6
25-29	48.8	54.2	51.6	44.5	50.0	47.3
30-34	48.4	55.5	52.0	44.0	51.5	47.8
35-39	51.5	57.5	54.6	47.8	53.3	50.5
40-44	53.3	56.6	54.8	49.4	53.0	51.1
45-49	55.8	58.0	56.9	51.9	54.7	53.3
50-54	59.1	59.5	59.3	55.7	51.6	53.7
55-59	55.8	56.2	56.0	51.9	52.6	52.3
60-64	62.0	58.5	60.2	58.0	55.1	56.5
65 & over	64.6	60.7	62.6	60.5	57.5	59.0
TOTAL	56.1	56.9	56.5	52.2	53.1	52.7

Statistical Abstract 1977- Midyear estimates

APPENDIX TABLE 6: NET MIGRATION FROM RURAL AREAS TO URBAN CENTERS, 1976

<u>MOHAFAZA</u> <u>OF ORIGIN</u>	<u>SAME MOHAFAZA</u>		<u>DIFFERENT MOHAFAZAT</u>		<u>TOTAL</u>
	<u>CENTER</u>	<u>OTHER URBAN</u>	<u>CENTER</u>	<u>OTHER URBAN</u>	
DAMASCUS	1048	- 38	- 151	- 3	856
HOMB	440	73	433	46	992
HAMA	34	15	437	12	498
TARTOUS	94	51	- 2	- 41	102
LATTAKIA	462	30	386	- 1	877
IDLEB	63	- 13	595	43	688
ALEPPO	2116	293	409	319	3137
RAQQA	59	13	- 17	5	60
DEIR EZ ZOR	10	41	76	51	178
HASBAKA	239	535	124	21	919
SWEIDA	173	40	301	- 14	500
DAR'A	87	26	1198	62	1373
QUNEITRA	<u>- 1</u>	<u>2</u>	<u>2553</u>	<u>86</u>	<u>2638</u>
TOTAL	4824	1,066	6,342	586	12,818

SOURCE: TABLE FURNISHED BY CENTRAL BUREAU OF STATISTICS, unweighted sample Census data. Since this data is unweighted, it indicates the direction of migration but not actual extent of migration.

APPENDIX TABLE 7: AGE AND SEX SPECIFIC LABOR PARTICIPATION RATES; SYRIA COMPARED TO TWO GROUPS OF COUNTRIES. 1970 FOR SYRIA, 1965 FOR OTHER COUNTRIES.

<u>LABOR PARTICIPATION RATES</u>						
	<u>MALE</u>			<u>FEMALE</u>		
	<u>LESS DEVELOPED COUNTRIES</u>	<u>MORE DEVELOPED COUNTRIES</u>	<u>SYRIA</u>	<u>LESS DEVELOPED COUNTRIES</u>	<u>MORE DEVELOPED COUNTRIES</u>	<u>SYRIA</u>
0 - 14	6.5 %	1.3 %	5.1 %	4.0 %	0.8 %	2.2 %
15 - 24	78.1	70.2	63.6	36.9	47.8	10.6
25 - 54	96.3	96.1	93.1	40.1	40.3	8.2
55 - 64	86.3	82.6	83.9	29.2	30.1	5.6
65 +	57.5	30.0	32.7	14.5	9.2	1.8
TOTAL	53.2 %	58.3 %	42.1 %	22.9 %	26.8 %	5.3 %

SOURCES: STATISTICAL ABSTRACT 1977, SYRIA, DAVID TURNHAM.

THE EMPLOYMENT PROBLEM IN LESS DEVELOPED COUNTRIES: A REVIEW OF EVIDENCE

APPENDIX TABLE 8: COMPARISON OF RURAL LABOR FORCE SIZE TO TOTAL LABOR FORCE SIZE, 1970-1976

<u>YEAR</u>	<u>TOTAL LABOR FORCE</u>	<u>RURAL LABOR FORCE</u>	<u>RURAL LABOR FORCE AS PERCENT OF TOTAL LABOR FORCE</u>
1970	1,570,776	907,109	57.7 %
1971	1,645,721	958,486	58.2
1972	1,715,072	1,035,460	60.4
1973	1,688,564	1,038,010	61.5
1974	1,718,553	1,044,702	60.8
1975	1,838,948	1,130,780	61.5
1976	1,827,924	957,956	52.4
1977	1,994,759	1,081,473	54.2

SOURCES: DATA FOR 1970, POPULATION CENSUS OF 1970; FOR 1976, SAMPLE POPULATION CENSUS; AND FOR 1971-75 AND 1977, Statistical Bulletin of the Ministry of Labor and Social Affairs, 1971-1975 and 1977



APPENDIX TABLE 9: LABOR FORCE AS A PROPORTION OF Able-Bodied Individuals  
Over 10 Years of Age, 1976 and 1977

	<u>RURAL</u>		<u>URBAN</u>	
	<u>1976</u>	<u>1977</u>	<u>1976</u>	<u>1977</u>
<u>MALE</u>	62.1 %	62.4 %	62.2 %	58.6 %
<u>FEMALE</u>	6.7 %	19.1 %	6.9 %	8.1 %
<u>TOTAL</u>	35.4 %	40.8 %	35.5 %	34.3 %

SOURCE: STATISTICAL ABSTRACT 1977 AND ANNUAL STATISTICAL BULLETIN OF  
MINISTRY OF SOCIAL AFFAIRS AND LABOR, 1976

APPENDIX TABLE 10: RURAL LABOR FORCE AS A PERCENT OF RURAL MANPOWER BY  
SEX AND MOHAFAZA, SEPTEMBER 22, 1976

	<u>MALE</u>	<u>FEMALE</u>
DAMASCUS	64.5 %	4.0 %
ALEPPO	63.9	4.6
HOMS	58.3	10.5
HAMA	60.7	16.1
LATTAKIA	55.7	11.0
DEIR EZ ZOR	64.6	6.7
IDLEB	61.0	4.9
HASSAKEH	69.4	6.1
RAKKA	72.7	3.3
SWEIDA	58.3	3.1
DAR'A	56.7	1.8
TARTOUS	55.0	4.8
QUENITRA	60.5	1.9
TOTAL	62.1 %	6.7 %

SOURCE: STATISTICAL ABSTRACT, 1977

APPENDIX TABLE 11: NUMBER OF WORKERS EMPLOYED IN FARMING WITH YEAR-TO-YEAR PERCENTAGE CHANGES,  
1970 - 1976.

<u>YEAR</u>	<u>TOTAL</u>		<u>FEMALE</u>		<u>MALE</u>	
	<u>NUMBER</u>	<u>PERCENT OF</u> <u>YEAR BEFORE</u>	<u>NUMBER</u>	<u>PERCENT OF</u> <u>YEAR BEFORE</u>	<u>NUMBER</u>	<u>PERCENT OF</u> <u>YEAR BEFORE</u>
1970	748,009	-	106,712	-	641,297	-
1971	844,269	118.2 %	245,751	230.3 %	638,518	99.6 %
1972	925,345	104.6	289,397	117.8	635,865	99.6
1973	857,943	92.7	280,031	96.8	577,612	87.7
1974	877,811	102.3	220,999	78.9	656,882	113.7
1975	896,517	102.1	309,027	139.8	587,496	89.9
1976	578,268	64.5	62,512	20.2	515,756	87.8

SOURCES: Annual Statistical Abstract, 1977; and Annual Statistical Bulletin of the Ministry of Labor and Social Affairs, 1971-75.

APPENDIX TABLE 12: FARM LABOR FORCE AND MALE FARM LABOR FORCE AS  
PERCENTAGE OF TOTAL LABOR FORCE, 1970 - 1976.

<u>YEAR</u>	<u>FARM LABOR FORCE</u>	<u>MALE FARM LABOR FORCE</u>
1970	47.6 %	40.8 %
1971	53.1	38.8
1972	53.9	37.1
1973	50.8	34.2
1974	51.0	38.2
1975	48.7	31.9
1976	31.3	28.2

Source: Statistical Abstract, 1977 and Annual Statistical  
Bulletin of the Ministry of Labor and Social Affairs  
1971-75.

APPENDIX TABLE 13: FARM LABOR WORK FORCE BY MOHAFAZA, 1970 AND 1976

<u>MOHAFAZA</u>	<u>Farm WORKERS</u>		<u>PERCENT BY MOHAFAZA</u>	
	<u>1970</u>	<u>1976</u>	<u>1970</u>	<u>1976</u>
DAMASCUS CITY	11,975	7,252	1.6 %	1.3 %
DAMASCUS	57,216	41,600	7.6	7.2
ALEPPO	152,108	97,615	20.2	16.9
HOMS	57,282	42,808	7.6	7.4
HAMA	87,813	80,163	11.7	13.9
LATTAKIA	51,968	44,269	6.9	1.7
DEIR EZ ZOR	49,095 *	45,643	6.5	7.9
IDLEB	55,120	48,310	7.3	8.4
AL HASAKEH	81,802	63,595	10.9	11.0
AL RAKKA	56,769	45,659	7.6	7.9
AL SWEIDA	18,182	10,819	2.4	1.9
DAR'A	26,694	16,833	3.6	2.9
TARTOUS	42,914	31,195	5.7	5.4
QUNEITRA	<u>2,581 *</u>	<u>2,507</u>	<u>0.3</u>	<u>0.4</u>
TOTAL	751,519	578,268	99.9 %	100.0 %

SOURCE: Statistical Bulletin 1977, and Population Sample Census, 1976, Central Bureau of Statistics, 1977.

APPENDIX TABLE 14: CHANGES IN FARM LABOR FORCE FROM 1970 TO 1976 BY  
MOHAFAZA

	<u>1970</u>	<u>1976</u>	<u>DECREASE</u>	
			<u>NUMBER</u>	<u>PERCENT</u>
DAMASCUS CITY	11,975	7,252	4,723	39.4 %
DAMASCUS	57,216	41,600	15,616	27.3
HOMS	57,282	42,808	14,474	25.3
HAMA	87,813	80,163	7,650	8.7
TARTOUS	42,914	31,195	11,719	27.3
LATTAKIA	51,968	44,269	7,700	14.8
IDLEB	55,120	48,310	6,810	12.4
ALEPPO	152,108	97,615	54,493	35.8
RAKKA	57,769	45,659	11,110	19.6
DEIR EZ ZOR	49,095	45,643	3,452	7.0
HASSAKEH	81,802	63,595	18,207	22.3
SWEIDA	18,182	10,819	7,403	40.7
DAR'A	26,694	16,833	9,861	36.9
QUNEITRA	2,584	2,507	77	3.0
TOTAL	<u>751,519</u>	<u>578,268</u>	<u>173,295</u>	<u>23.1 %</u>

SOURCE: Statistical Abstract 1977 and Population Sample Census 1976,  
Central Bureau of Statistics, 1977.

APPENDIX TABLE 15: AVERAGE DAILY WAGES FOR SELECTED BUILDING WORKERS<sup>1</sup> IN THE PRIVATE SECTOR 1975,  
1976 BY MOHAFAZA

<u>MOHAFAZA</u>	<u>HIGHEST WAGE GROUP</u>		<u>LOWEST WAGE GROUP</u>		<u>AVERAGE OF BOTH GROUPS</u>	
	<u>1975</u>	<u>1976</u>	<u>1975</u>	<u>1976</u>	<u>1975</u>	<u>1976</u>
DAMASCUS	37	73	15	37	26	55
ALEPPO	32	47	17	21	24	34
HOM8	52	-	15	15	15	15
HAMA	42	47	10	10	26	28
IDLEB	50	42	17	20	33	26
LATTAKIA	30	42	17	19	23	30
DEIR EZ ZOR	30	50	12	18	21	34
AL RAKKA	50	45	12	15	31	30
HABSAKAH	38	49	11	11	24	30
TARTOUS	40	47	20	19	30	33
SWEIDA	25	35	-	10	-	22
DAR <sup>1</sup> A	25	40	10	10	17	25

<sup>1</sup> FOR THE MOST PART THE TWO GROUPS ARE CEMENT CARPENTERS AND ORDINARY WORKMEN.

SOURCE: ANNUAL STATISTICAL BULLETIN OF MINISTRY OF SOCIAL AFFAIRS AND LABOR, 1976

APPENDIX TABLE 16: PERCENTAGE CHANGE IN AVERAGE OF LOWEST AND HIGHEST AVERAGE DAILY WAGES FOR CONSTRUCTION WORKERS, 1975 - 1976 COMPARED TO CHANGES IN FARM LABOR FORCE BY MOHAFAZA, 1970 - 1976.

<u>MOHAFAZA</u>	<u>PERCENT Decrease in FARM LABOR FORCE</u>	<u>PERCENT CHANGE IN CON- struction Wage</u>
SWEIDA	40 %	40 % <sup>1</sup>
ALEPPO	36	42
DAR <sup>a</sup> A	35	47
DAMASCUS	29	111
TARTOUS	27	10
HOMS	24 <sup>2</sup>	0
HASSAKEH	22	25
RAKKA	19.5	- .03
LATTAKIA	14.7	30
IDLEB	12.3	- 22
HAMA	8.7	8
DEIR EZ ZOR	7.0	62

<sup>1</sup> BASED ONLY ON HIGHEST WAGE SINCE LOWEST WAS NOT REPORTED FOR 1975

<sup>2</sup> BASED ONLY ON LOWEST WAGE SINCE HIGHEST WAS NOT REPORTED FOR 1975 OR 1976.

Sources: Annual Statistical Bulletin of Ministry of Social Affairs and Labor 1976, and Statistical Abstract 1977.



APPENDIX TABLE 17: CLASSIFICATION OF AGRICULTURAL, ANIMAL HUSBANDRY, FORESTRY WORKERS, FISHERMEN, HUNTERS BY MOHAFAZAT, 1970.

	<u>FARM MANAGERS AND SUPERVISORS</u>	<u>FARMERS</u>	<u>AGRICULTURAL ANIMAL HUSBANDRY WORKERS</u>	<u>FORESTRY WORKERS</u>	<u>FISHERMEN, HUNTERS, &amp; RELATED WORKERS</u>	<u>TOTAL</u>
<u>MOHAFAZAT</u>						
DAMASCUS	154	27,604	27,409	249	27	55,443
ALEPPO	70	72,397	79,411	50	51	151,979
HOMS	22	30,242	25,957	26	237	56,484
HAMA	32	43,561	44,083	49	56	87,781
LATTAKIA	29	28,866	22,446	181	410	51,932
DEIR EZ ZOR	18	25,271	23,728	33	18	49,068
IDLEB	16	31,409	23,620	37	30	55,112
HASAKEH	14	46,997	34,496	12	17	81,536
RAQQA	14	24,459	32,273	3	15	56,764
SWEIDA	1	12,236	5,840	9	0	18,086
DAR'A	5	15,968	9,876	36	2	25,887
TARTOUS	10	27,603	14,609	41	486	42,749
	<u>·</u>	<u>·</u>	<u>·</u>	<u>·</u>	<u>·</u>	<u>·</u>
TOTAL	385	386,613	343,748	726	1349	732,821

SOURCE: 1970 POPULATION CENSUS

APPENDIX TABLE 18: CLASSIFICATION OF AGRICULTURE, ANIMAL HUSBANDRY, FORESTRY WORKERS, FISHERMEN  
AND HUNTERS BY MOHAFAZAT: PERCENTAGE IN EACH CATEGORY, 1970.

<u>MOHAFAZAT</u>	<u>FARM MANAGERS AND SUPERVISORS</u>	<u>FARMERS</u>	<u>AGRICULTURE AND HUSBANDRY WORKERS</u>	<u>FORESTRY WORKERS</u>	<u>FISHERMEN</u>	<u>TOTAL</u>
DAMASCUS	0.3 %	49.8 %	49.4 %	0.4 %	0.04 %	99.9 %
ALEPPO	0.04	47.6	52.3	0.03	0.03	100.0
HOMS	0.04	53.5	46.0	0.04	0.4	100.0
LATTAKIA	0.05	55.6	43.2	0.3	0.8	100.0
DEIR-EZ-ZOR	0.03	51.5	48.3	0.06	0.03	99.9
IDLEB	0.02	57.0	42.9	0.06	0.05	100.0
HASSAKEH	0.02	57.6	42.3	0.01	0.02	100.0
RAKKA	0.02	43.1	56.9	-	0.02	100.0
SWEIDA	-	67.7	32.3	0.05	0	100.0
DAR'A	0.02	61.7	38.2	0.1	-	100.0
TARTOUS	0.02	64.6	34.2	0.1	1.1	100.0
QUNEITRA	-	-	-	-	-	-
TOTAL	0.05 %	52.8	46.9	0.1	0.2	100.0

Source: 1970 Population Census.

APPENDIX TABLE 19: EMPLOYMENT STATUS OF THE AGRICULTURAL WORK FORCE BY MOHAFAZAT, 1970

<u>MOHAFAZAT</u>	<u>UNPAID FAMILY LABOR</u>	<u>PAID IN KIND</u>	<u>PAID IN WAGES</u>	<u>UNPAID APPRENTICE</u>	<u>SELF- EMPLOYED</u>	<u>EMPLOYER</u>	<u>TOTAL</u>
DAMASCUS	11,833	638	14,860	27	26,975	661	54,994
ALEPPO	54,199	1,279	23,701	48	71,200	1,614	152,041
HOMS	16,494	408	8,844	8	29,683	716	56,153
HAMA	28,607	268	15,081	12	42,173	1,570	87,711
LATTAKIA	16,126	388	6,044	14	28,606	365	51,543
DEIR-EZ-ZOR	14,859	1,166	8,094	10	24,896	464	49,489
IDLEB	13,552	652	9,291	11	31,026	592	55,124
HABSAKEH	16,004	1,120	17,515	30	46,192	997	81,858
RAKKA	19,923	1,204	11,158	31	23,924	638	56,878
SWEIDA	3,800	457	1,488	3	12,214	112	18,074
DAR'A	5,582	424	3,700	3	16,046	94	25,859
TARTOUS	10,838	303	3,466	13	27,555	124	42,299
QUNEITRA	460	36	583	0	1,489	3	2,571
TOTAL	212,177	8,343	123,835	210	381,979	7,950	734,594

SOURCE: 1977 POPULATION CENSUS

APPENDIX TABLE 20: EMPLOYMENT STATUS OF THE AGRICULTURAL WORK FORCE BY MOHAFAZAT, PERCENTAGE  
IN EACH CATEGORY, 1970

	<u>UNPAID FAMILY</u> <u>LABOR</u>	<u>PAID IN</u> <u>KIND</u>	<u>PAID IN</u> <u>WAGES</u>	<u>UNPAID</u> <u>APPRENTICE</u>	<u>SELF</u> <u>EMPLOYED</u>	<u>EMPLOYER</u>	<u>TOTAL</u>
DAMASCUS	21.5 %	1.2 %	27.0 %	-	49.1 %	1.2 %	100.0
ALEPPO	35.7	0.8	15.6	-	46.8	1.1	100.0
HOMB	29.4	0.7	15.7	-	52.9	1.3	100.0
HAMA	32.6	0.3	17.2	-	48.1	1.8	100.0
LATTAKIA	31.3	0.8	11.7	-	55.5	0.7	100.0
DEIR EZ ZOR	30.0	2.4	16.4	-	50.3	0.9	100.0
IDLEB	24.6	1.2	16.9	-	56.3	1.1	100.0
HASSAKEH	19.6	1.4	21.4	-	56.4	1.2	100.0
RAKKA	35.0	2.1	19.6	-	42.1	1.1	99.9
SWEIDA	21.0	2.5	8.2	-	67.6	0.6	99.9
DAR'IA	21.6	1.6	14.3	-	62.1	0.4	100.0
TARTOUS	25.6	0.7	8.2	-	65.1	0.3	99.9
QUNEITRA	17.9	1.4	22.7	-	57.9	0.1	100.0
TOTAL	28.9 %	1.1 %	16.9 %	-	52.0 %	1.1 %	100.0 %

Source: 1970 Population Census

APPENDIX TABLE 21: LITERACY OF THE AGRICULTURAL WORK FORCE BY TYPE OF WORKER BY MOHAFAZAT, 1970

<u>MOHAFAZAT</u>	<u>FARMERS</u>		<u>FARM MANAGERS AND SUPERVISORS</u>		<u>AGRICULTURAL AND ANIMAL HUSBANDRY WORKERS</u>		<u>TOTAL WORKERS<sup>1</sup> IN AGRICULTURE, ANIMAL HUSBANDRY, FORESTRY, AND FISHING</u>	
	<u>TOTAL</u>	<u>% LITERATE</u>	<u>TOTAL</u>	<u>% LITERATE</u>	<u>TOTAL</u>	<u>% LITERATE</u>	<u>TOTAL</u>	<u>% LITERATE</u>
DAMASCUS	27,604	42.4 %	154	59 %	27,409	52.6 %	55,443	47.4 %
ALEPPO	72,397	27.3	70	74.3	79,411	26.4	151,979	27.0
HOMS	30,242	47.1	22	67.2	25,957	44.7	56,484	46.0
HAMA	43,561	40.6	32	62.5	44,083	35.9	87,781	38.2
LATTAKIA	28,866	45.1	29	58.4	22,446	45.0	51,932	45.1
DEIR-EZ ZOR	25,271	18.2	18	66.7	23,728	28.7	49,068	23.7
IDLEB	31,409	30.0	16	87.5	23,620	40.6	55,112	34.5
HASSAKEH	46,997	16.5	14	75.7	34,496	21.9	81,536	18.2
RAKKA	24,459	10.1	14	93.0	32,273	18.0	56,764	17.6
SWEIDA	12,236	51.4	1	100.	5,840	65.2	18,086	55.9
DAR'A	15,968	36.1	5	100	9,876	55.6	25,887	44.2
TARTOUS	27,603	54.4	10	100	14,609	51.7	42,789	53.3
QUNEITRA <sup>2</sup>	-	-	-	-	-	-	2,574	29.9
TOTAL	386,613	33.5 %	385	68.1 %	343,748	34.8 %	735,395	34.3 %

Source: 1970 Population Census.

<sup>1</sup> THE 2075 FISHERMEN AND FORESTRY WORKERS HAVE BEEN LEFT OUT OF THE ANALYSIS BY MOHAFAZAT. THE NUMBERS UNDER EACH CATEGORY DO NOT TOTAL TO THE FINAL COLUMN. THIS GROUP WAS 45 % LITERATE.

<sup>2</sup> NOT ANALYZED BY GROUPS.

APPENDIX TABLE 22: PERCENT LITERATE OF TOTAL LABOR FORCE BY MOHAFAZA AND SEX, 1970 AND 1976

	<u>MALE</u>		<u>FEMALE</u>		<u>TOTAL</u>	
	<u>1970</u>	<u>1976</u>	<u>1970</u>	<u>1976</u>	<u>1970</u>	<u>1976</u>
DAMASCUS CITY	78.0 %	85.6 %	74.8 %	88.3 %	77.9 %	85.9 %
DAMASCUS	61.5	73.5	34.4	70.0	60.4	71.9
ALEPPO	46.6	62.6	17.8	50.0	37.8	61.7
HOMB	66.6	76.3	19.2	45.4	63.6	73.5
HAMA	58.6	71.9	12.6	29.2	50.2	64.5
LATTAKIA	62.4	72.5	19.4	44.7	55.0	68.2
DEIR EZ ZOR	37.1	44.3	11.5	16.6	34.7	43.9
IDLEB	48.0	63.1	13.1	44.9	44.6	61.6
HASSAKEH	30.0	44.8	10.0	26.2	28.4	43.4
RAKKA	32.5	42.5	2.0	25.3	27.1	41.8
SWEIDA	69.0	78.8	35.8	78.7	66.7	79.8
DAR'A	54.1	67.3	15.2	67.4	53.9	67.3
TARTOUS	69.4	76.3	30.2	61.7	68.5	74.9
QUNEITRA	35.8	67.3	29.1	0	35.7	65.4
TOTAL	54.7 %	67.9 %	21.5 %	51.4 %	51.1 %	66.4 %

SOURCE: STATISTICAL ABSTRACT, 1977

APPENDIX TABLE 23: PROPORTION OF SELECTED AGE GROUPS IN THE ACTIVE AGRICULTURAL AND NON-AGRICULTURAL LABOR FORCES, BY SEX 1970\*

<u>AGE</u>	<u>AGRICULTURE</u>		<u>NON AGRICULTURE</u>	
	<u>MALE</u>	<u>FEMALE</u>	<u>MALE</u>	<u>FEMALE</u>
10 - 14	7.1 %	23.2 %	2.9 %	9.4 %
15 - 19	11.4	23.1	10.7	12.4
20 - 39	39.8	32.1	54.6	57.0
40 - 60	27.9	16.1	26.2	17.6
60 +	13.8	5.5	5.6	3.6
TOTAL	100.0 %	100.0 %	100.0 %	100.0 %

SOURCE: 1970 POPULATION CENSUS

\*THOSE SEEKING WORK FOR THE FIRST TIME, MOST OF WHOM WERE UNDER 20 YEARS OF AGE, WERE EXCLUDED FROM THE ABOVE CALCULATIONS AS THEY WERE NOT PART OF EITHER THE FARM OR NON-FARM WORK FORCE.

APPENDIX TABLE 24: FARM LABOR FORCE COMPARED TO NON FARM LABOR FORCE BY AGE GROUPS AND MOHAFAZAT 1970\*

MOHAFAZAT	OVER 64		40 - 64		20 - 39		10 - 19		TOTAL	
	AGR.	NON-AGR.	AGR.	NON-AGR.	AGR.	NON-AGR.	AGR.	NON-AGR.	AGR.	NON-AGR.
DAMASCUS	4,511	1,683	19,533	17,073	21,930	35,496	9,447	10,625	55,421	64,877
ALEPPO	10,155	5,567	43,463	51,220	55,297	87,796	43,045	32,063	151,960	176,646
HOMS	4,497	2,146	18,775	19,541	22,274	35,819	10,989	8,482	56,535	65,988
HAMA	6,047	1,446	24,827	11,701	34,128	23,703	22,748	5,483	87,777	42,333
LATTAKIA	4,325	950	17,552	13,206	21,620	24,809	8,426	3,868	51,923	42,833
DEIR EZ ZOR	3,608	594	13,540	5,806	18,693	11,244	13,212	2,476	49,053	20,120
IDLEB	6,138	1,483	18,241	9,431	20,775	18,321	9,952	4,915	55,106	34,150
HASSAKEH	6,331	924	26,225	8,412	30,111	15,731	18,863	5,351	81,530	30,418
RAKKA	3,150	369	14,170	4,312	20,962	11,801	18,466	2,917	56,748	19,399
SWEIDA	2,108	259	7,536	3,325	6,508	7,796	1,922	1,305	18,074	12,685
DAR'IA	3,023	467	8,865	4,468	10,689	10,395	3,305	1,798	25,882	17,068
TARTOUS	3,430	670	15,361	6,863	17,353	14,735	6,593	2,730	42,737	24,998
QUNEITRA	188	29	924	242	995	563	467	89	2,574	923
TOTAL	57,538	16,587	229,012	155,346	281,335	298,204	167,435	82,102	735,320	552,438

SOURCE: 1970 POPULATION CENSUS

\*THOSE SEEKING WORK FOR THE FIRST TIME WERE EXCLUDED FROM THE ANALYSIS



APPENDIX TABLE 25: FARM LABOR FORCE COMPARED TO NON-FARM LABOR FORCE BY AGE GROUP AND MOHAFAZA  
PERCENTAGES IN EACH AGE GROUP, 1970

<u>MOHAFAZAT</u>	<u>OVER 64</u>		<u>40 - 64</u>		<u>20 - 39</u>		<u>10 - 19</u>	
	<u>AG.</u>	<u>NON AGR.</u>	<u>AG.</u>	<u>NON AGR.</u>	<u>AG.</u>	<u>NON AGR.</u>	<u>AG.</u>	<u>NON AGR.</u>
DAMASCUS	8.1	2.6	35.2	26.3	39.6	54.7	17.0	16.4
ALEPPO	6.7	3.2	28.6	29.0	36.4	49.7	28.3	48.2
HOMS	8.0	3.3	33.2	24.6	39.4	54.3	19.4	12.9
HAMA	6.9	3.4	28.3	27.6	38.4	56.0	25.9	13.0
LATTAKIA	8.3	2.2	33.8	30.8	41.6	57.9	16.2	9.0
DEIR EZ ZOR	7.4	3.0	27.6	28.4	38.1	55.9	26.9	12.3
IDLEB	11.1	4.3	33.1	27.6	37.7	53.6	18.1	14.4
HASSAKEH	7.8	3.0	32.2	27.6	36.9	51.7	23.7	17.6
RAKKA	5.6	1.9	25.0	22.2	36.9	60.8	32.5	15.0
SWEIDA	11.7	2.0	41.7	26.2	36.3	61.5	10.6	10.3
DAR'A	11.7	2.7	34.3	25.8	41.3	60.9	12.8	10.5
TARTOUS	8.0	2.7	35.9	27.5	40.6	58.9	15.4	10.9
QUNEITRA	7.3	3.0	35.9	25.3	38.7	58.9	17.8	9.3
TOTAL	7.8	3.0	31.1	28.2	38.3	54.0	22.8	14.9

Source: 1970 Population Census.

APPENDIX TABLE 26: Area Planted to 22 Selected Major Crops  
Considered in Labor Requirement Analysis, 1977

Crop	Hama	Idleb	Rakka	Dier-ez-Zor	Hassakeh	Aleppo
Wheat	125,232	71,417	134,590	76,466	523,792	312,394
Olives	--	66,104	--	--	--	74,151
Cotton	30,880	8,506	29,225	38,455	36,417	35,609
Barley	86,046	47,166	203,808	15,666	328,354	230,000
Grapes	12,462	4,011	--	--	1,000	23,512
Lentils	14,606	29,218	1,912	--	48,054	55,864
Watermelon	15,605	16,823	--	1,507	9,948	31,818
Tomato	--	3,626	--	1,393	--	5,831
Apples	--	2,734	--	550	--	--
Sesame	--	5,609	3,553	9,008	1,343	14,916
Muskmelon	--	6,556	--	1,134	3,552	10,790
Cucumber	2,082	--	--	465	--	5,109
Apricot	--	--	--	1,045	--	--
Chickpeas	--	--	--	--	--	2,873
Potato	2,777	--	--	--	--	--
Vetches	9,274	--	--	--	--	--
Peanut	--	--	--	--	--	--
Dry Onion	2,302	--	--	--	--	1,096
Squash	--	--	--	--	--	--
Sugarbeet	2,956	--	2,928	--	--	--
Eggplant	--	--	--	--	--	--
Tobacco	--	4,637	--	--	--	--
TOTAL INCLUDED	304,222	271,507	376,016	145,689	952,460	803,963
TOTAL CROPS	345,942	310,388	380,322	160,950	959,783	844,926
MISC CROPS	41,720	38,881	4,306	15,261	7,323	40,963
%MISC CROPS	12%	1.3%	1.1%	9.5%	7.6%	4.8%

APPENDIX TABLE 26 (CONT)

CROP	DAMASCUS	HOMS	TARTOUS	LATTAKIA	SWEIDA	DAR'A	QUNEITR
Wheat	32,461	78,389	34,088	21,067	37,627	74,380	5,785
Olives	3,531	3,523	58,311	18,560	995	1,830	--
Cotton	2,713	4,702	--	--	--	--	--
Barley	20,021	56,358	4,158	4,178	12,765	12,437	535
Grapes	11,948	19,203	1,710	652	12,939	--	755
Lentils	1,752	6,870	--	--	3,766	14,281	--
Watermelon	--	2,095	597	--	6,279	2,658	--
Tomato	2,939	2,552	3,257	5,043	3,039	2,171	288
Apples	7,274	--	1,403	2,674	2,775	--	--
Sesame	--	--	--	--	--	3,465	--
Muskmelon	--	--	--	--	--	--	--
Cucumber	1,538	--	2,925	1,014	2,097	--	--
Apricot	6,284	--	--	--	--	--	--
Chickpeas	3,568	--	2,352	--	5,563	19,425	2,675
Potato	2,884	4,652	799	428	--	439	--
Vetches	4,591	26,428	2,598	--	5,361	13,786	1,760
Peanut	--	--	5,510	4,162	--	--	--
Dry Onion	--	2,178	--	--	--	868	--
Squash	1,220	--	1,032	2,082	--	--	--
Sugarbeet	1,437	3,646	--	--	--	--	--
Eggplant	1,431	--	--	689	--	--	--
Tobacco	--	--	2,057	8,330	--	--	--
TOTAL INCLUDED	105,627	210,596	120,797	68,879	93,206	145,740	11,798
TOTAL CROPS	144,729	250,773	145,326	85,240	95,677	153,998	13,374
MISC CROPS	38,102	40,177	24,529	16,361	2,471	8,258	1,570
%MISC CROPS	27%	16%	17%	19.2%	2.6%	5.4%	11.8%

APPENDIX TABLE 26 (CONT)

CROP	TOTAL CONSIDERED	TOTAL HECTARES	OMITTED HECTARES	PERCENT OMITTED
Wheat	1,527,718	1,527,718	0	0
Olives	227,005	228,263	1258	1.4
Cotton	186,507	186,507	0	0
Barley	1,021,429	1,021,429	0	0
Grapes	93,192	93,973	781	0.8
Lentils	176,323	178,346	2,023	1.1
Watermelon	87,330	87,728	398	0.5
Tomato	30,139	32,791	2,642	5.5
Apples	17,510	19,072	1,562	8.2
Sesame	37,894	39,318	1,424	3.6
Muskmelon	22,032	25,917	3,885	14.9
Cucumber	15,230	18,739	3,509	18.7
Apricot	7,334	11,888	4,554	38.3
Chickpeas	36,456	41,146	4,690	11.4
Potato	11,979	12,830	851	6.6
Vetches	63,793	82,544	18,751	22.7
Peanut	9,672	10,919	1,247	11.4
Dry Onion	6,444	9,433	2,989	31.7
Squash	4,334	7,151	2,917	39.4
Sugarbeet	10,967	12,245	1,278	10.4
Eggplant	2,120	6,180	4,060	65.7
Tobacco	15,024	15,331	307	2.0
TOTAL INCLUDED	3,600,500	3,669,531	58,288	1.67
TOTAL CROPS	3,891,428			
MISC CROPS	280,928			
MISC CROPS	7.8%			

EXPLANATION FOR APPENDIX TABLE 26:

This table shows the number of hectares grown of the principal crops in each Mohafaza. Blank spaces do not necessarily mean that none of that crop is grown in that Mohafaza, but rather that crop would add more to the computational burden than it would to the precision of the analysis. For example, 1500 ha. of tomatoes are grown in Hama, but adding this crop would be adding only 0.4% of the Mohafaza acreage. In addition, the omitted acreage includes small acreages of other minor crops. At the bottom of this table are shown the acreages omitted from the analysis of labor requirements by Mohafaza with the percentages of those omitted. At the right are the total hectares for each of the 22 crops which were included in the analysis so far. Next are the omitted hectares for each of these crops which, of course, are zero for wheat, barley, and cotton, because all of the acreage grown has been included for these three crops. However, 3,088 ha. of olives, for example, were omitted since their inclusion would have contributed very little to the analysis. At the far right are the omitted hectares as a percentage of total hectares grown of the 22 crops.

APPENDIX TABLE 27: Labor Requirements for Irrigated Wheat, per Hectare.

<u>Farm Operation</u>	(Man-hours)		
	<u>Least</u> <u>Mechanized</u>	<u>Partially</u> <u>Mechanized</u>	<u>Most</u> <u>Mechanized</u>
First tractor tillage	3	3	3
Fertilizing	2	2	1
Second tractor tillage	-	3	3
Animal tillage	50	-	-
Sowing	10	2	1
Harrowing with tractor	-	3	2
Livestock plowing to cover seed	50	-	-
Mech. land forming for irrigate	-	3	3
Manual " " " "	50	-	-
Irrigation	50	50	40
Machine reaping	-	-	10
Manual reaping	80	80	-
Machine threshing	-	45	-
Manual threshing, winnowing, sifting, etc.	76	-	-
Transportation of grain from field	-	-	3
Manual weeding	50	-	-
Herbicide spraying	-	7	7
Guarding	<u>4</u>	<u>4</u>	<u>4</u>
TOTALS	425	202	77

Fully Mechanized Standard:\* 7.5 man-hours per hectare plus irrigation

\*Agricultural Statistics USDA 1977

APPENDIX TABLE 28: Labor Requirements for Non-Irrigated Barley, per Hectare

<u>Farm Operation</u>	<u>Least Mechanized</u>	<u>Partly Mechanized</u>	<u>Most Mechanized</u>
First tractor tillage	3	3	3
Fertilizing	2	2	1
Second tractor tillage	-	3	3
Animal tillage	50	-	-
Sowing	10	2	1
Harrowing with tractor	-	3	2
Livestock plowing to cover seed	50	-	-
Machine reaping	-	-	10
Manual reaping	80	80	-
Machine threshing	-	45	-
Manual threshing, winnowing, sifting, etc.	76	-	-
Transportation of grain from field	-	-	-
Herbicide spraying	-	7	5
Manual weeding	<u>50</u>	<u>-</u>	<u>-</u>
TOTAL	321	145	25

Fully Mechanized Standard: 7.5 man-hours per hectare

APPENDIX TABLE 29: Mechanization of Wheat and Barley Harvest, 1977

<u>Mohafazat</u>	<u>Hectares of Wheat &amp; Barley</u>	<u>Number of Combines</u>	<u>Number of Hectares Per Combine</u>
Damascus	52,512	13	4,039
Dar'a	86,817	34	2,553
Sweida	50,392	21	2,400
Homs	134,747	46	2,929
Hama	177,844	110	1,617
Ghab	33,434	180	186
Lattakia	25,245	6	4,210
Tartous	38,246	28	1,366
Idleb	118,583	150*	790
Aleppo	542,394	370	1,466
Hassakeh	852,146	1069	797
Rakka	338,396	165*	2,050
Dier-ez-Zor	92,132	51	1,807
TOTAL	2,549,210	2,194	1,163 (average)

\* The data for 1977 showed 321 for Idleb, an increase of 127% from the 141 recorded the year before, while for Rakka it showed 110 for a decrease of 35% from the 170 recorded the year before. These changes appear to be too large and seemed out of line with what would be expected, so the data was adjusted to be more in line with the 1976 data.

Source: Statistical Abstract, 1977.



APPENDIX TABLE 30: Labor Requirements for Irrigated Potatoes per Hectare

<u>Farm Operations</u>	<u>Man Hours</u>
Tractor Tillage	16
Fertilizing	20
Furrowing	10
Planting	160
Irrigating	70
Hoeing and hilling	200
Harvesting	220
TOTAL	696

APPENDIX TABLE 31: Labor Requirements for Irrigated Eggplant per Hectare

<u>Farm Operations</u>	<u>Man Hours</u>
Tractor Tillage	9
Animal Tillage	10
Furrowing	40
Fertilizing	10
Seeding	10
Irrigation	120
Hoeing and Weeding	160
Spraying Insecticides	20
Harvesting and Hauling	330
TOTAL	719

APPENDIX TABLE 32: Labor Requirements for Chickpeas, per Hectare

<u>Farm Operation</u>	<u>Man Hours</u>
Tractor Tillage	8
Planting	4
Spraying Insecticide	2
Harvesting	39
	<hr/>
TOTAL	53

APPENDIX TABLE 33: Labor Requirements for Lentils, per Hectare

<u>Farm Operation</u>	<u>Man Hours</u>
Livestock Plowing	40
Planting	30
Hoeing	20
Harvesting	55
	<hr/>
TOTAL	145

APPENDIX TABLE 34: Labor Requirements for Vetches, per Hectare

<u>Farm Operation</u>	<u>Man Hours</u>
Tractor Tillage	6
Seeding	8
Hoeing	30
Harvesting	120
	<hr/>
TOTAL	164

APPENDIX TABLE 35: Labor Requirements for Irrigated Sugar Beets, per Hectare

<u>Farm Operation</u>	<u>Man Hours</u>
Tractor Tillage	3
Spreading Manure	5
Tractor Disk Tillage	3
Spreading Chemical Fertilizer	2
Livestock Plowing	50
Preparing Land for Irrigation	28
Flooding	12
Planting	9
Irrigation	50
Re-Planting	16
Thinning	40
Hoeing and Weeding	90
Pest Control	16
Digging Beets	100
Cutting Tops, Loading, etc.	120
Guarding	8
TOTAL	562
Fully-Mechanized Standard	75

APPENDIX TABLE 36: Labor Requirements for Muskmelon per Hectare

<u>Farm Operations</u>	<u>Man Hours</u>
Tractor Tillage	9
Planting	30
Re-Planting, Thinning & Hilling	25
Fertilizing	20
Hoeing and Weeding	100
Spraying Insecticides	10
Harvesting and Transporting	125
TOTAL	319

APPENDIX TABLE 37: Labor Requirements for Irrigated Cucumbers, per Hectare

<u>Farm Operations</u>	<u>Man Hours</u>
Tractor Tillage	9
Seeding	30
Re-Planting and Thinning	20
Fertilizing	20
Irrigating	150
Hoeing and Weeding	120
Spraying Insecticides	15
Harvesting and Transporting	150
TOTAL	514

APPENDIX TABLE 38: Labor Requirements for Watermelon, per Hectare

<u>Farm Operations</u>	<u>Man Hours</u>
Tractor Tillage	9
Planting	30
Re-Planting & Thinning	25
Fertilizing	20
Hoeing and Weeding	100
Spraying Insecticides	10
Harvesting and Transporting	145
TOTAL	339

APPENDIX TABLE 39: Labor Requirements for Non-Irrigated Tobacco, per Hectare

<u>Farm Operations</u>	<u>Man Hours</u>
Seedling Production	170
Plowing X3 with Livestock	90
Transplanting	160
Hoeing Twice	448
Spreading Fertilizer	80
Topping and Chemical Control	420
Harvesting	300
Residue Removal	140
TOTAL	1808
Fully Mechanized Standard	575

APPENDIX TABLE 40: Labor Requirements for Tomatoes, per Hectare

<u>Farm Operations</u>	<u>Man Hours</u>
Tillage and Fertilizing	26
Seeding	30
Re-Planting	10
Hoeing and Weeding	150
Spraying Insecticides	20
Harvesting	560
TOTAL	796

APPENDIX TABLE 41: Labor Requirements for Irrigated Dry Onions, per Hectare

<u>Farm Operations</u>	<u>Man Hours</u>
Tractor Tillage	6
Animal Tillage	30
Spreading Chemical Fertilizer	8
Planting Onion Sets	150
Irrigation	50
Hoeing and Weeding	190
Pest Control	20
Harvesting, Sorting, Cleaning	350
TOTAL	804

APPENDIX TABLE 42: Labor Requirements for Squash, per Hectare

<u>Farm Operations</u>	<u>Man Hours</u>
Tractor Tillage	10
Spreading Fertilizer	15
Planting	90
Re-Planting	20
Hoeing and Weeding	100
Insecticide Spraying	10
Harvesting	255
TOTAL	500

APPENDIX TABLE 43: Labor Requirements for Apples, per Hectare

<u>Farm Operations</u>	<u>Man Hours</u>
Tillage with Animals	130
Hand Tillage	139
Pruning	68
Spreading Manure	36
Spreading Chemical Fertilizer	26
Spraying Trees	115
Harvesting	200
TOTAL	<u>714</u>

APPENDIX TABLE 44: Labor Requirements for Apricots, per Hectare

<u>Farm Operations</u>	<u>Man Hours</u>
Tillage with Animals	69
Hand Tillage	74
Pruning	44
Fertilizing	10
Harvesting	160
TOTAL	<u>357</u>

APPENDIX TABLE 45: Labor Requirements for Olives, per Hectare

<u>Farm Operations</u>	<u>Man Hours</u>
Tillage with Animals	90
Hand Tillage	34
Replacement Planting	2
Pruning	88
Spreading Fertilizer	49
Spraying Trees	65
Harvesting	200
TOTAL	528

APPENDIX TABLE 46: Labor Requirements for Grapes, per Hectare

<u>Farm Operations</u>	<u>Man Hours</u>
Tillage with Animals	86
Hand Tillage	53
Pruning	44
Spreading Manure	34
Pest Control	16
Harvesting	84
TOTAL	317



APPENDIX TABLE 47: Labor Requirements for Irrigated Cotton, per Hectare

<u>Farm Operations</u>	<u>Man Hours</u>
Tractor Tillage	12
Gathering Stalks	25
Furrowing	15
Irrigating	90
Planting	20
Thinning	25
Fertilizing	8
Hoeing and Weeding	120
Harvesting, Hauling, etc.	232
TOTAL	<hr/> 547

APPENDIX TABLE 48: Labor Requirements for Sesame, per Hectare

<u>Farm Operations</u>	<u>Man Hours</u>
Tractor Tillage	8
Seeding	2
Hoeing	25
Harvesting	65
TOTAL	<hr/> 100

APPENDIX TABLE 49: Labor Requirements for Peanuts, per Hectare

<u>Farm Operations</u>	<u>Man Hours</u>
Tractor Tillage & Fertilizing	20
Planting	100
Irrigation	100
Hoeing	120
Harvesting	220
TOTAL	<hr/> 560

APPENDIX TABLE 50: Labor Requirements for the Major Producing Areas for  
22 Selected Major Crops by Mohafaza in Man-Days, 1976-1977\*

CROP	Deir-ez-Zor	Hama	Idleb	Rakka	Hassakeh	Aleppo	Damascus
Wheat	1,749,276	829,662	490,992	1,054,899	2,798,672	2,069,562	377,708
Olives	--	--	4,366,864	--	--	4,889,967	255,114
Cotton	2,663,009	2,111,420	581,599	1,523,353	2,490,013	2,408,061	185,402
Barley	291,781	548,545	288,893	1,299,276	1,272,873	1,466,250	147,656
Grapes	--	351,083	207,501	--	37,625	931,663	473,440
Lentils	--	264,698	529,577	46,605	901,013	1,012,535	31,755
Watermelon	93,998	866,073	733,904	--	545,898	1,288,287	--
Tomatoes	164,725	--	358,521	--	--	352,048	--
Apples	48,332	--	234,869	--	--	--	666,482
Sesame	191,420	--	70,112	62,177	15,949	188,316	--
Muskmelon	66,484	--	261,422	--	146,076	565,127	--
Cucumber	45,633	98,636	--	--	--	293,089	88,254
Apricot	59,696	--	--	--	--	--	359,260
Chickpeas	--	--	--	--	--	19,034	17,394
Potatoes	--	248,542	--	--	--	--	258,118
Vetches	190,118	--	--	--	--	--	102,721
Peanuts	--	--	--	--	--	--	--
Dry Onions	--	231,353	--	--	--	108,230	--
Squash	--	--	--	--	--	--	75,183
Sugarbeets	--	206,182	--	220,698	--	--	108,315
Eggplant	--	--	--	--	--	--	128,612
Tobacco	--	--	781,245	--	--	--	--
TOTAL	5,374,358	5,946,312	9,005,499	4,212,008	8,208,119	15,592,169	3,592,169

\* For Tables 50 through 55, crop area data refer to 1977, while the employment data come from the 1976 Sample Census.

APPENDIX TABLE 50: Labor Requirements for the Major Producing Areas for  
(cont) 22 Selected Major Crops by Mohafaza in Man-Days, 1976-1977

CROP	Homs	Tartous	Lattakia	Sweida	Dar'a	Quneitra	TOTAL
Wheat	382,146	285,487	262,970	249,275	482,766	38,326	11,076,741
Olives	232,517	3,491,372	984,785	63,670	120,781	--	14,407,070
Cotton	321,507	--	--	--	--	--	12,284,364
Barley	218,388	27,028	46,481	81,378	79,223	3,412	5,771,184
Grapes	355,303	58,754	22,250	545,056	--	25,765	3,108,440
Lentils	124,519	--	--	68,258	258,884	--	3,237,804
Watermelon	88,776	32,014	--	273,922	115,956	--	4,038,828
Tomatoes	282,634	374,963	541,493	168,665	259,435	32,976	2,852,703
Apple	--	115,923	242,232	154,707	--	--	1,462,546
Sesame	--	--	--	--	43,312	--	571,286
Muskmelon	--	--	--	--	--	--	1,039,109
Cucumber	--	167,822	58,180	83,959	--	--	835,576
Apricot	--	--	--	--	--	--	418,956
Chickpeas	--	15,582	--	36,857	128,691	17,722	235,280
Potatoes	402,980	64,719	34,615	--	29,687	--	1,038,661
Vetches	541,744	53,260	--	109,988	282,613	--	1,323,035
Peanuts	--	385,700	291,340	--	--	--	677,040
Dry Onion	219,091	--	--	--	89,234	--	647,908
Squash	--	71,595	144,439	--	--	--	291,217
Sugarbeet	274,819	--	--	--	--	--	810,014
Eggplant	--	--	61,924	--	--	--	190,536
Tobacco	--	454,598	1,884,581	--	--	--	3,120,424
TOTAL	3,444,424	5,598,817	4,575,290	1,837,646	1,890,542	160,881	69,438,722

APPENDIX TABLE 51: Estimation of Labor Requirements for Omitted Acreage, Livestock Production, and Total, in Man-Days, 1976-1977

Item	Hama	Idleb	Rakka	Dier-ez-Zor	Hassakeh
Omitted hectares	41,720	38,881	4,306	15,261	7,323
Omitted hectares X250 man-hr./ha 8	1,303,750	1,215,031	134,563	476,906	228,844
No. of Milk cows	31,755	13,439	1,107	22,514	23,109
No. Milk cows/20X $\frac{1}{3}$ X365	193,176	81,754	6,734	136,960	140,580
No. Sheep & Goats	1,352,067	505,604	822,348	663,607	988,000
Sheep & Goats/150 X $\frac{1}{2}$ X 365	1,645,004	615,151	1,000,523	807,389	1,202,067
Line 2 + 4 + 6 = Total additional Man - Days	3,141,930	1,911,936	1,141,822	1,421,255	1,571,491
Labor Requirement 22 Major Crops	5,946,312	9,005,499	4,212,008	5,374,358	8,208,119
Total Farm Labor Requirements	9,088,242	10,917,435	5,353,828	6,795,613	9,779,610
Item	Aleppo	Damascus	Homs	Tartous	Lattakia
Omitted hectares	40,963	39,102	40,177	24,529	16,361
Omitted hectares X250 man-hr./ha. 8	1,280,094	1,221,938	1,255,531	766,531	511,281
No. of Milk cows	9,668	51,735	42,678	35,795	24,162
No. Milk cows/20X $\frac{1}{3}$ X365	58,814	314,721	259,624	217,753	146,986
No. Sheep & Goats	1,400,267	567,067	1,135,965	64,335	51,161
Sheep & Goats/150 X $\frac{1}{2}$ X 365	1,703,658	689,931	1,382,091	78,274	62,083
Line 2 + 4 + 6 = Total additional Man - Days	3,042,566	2,226,590	2,897,246	1,062,558	720,350
Labor Requirement 22 Major Crops	15,592,169	3,542,657	3,444,424	5,598,817	4,575,290
Total Farm Labor Requirements	18,634,735	5,819,247	6,341,670	6,661,375	5,295,640

APPENDIX TABLE 51: Estimation of Labor Requirements for Omitted Acreage, Livestock Production, and Total in Man-Days, 1976-1977  
(Cont)

Item	Sweida	Dar'a	Quneitra	Total
Omitted hectares	2,471	8,268	1,576	280,928
Omitted hectares $\frac{X250 \text{ man-hr./ha.}}{8}$	77,219	258,375	49,250	8,779,313
No. of Milk cows	8,410	22,745	4,500	291,617
No. Milk cows/20X $\frac{1}{3}$ X365	51,161	138,365	27,375	1,774,003
No. Sheep & Goats	222,833	268,120	39,000	8,080,235
Sheep & Goats/150 $X\frac{1}{2} X 365$	271,113	326,213	47,450	9,830,947
Line 2 + 4 + 6 = Total additional Man-Days	399,493	722,953	124,075	20,384,268
Labor Requirement 22 Major Crops	1,837,646	1,890,542	160,881	69,438,922
Total Farm Labor Requirements	2,237,139	2,613,495	284,956	89,822,985

APPENDIX TABLE 52: Man-Days Required for Total Acreages of the 22 Selected Major Crops, 1976-1977

<u>Crop</u>	<u>Total Hectares</u>	<u>Total Man-Days Required</u>
Wheat	1,527,718	11,076,714
Barley	1,021,492	5,770,180
Olives	228,263	14,486,909
Cotton	186,507	12,284,364
Grapes	93,973	3,934,490
Lentils	178,346	3,274,774
Watermelon	87,728	4,057,235
Tomatoes	32,791	3,103,719
Apples	19,072	1,593,123
Sesame	39,318	592,620
Muskmelon	25,917	1,222,340
Cucumber	18,739	1,027,544
Apricot	11,888	679,154
Chickpeas	41,146	265,553
Potatoes	12,830	1,112,448
Vetches	82,544	1,711,787
Peanuts	10,919	764,330
Dry Onions	9,433	948,435
Squash	7,151	480,501
Sugar Beets	12,245	904,406
Egg Plant	6,180	555,430
Tobacco	<u>15,331</u>	<u>3,184,186</u>
TOTAL	3,669,531	73,030,223

NOTE: These tables are derived from the crop requirements for each Mohafaza and contain some differences by Mohafaza according to calculated proportions of mechanization, irrigation and yield difference; therefore, they will differ somewhat from the total hectares of each crop times the labor requirements as listed in this appendix.

APPENDIX TABLE 53: Number of Workers Required by Month and by Mohafaza for 22 Selected Crops Only, 1976-1977

<u>Mohafaza</u>	<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>	<u>Apr.</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sep.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>
Tartous	19100	24039	23969	19682	14217	16545	21802	9544	17221	25754	23889	18936
Homs	5262	9527	12361	12107	27241	16205	17764	11823	16833	14253	8232	5463
Aleppo	31651	42679	53165	39392	52943	88334	69043	45746	43701	61267	59170	37323
Latakia	3190	14389	20538	18017	28397	32845	28677	10070	27789	25467	23901	3450
Hassakeh	8797	10461	17105	20563	40908	60481	35716	13991	50827	42826	28163	8395
Dar'a	4610	5488	7935	3988	16356	12237	7611	4930	5566	4168	3649	2540
Lattakia	8726	18501	13760	12410	18257	19505	21442	17994	14977	20068	17899	8404
Quneitra	165	464	438	208	1949	544	461	427	472	468	336	173
Sweida	3953	4356	5136	5139	11851	11014	7357	8639	9490	8046	5802	4727
Damascus	6882	10415	12651	9565	16091	17337	15406	12154	12532	11649	10185	7762
Idleb	27765	34150	32895	28065	27920	34966	35876	26626	32516	36189	32965	24106
Hama	6311	9469	14967	13112	39690	36874	23766	20501	34321	26097	26357	7838
Rakka	<u>877</u>	<u>5837</u>	<u>9685</u>	<u>11508</u>	<u>24213</u>	<u>40517</u>	<u>28490</u>	<u>8034</u>	<u>29247</u>	<u>27713</u>	<u>18792</u>	<u>2184</u>
TOTAL	127289	189775	224605	193756	320033	382404	313411	190479	295492	303965	259340	131301

APPENDIX TABLE 54: Total Number of Workers Required by Month and by Mohafaza, 1976-1977

<u>Mohafaza</u>	<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>	<u>Apr.</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sep.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	Total Available Farm Work Force, 1976
Tartous	22977	27916	27846	23559	18094	20422	25679	13421	21098	29631	27766	22813	31195
Homs	13944	18209	21043	20789	35923	24887	26446	20505	25515	22935	16914	14145	42808
Aleppo	40747	51775	62261	48488	62039	97430	78139	54842	52797	70363	68266	46419	97615
Dier-ez-Zor	7267	18466	24615	22094	32474	36922	32754	14147	31866	29544	27978	9527	45643
Hassakeh	13198	14862	21506	24964	45309	64882	40117	18392	55228	47227	37564	12796	63595
Dar'a	6744	7622	10069	6122	18490	14371	9745	7064	7700	6302	5783	4674	16833
Lattakia	12707	22482	17741	16391	22238	23486	25423	21975	18958	24049	21880	12385	44269
Quneitra	467	766	740	510	2251	856	763	738	783	779	647	484	2507
Sweida	5093	5496	6276	6279	12591	12154	8497	9779	10630	9186	6942	5867	10819
Damascus	13707	17240	19476	16390	22916	24162	22231	18971	19357	18474	17010	14587	41600
Idleb	33724	40109	38354	37024	33879	40925	41835	32585	38475	42148	38924	30065	48310
Hama	15672	18830	24328	2247	49051	46235	33127	29862	43682	35458	35718	17199	80163
Rakka	<u>4858</u>	<u>9018</u>	<u>12866</u>	<u>14689</u>	<u>27394</u>	<u>43698</u>	<u>31671</u>	<u>11215</u>	<u>32428</u>	<u>30894</u>	<u>21973</u>	<u>5365</u>	<u>45659</u>
TOTAL	190305	255903	287621	256772	383049	450430	376427	253504	358517	366990	322365	194326	578268



APPENDIX TABLE 55: Average Number of Workers Required; Percentage of Farm Labor Force by Mohafaza, 1976-1977

<u>Mohafaza</u>	<u>Average Monthly Number of Workers Required</u>	<u>Average Monthly Number of Workers Required as % of Farm Labor Force</u>
Tartous	23,434	75.1%
Homs	21,775	50.9%
Aleppo	61,131	62.6%
Deir-ez-Zor	23,805	52.2%
Hassakeh	32,586	51.2%
Dar'a	8,724	51.8%
Lattakia	19,976	45.1%
Quneitra	820	32.7%
Sweida	8,266	76.4%
Damascus	18,711	45.0%
Idleb	37,129	76.9%
Hama	30,970	38.6%
Rakka	<u>20,439</u>	<u>44.8%</u>
TOTAL	307,762	53.2%

APPENDIX TABLE 56: Number and Percentage Unemployed in Urban and Rural Labor Forces by Mohafaza, Sept. 1977.

<u>Mohafaza</u>	<u>Urban Labor Force</u>			<u>Rural Labor Force</u>		
	<u>Employed</u>	<u>Unemployed</u>	<u>Percent</u>	<u>Employed</u>	<u>Unemployed</u>	<u>Percent</u>
Damascus City	278,169	17,596	6.3%	---	---	---
Damascus	54,975	3,091	5.6%	125,441	4,857	3.9%
Aleppo	234,758	13,920	5.9%	151,882	6,605	4.3%
Homs	71,618	4,280	6.0%	78,572	3,838	4.9%
Hama	52,588	3,623	6.9%	103,700	5,815	5.6%
Lattakia	46,804	4,581	9.8%	68,856	3,438	5.0%
Dier-ez-Zor	22,358	2,820	12.6%	52,149	1,838	3.5%
Idleb	25,147	1,788	7.1%	84,616	6,103	7.2%
Rakka	18,773	1,335	7.1%	54,445	1,609	3.0%
Hassakeh	28,738	1,832	6.4%	101,465	10,602	10.4%
Sweida	9,116	1,039	11.4%	22,109	1,898	8.5%
Dar'a	8,958	583	6.5%	46,354	2,747	5.9%
Tartous	<u>17,843</u>	<u>1,997</u>	<u>11.2%</u>	<u>64,695</u>	<u>5,554</u>	<u>8.6%</u>
TOTAL	869,843	58,485	6.7%	957,956	59,949	6.3%

Source: Annual Statistical Bulletin of the Ministry of Social Affairs, 1977.

APPENDIX TABLE 57: Number and Percentage of Farmers  
Unemployed by Mohafaza, 1976

<u>Mohafaza</u>	<u>No. Farmers Unemployed</u>	<u>Unemployed Farmers as % of Farmers</u>
Damascus City	663	9.1%
Damascus	981	2.4%
Homs	899	2.1%
Hama	1924	2.4%
Tartous	1039	3.3%
Lattakia	531	1.2%
Idleb	1612	3.3%
Aleppo	1913	2.0%
Rakka	922	2.0%
Hassakeh	1972	3.1%
Dier-ez-Zor	867	1.9%
Sweida	113	1.1%
Dar'a	372	2.2%
Quneitra	<u>0</u>	<u>0.0%</u>
TOTAL	13,808	2.4%

SOURCE: Annual Statistical Bulletin of the Ministry of Social Affairs and Labor, 1977.

الحد الأدنى للاجر اليومي للعمال الزراعيين في المحافظات حسب المصالحات الزراعية الرئيسية لعام ١٩٧٧ (الاجرة بالليرات السورية)

Appendix Table 58

DAILY MINIMUM WAGE FOR AGRICULTURE WORKERS IN MOHAFAZA ACCORDING TO AGRICULTURAL OPERATIONS 1977(S.P.)

Mohafaza	العمال الدائمون Permanent workers						Seasonal workers						العمال الموسميون						المحافظة
	الوسطى العام المحافظة Average wage for Mohafaza	وسطى الاجر Average wage	وكلاء اصحاب العمل Managers	عمال النون بتقاضيون أجورهم Annually wage workers	عمال دائرون بتقاضيون أجورهم شهريا Monthly wage workers	عمال خدمة Service workers	وسطى الاجر Average wage	الفراس والبذار Planting & seeding	الري Irrigation	تفريد وتعتيب Thinning & weeding	نكاش Hoeling	حرارة يدوية Hand burrowing	دراس Threshing	حصاد Harvesting	تلوية Winnowing	جني القطن Picking of cottons	قطاف الخضار والفواكه والزيتون وغير ذلك Plucking of fruits & vegetables		
Damascus	9.23	9.57	13.00	8.30	8.70	8.30	8.88	—	9.00	8.50	8.00	8.50	8.50	12.00	8.50	8.50	8.50	دمشق	
Homs	6.89	6.43	—	6.00	6.00	7.30	7.34	7.30	7.30	6.80	6.80	8.00	—	11.00	6.00	6.80	6.10	حمص	
Hama	7.43	7.69	10.50	6.40	6.00	7.89	7.17	7.62	6.00	6.08	6.60	7.62	—	12.18	6.06	6.90	6.06	حماة	
Tartouss	7.30	7.11	7.54	6.90	6.90	—	7.48	6.90	6.90	6.90	6.90	6.90	—	11.00	—	—	6.90	طرطوس	
Lattakia	6.75	5.82	6.40	—	5.24	—	7.67	7.25	7.25	7.25	7.25	7.25	—	12.55	—	6.00	6.60	اللاذقية	
Idleb	4.71	4.40	4.00	4.00	4.60	5.00	5.02	—	6.50	5.25	4.00	4.00	4.00	6.50	5.25	5.75	4.00	ادلب	
Aleppo	8.52	8.86	13.00	7.00	6.90	—	8.18	—	7.92	8.34	8.34	8.34	8.34	9.96	—	7.56	6.66	حلب	
Al-Rakka	7.23	8.45	9.90	—	7.00	—	6.00	6.00	6.00	6.00	6.00	—	6.00	6.00	6.00	6.00	6.00	الرقبة	
Al-Hassakeh	7.41	7.90	8.80	—	7.00	—	6.91	6.00	7.00	6.00	6.00	9.50	7.00	10.50	6.00	5.75	5.40	الحسكة	
Deir-ez-Zor	5.46	5.66	8.00	4.25	4.75	—	5.25	—	4.00	4.00	—	—	6.50	6.50	—	5.25	—	دير الزور	
Sweida	5.51	—	—	—	—	—	6.51	6.00	—	—	—	6.00	6.00	9.60	6.00	6.00	6.00	السويداء	
Dar'a	7.38	7.75	—	8.00	7.50	—	7.00	6.00	8.00	6.00	8.00	6.00	6.00	10.00	8.00	6.00	6.00	درعا	
G. average	7.07	7.24	9.02	6.36	6.39	7.13	6.95	6.63	6.90	6.46	6.73	7.21	6.54	9.82	6.48	6.41	6.20	الوسطى العام	

الحد الأدنى العام للاجر اليومي للعمال الزراعيين بحسب المحافظات لعام ١٩٧٧ (الاجرة بالليرات السورية)

MINIMUM DAILY WAGE FOR UNSKILED AGRICULTURE WORKERS IN MOHAFAZAT 1977 (S.P.)

Mohafaza	الوسطى العام Average M.W.	Dar'a درعا	Deir-ez-Zor السويداء	Hasaka الحسكة	Al-Rakka الرقبة	Aleppo حلب	Idleb ادلب	Lattakia اللاذقية	Tartouss طرطوس	Hama حماة	Homs حمص	Damascus دمشق	المحافظة
Minimum wage	5.91	6.00	6.00	6.00	6.00	6.00	4.00	6.00	6.90	6.00	6.00	8.00	الحد الأدنى العام

APPENDIX TABLE 59: Hourly Wage Rates in Various Mohafaza and by Task

<u>Task</u>	<u>1975</u>		<u>1976</u>			<u>1977</u>
	<u>Damascus</u>	<u>Idleb</u>	<u>Idleb</u>	<u>Aleppo</u>	<u>Lattakia</u>	<u>Dar'a</u>
Furrowing	1.38	2.00	1.72	1.74	--	1.34
Seeding	1.75	1.25	1.14	1.42	1.63	1.24
Reseeding	2.00	1.33	1.13	1.04	1.52	1.63
Thinning	--	1.25	1.08	1.21	--	--
Irrigating	1.45	1.25	1.22	1.18	1.69	1.37
Hoeing	2.08	1.-0	1.17	0.91	1.25	1.13
Weeding	1.68	--	1.00	0.92	--	1.23
Harvesting	1.88	0.69	0.93	1.37	1.25	1.46
Residual Cleaning	1.46	--	0.60	--	--	--
Threshing & Winnowing	<u>2.28</u>	<u>--</u>	<u>--</u>	<u>1.09</u>	<u>--</u>	<u>2.01</u>
AVERAGE	1.77	1.25	1.11	1.09	1.47	1.43

SOURCE: Ministry of Agriculture crop budgets. These wage rates reflect averages of wage rates for each of teh groupings from two to as many as 19 for each of the tasks. Wages are in Syrian Pounds per hour.

APPENDIX TABLE 60: Land Area Planted in 1973 Compared to Number<sup>1</sup>  
of Agricultural Workers in 1970, by Mohafazat

<u>Mohafaza</u>	<u>Planted Area</u> <u>1973</u>	<u>Number of</u> <u>Farm Workers</u>	<u>Planted Area/Worker</u>
Damascus <sup>2</sup>	131,000	69,191	1.9 ha.
Dar'a	137,000	26,694	5.1 ha.
Sweida	99,000	18,182	5.4 ha.
Quneitra	2,000	2,581	0.8 ha.
Homs	273,000	7,286	4.8 ha.
Hama	350,000	87,813	4.0 ha.
Lattakia	85,000	51,968	1.6 ha.
Tartous	127,000	42,914	3.0 ha.
Idleb	286,000	55,120	5.2 ha.
Aleppo	683,000	152,108	4.5 ha.
Hassakeh	664,000	81,802	8.1 ha.
Rakka	437,000	56,769	7.7 ha.
Dier-ez-Zor	<u>123,000</u>	<u>49,095</u>	<u>2.5 ha.</u>
TOTAL	3,397,000	751,519	4.5 ha.

SOURCE: Statistical Abstract, 1974.

1. About 1900 hectares more was planted in 1970 than in 1973, a difference of 0.05% for Syria as a whole. Therefore, the difference by mohafaza is assumed to be small.

2. Damascus City and the rest of the mohafaza were considered together.

APPENDIX TABLE 61: Cultivated Area per Farm Worker by Mohafaza, 1976

<u>Mohafaza</u>	<u>Cultivated Area</u>	<u>Number of Farm Workers</u>	<u>Cultivated Area Per Worker</u>
Damascus	141,076	48,852	2.9 ha.
Dar'a	191,465	16,833	11.4 ha.
Sweida	102,899	10,809	9.5 ha.
Quneitra	17,523	2,507	6.99 ha.
Homs	285,130	42,808	6.67 ha.
Hama	252,316	80,163	4.07 ha.
Ghab*	74,380		
Lattakia	90,582	44,269	2.05 ha.
Tartous	148,826	31,195	4.17 ha.
Idleb	330,014	48,310	6.83 ha.
Aleppo	839,405	97,615	8.60 ha.
Hassakeh	906,590	63,595	14.26 ha.
Rakka	519,231	45,659	11.37 ha.
Dier-ez-Zor	<u>164,520</u>	<u>45,643</u>	<u>3.60 ha.</u>
TOTAL	4,063,957	578,268	7.03 ha.

SOURCE: 1976 Population Census and Annual Agricultural Statistical Abstract 1976

\* This area was added to Hama and the total divided by the Hama population.

APPENDIX TABLE 62: Value of Production per Hectare by Mohafaza, 1977

<u>Mohafaza</u>	<u>Value of Production per Hectare*</u>
Dar'a	861 S.P.
Aleppo	1298 S.P.
Dier-ez-Zor	1826 S.P.
Rakka	827 S.P.
Hassakeh	593 S.P.
Idleb	1380 S.P.
Tartous	1532 S.P.
Damascus	3491 S.P.
Lattakia	3107 S.P.
Hama	2171 S.P.
Quneitra	1223 S.P.
Homs	1872 S.P.
Sweida	<u>807 S.P.</u>
AVERAGE	1321 S.P.

\* This was estimated from production and prices of 22 principal crops and expanded to total hectares by multiplying the percentage these 22 crops constitute of the entire cropped area.



APPENDIX TABLE 63: Value of Production Compared to Number  
Of Workers by Mohafaza, 1977.

<u>Mohafaza</u>	<u>Crop Value</u> (000S.P.)	<u>Crop Value/Worker</u> (S.P.)	<u>Crop Value Plus</u> <u>1/2 Livestock Product</u> <u>Value (000 S.P.)</u>	<u>Value per</u> <u>Farm Worker</u>
Dar'a	132,573	7,876	174,182	10,348
Aleppo	1,096,655	11,234	1,251,554	12,821
Dier-ez-Zor	293,337	6,427	322,527	7,066
Rakka	314,513	6,888	349,845	7,662
Hassakeh	569,180	8,950	614,187	9,658
Idleb	428,337	8,866	458,827	9,498
Tartous	222,620	7,136	259,491	8,318
Damascus	505,218	10,342	574,979	11,770
Lattakia	264,860	5,982	287,411	6,492
Hama	751,005	9,368	827,402	10,321
Homs	469,542	10,969	598,341	13,977
Quneitra	16,362	6,526	21,414	8,542
Sweida	<u>77,188</u>	<u>7,134</u>	<u>93,752</u>	<u>8,665</u>
TOTAL	5,141,139	8,891	5,833,285	10,088

APPENDIX TABLE 64: Projected Increases in Rural Labor Force, 1976-81 and 1981

<u>Age Group</u>	<u>Rural 1976 Population<sup>a</sup></u>	<u>Rural 1986 Population<sup>a</sup></u>	<u>Rural 1986 Population<sup>a</sup></u>	<u>% Labor Particip.</u>	<u>1981 Available Rural Labor</u>	<u>1986 Available Rural Labor</u>
0-4	790,000	-- <sup>b</sup>	-- <sup>b</sup>	0	--	
5-9	692,000	790,000	-- <sup>b</sup>	0	--	
10-14	523,000	692,000	790,000	10.9%	75,428	86,110
15-19	386,000	523,000	692,000	37.2%	194,556	257,424
20-24	278,000	386,000	523,000	34.1%	131,026	178,347
25-29	210,000	278,000	386,000	43.7%	121,486	168,886
30-34	188,000	210,000	278,000			
35-39	184,000	188,000	210,000	54.6%	405,132	469,560
40-44	160,000	184,000	188,000			
45-49	131,000	160,000	184,000			
50-54	101,000	131,000	160,000	73.8%	96,132	118,080
55-59	81,000	101,000	131,000	57.0%	57,570	74,670
60-64	78,000	81,000	101,000	50.0%	40,500	50,500
65-69	65,000	78,000	81,000			
70-74	52,000	65,000	78,000	24.8%	58,280	76,880
75-	80,000	100,000 <sup>c</sup>	120,000 <sup>c</sup>			
TOTAL					1,181,256	1,480,449

a) X10.

b) No projections were made for these age groups as they did not affect the available labor force projections.

c) Assumes the same percentage increase in this age group over the 70-74 age groups as existed in 1976. This thus assumes the death of 32,000 from 1976 to 1981 and 45,000 from 1981 to 1986 in this age group.

APPENDIX TABLE 65: Growth in Rural and Urban Population, 1960-70 and 1970-76

	<u>Rural</u>	<u>Urban</u>	<u>Total</u>
1960 Population	2,880,165	1,689,956	4,565,121
1970 Population	3,563,514	2,741,171	6,304,685
1960-70 Pop. Growth	683,389	1,056,215	1,739,564
% Change 1960-70	23.7%	62.7%	38.1%
Annual Compounded % Change	2.15%	4.99%	3.28%
1976 Pop. Estimate	4,161,355	3,551,830	7,713,185
1970-76 Pop. Growth	597,841	810,659	1,408,500
% Change 1970-76	16.8%	29.7%	22.3%
Annual Compounded % Change	2.62%	4.41%	3.41%

SOURCE: Statistical Abstract, 1977. p.144

APPENDIX TABLE 66: Number and Percentage Unemployment of the Labor Force, Urban and Rural, by Educational Status, 1977

	<u>Urban</u>			<u>Rural</u>		
	<u>Employed</u>	<u>Unemployed</u>	<u>% Unemployed</u>	<u>Employed</u>	<u>Unemployed</u>	<u>% Unemployed</u>
<u>Literate:</u>						
Male	578,530	27,136	4.5%	419,105	19,430	4.4%
Female	78,135	5,409	6.4%	22,439	7,779	25.7%
TOTAL	656,665	32,545	4.7%	441,544	27,209	5.8%
<u>Illiterate:</u>						
Male	190,171	12,595	6.2%	375,004	15,729	4.0%
Female	20,077	1,182	5.6%	210,918	11,069	5.0%
TOTAL	210,248	13,777	6.1%	585,922	26,798	4.4%